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ABSTRACT BOOKLET

THEME HIGHLIGHTS

Nutrition in the Treatment, Management and Prevention of Disease

Higher frequency of fruit and vegetable consumption is associated with greater daily stool weight in adults with constipation. S. Steenson¹, D. Farsi¹, Z. Katsirma¹, D. So¹, O. Bolton¹, V. Rucco¹, A.

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Chronic constipation is a prevalent gastrointestinal condition affecting approximately 10% of the global population⁽¹⁾ and is associated with substantial healthcare costs and quality of life impairments in the UK⁽²⁾. While the aetiology of chronic constipation is not fully understood, lower dietary fibre intake is associated with greater risk of constipation⁽³⁾ and consumption of fruits, vegetables, and wholegrains is recommended within clinical guidelines. Although not diagnostic for constipation, low stool weight is a common feature and is associated with greater risk of colorectal cancer⁽⁴⁾; yet few studies have ever measured stool weight in constipation. This study investigated associations between frequency of plant food intake and stool weight in people with constipation.

Baseline data from a dietary intervention trial were analysed, which included participants meeting Rome IV criteria for constipation. Self-reported data on habitual consumption of nine plant food categories were collected using a validated tool. Participants performed 7-day total stool collection, which was weighed on the same weighing scales at the research centre. Associations between intake frequency for each plant food category and daily stool weight (total stool weight divided by 7 days) were analysed using independent-samples t-tests (SPSS, version 28, $p < 0.05$ considered significant).

Ninety-nine people with Rome IV constipation (89% female; mean [\pm SD] age 32.4 [\pm 12.4] y; BMI 23.0 [\pm 3.2] kg/m²) provided 7-day total stool collections. Mean (\pm SD) stool weight was 72.5 \pm 47.2 g/day (minimum 2.1 g/day; maximum 280.6 g/day). Stool weight was significantly higher among those consuming fruit once or more per day (86.2 \pm 48.2 g/day), compared with those consuming fruit less than once per day (62.4 \pm 44.1 g/day; $p = 0.012$). Stool weight was also higher among those consuming vegetables once or more per day (98.6 \pm 59.1 g/day) compared with those eating vegetables less than once per day (62.2 \pm 37.2 g/day; $p < 0.001$). Differences for green salad (79.6 \pm 52.1 g/day; 63.3 \pm 38.5 g/day; $p = 0.088$) and high-fibre breads (84.1 \pm 46.6 g/day; 65.1 \pm 46.6 g/day; $p = 0.05$) were borderline significant, when comparing those consuming these more than once per week, compared with once or less per week (respectively). No significant differences were found for frequency of consuming fruit juices, potatoes, vegetable soups/stews, high-fibre cereals, or beans and lentils.

This is the most comprehensive analysis to date of measured stool weight in constipation, and its association with plant food intake. Despite presence of constipation, participants with higher intakes of fruit and vegetables had a greater daily stool weight; an important feature associated with lower colorectal cancer risk⁽⁴⁾. However, intakes were not sufficient to manage their constipation symptoms. Intervention studies investigating potential benefits from increasing fruit and vegetable intakes in people with constipation are required and are currently underway.

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Food Systems

LIFE Climate Smart Chefs; An Analysis of the Impact of Recipe Reformulation on Environment and Nutrition to Support Sustainable Menu Design (Editions 4 to 6). L. Geaney^{1,2}, H.Stack¹, A.

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The rate of climate change has significantly increased over the last decade, with 2023 reported as the warmest year on record ⁽¹⁾. Human activities contribute significantly to greenhouse gas emissions (GHGe) and environmental degradation ⁽¹⁾ with food production and consumption contributing up to 37% of global emissions ⁽²⁾. Recognising the power of food service, and food choices, is crucial in addressing these environmental challenges ⁽³⁾. Data on the impact that reformulation has on reducing environmental impact is required to ensure evidence based strategy development and data based decision making. The LIFE Programme Climate Smart Chef (CSC) project aims to engage chefs to promote low-emission, nutritious diets aligned with EU Climate Policy and the Farm to Fork (F2F) Strategy. It targets improved public health, reduced environmental impact, and food waste ⁽⁴⁾. Under this project, a digital environmental impact tool 'Foodprint' was developed by Nutritics. This study aims to analyse the nutritional content and environmental impact of original and reformulated recipes entered by chefs who completed training between July and October 2023.

Chefs were required to enter their recipes, undertake training on sustainable menu design and subsequently reformulate their recipes using Foodprint as a post training exercise. 200 recipes were created by the chefs (100 original; 100 reformulated). Nutritics software was used for the analysis, with the LIFE Su-Eatable LIFE database on carbon and water selected for use in the Foodprint tool. The impact of reformulation on nutrition, carbon and water was analysed using SPSS V29.

For the environmental analysis, reformulating the recipes had significant reductions in carbon emissions (P= 0.002), (Average -51.18%; Range -6.66 -0.96 kg CO₂eq), water footprint (P= 0.278), (Average -46.63%; Range -17839L to 4035L). For the nutrition analysis, reductions were also observed for sugar (P = 0.001), (Average -9.42%; Range -16.40g to +24g), salt (P= 0.233), (Average -12.57%; Range -5.42g to +1.80g), and saturated fat (P= 0.043) (Average -39.77%; Range -34.90g to +12.20g).

Reformulation resulted in decreased environmental impact, and improved nutrition. This study gives a quantitative indication of how reformulating menus can reduce carbon, while improving the nutrient profile of food offerings. This research contributes valuable insights into the use of software to reformulate menus, the complex impact of recipe reformulation, and its potential to positively impact both health and environmental sustainability. This research indicates the potential of menu reformulation in advancing sustainability goals and promoting healthier food choices. Future analysis should analyse cost, additional environmental impacts, serving size, and demographic analysis to provide more in-depth analysis.

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Nutrition and Optimum Life Course

The influence of fish consumption on the omega 3 index in low fish consuming women of childbearing age: findings from the iFISH study. James E. McMullan¹, Marie C. Conway¹, Alison J. Yeates¹, Philip J. Allsopp¹, Maria S. Mulhern¹, Edwin van Wijngaarden², J.J. Strain¹, Emeir M. McSorley¹ 1. Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine BT52 1SA, Ireland and 2. School of Medicine and Dentistry, University of Rochester, Rochester, USA.

The n-3 polyunsaturated fatty acids (n-3 PUFA), eicosapentaenoic acid (EPA; 20:5n-3) and docosahexaenoic acid (DHA; 22:6n-3), are known for their beneficial roles in regulating inflammation⁽¹⁾. The omega 3 index (O3I) refers to the percentage of EPA+DHA within the erythrocyte membrane with respect to total fatty acids and is a recognised biomarker for cardiovascular disease⁽²⁾. An O3I >8% is proposed to confer the greatest level of cardioprotection⁽²⁾. Fish is the richest dietary source of n-3 PUFAs and has been noted as one of the main predictors of a higher O3I⁽³⁾. Current UK dietary guidelines recommend the consumption of two portions of fish per week; albeit the efficacy of these recommendations in raising the O3I is unknown⁽⁴⁾. The aim of this study was to investigate the influence of consuming two portions of fish per week on the O3I amongst low fish consuming women of childbearing age.

Data were analysed from the iFish study⁽⁵⁾, an 8-week randomised controlled trial where low fish consuming women, were randomly assigned to consume either no fish (n=18) or 2 portions of tuna (n=8) or sardines (n=9) per week. Total n-3 PUFA concentrations of the fish provided in the intervention were 6.47g/100g for sardines and 4.57g/100g for tuna. Fasting blood samples were collected at baseline and post-intervention. The O3I was determined in red blood cells in the control and two portions of fish groups by OmegaQuant Europe. Analysis of covariance, adjusting for age, BMI, and baseline O3I, examined the effect of the fish intervention on the O3I. Chi-square test was used to compare the O3I between groups when categorised as at risk (<4%), intermediate risk (4-8%) and low risk (>8%).

Participants had a mean±SD age of 25.5±6.4 years. Baseline median (IQR) O3I of the cohort was 5.7 (5.2, 6.7) %. There was no significant difference in the O3I between treatment groups at baseline. Consumption of two portions of fish significantly increased the O3I when compared to the consumption of no fish [6.73 (5.41, 7.38) % vs 5.58 (5.12, 6.49) %, respectively, $p=0.034$]. Those consuming two portions of sardines, an oily fish high in n-3 PUFAs, had a significantly greater O3I when compared to those consuming two portions of tuna [7.38 (6.83, 8.37) % vs 5.61 (5.29, 6.79) %, respectively, $p<0.001$]. Post-intervention, the proportion of participants in the low risk O3I category (>8%) was greater in the two portions of fish group when compared to the control group; albeit this did not reach statistical significance ($p=0.104$).

In support of the current dietary guidelines, increasing fish consumption of low consumers to two portions of any fish per week will increase the O3I. Future research should determine the potential cardioprotective properties of a higher O3I as a result of consuming fish.

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Novel Nutrition Research Methodologies and Technologies

Identifying Foods within the UK diet that are rich sources of the micronutrient Queuosine (Q).

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Queuosine (Q) is a vital micronutrient crucial for protein translation and cellular function in humans. Deficiencies of Q have been linked to chronic illnesses, such as inflammatory bowel disease, neurodegenerative diseases, and various cancers. Human requirements for this micronutrient have not yet been established. Thus far, there has been no systematic investigation of the human diet to understand typical intakes. It is necessary to measure the levels of Q metabolites in commonly consumed foods to identify the richest dietary sources and determine Q intake. Only then can its role in human health and disease be established.

This study aimed to comprehensively analyse Q distribution in the UK diet by quantifying it in foods, identifying rich sources, and ultimately, enabling the design of dietary intervention studies assessing Q absorption/bioavailability.

Data from the UK National Diet and Nutrition Survey (NDNS 5Y) were processed to identify the most frequently consumed foods in 31 main categories, reflecting the dietary habits of >99.5% of UK consumers. Extraction techniques were developed, including a methanol-based method for extracting free Q metabolites and a specialized approach for isolating tRNA-bound Q metabolites from various food matrices. Quantitative LC-MS/MS (SCIEX 5500+) was utilized to accurately measure queuine (q), Q, Q monophosphates (QMPs), and Q precursor (PreQ1) in food samples. These values were summed to determine Total Q levels. Additionally, four-day food diary data from 93 participants in the Northern Ireland Dietary Assessment Study (NIDAS) were analysed to determine the average daily consumption of Q metabolites in adults. Dairy sources were considered promising, so five commercial probiotic yoghurt brands were compared side-by-side.

Q metabolite levels varied significantly across various food types. Total Q metabolite levels in foods ranged from 0.05ng/g to 80ng/g, with a mean level of 20ng/g. The calculated Q consumption of participants in NIDAS ranged from nil/day in some individuals to 170µg/day in others, with a typical mean intake of 18µg/day. The mean amounts (ng/g) of Total Q metabolites (tRNA-bound + free) measured in food categories were dairy 57.2±9.7, meat 20.1±9.9, poultry 4.9±4, and plant-based milk 15.3±10, fruits 2±1.3, vegetables 5.3±2.8, starchy foods 2.2±0.7. Dairy products emerged as significant sources of Q metabolites based on these findings. Concentrations observed in short-listed probiotic yoghurts ranged from 32 to 352 ng/g.

This study determined typical Q intakes and is the first to identify Q-rich food sources in the UK diet. The highly Q-enriched probiotic yoghurt products could be used in controlled dietary intervention studies to assess Q absorption/bioavailability and this micronutrient's role in human health and disease.

Acknowledgments

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OC01. Periconception folic acid supplement use in Northern Ireland: A longitudinal analysis of maternity healthcare data 2015-2020. E.H. Cassinelli¹, M.C. McKinley¹, L. Kent¹, K.-A. Eastwood^{1,2}, D.A. J. M. Schoenaker^{3,4,5} and L. McGowan¹ 1. Centre for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast (United Kingdom) and 2. University Hospitals Bristol NHS Foundation Trust, Bristol (United Kingdom) and 3. School of Human Development and Health, Faculty of Medicine, University of Southampton, Southampton (United Kingdom) and 4. MRC Lifecourse Epidemiology Centre, University of Southampton, Southampton (United Kingdom) and 5. NIHR Southampton Biomedical Research Centre, University of Southampton and University Hospital Southampton NHS Foundation Trust, Southampton (United Kingdom).

Folic acid supplement use is involved in the prevention of neural tube defects, the most common major malformations of the central nervous system⁽¹⁾. Women with childbearing potential are advised to take supplements containing 400mcg/day of folic acid in the period preceding pregnancy until the 12th week of pregnancy, while some women (e.g., women with obesity) require a higher dose of 5mg/day⁽²⁾. Despite these public health recommendations, there is limited translation to folic acid supplement use behaviours⁽³⁾. In Northern Ireland, data on women's self-reported periconception folic acid supplement use can be accessed via the Northern Ireland MATernity System. Using this dataset, the current study reports trends of periconception folic acid supplement use (2015-2020), exploring differences based on women's age, deprivation, pregnancy planning, gravida, and body mass index (BMI) at their antenatal booking appointment.

R, accessed via the UK Secure eResearch Platform, was used to calculate yearly proportions of self-reported periconception folic acid supplement use. To comply with disclosure controls, only complete cases were retained for analyses. When necessary, years were combined (e.g., instead of yearly prevalences, data on BMI was analysed in 2015-2016, 2017-2018, and 2019-2020) and numerical restrictions were applied (e.g., BMI was restricted to values between 14-70kg/m²). Patient and Public Involvement and Engagement strategies were adopted throughout the study.

Analyses included 132,205 pregnancies. Under a third of pregnancies were primigravida (30.90%), and less than half of pregnancies were conceived by women with a BMI within the healthy range (44.75%). In most cases (58.96%), folic acid supplement use was initiated after, rather than before, conception. Preconception supplement use of 400mcg of folic acid declined between 2015 and 2020 (34.40%-30.03%) and was especially low in young women (i.e., <25 years old), women living in the most deprived areas, and women who did not report planning their pregnancy. Although postconception supplement use of 400mcg also declined, trends exhibited a slight increase in the last year (2019: 51.38%; 2020: 53.94%). Preconception and postconception use of supplements containing 5mg of folic acid increased throughout the study period (3.57%-4.98% and 4.02%-7.67%, respectively). The most notable increase was observed among women with obesity, especially those with BMI \geq 40kg/m² (preconception: 8.31%-15.70%; postconception: 23.05%-37.97%).

Overall, these analyses of routinely collected maternity data indicate that folic acid supplement use before pregnancy remains suboptimal in Northern Ireland. The use of higher-dose supplements (5mg/day) is increasing for specific population groups, but it remains at a concerning low level particularly in the preconception period. Although based on women's self-reported folic acid supplement use, these findings can provide valuable insights for policymakers and healthcare professionals, informing the development of future interventions and campaigns. These may include long-term awareness-raising initiatives and preconception support for all women, especially at-risk groups.

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Student Competition

OC02. Can dietetic-led nutrition education sessions lead to a change in midwifery practice? G

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Good maternal nutrition is vital for positive pregnancy outcomes. However, midwives report a lack of confidence and skills regarding advising pregnant women about diet and weight during antenatal care ⁽¹⁾. Research has shown that the delivery of nutrition education sessions for midwives can improve their knowledge and skills ⁽²⁾, but there is no evidence that this leads to a change in practice. The aim of this study was to evaluate a series of nutrition education sessions for student midwives, delivered by a dietitian, to determine if it is likely to lead to a change in practice.

Final year student midwives (n=33) were recruited during a final taught nutrition session at their university. They were asked to provide free-text feedback on anonymous post-it notes regarding their thoughts and feelings as to whether the taught nutrition sessions were likely to result in a change in their midwifery practice. The comments were collated and analysed thematically.

Three main themes were identified: 1) Nutrition as a priority 2) Personalised Nutrition 3) Sources of information and signposting.

Most students commented that they now viewed maternal nutrition as '*important*' and intended to prioritise discussions about nutrition in their future practice. They realised that messages needed to be personalised "*It has made me aware to tailor advice to different women.*" They also appreciated that signposting women to reliable sources of information or other health professionals helped to support '*evidence-based practice,*' and was an important part of their role: "*The additional resources and signposts were really helpful.*"

The results from this convenience sample of student midwives indicates promising findings that the taught nutrition sessions are likely to result in a positive change in practice. UK antenatal guidelines state that midwives should discuss nutrition, diet, and vitamin supplementation at booking-in appointments ⁽³⁾, but earlier research suggests that this rarely happens ⁽¹⁾. Nutrition education which is delivered by a dietitian and focuses on case studies and care pathways, appears to have empowered student midwives to consider incorporating some of this applied knowledge and advice into their practice.

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OC03. Women's experience of body weight management during and post-pregnancy: a mixed methods approach. R. Nolan¹, A.M. Gallagher¹, A.J. Hill¹ 1. Nutrition Innovation Centre for Food and Health, School of Biomedical Sciences, Ulster University, Coleraine, Northern Ireland.

Optimal gestational weight gain (GWG) during pregnancy is required for healthy foetal growth, however excessive GWG has been linked with adverse effects including increased risk of caesarean delivery and postpartum weight retention⁽¹⁾. Currently no UK GWG guidelines exist, and women are not routinely weighed throughout pregnancy; consequently, women's understanding of GWG remains poor⁽²⁾. The aim of this study was to explore factors influencing weight change during and post-pregnancy, plus identify potential opportunities that could help women manage weight during this period.

Women aged 18-45 years-old who had a full-term, singleton, uncomplicated pregnancy within the last 3 years were recruited from mother and toddler groups, advertising on social media platforms and a university-wide email sent to staff and students. 108 eligible women completed the online questionnaire, between April and June 2023, on their experience regarding changes in body weight during and post-pregnancy. Follow on focus groups were then conducted within the same population. 4 focus groups with 2-5 participants per group and a 1-2-1 interview (n=13 participants) were conducted online between September and October 2023, using a semi-structured topic guide. Discussions ranged between 32 to 90 minutes (average 59 minutes), were audio recorded, transcribed verbatim and thematically analysed⁽³⁾ using NVivo12 software, with each theme being assigned to one level of the ecological model⁽⁴⁾. Ethical approval was granted by Ulster University's Research Ethics Committee.

Respondents reported in the online questionnaire, they did not receive enough information around weight management during (81.5%) and post-pregnancy (86.1%). Barriers to managing weight during and post-pregnancy were identified at each level of the ecological model. At the intrapersonal level (n=4 themes), namely: changes in diet (convenience foods/ snacks), priorities (priority on the baby), lack of knowledge (not aware of adverse effects) barriers to physical activity (tired). At the interpersonal level (n=3 themes), namely: lack of time (parity, working mum), conflicting advice (friends and family), lack of support (lack of support at appointments). At the environment and society level (n=3 themes), namely: COVID-19 pandemic (amenities closed), location (rural communities), societal expectations. At the institutional and policy level (n=1 theme), namely: system failing (lack of follow-up care). Potential strategies to help manage weight were also identified, at the intrapersonal level (n=1 theme), namely: need for further information (components of GWG), interpersonal level (n=1 theme), namely: support groups. At the environment and society level (n=1 theme), namely: messaging (realistic expectations), institutional and policy level (n=2 themes), namely: regular weighing, and further follow-up care.

In conclusion, mothers report receiving insufficient information around weight management, with barriers identified at each level of the ecological model highlighting that support is needed on multiple levels during and post-pregnancy, with potential strategies identified to assist mothers which informs future studies.

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Student Competition

OC04. Vitamin D intakes and food sources in breastfeeding women in Ireland: findings from the WellFed study. M. Ali¹, B. Murphy¹, F. O'Dwyer¹, M. Sanecka¹, S. O'Reilly¹ and A. O'Sullivan¹. UCD Institute of Food & Health, University College Dublin, Belfield, Dublin 4, Ireland.

Limited sunshine and dietary vitamin D make vitamin D deficiency very common in Ireland. Breastfeeding is the universal recommendation and supplies the best combination of nutrients and bioactive factors for all infants⁽¹⁾. However, maternal diet and nutrition status impacts concentrations of certain nutrients in breastmilk and therefore vitamin D concentrations can be lower than recommended for infants^(2, 3). This study aimed to determine the vitamin D intakes and food sources of breastfeeding mothers in Ireland.

Data was collected as part of the WellFed study, a 4-week randomised control trial investigating the effectiveness of a food supplement containing a protein hydrolysate and beta glucan (Wellmune®) during lactation on immune and gut health (LS-23-07-O'Sullivan). Participant vitamin D intakes were assessed using FoodBook24 self-completed 24-hour recalls. Foods were grouped into food groups to determine their contribution to intake as well as the contribution from natural and added vitamin D foods. Data was analysed using IBM SPSS Statistics (version 27).

Dietary analysis of 45 participants indicated that maternal vitamin D intakes were low ($6.4 \pm 4.6 \mu\text{g}/\text{day}$). Most participants (96%) did not meet the $15 \mu\text{g}/\text{day}$ recommendation, despite 56% of participants reporting they consumed some form of vitamin D supplement. Natural vitamin D foods like eggs and egg dishes, fish and fish products, meat and meat products and foods with added vitamin D including breakfast cereals, beverages, and milk and yoghurt were the key food groups contributing to intake, with the majority coming from natural food sources.

Low dietary vitamin D intake is common among breastfeeding women and diet alone is insufficient to achieve the daily vitamin D requirements even when supplements are consumed. As natural food sources of vitamin D are limited and infrequently consumed, recommendations to consume more vitamin D foods may not be successful as a standalone strategy to improve vitamin D status. A combination of approaches including the promotion of vitamin D rich food consumption, supplementation strategies, and the introduction of food fortification policies may be a feasible method for improving vitamin D across the population.

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Student Competition

OC05. Outcomes of children's cooking programs: a systematic review of intervention studies.

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Children's cooking programs have been linked to increased cooking frequency and positive dietary outcomes ^(1,2). A systematic review on children's cooking interventions with a control group, in a variety of settings, on all age groups has not yet been conducted. Thus, we aimed to examine the effects of children's participation in published cooking interventions on their cooking skills, food acceptance, and dietary behaviors; and the quality of the scientific evidence.

Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, two independent electronic searches across six databases were conducted to identify cooking-focused interventions with comparison groups among participants aged up to 18 years old, published in English, between 2017 and 2022. Studies were assessed on quality using the Academy of Nutrition and Dietetics Evidence Analysis Library quality criteria checklist.

Among 1104 articles identified, 23 met inclusion criteria and described main results for distinct interventions. Interventions varied in participant age, settings, cooking sessions and program length. Knowledge of cooking skills, self-efficacy and involvement were the most frequent positive outcomes; improvements in dietary intake were rarely achieved. Seven studies were highly rated for research quality.

Lack of assessment standardization, variability in program characteristics, and insufficient intervention description made it difficult to discern best practices for children's cooking programs. Improvements in intervention development and measurement instruments are needed. Interventions that include hands-on cooking lessons seem promising in improving knowledge and self-efficacy, however, further exploration is needed on the factors that make cooking programs successful long-term, while considering age and gender.

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OC06. UK secondary school pupils' perspectives of interventions to encourage healthier food and drink choices in the school environment. A. Roberts¹, L. McSweeney¹, E. Evans², F. Hillier-Brown¹ and S. Spence¹ 1. *Human Nutrition and Exercise Research Centre, Population Health Sciences Institute, Faculty of Medical Sciences, Newcastle University, Newcastle Upon Tyne, UK* and 2. *Department of Psychology, Durham University, Durham, UK.*

The school food and drink environment offers opportunities to improve pupils' food and drink choices, with school food accounting for up to 30% of pupils' dietary intake⁽¹⁾. School canteens are often overcrowded and chaotic, which may lead to pupils choosing less healthy but quicker options. Interventions aiming to improve adolescents' dietary behaviours have been conducted but usually lack adolescent involvement and can have limited impact on pupils' dietary choices⁽²⁾. Pupil involvement in design and development may lead to more acceptable interventions⁽³⁾. The aim was to explore potential interventions with secondary school-aged pupils focused on key areas of the school food and drink environment.

A total of three North East England secondary schools were recruited based on pupil eligibility for free school meals and index of multiple deprivation. Approximately eight pupils (aged 12 – 13) were recruited per school to participate in three focus groups. Consent was collected from parents and pupils. In focus group one, pupils prioritised areas within the school food and drink environment for potential interventions. In focus group two, pupils explored what these interventions might comprise. Finally, pupils reviewed the acceptability, sustainability, and feasibility of their interventions. Thematic analysis using a coding framework was used to analyse data.

Ethical approval was granted by Newcastle University Ethics Committee, reference number: 2402/24272/2021.

Across the three schools, twenty-two (m = 9; f = 13) pupils participated in the focus groups. Preliminary analysis revealed the inability for pupils to eat their school lunch outside was a key area for improvement. Pupils felt that with dedicated areas to eat outside, they would have more time to eat and not rely on convenient options. Incorrect menus in the canteen also meant pupils did not know what they could select and instead chose the same, often less healthy options. Pupils wanted posters in the canteen to promote the available healthier options previously used in nudge-based interventions. School food and drink were usually considered poor value for money due to high prices and perceived poor quality of school food compared to what is available outside of school. Pupils felt that introducing meal deals or food-based rewards for healthier options would encourage higher consumption due to them being perceived as better value for money.

Prioritised areas and interventions within the school food and drink environment were school-specific. Before interventions are conducted in schools, further understanding of the school context and whether interventions are appropriate are needed. Further work exploring continued project development, including further pupil and school staff input to explore intervention feasibility is required.

Acknowledgements

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Student Competition

OC07. The Food-NEWS Project: How children and adolescents experience nutrition education and food messaging in today's food environment. A. Moorhead¹, F. Quigley¹, R. Price², L. Hollywood³, A.M. Gallagher⁴, E. Mooney⁵ and A. McCloat⁵ 1. School of Communication & Media, Institute for Nursing and Health Research, Ulster University, Belfast, Northern Ireland and 2. School of Biomedical Sciences, Northern Ireland Centre for Food and Innovation (NICHE), Ulster University, Coleraine, Northern Ireland and 3. Ulster Business School, Ulster University, Belfast, Northern Ireland and 4. School of Biomedical Sciences, Northern Ireland Centre for Food and Innovation (NICHE), Ulster University, Coleraine, Northern Ireland and 5. National Centre of Excellence for Home Economics, School of Home Economics, Atlantic Technological University, Angelas College, Sligo, Ireland.

Food literacy is a valuable life skill, and developing these skills early in life is shown to have a positive association with cooking attitude and behaviours, health and diet quality in later life^(1,2). There is a plethora of food messaging available for children and adolescents but little evidence on which strategies are effective and why^(1,2). As part of a larger research programme funded by safefood, the current study explored the experiences, perceptions and attitudes of children (4-11yr) and adolescents (12-18yr) on existing models and approaches on food and nutrition education, and food messaging on the island of Ireland.

This research was based on qualitative methodology with friendship pairs with children and focus groups with adolescents to obtain their experiences, perceptions, and attitudes on existing models and approaches on food messaging. Data were collected to reflect different groups in terms of social class, age, region and rural/urban. Recruitment and data collection were completed in schools on the island of Ireland. Data were analysed using thematic analysis⁽³⁾. Ethical approval was obtained.

Using data from 12 friendship pairs (n=10 males, n=14 females; mean age 8 (SD2.0)yr) and 6 focus groups (n=16 males, n=30 females, mean age 15 (SD1.6)yr), three overarching themes were identified, namely (1) *"Food messages that made the most impact"*, (2) *"Food messaging through surveillance and monitoring"*, and (3) *"Ideas to improve food messaging"*. Overall, children and adolescents reported mixed experiences, perceptions and attitudes to food and nutrition education, and food messaging. They recalled food messages from social media, schools, sports coaches and family, with the most impact included an element of fun and practical components, such as cooking, tasting and gardening, being most memorable. They had an awareness and a basic knowledge of nutrition and food messaging, such as *"you need to drink more water if you are exercising"*, *"eat vegetables with this meal as you've had enough pizza this week"*, *"that's too much sugar"*, and *"we only have treats in our lunch boxes on Fridays"*. There was an indication that social media such as YouTube, Instagram and TikTok, presents both potential harms and potential benefits on the attitudes to and knowledge of nutrition, and subsequent dietary behaviours among children and adolescents.

This study found that children and adolescents had mixed experiences, perceptions and attitudes to food and nutrition education, and food messaging. Although children and adolescents may be aware of the healthy eating guidelines, there appears to be a disconnect in translating into practical everyday use. Food and nutrition education, and food messaging for children and adolescents needs to be communicated with simple clear messages, consistently with repetition using practical and fun methods in partnership with schools, and families, taking account of the harm/benefit potential of social media.

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OC08. Using school food purchase data as a method to assess food group and nutrient intakes in secondary school-aged pupils. *J. Bradley¹ and S. Spence¹* 1. *Human Nutrition and Exercise Research Centre, Population Health Sciences Institute, Faculty of Medical Sciences, Newcastle University, UK.*

Obtaining data on pupils' school food intakes often relies upon self-reported dietary assessment methods, which can be subject to reporting errors⁽¹⁾. Online tools offer an engaging, streamlined method, however reporting errors still exist. Furthermore, gaining access into schools to conduct research is challenging⁽²⁾. School food purchase data may offer an alternative approach. Objective data on individual-level school food purchases can be obtained for the whole school day owing to cashless canteens. The use of school food purchase data as a method to assess dietary intakes in secondary school pupils warrants exploration. The aims of the study were to assess the information available in school food purchase data and explore its potential in assessing food group and nutrient intakes.

Individual pupil-level purchase data was obtained from five secondary schools over a four-week period. Following data cleaning and manipulation in excel and Stata v18, the proportion of food and drink items that were assigned an Intake24 food group and linked to a UK Nutrient databank code(s) was calculated.

Ethical approval was obtained from the Faculty of Medical Sciences Ethics Committee, Newcastle University (ref: 2482/26614). Data protection impact assessment was created to ensure efficient transfer of data.

The data captured school food purchases in 3466 pupils; this equated to approximately 80% of total pupils purchasing at least one item at school across the four-week period. A total of 119125 purchases were made by pupils. There were 367 different food and drink item descriptions. Ninety-two percent ($n=338$) of these were able to be assigned to a food group, for example 'veg/salad' and 'hot meat baguette'. This accounted for 82% ($n=97821$) of total purchases. Of these, 258 food and drink items (60% of total purchases) contained enough information for a nutrient code to be assigned, for example 'flapjack' and 'Radnor Fizz drink'.

Eight percent ($n=29$) did not have enough information to assign either a food group or nutrient code. These included items such as 'Main Dish' and 'Packed Lunch Deal'. These accounted for 18% ($n=20954$) of total purchases across the four-week menu cycle.

Pupil-level purchase data is a novel and feasible approach to obtaining objective food intake data on a large scale, maximising generalisability of findings. Obtaining intake data on >3000 pupils in a short time frame would be unachievable using traditional dietary assessment methods. There are some limitations in the use of pupil purchase data to assess pupils' nutrient intakes, for example, missing portion size information. However, the use of average portions warrants investigation. Future work to compare purchases with self-reported data to assess agreement with validated dietary assessment methods is required.

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OC09. A photovoice study exploring perceptions of healthy eating, nutrition and healthy ageing in older Black African adults in the United Kingdom. S.D. Amenyah¹, H. Osei-Kwasi², J. Adjei¹, L. Bradley¹, L-A Fenge¹ and J.L. Murphy¹. 1. Faculty of Health and Social Sciences, Bournemouth University, Bournemouth, UK and 2. School of Sports, Exercise and Health Science, Loughborough University, UK.

A healthy diet is a key determinant of healthy ageing⁽¹⁾. Research indicates that individuals from Black African communities (both born in the UK and migrants communities) often have bicultural dietary patterns including both Westernised and African dietary practices⁽²⁾. While this is known for the general Black African adult population, there remains a dearth of research on older African adults who may experience a complex nutrition landscape owing to an interplay of perceptions of healthy/unhealthy diets, social and cultural factors which can have negative outcomes for nutrition and health in later life. The aim of this study was to explore perceptions of eating well and healthy diets as determinants of inequalities in nutrition and healthy ageing in older African adults.

A mixed methods cross-sectional study was conducted in older Africans, ≥ 55 years in the UK. Qualitative data was collected using Photovoice⁽³⁾, an innovative visual, community-based participatory research (CBPR) method whereby participants take photographs to document, reflect upon health and social issues from their own perspective. As a research method, photovoice provides an alternative to the traditional barriers and enablers approach to understanding complex health challenges and is suited for use for populations who have been disenfranchised by traditional research methods⁽⁴⁾. A purposive sample of 12 participants were provided with cameras and encouraged to take photos describing what they considered as healthy and unhealthy food and thoughts on eating well and older adult's health. Semi-structured interviews were conducted to gain insights into the photos. Thematic analyses using both deductive and inductive approaches of photos and transcripts were conducted to develop and refine emerging themes using a framework.

Participants were 62 ± 5.4 years and, 75% female. The majority were married (58.3%), living with family (41.7%), educated to postgraduate degree level (50.0%) and fulltime employed (66.7%). Emerging themes around healthy eating included variety and dietary diversity, organic foods, traditional foods, plant-based foods and healthy cooking methods. Themes around unhealthy food included ultra-processed foods, take-out foods, appearance, preservatives and consuming fats and oils. Hydration, social eating, accessing health and dietary advice, eating food that meets ageing needs, nostalgic eating and physical activity were the key themes that emerged around eating well and older adults' health.

This research provides new insights on perceptions of healthy eating among older African adults using photovoice, a novel participatory research method. The findings contribute to a better understanding of perceptions of healthy diets as a determinant influencing nutrition and healthy ageing in older African adults. There is a need for further research to understand i) how these perceptions influence dietary intake and ii) the complex interactions in nutritional knowledge, tradition, cultural and social factors to inform the design of effective community-based nutrition intervention tailored to ethnic identity of older African adults.

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OC10. Identifying the Relation between Food Groups and Biological Ageing; a Data-driven Approach. Ynte Biemans¹, Daimy Bach¹, Pariya Behrouzi², Steve Horvath^{3,4,5}, Charlotte Kramer¹, Simin Liu⁶, JoAnn Manson⁷, Aladdin H. Shadyab⁸, James Stewart⁹, Eric Whitset^{9,10}, Bo Yang¹¹, Lisette de Groot¹ and Pol Grootswagers¹ 1. Division of Human Nutrition and Health, Wageningen University and Research, Wageningen, Netherlands and 2. Biometris, Mathematical and Statistical Methods, Wageningen University and Research, Wageningen, Netherlands and 3. Department of Human Genetics, David Geffen School of Medicine, University of California, Los Angeles, USA and 4. Altos Labs, San Diego Institute of Science, San Diego, CA, USA and 5. Department of Biostatistics, Fielding School of Public Health, University of California, Los Angeles, USA and 6. Department of Epidemiology and Center for Global Cardiometabolic Health, School of Public Health; Departments of Medicine and Surgery, Alpert School of Medicine, Brown University and 7. Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA and 8. Herbert Wertheim School of Public Health and Human Longevity Science, University of California, San Diego, La Jolla, CA, USA and 9. Department of Epidemiology, Gillings School of Global Public Health, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA and 10. Department of Medicine, School of Medicine, University of North Carolina, Chapel Hill, NC, USA 11. Department of Epidemiology, Brown University.

Heterogeneity in ageing rates drives the need for research into lifestyle secrets of successful agers (1). Biological age, predicted by epigenetic clocks, has been shown to be a more reliable measure of ageing than chronological age. Dietary habits are known to affect the ageing process. However, much remains to be learnt about specific dietary habits that may directly affect the biological process of ageing. The objective was to identify food groups that are directly related to biological ageing, using Copula Graphical Models.

We performed a preregistered analysis of data collected from 3,990 postmenopausal women from the Women's Health Initiative. Biological age acceleration was calculated by the epigenetic clock PhenoAge using whole-blood DNA methylation. Copula Graphical Modelling, a powerful data-driven exploratory tool, was used to examine relations between food groups and biological ageing while adjusting for an extensive amount of confounders, namely all other factors in the dataset, including demographic and lifestyle information and all other food group and energy intake. Two food-group – age acceleration networks were established; one based on the MyPyramid food grouping system, and another based on item-level food group data.

Intake of eggs (96% certainty), organ meat (97%), sausages (95%), cheese (96%), legumes (97%), starchy vegetables (100%), added sugar (97%), and lunch meat (97%), was associated with biological age acceleration, while intake of peaches/nectarines/plums (99% certainty), poultry (96%), nuts (96%), discretionary oily and solid fat (99%) was associated with slower biological ageing.

We identified several associations between specific food groups and biological ageing. These findings pave the way for subsequent studies to confirm causality and magnitude of these relationships, thereby improving the understanding of biological mechanisms underlying the interplay between food groups and biological ageing.

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OC11. Dietary patterns in ethnic minority groups: data analysis of vegetable intake from 'Understanding Society' (the UK Household Longitudinal Study). M. Demashkieh¹, R. Hardy¹, P. Shah², B. Ellahi³, S. Amenyah², H. Osei-Kwasi¹, L-A Fenge², R. Vijayakumaran², J.L. Murphy². 1. School of Sports, Exercise and Health Science, Loughborough University, UK and 2. Faculty of Health and Social Sciences, Bournemouth University, Bournemouth Gateway Building, Bournemouth, UK and 3. Faculty of Health, Medicine and Society, University of Chester, UK.

The UK population is ageing and becoming more ethnically diverse⁽¹⁾. Nutrition is a key modifiable determinant of healthy ageing but there is little published data of dietary patterns in ethnic minority groups. The reasons for poor dietary habits of older adults from ethnic minority groups could be attributed to cost of living, language barriers, age, availability of traditional foods⁽²⁾. As part of a larger research study to improve nutritional health in older adults (TANGERINE: nuTritional heAlth aNd aGeing in oldER ethnIc miNoritiEs), the aim of this study was to investigate vegetable intake in different older ethnic groups compared with a white (British) reference population.

We used food frequency questionnaire (FFQ) data drawn from Wave 2 (2010-2012) and Wave 13 (2021-2022) of Understanding Society, a UK household panel survey⁽³⁾. We calculated the proportions of vegetable intake by ethnic group for each wave, weighted for population representativeness, and used (weighted) logistic regression for intake (everyday vs less than every day) to adjust for potential confounders. Data from the WHO food insecurity questionnaire in wave 13 was used to evaluate the ethnic group differences in food insecurity.

The percentage vegetable intake at least every day was reduced between Waves 2 and 13 in all ethnic groups. At both Waves all ethnic groups, except Indian ethnicity have lower vegetable intakes than white (British) reference group. The age and sex adjusted odds ratios (OR) (95% confidence intervals) at Wave 2 were 0.60 (0.51, 0.71) for Caribbean, 0.67 (0.56, 0.79) for African, 0.36 (0.28, 0.44) for Pakistani, 0.78 (0.62, 0.98) for Bangladeshi and 1.10 (0.94, 1.28) for Indian. The differences could be largely explained by lower income and greater area deprivation for Bangladeshi, less so for Caribbean, African and Pakistani groups. Results were similar for Wave 13. All ethnic groups, except Indian had higher odds of greater food insecurity than the white (British) reference group, largely attributed to income and area deprivation, for example, the OR for Pakistani group compared with white (British) reference group decreased from 1.74 (1.18, 2.56) to 1.05 (0.70, 1.58). However, for the African group, the OR remained greater than white reference population at 2.55 (1.73, 3.76) even after accounting for socioeconomic position.

The findings suggest differences in vegetable intake between different ethnic groups which have been maintained between 2010-2012 and 2021-2022 and may be explained to some extent by socioeconomic disadvantage. Whilst we used cross-sectional analyses of self-reported data, there remains a need for further large-scale studies using longitudinal and experimental designs in older ethnic groups considering socioeconomic position, recognising the importance of heterogeneity and the need to analyse ethnic groups individually, rather than as a group for measurements of dietary intake.

Acknowledgments

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OC12. Characterising users of community-based interventions designed to improve the food practices of low-income populations. O. Petre¹, J. Allan², L. Craig¹, F. Douglas³, J. Kyle¹, A. Stephen¹ and F. Thies¹ 1. University of Aberdeen, Aberdeen, UK and 2. University of Stirling, Stirling, UK 3. Robert Gordon University, Aberdeen, UK.

Approximately two out of three adults and three in ten children living in Scotland are overweight or obese, which increases their susceptibility to non-communicable diseases such as type II diabetes, specific cancers, heart disease, and stroke ⁽¹⁾. The burden of poor diet and its associated health consequences disproportionately affect those living in the most deprived communities ⁽¹⁾. Cost of living pressures have exacerbated this issue, making a healthy diet unaffordable for many low-income households ^(2,3). Thus, promoting affordable and practical ways to help low-income families improve dietary behaviours and achieve a healthy weight represents a priority for Scottish public health policy ⁽³⁾. For such interventions to be appropriately tailored and targeted, it is important to better understand the intended recipients. The present study aimed to assess the dietary practices and psychosocial characteristics of users of Aberdeen City community-based interventions (e.g., food banks, social cafés, community kitchens) designed to support low-income communities in accessing food and engaging in healthier food practices.

From January to June 2023, a cross-sectional survey was conducted employing convenience sampling among users of community-based interventions (N=105; 73 females) situated in an urban location. The questionnaire assessed diet quality (measured through a short-form FFQ and a 10-point self-rated diet quality item), household food insecurity (HFIAS), mental health (PHQ-4), well-being (Cantril Ladder), intention and self-efficacy toward healthy eating, and sociodemographic variables. Data were analysed using descriptive statistics, group comparisons, Pearson correlations, and regression analyses.

Results indicated that community-based food provision users are highly vulnerable to food insecurity and related negative health experiences. Among participants, 53.3% reported severe food insecurity, 18.1% reported moderate levels, and higher food insecurity was significantly associated with higher levels of mental distress ($r=.41$, $p<.001$) and lower well-being ($r=-.460$, $p<.001$). Results also indicated that service users have a diet high in discretionary foods and drinks (26% consume daily >1 portion of fizzy juice, 18.2% sweets, 16.7% crisps vs. 11.5% fruits and 10.6% vegetables). The mean dietary quality score (DQS) based on fruit, vegetable, oily fish, non-milk extrinsic sugar, and fat intake was 9.48 (SD= 1.90) from a possible 15. In addition, 73.8% of participants rated their diet as unsatisfactory. Both low objective and subjective diet quality scores were also significantly associated with greater mental distress ($r=-.287$, $p=.005$; $r=-.332$, $p=.001$) and poorer well-being ($r=.19$, $p=.049$; $r=.462$, $p<.001$). Notably, service users who perceived their current diet as healthier reported stronger intentions to eat healthily in the future ($r=.249$, $p=.013$).

This study is part of a larger project aiming to optimise community-based dietary interventions for low-income populations. The results provide a clearer picture of the intended beneficiaries of such interventions and highlight user needs that can be prioritised in optimisation efforts.

Acknowledgments

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OC13. Efficacy of a PROtein enriched MEDiterranean diet with or without Exercise on Nutritional status and Diet Quality in Older Adults at Risk of Undernutrition with Subjective Memory Decline enrolled in the PROMED-EX Trial. NA.Ward¹, L.Brennan², LCPGM.de Groot³, F.Prinelli⁴, D.Volkert⁵, JV.Woodside¹ and CT.McEvoy^{1,6}. 1. Centre for Public Health, Queen's University Belfast, Belfast. Northern Ireland. UK and 2. School of Agriculture and Food Science, Institute of Food and Health and Conway Institute, University College Dublin, Dublin. Ireland and 3. Division of Human Nutrition, Wageningen University, Wageningen. Netherlands and 4. Epidemiology Unit, Institute of Biomedical Technologies, National Research Council (CNR), Segrate (MI). Italy and 5. Institute for Biomedicine of Aging, Friedrich-Alexander-Universität Erlangen-Nürnberg, Nuremberg. Germany and 6. The Global Brain Institute, Trinity College Dublin, Ireland & University of California San Francisco, USA.

Undernutrition is common among older adults and, if untreated, can lead to weight loss, adverse cognitive and functional health outcomes and poorer quality of life. The Mediterranean diet (MedDiet) has been associated with reduced nutrient deficiency¹ and better cognitive health in older adults², while adequate protein intake combined with exercise is crucial for maintaining muscle health during ageing³. Early intervention with MedDiet to meet energy and increased protein (1.2g/kg/day)⁴ and micronutrient needs of older adults in combination with exercise could help to prevent undernutrition during ageing but has not yet been tested.

The PROMED-EX trial is a 6-month randomised controlled trial evaluating a PROtein-enriched MED Diet, with and without Exercise on nutritional status and cognitive performance, in older adults at increased risk of undernutrition and cognitive decline.⁵ The current objective is to evaluate the 3-month change in nutritional status and diet quality measured using repeated Mini Nutritional Assessment (MNA), 4-day food diaries and PROMED diet score (0-14). Food diaries were analysed for energy and nutrients using Nutritics at each time-point. Data was analysed on the intention-to-treat principle using multiple linear regression to compare outcomes at 3 months after adjusting for baseline values. Dunnett's procedure was used to control for multiple comparisons when comparing the two intervention groups with the control group.

One hundred and five eligible participants (69% female; mean age 67.7years [60-87 years]; BMI: 23.8±3.4 kg/m²) were recruited and randomised into one of three groups: PROMED-EX (diet + exercise; n=34), PROMED (diet only; n=35) and Standard Care (control; n=36). After 3-months, the MNA score improved in both PROMED-EX and PROMED intervention groups compared with the control group by on average 2.6 points (95% CI 1.1, 4.1; P<0.01) and 2.2 points (95% CI 0.8, 3.7; P<0.01) respectively; after adjusting for baseline MNA. Similarly, the mean 3-month increase in diet quality score was +4.0 (95% CI 3.1, 5.0); +4.6 (95% CI 3.7, 5.4) points in PROMED-EX and PROMED respectively; P<0.001, versus Control.

No between group changes in energy intake were detected, however protein and selected micronutrient intakes improved in the intervention groups. Compared to the control group, the between-group difference in mean protein intake was +21.4g/day (95% CI 9.8, 32.9) in PROMED (P<0.001) and +9.0g/day (95% CI -3.1, 21.0) in PROMED-EX (P>0.05). There was significantly greater improvement in dietary fibre, selenium, iron and vitamin D intakes in both interventions relative to Control (all P<0.001).

This 3-month analysis demonstrates the positive effects of the PROMED-EX and PROMED interventions on nutritional status and diet quality, as well as improvement in selected nutrients in older adults vulnerable to both undernutrition and cognitive decline.

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Student Competition

OC14. Understanding the barriers and facilitators towards dietary change for dementia risk reduction among British South Asians. O. Cuthbert¹, R. Townsend^{1,2}, R. Stocker¹, S. Mills^{2,3}, C. McEvoy⁴, and A. Fairley^{1,2} 1. School of Biomedical, Nutritional & Sport Sciences, Newcastle University, Newcastle upon Tyne, UK and 2. Human Nutrition & Exercise Research Centre, Centre for Healthier Lives, Population Health Sciences Institute, Newcastle University, Newcastle Upon Tyne, UK and 3. Population Health Sciences Institute, Faculty of Medical Sciences, Newcastle University, Newcastle upon Tyne, UK and 4. Centre for Public Health, Institute for Global Food Security, Institute of Clinical Sciences A, Grosvenor Road, Belfast, UK.

Up to 40% of dementia cases could potentially be prevented through targeting modifiable risk factors ⁽¹⁾. South Asian communities are at increased risk for dementia, having an earlier onset and greater cumulative life-course exposure to dementia related risk factors ⁽²⁾. Research on dietary patterns, such as the Mediterranean Diet ⁽³⁾, has shown promise as a non-pharmacological strategy to reduce cognitive decline. Acculturation and the assimilation of dietary habits to that of the host country can mean that minority ethnic groups require tailored dietary advice to suit their needs ⁽⁴⁾. Therefore, cultural adaptation of dietary interventions is required to ensure that advice for brain health is culturally relevant. Research concerning which culturally adapted, or country-specific dietary interventions are brain healthy, is currently lacking. The aim of this research was to understand the perceived barriers and facilitators towards dietary change for dementia risk reduction among British South Asians.

Five focus groups were conducted with individuals of South Asian ethnicity (n= 38) living in the North East of England. Patient and Public Involvement contributors from preliminary engagement activities supported recruitment from community and voluntary organisations. Data were transcribed and analysed using template analysis ⁽⁴⁾. This involved deductively analysing the data using relevant a-priori themes; pre-identified themes generated based on previous experience of the research team, and from a broad literature review.

Participants were aged between 26-82 years with the majority being female (n=26, 68.4%), unemployed (n=22, 57.9%), Pakistani ethnicity (n=28, 73.7%), with an education level of college attendance or higher (n=22, 57.9%). Themes identified included a lack of awareness of dementia, and the link between diet and dementia. Shame and stigma surrounding dementia was highlighted as a major issue that could influence willingness to engage in preventative strategies. Participants reported the main barriers to dietary change as: the influence of religious beliefs; issues with interpretation, accessibility, and lack of culturally appropriate resources; engrained dietary habits; time, cost, and convenience. Generational influences relating to differences in eating habits and awareness of healthy eating were highlighted as both a barrier and facilitator to behaviour change. Peer support strategies and the provision of practical, culturally sensitive dietary advice were viewed as facilitators.

This qualitative study highlights the need to increase awareness surrounding dementia prevention, specifically the role of diet, and to address this in a culturally sensitive way, that supports ethnic minority communities to improve their understanding and willingness to openly talk dementia. These findings will inform the development of a prototype for a dietary intervention, guided by the Medical Research Council guidance for complex interventions, and co-developed with the South Asian community, to explore how dietary advice for dementia prevention can be implemented in a culturally acceptable and feasible way in a community setting.

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OC15. Adherence to healthy dietary scores and risk of dementia: findings from the UK Biobank prospective study. *F. Carrasco-Marín^{1,2}, C. Araya-Bastias¹, J. Mathers³, K. Livingstone⁴, C. Celis-Morales¹* 1. School of Cardiovascular and Metabolic Health, University of Glasgow, Glasgow, UK and 2. Healthy Life Centre, Universidad de Concepción, Concepción, Chile and 3. Human Nutrition & Exercise Research Centre, Centre for Healthier Lives, Population Health Sciences Institute, Newcastle University, UK and 4. Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Geelong, Victoria, Australia.

While adherence to a healthy diet is known to reduce dementia risk, the impact varies by diet type. This study examines the association between six dietary scores and dementia incidence.

In this prospective analysis, 210,269 participants aged 60 and above (mean age 64.1 years, 52.7% women) from the UK Biobank were included. Dietary adherence was assessed using six scores: Mediterranean Diet Adherence Index (MEDAS-14), Recommended Food Score (RFS), Healthy Diet Indicator (HDI), Mediterranean Diet Score (MDS), Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND), and a meat consumption index (MCI). Dementia incidence (all-cause, Alzheimer's, vascular, and non-vascular) was the primary outcome, analyzed using Cox proportional hazards models. The lowest quintile (low adherence) was used as reference group. Analyses were conducted using a 2-years landmark and adjusted for sociodemographic (age, sex, ethnicity and deprivation), lifestyle (physical activity, alcohol and smoking) and health-related factors (multimorbidity and BMI).

Among the participants, 4,151 developed dementia during the 8.9 years follow up. Those with the highest adherence to dietary patterns (Quintile 5) showed a reduced risk of all-cause dementia: 49% with MDS (HR: 0.51, CI: 0.42-0.62), 38% with MIND (HR: 0.77, CI: 0.60-0.99), and 19% with MEDAS-14 (HR: 0.81, CI: 0.64-1.00). No significant associations were found with HDI. Individuals reporting low meat consumption (<5 times a week) exhibited a 15% lower dementia risk compared to high meat eaters (≥5 times a week, HR: 0.85, CI: 0.77-0.94). No associations were observed with pescatarian or vegetarian diets. These patterns were consistent across both vascular dementia and Alzheimer's disease.

Our findings suggest that higher adherence to certain healthy dietary patterns, particularly the Mediterranean and MIND diets, is associated with substantially lower risk of dementia. These findings emphasise the potential for achieving better brain health among older people by improving overall dietary pattern.

Student Competition

OC16. POWER Study: Functional characteristics and dietary intake of adults aged 70+ at risk of sarcopenia with supportive home care. C. Fallon¹, I. Malinauskaite¹, C. Cunningham¹, K. Horner¹, C. A. Corish¹. *School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin 4, Republic of Ireland.*

The POWER study (NCT05688956) is a 12-week randomised controlled trial (ongoing) investigating the effectiveness of a novel protein-based oral nutritional supplement combined with an online resistance training programme for community-dwelling adults aged 70+ who require home care and are at risk of sarcopenia. Older adults reliant on home care are an understudied cohort acknowledged as vulnerable to sarcopenia⁽¹⁾ and malnutrition⁽²⁾. This study aims to report the pre-intervention (baseline) functional status and dietary intake of older adults recruited to the POWER study.

Community-dwelling adults (≥ 70 y) living in Ireland receiving supportive home care and at risk of sarcopenia. Sarcopenia was screened for using the Strength, Assistance walking, Rising from a chair, Climbing stairs, and Falls (SARC-F) questionnaire with a cut-off score of ≥ 1 ⁽³⁾ (out of 10). Participants were recruited into the POWER study between July 2023 and January 2024. Data on participant demographic, nutritional status (anthropometric measures and 24-hour multiple-pass dietary recall) and muscle strength (handgrip strength (Jamar[®] dynamometer) and five times sit-to-stand) were obtained during pre-intervention home visits. Dietary intake was analysed using Nutritics[™] software (version 5.96). Intakes of protein and kilocalories were calculated as grams per kilogram body weight (g/kgBW) and as kilocalorie per kilogram body weight (kcal/kgBW) respectively. Statistical analysis was performed using RStudio (2023.06.2).

Seventeen adults aged 70+ were recruited over a 7-month period (12F, 5M; age range 71-87 years). Ten participants were receiving informal home care (i.e., from a relative) with seven receiving professional home care. All participants had a SARC-F score over 4, with a mean score of 5 ± 1.3 . Median BMI was 28.7 (range 17.1-36.2) kg/m². One participant was underweight (BMI 17.1 kg/m²), five were overweight (BMI ≥ 24.9 kg/m²) and six were living with obesity (BMI ≥ 30 kg/m²). Using the Mini-Nutritional Assessment-Full Form (MNA-FF), nine participants were at risk of malnutrition (MNA-FF 17–23.5), and one was malnourished (MNA-FF= 16.5). Mean intake of protein was 0.84 ± 0.23 g/kgBW/day, with only two participants consuming ≥ 1.0 g/kgBW/day. Mean daily energy intake was 1,488 kcal or 17.0 kcal/kgBW. Time taken for five times sit-to-stand was 21 ± 8 seconds (>15 seconds for five rises⁽⁴⁾) and handgrip strength was 15 ± 6 kg (<16 kg for females⁽⁴⁾) and 21 ± 12 kg (<27 for males⁽⁴⁾) for females and males, respectively.

Analysis of the pre-intervention data from the POWER study indicates that older adults at risk of sarcopenia are not meeting recommended daily protein intakes of 1-1.2 g/kgBW⁽⁵⁾. Participants also demonstrated poor muscle strength. This highlights the need for a multi-component approach to support dietary intake and muscle strength in older adults reliant on home care.

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Student Competition

OC17. *Hericium erinaceus*: A possible future therapeutic treatment for the prevention and delayed progression of Alzheimer's disease? – A Systematic Review. N. Cornford^d, S. Liu¹, M. Charnley¹ 1. School of Health and Sport Sciences, Liverpool Hope University, Hope Park, Liverpool, L16 9JD.

Alzheimer's disease (AD) is the most common progressive central nervous system neurodegenerative disease globally⁽¹⁾. At present, the treatment of AD involves only symptomatic medications which have continually demonstrated little efficacy⁽²⁾. *Herichium erinaceus* (HE), commonly known as lion's mane mushroom, has not yet been fully utilised among western pharmacology for its medicinal purposes, demonstrating a possible omittance of a highly beneficial neuro-altering substance. To date, studies that have investigated the potential medicinal properties of HE have found that various neuroprotective effects are exerted when following consumption⁽³⁾. The aim of this review is to systematically investigate the neuroprotective pathways impacted by dietary supplementation of HE, determine specific bio-compounds responsible, and highlight the importance of continued research to determine the true potential relevance of this therapeutic treatment for AD.

Electronic databases were systematically searched for studies investigating the relationship between HE and AD. For inclusion in this review, human studies must have been of a clinical design involving adults >30 years that are healthy, have mild cognitive impairment, probably AD or memory deficits. Animal studies were required to involve interventions that directly impact AD-related mechanisms. The exclusion criteria involved any observational studies that involved participants with other neurological implications, or any studies that noted existing interventions (i.e., medications, post-surgery, dietary intervention). A study quality assessment was conducted for all qualified studies using Cochrane RoB2 tools. Data extraction was undertaken according to PRISMA guidelines.

A total of 16 studies (including 3 human clinical trials and 13 animal model studies) met the criteria for inclusion. All studies included either behavioural, biochemical, ophthalmic, and neuroimaging assessments which demonstrated to be directly influenced by HE intake and highlighted key mechanisms previously associated with neurohealth promotion or neuropathological decline. Behavioural and biochemical clinical trial results revealed statistical differences ($p < 0.05$) between result comparison between HE and control groups and various week intervals. Animal model behavioural and biochemical assessments demonstrated positive findings. Histological assessments of AD-induced rodents following HE administration revealed statistically significant results ($p < 0.05$) in cholinergic transmitter and NGF concentrations, β -amyloid peptide plaque accumulation, and microglia and astrocyte activation compared to control groups.

Evidence suggests that an intake of HE, specifically the compound erinacine-A may be an appropriate and relevant candidate for the future therapeutic treatment for the prevention and delayed progression of AD. Application of HE demonstrated numerous improvements in AD-related behaviour, biomarker parameters, histological features, and physiological mechanisms while neuroprotective and neurotrophic properties were also clearly established. Nevertheless, the review highlights the necessity for continued research specifically human clinical trials to contribute continued evidence surrounding the use of HE for AD, to provide direction for future research and provide constructive methods for the possible future targeting of AD populations.

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Student Competition

OC18. The effect of sociodemographic factors on energy intake by time of day in the Italian over-50 population: a multilevel approach. B. Pongiglione¹, E. Campese² and L. Palla² 1. Centre for Research in Health and Social Care Management (CeRGAS), Bocconi University, Milan, Italy and 2. Department of Public Health and Infectious Diseases, University of Rome La Sapienza, Italy

Chrononutrition studies the effect of timing, regularity and frequency of eating on body metabolism and health. Diurnal eating patterns may be obtained based on time-of-day and regularity and its association with health outcomes investigated in national representative samples^(1,2).

In this study we focus on the Italian population over 50 and we aim to study how their sociodemographic characteristics, such as sex, civil and professional status, geographical area of residence, affect their energy intake at different times of the day.

We used INRAN-SCAI national representative survey conducted in 2005/2006⁽³⁾, including sociodemographic information from questionnaires and 3-day-diet-diaries on 1317 over-50 subjects. The energy intake has been aggregated according to Italian dietary habits into 6 time-slots (6-9am/9am-12/12-3pm/3-7pm/7-10pm/10pm-6am). For each time-slot, we applied multilevel analysis including 3 levels (repeated measures within individuals, between individuals and due to specific sociodemographic strata), to estimate the respective components of intake variability. The third-level stratification resulted in 40 clusters based on sex, professional status, geographic region of residence and civil status. The study further applied multilevel analysis of individual heterogeneity and discriminatory accuracy (MAIHDA)⁽⁴⁾ to analyze how sociodemographic factors influence daily calorie intake, comparing two mixed effect models, one “null” model including also fixed effects of other potential confounders (age, smoking, alcohol, total intake) as well as the day of data collection, and one “main” model, which, additionally, included the main effects for the variables determining the strata.

In terms of fixed effects, results showed significant energy intake variations in energy at different time-slots, depending on the area of residence (on average 47 kcal less at breakfast and 164 kcal more at lunch in the South compared to North-West, $p < 0.001$) and data collection day (122kcal more at lunch on the third day falling in the weekend, compared to first day in the week, $p < 0.001$). Furthermore, people who worked (on average 29 kcal more at dinner) and those who didn't live alone (26 kcal more at lunch) tended to consume more calories during some main meal times while those living alone were more likely to have out-of-meal eating patterns (13 kcal more at afternoon and night snacking times).

MAIHDA demonstrated that only dinner and night times had an intersectional effect, i.e. 56% and 86% percent of their variability respectively was not explained by main fixed and was therefore attributable to the interaction among sex, region, professional and civil status.

Our study offered a detailed description of how selected social and demographic factors were related to dietary behaviors held during the 24-hours. The findings are critical for crafting tailored nutritional advice to help mitigate the health threats faced by an aging population. The analysis will be extended to more recent survey samples of the Italian population, when available.

Acknowledgments

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OC19. Impacts of fortified foods and supplement use on B-vitamin status in older adults: findings from the TUDA study. M. Clements¹, M. Ward¹, C.F. Hughes¹, L. Hoey¹, J.J. Strain¹, A.M. Molloy² and H. McNulty¹ 1. Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine, Northern Ireland, United Kingdom and 2. School of Medicine, Trinity College Dublin, Dublin, Ireland.

Sub-optimal status of one or more of the interrelated B-vitamins (folate, B12, B6 and riboflavin) is common among older adults¹, and considerable observational evidence links low B-vitamin status (and/or elevated concentrations of the related metabolite, homocysteine) with a higher risk of age-related diseases^{2,3}. These nutrients are interlinked through their roles in one-carbon metabolism, but very few studies have investigated the major contributors to status of all four B-vitamins or the trends in B-vitamin biomarkers with advancing age. The aim of this study, therefore, was to investigate the contribution of fortified foods and supplements to dietary intakes and biomarkers of B-vitamins in older adults.

From a total sample of community-dwelling older adults (n=5,186; ≥ 60 years) initially recruited to the Trinity-Ulster-Department of Agriculture (TUDA) study from 2008–2012, an eligible subset (n=953) was re-investigated between 2016 and 2019. Dietary intake was assessed using a 4-day food diary (over four consecutive days) in combination with a food-frequency questionnaire. Mean daily energy and B-vitamin intakes were calculated using a customised version of the nutritional software package Nutritics (V.4). Non-fasting blood samples were collected at initial sampling and at follow-up to measure corresponding B-vitamin biomarkers. Statistical differences between categories of fortified food consumption and supplement use were assessed using ANCOVA (with adjustment for relevant covariates), while relationships between dietary and corresponding biomarker variables were examined using Pearson correlation coefficients.

As dietary intakes of fortified foods increased (from 0 to > 7 portions per week), biomarkers of each B-vitamin improved in a stepwise manner ($P < 0.001$), and there was a corresponding decrease in plasma homocysteine concentrations ($P < 0.001$), and the highest B-vitamin biomarkers were observed in those taking B-vitamin supplements. Although mean values for B-vitamin biomarkers generally compared favourably with normal ranges, deficient status of individual B-vitamins at initial sampling (2008 – 2012) was identified in: serum folate (8%), vitamin B12 (8%), vitamin B6 (8%), riboflavin (23%). Non-consumers of fortified food or supplements were at greatest risk of deficiency for each B-vitamin. Dietary intakes from foods were significantly correlated with corresponding biomarkers for serum folate ($r = 0.458$, $P < 0.001$), plasma pyridoxal-5-phosphate (PLP; $r = 0.192$, $P = 0.002$) and erythrocyte glutathione reductase activation coefficient (EGRac; $r = -0.197$, $P = 0.001$), whereas no significant correlation was observed for vitamin B12 intake with status.

In conclusion, regular consumption of fortified foods is an effective means to improve intakes and status of folate and related B-vitamins, reduce homocysteine concentrations and lower the prevalence of B-vitamin deficiency. These results emphasise the importance of fortified foods and supplements in contributing to status and highlight potential opportunities for the food industry to develop a wider range of foods fortified with sufficient levels of B-vitamins to optimise status and support healthy ageing.

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OC20. The associations of n-3 fatty acid intake with handgrip strength and muscle mass indices in older adults: a cross-sectional study from UK Biobank. A. Alsowail^{1, 2}, C. Celis-Morales¹, M. Guerrero-Wyss¹, F. Ho³ and S. Gray¹ 1. School of Cardiovascular and Metabolic Health, University of Glasgow, Glasgow G12 8TA, UK and 2. Physical Therapy Department, Faculty of Medical Rehabilitation Sciences, Taibah University, Madinah, Saudi Arabia and 3. School of Health and Wellbeing, University of Glasgow, Glasgow, UK.

There is strong evidence that low muscle strength and muscle mass are associated with an increased the risk of mortality and morbidity.⁽¹⁾ Muscle mass and strength progressively decline from around the fourth decade⁽²⁾, a process known as sarcopenia, for which there is no effective pharmacological treatment.⁽³⁾ Current literature indicates that resistance exercise and/or supplementation with n-3 fatty acids can be beneficial for muscle strength and mass in older adults.⁽⁴⁾ However, the sample sizes in these studies are relatively small and are restricted to only resistance exercise. The relationship between dietary n-3 fatty acid intake, rather than supplements, and general physical activity, rather than resistance exercise, and muscle strength and mass remain unknown. The aim of the current study, therefore, was to investigate the associations of n-3 fatty acid intake with handgrip strength and muscle mass indices in older adults. A secondary aim was to investigate whether these associations differed by physical activity status.

Analyses included 53,994 participants from the UK biobank study (25,773 men and 28,221 women). Participants were aged 60 years or older with complete data for outcome, predictor and covariate variables. Multivariable linear regression analyses were performed to explore the associations between n-3 fatty acid intake and grip strength index (kg/m²) and muscle mass index (kg/m²) in three separate models. All analysis were performed stratified by sex and physical activity status (active/inactive). Model 1 was adjusted for age, ethnicity, deprivation index and month of assessment. Model 2 was also adjusted for total energy intake and model 3 was also adjusted for multimorbidity count.

In model 3 there were positive associations between n-3 fatty acid intake and grip strength index in women with a 0.03 kg/m² (95% CI 0.00 to 0.06 kg/m²) higher grip strength index seen in those who were active and a 0.04 kg/m² (95% CI 0.00 to 0.08 kg/m²) higher grip strength index in those who were inactive for each additional gram of n-3 fatty consumed per day, with no associations in active (p=0.355) or inactive (p=0.186) men. In model 3, no association between n-3 fatty acid and muscle mass index were seen in men who were active (p=0.981) or inactive (p=0.331) and in women who were active (p=0.843) or inactive (p=0.058).

Although n-3 fatty acid intake was significantly associated with grip strength index in older women, regardless of their activity status, the magnitude of this association was very small and unlikely to be clinically relevant. Additionally, n-3 fatty acid was not associated with muscle mass index. Therefore, manipulation of n-3 fatty acid intake within the normal dietary range is unlikely to be an effective strategy to prevent and/or treat sarcopenia and n-3 fatty acid supplements are likely required.

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Student Competition

OC21. Effect of specific nutrients or dietary patterns on mental health outcomes in adults; A systematic review and meta-analyses of nutrition interventions. L. Montgomery¹, H. McNulty¹, M. Ward¹, L. Hoey¹, C. Patterson², C. F. Hughes¹ 1. Nutrition Innovation Centre for Food and Health, Ulster University, Northern Ireland and 2. Centre for Public Health, Queen's University Belfast, Northern Ireland.

Mental health disorders are the leading cause of ill-health and disability, with depression and anxiety being among the most prevalent⁽¹⁾. There is a growing body of evidence to indicate that optimal nutrition can help to promote better mental health, while suboptimal dietary patterns or status of specific nutrients have been associated with a greater risk of depression and anxiety, but the evidence is conflicting^(2,3,4,5). Therefore, the aim was to conduct a systematic review with meta-analyses to investigate the effect of interventions with specific nutrients or dietary patterns on mental health outcomes in adults.

Searches were conducted using the electronic bibliographic databases: MEDLINE, EMBASE and PsycINFO. The inclusion criteria were randomised controlled trials or controlled dietary interventions; study duration ≥ 12 weeks; participants aged ≥ 18 years old; outcome measures of depression or anxiety. The meta-analysis was conducted using Cochrane Review Manager Software (RevMan), version 5.4. The Risk of Bias and Quality of Evidence were assessed utilising the Cochrane Risk of Bias 2 tool and the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) framework, respectively.

A total of 68 studies met the inclusion criteria: 5 investigated dietary patterns, while 63 were nutrient interventions, involving omega-3 (n=22), vitamin D (n=18), B-vitamins (n=10), zinc (n=7), iron (n=1), vitamin D combined with calcium (n=4), and omega-3 combined with vitamin D (n=1). Insufficient studies were available to conduct a meta-analysis for any nutrient in relation to anxiety; all results relate to depression. Meta-analysis results showed that zinc intervention significantly reduced depression (standardised mean difference (SMD) in depression scores was -0.67; 95% Confidence Interval (95% CI) -0.96, -0.37); 4 studies, GRADE: moderate certainty). No significant effects on depression were reported in response to intervention with omega-3 fatty acids [SMD -0.26 (95% CI -0.64, 0.12); 10 studies, GRADE: moderate certainty] or vitamin D [SMD 0.07 (95% CI -0.34, 0.47); 10 studies, GRADE: moderate certainty], while there were insufficient studies to perform a meta-analysis for B-vitamins and depression. There was also no significant effect of the Mediterranean Diet on depression [SMD -0.95 (95% CI -1.90, 0.01); 3 studies, GRADE: high certainty], and insufficient studies for analysis of the Dietary Approaches to Stop Hypertension (DASH) diet.

The results indicate that zinc supplementation has beneficial effects on depression, but there were no significant effects of intervention with the Mediterranean Diet, omega-3 fatty acids or vitamin D. These meta-analyses are however based on a limited number of intervention studies and therefore no firm conclusions can be reached. Further intervention trials are required to fully investigate the effects of specific nutritional factors on mental health.

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Student Competition

OC22. Longitudinal trajectories of plasma polyunsaturated fatty acids and associations with psychosis-spectrum outcomes in early adulthood. *David Mongan^{1,2}, PhD; Benjamin I. Perry^{3,4}, PhD; Colm Healy², PhD; Subash Raj Susai², PhD; Stan Zammit^{5,6}, PhD; Mary Cannon^{2,7}, PhD; and David R. Cotter^{2,7}, PhD.* *Joint first authors 1. Centre for Public Health, Queen's University Belfast, Northern Ireland and 2. Department of Psychiatry, Royal College of Surgeons in Ireland University of Medicine and Health Sciences, Dublin, Ireland and 3. Department of Psychiatry, University of Cambridge School of Clinical Medicine, Cambridge, United Kingdom and 4. Cambridgeshire and Peterborough NHS Foundation Trust, Cambridge, United Kingdom and 5. Centre for Academic Mental Health, Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, United Kingdom and 6. Division of Psychological Medicine and Clinical Neurosciences, MRC Centre for Neuropsychiatric Genetics and Genomics, Cardiff University, Cardiff, United Kingdom and 7. Future Neuro SFI Research Centre, Royal College of Surgeons in Ireland University of Medicine and Health Sciences, Dublin, Ireland.

There is evidence for associations between polyunsaturated fatty acids (PUFAs) such as docosahexaenoic acid (DHA) and psychosis risk⁽¹⁻³⁾. However, the existing literature has focused on PUFA measurements at single timepoints^(4,5), which may overlook dynamic patterns of variability over time. The aims of this study were: 1) To describe longitudinal trajectories of plasma omega-6:omega-3 ratio and DHA in a large general population sample; and 2) To evaluate associations between trajectories and psychosis-spectrum outcomes in early adulthood.

We performed a cohort study within the Avon Longitudinal Study of Parents and Children. 3635 participants completed psychiatric assessments at age 24 years (2247 [61.8%] female). Participants provided plasma samples at four timepoints when aged 7, 15, 17 and 24. Plasma omega-6:omega-3 ratio and DHA levels (% total fatty acids) were measured using nuclear magnetic spectroscopy, then standardised by sex.

Psychosis-spectrum outcomes were assessed at age 24. Psychotic experiences (PEs) and psychotic disorder were assessed using the Psychosis-Like Symptoms interview (PLIKSi), as was the total number of PEs (range 0 to 11). Negative symptoms score (range 0 to 10) was measured using the Community Assessment of Psychic Experiences.

Curvilinear growth mixture modelling was used to derive longitudinal trajectories of plasma omega-6:omega-3 ratio and DHA levels over time. Trajectories were adjusted contemporaneously for body mass index at each timepoint. Associations between trajectory membership and outcomes were adjusted for sex, ethnicity, parental socioeconomic class, smoking and alcohol use.

A three-trajectory solution was optimal for omega-6:omega-3 ratio (stable average, n=3282 [90.3%]; slightly above average, n=61 [1.7%]; and persistently high, n=292 [8.0%]) and DHA (stable average, n=2739 [75.4%]; persistently high, n=245 [6.7%]; and persistently low, n=651 [17.9%]).

Relative to stable average, trajectories characterised by persistently high omega-6:omega-3 ratio and persistently low DHA were associated with increased odds of PEs and psychotic disorder in unadjusted analyses, but these associations attenuated on adjustment for covariates. Conversely, the persistently high omega-6:omega-3 ratio trajectory was associated with increased number of PEs (adjusted β 0.41, 95% confidence interval [CI] 0.05-0.78, p=0.026) and negative symptoms (adjusted β 0.43, 95%CI 0.14-0.72, p=0.004). Similarly, the persistently low DHA trajectory was also significantly associated with increased number of PEs (adjusted β 0.45, 95%CI 0.14-0.76, p=0.004) and negative symptoms (adjusted β 0.35, 95%CI 0.12-0.58, p=0.003).

Persistently high plasma omega-6:omega-3 ratio and persistently low plasma DHA were associated with increased PEs and negative symptoms of psychosis at age 24. Optimisation of PUFA status during development warrants further investigation in relation to psychosis-spectrum outcomes in early adulthood. Limitations include that causality cannot be inferred and residual confounding is possible. Attrition occurred along a socioeconomic gradient, although we used multiple imputation to avoid complete-case biases. Strengths include the use of a well-characterised cohort, and the use of biomarker measurement of plasma PUFAs.

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OC23. Effects of cranberry (poly)phenols on mental health in university students: the CRANMOOD randomized controlled trial. N. N. Z. Kamarunzaman¹, M. Le Sayec¹, Y. Li¹, H. Wu¹, R. Mesnage¹, K. Dalrymple¹, J. Halket¹, A. Caldwell¹, A. Borsini², C. Pariente², D. Vauzour³, G. Le Gall³, B. Bajka¹, and A. Rodriguez-Mateos¹ 1. Department of Nutritional Sciences, King's College London, UK and 2. Institute of Psychiatry, Psychology & Neuroscience, King's College London, UK and 3. Norwich Medical School, Biomedical Research Centre, University of East Anglia, UK.

Increasing evidence indicates that (poly)phenol consumption can have beneficial effects in human brain function⁽¹⁾. The overall aim of this project is to investigate whether consumption of a (poly)phenol rich cranberry drink improve mental health and cognitive function in university students via the gut-brain axis.

A parallel randomised controlled trial was conducted in 72 young healthy final year university students assigned to consume 236 mL cranberry drink (442 mg polyphenols) or nutrient matched placebo, daily for 12 weeks. The primary outcome was mood, measured as Total Mood Disturbance (TMD), using the Profile of Mood States (POMS) questionnaire. Secondary outcomes included stress, anxiety and depression levels, measured using the Perceived Stress Scale (PSS), and the Hospital Anxiety Depression Scale (HADS) questionnaire, salivary cortisol levels and cognitive function measured using the Online General Cognitive Assessment Battery (CogniFit). All of these questionnaires were measured every 4 weeks. Blood and urine samples were collected to measure inflammatory markers, gut-brain-axis metabolites, short chain fatty acids (SCFA), and cranberry polyphenols metabolites. Faecal samples were also collected for measuring gut microbiome diversity and composition and faecal metabolomics. Diet was assessed using food frequency questionnaires (FFQ), 7-day food diaries (EPIC) and 24 h online dietary recalls (intake 24) during the study. Linear mixed-effect model (LMM) and ANCOVA were used to investigate the relationship between the 2 trial arms.

No significant differences were found between treatments for mood, stress levels, anxiety, depression, circulating short chain fatty acids or inflammatory markers, however a significantly lower diurnal area under the curve of salivary cortisol ($p=0.010$) and significantly higher short-term memory (Z-score: $p=0.024$; Raw-score: $p=0.034$) was found at 12 weeks in the cranberry group compared with the placebo. Besides, significant differences between interventions were found in plasma gut-brain axis metabolites, including the kynurenine and bile acids pathway which were kynurenine ($p=0.023$), kynurenic ($p=0.032$), quinolinic ($p=0.018$), and glycolithocholic acid ($p=0.04$) as well as several plasma and urinary cranberry (poly)phenol metabolites were modulated by cranberry consumption.

In conclusion, daily cranberry (poly)phenol supplementation for 12 week did not improve mood, stress, anxiety, and depression symptoms in healthy university students, however it may modulate cortisol levels and some aspects of cognitive function via the gut-brain axis.

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Student Competition

OC24. The effects of a short-term Mediterranean diet intervention on mood and mental wellbeing in adults. *F. Tsofliou¹, G. Pegram¹, P. Fairbairn¹ and E. Brenner¹* ¹. Department of Rehabilitation and Sport Sciences, Faculty of Health and Social Sciences, Bournemouth University, Bournemouth, BH8 8GP UK.

Emerging evidence suggests protective properties of a Mediterranean diet (MD) in relation to prevention and management of mood disorders⁽¹⁾. However, there is paucity of dietary interventions investigating adherence to MD and effects on mood and wellbeing in individuals without a clinical diagnosis. The present study aimed to investigate the effects of adherence to a short-term MD on mood and wellbeing in healthy adults.

A controlled crossover design randomly assigned 18 adults (Age(yrs) 53.74 (\pm 7.10), BMI(kg.m⁻²) 26.62 (\pm 5.45)) to follow a MD or their habitual diet (control) for 7-days, before switching to the alternate condition (following a 7-day washout). At baseline, an Educational Group Session familiarised participants with MD principles through informal presentation and interactive explanation of participant resource booklets to use at home throughout the MD condition only. Anthropometric characteristics, self-reported mood (Profile of Mood States (POMS), Lader Visual Analogue Scale(VAS)) and wellbeing (Warwick Edinburgh Mental Wellbeing Scale (WEMWBS)) were assessed at baseline and upon completion of each diet condition. The MD Adherence Screener (MEDAS) assessed adherence to the interventions.

A significant difference was found in MD adherence scores between MD (M = 11.3, SD = 1.8) and Control Diet (CD) (M = 2.5, SD = 1.5); $t(17) = 16.1$, $p < 0.001$). Main effects analysis using a general linear model controlling changes in body mass index showed significant effects of MD intervention versus the CD on the change in total mood disturbance (M(MD) = -15, SD = 12), M(CD) = -3, SD = 9), $F(1,31) = 4.9$, $p = 0.034$); feelings of calm (VAS) (M(MD) = 9, SD = 14), M(CD) = -2, SD = 6), $F(1,31) = 8.5$, $p = 0.006$); wellbeing (M(MD) = 6, SD = 5), M(CD) = -2, SD = 6), ($F(1,31) = 6.6$, $p = 0.015$).

These findings suggest that a short-term dietary change towards a MD can improve mood, feelings of calm and overall wellbeing in middle aged adults.

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OC25. The effect of healthy dietary patterns on stress, mood, and mental health outcomes: A systematic review. James Brooks¹, Paul Fairbairn¹, Anna Mantzouratou¹, Leigh Chester¹, Fotini Tsofliou¹. 1. Bournemouth University, Bournemouth Gateway Building, St Paul's Lane, Bournemouth, Dorset, BH8 8GP.

Chronic low-grade inflammation has been associated with poor mood states and reduced mental well-being, increasing the chances of comorbidities such as diabetes and mental illness ⁽¹⁾. Inflammation and stress share a bi-directional relationship ⁽²⁾, impacting an individual's mood and mental well-being. Whole food interventions such as the Mediterranean diet (MD) possess anti-inflammatory properties and might offer protection for perceived stress and mood disorders ⁽³⁾. This systematic review investigated the effects of whole food interventions on stress, mood, and mental well-being.

The following databases were searched for studies published until the end of March 2024: MEDLINE, CINAHL, Prospero, Web of Science, Cochrane Library ($n=6$). Inclusion criteria were: (1) RCT; (2) mean participant age between 18 and 65 years; (3) measured one (or more) relevant outcomes e.g. stress, mood, or mental wellbeing; (4) whole food intervention. The Cochrane Risk of Bias v2 will be used to assess randomised controlled trials (RCT) ⁽⁴⁾.

The review identified 3,854 results in accordance with the PRISMA guidelines with fifteen meeting inclusion criteria. Backward citation searching yielded 8 studies. A total of twenty-three studies were included in this review. Seventeen applied whole food dietary intervention (WFDI) while six investigated supplementing the habitual i.e. adding nuts to diet (STH). Seventeen studies used WFDI: MD ($n=7$), Nordic diet ($n=1$), Ketogenic diet ($n=1$), time-restricted eating ($n=1$), *a priori* diets ($n=7$). The remaining six STH studies supplemented with: nuts ($n=3$), basil ($n=1$), cacao ($n=1$) and corn leaf ($n=1$). Five studies reported positive changes in mood states i.e. vigor ($p < .05$). Two of these investigated the effects of a 10-day MD intervention compared to habitual diet, finding significant improvement in mood states ($n=4$). Three studies measured mental well-being as an outcome with WFDI, MD ($n=1$) and *a priori* diets ($n=2$) reporting significance ($p < .05$) but demonstrating heterogeneity in measurement methods. Two studies were conducted with the outcome of stress with a WFDI, Mediterranean diet ($n=1$) and *a priori* ($n=1$). The findings reported to have a positive effect on reducing stress, when compared to baseline ($p < .035$). Four studies examined the effects of STH on mood states reporting positive significant change respectively: nut ($n=2$), basil ($n=1$), cacao ($n=1$).

This systematic review is the first to examine the interaction of whole food intervention with stress, mood, and/or mental well-being. Our findings offer an insight to the interplay of different whole food interventions, whether entire diet or supplementation on the outlined outcomes in this review. The findings demonstrate heterogeneity of measurements which could be a factor in not establishing significance in some studies ($n=9$). Other considerations of this review are the confounding variables that can influence stress, mood, and mental well-being such as physical activity, hydration, sleep quality.

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Student Competition

OC26. The effects of tea (*Camellia sinensis*) or its bioactive compounds L-theanine or L-theanine plus caffeine on cognition, sleep, and mood in healthy participants: a systematic review and meta-analysis of randomised controlled trials. Edward R. Payne¹, Magaly Aceves-Martins¹, Joy Dubost², Arno Greyling³ and Baukje de Roos¹ 1. The Rowett Institute, University of Aberdeen, Aberdeen, UK and 2. Lipton Teas and Infusions, Amsterdam, The Netherlands and 3. Unilever Foods Innovation Centre, Wageningen, The Netherlands.

Tea produced from the tea plant (*Camellia sinensis*) is potentially beneficial for health: it contains theanine and caffeine which may improve short-term physiological outcomes such as accuracy of attention,^(1,2) and polyphenols, specifically flavan-3-ols, which may improve long-term health outcomes such as cardiovascular diseases.^(3,4) The aim of this systematic review and meta-analysis was to update the overall understanding of the effects of tea, or theanine (alone or in combination with caffeine), on cognition, mood, and/or sleep outcomes in healthy participants.

The Cochrane Library, Embase, and Medline were systematically searched, up to and including August 2023, for randomised controlled trials investigating the short-term effects of tea, theanine alone, or theanine plus caffeine interventions, on cognition, mood, and sleep outcomes in healthy participants. Where possible, meta-analysis was performed using standardised mean differences (SMD), or mean differences, with 95% confidence intervals (CI), in random effects models. SMDs and CIs were re-expressed (ReSMD) in the units of the most common measurement tool used by the studies in each meta-analysis.

Fifty RCTs were included in the review; data from fifteen RCTs were eligible for at least one meta-analysis. In the first hour (h1) and second hour (h2) after intake, differences were found between the effects of theanine plus caffeine, and placebo, that favoured the former, on cognitive outcomes including choice reaction time (h1; ReSMD: -24.71 ms; 95 % CI: -51.90 to 2.48), digit vigilance task accuracy (h2; ReSMD: 1.59 %; 95 % CI: 0.17 to 3.01), and attention switching task accuracy (h2; ReSMD: 1.10 %; 95 % CI: 0.43 to 1.77), and mood outcomes including overall mood (h2; ReSMD: 3.46 units on the caffeine research visual analogue scale; 95 % CI: -1.36 to 8.28) and alertness(h2; ReSMD: 2.94 units on the Bond-Lader visual analogue scale; 95 % CI: -0.87 to 6.75). Improvements favouring theanine, compared to placebo, were found for cognitive outcomes including rapid visual information processing accuracy (h2; ReSMD: 1.20 %; 95 % CI: 0.75 to 1.65) and reaction time (h2; ReSMD: -9.77 ms; 95 % CI: -16.98 to -2.55), and choice reaction time (h1; ReSMD: -18.01 ms; 95% CI: -31.27 to -4.83). No consistent evidence was found to indicate whether tea or theanine were beneficial for sleep.

This meta-analysis provides evidence that theanine plus caffeine, and theanine alone, possibly improve attention and mood, however, tea-inequivalent doses, small numbers of studies eligible for meta-analysis, and confidence intervals showing uncertainty surrounding the direction and magnitude of overall effect sizes, were common. More research of tea or tea-equivalent bioactive doses, in free-living participants, would be beneficial.

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Student Competition

OC27. The effect of Ashwagandha (*Withania somnifera*) supplementation on sleep, mood, and cognitive function in healthy university students. A. Murphy¹, K. McLachlan¹, H. Egan¹, M. Bedwell¹ and R. Kimble¹. *Sport and Physical Activity Research Institute, The University of the West of Scotland, Blantyre, UK.*

University students often face high levels of stress and sleep disturbances due to their academic demands and lifestyle factors⁽¹⁾. Ashwagandha (*Withania somnifera*), an adaptogenic herb, has shown the potential to mitigate stress and improve cognitive function⁽²⁾. However, limited research has examined its effects on these variables in university students. This study aimed to determine the effects of ashwagandha supplementation on sleep quality, mood, and cognitive function in university students.

A randomized, double-blind, placebo-controlled crossover study was used. Nine university students (5 males, 4 females; Age: 21 ± 1 years; BMI: 25 ± 2.5 kg/m²) were randomly assigned to receive 500 mg of standardized ashwagandha root extract capsules for 7 days or a placebo (encapsulated cornstarch) with a 7-day washout between treatments. Sleep was measured during the 7-day supplementation period using the Loughborough Daily Sleep Diary. Post-supplementation mood and cognitive function were measured by the Profile of Mood States (POMS) scale⁽³⁾ and computerised Stroop, and Deary-Liewald simple and choice reaction tasks⁽⁴⁾. Paired sample t-tests were used to determine differences between the ashwagandha and placebo conditions with calculated effect sizes (Cohen's d).

Participants reported lower confusion indicator on the POMS following ashwagandha compared to the placebo (mean \pm SD: 4.8 ± 2.0 vs 7.6 ± 3.1 arbitrary units; $P = 0.03$; $d = -0.92$). No other differences were found for any other mood indicators, sleep, or cognitive function parameters ($P > 0.05$).

These data suggest that ashwagandha may improve feelings of confusion in university students but further studies with larger sample sizes are needed to verify these findings and elucidate the underlying mechanisms.

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OC28. Investigating dietary intakes of pregnant women in an outpatient department using the FIGO Nutrition Checklist and assessing the acceptability of the checklist for use in routine antenatal care. L. Murphy^{1,3}, E. Hokey¹, SL. Killeen², E. O’Sullivan³ and F. McAuliffe¹ 1. UCD Perinatal Research Centre, School of Medicine, University College Dublin, National Maternity Hospital, Dublin, Ireland and 2. Department of Clinical Nutrition & Dietetics, National Maternity Hospital, Dublin and 3. School of Biological, Health & Sport Sciences, TU Dublin.

Many adverse outcomes for both mother and baby can result from suboptimal maternal nutrition during pregnancy⁽¹⁾. Pregnancy is seen as an opportunity to encourage beneficial lifestyle changes⁽²⁾. The Health Service Executive published nutritional guidelines for pregnancy in Ireland⁽³⁾, however there is no standardised approach for assessment in antenatal care. The FIGO Nutrition Checklist is a tool which asks “yes/no” questions about dietary intakes in pregnant women with the goal of identifying deficits compared to recommendations. A “no” answer to one or more questions indicates a possible nutrition risk in the diet. Implementation of the Nutrition Checklist during pregnancy would benefit both mother and baby. The aim of this study is to assess the nutritional intakes of pregnant women attending the public outpatient clinic in the National Maternity Hospital, Dublin using the FIGO Nutrition Checklist, and assess the acceptability of the tool for use as part of routine antenatal care.

This observational cross-sectional study used two self-administered questionnaires to (i) assess women’s nutritional intakes to identify those at nutritional risk, and (ii) assess the acceptability of the Nutrition Checklist as part of routine antenatal care. Recruitment took place from December 2023 to February 2024. All English-speaking women of any gestation or parity attending the public outpatient department of NMH were eligible to take part. Baseline characteristics were obtained through their hospital records on the electronic chart system. Statistical analysis was completed using IBM SPSS.

A total of 102 pregnant women were recruited during routine antenatal clinics in the public outpatients department in the NMH, Dublin, Ireland. Most (88.7%) declined following a special diet. The majority (85.7%) answered “No” to at least one diet quality question, highlighting potential nutritional risk. Only 43.9% reported eating at least one portion of fish per week and 20.4% reported consuming <1 serving of wholegrains per day. Current folic acid intakes were high among the cohort, however 16.3% answered “No” to currently taking folic acid. The acceptability of the checklist was excellent. Most (70.6%) women strongly agreed that the checklist was easy to complete, with 80% recommending using it in practice and most (81.4%) of the women who took part in the survey agreed that the checklist contained useful information, with only 1% disagreeing.

The FIGO Nutrition Checklist identified numerous nutritional concerns and the acceptability of the checklist was excellent. This suggests that using the tool as part of routine antenatal care should be considered.

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Student Competition

OC29. Developing a nutrition resource for midwives, incorporating a patient and public involvement approach. M Charnley¹, G Stone² and J Abayomi² 1. School of Health & Sport Sciences, Liverpool Hope University, Liverpool, Merseyside, L16 9JD and 2. Faculty of Health, Social Care & Medicine, Edge Hill University, Ormskirk, Lancashire L39 4QP.

UK antenatal guidelines state that midwives should discuss nutrition, diet, and vitamin supplementation at booking-in appointments ⁽¹⁾. Our earlier research suggests that this rarely happens ⁽²⁾. Participant and Public Involvement (PPI), enhances research by making it more meaningful and reliable. This study incorporated PPI to elicit the experiences of postnatal women regarding the nutrition and weight management advice they received during antenatal care and their opinions regarding the design of a future resource for midwives.

Eight postnatal women were recruited from a Children's Centre in Liverpool. They were asked questions by one researcher, about: a) any nutrition advice given by midwives during their antenatal care and b) their opinions regarding the development of a nutrition resource for midwives in future. Notes of the conversations were made by a second researcher; these were then transcribed and analysed thematically. Participants were given a shopping voucher to thank them for their input.

Regarding the development of a resource, three themes were identified: 1) Factual information, 2) The Midwives approach, 3) Include us. They identified that they wanted more in-depth facts from midwives, particularly regarding key nutrients and food that should be included in a healthy diet "Good nutrition grows babies". However, they felt that midwives needed to improve their approach to discussing diet and weight, to include more *empathy* and *sensitivity*, as women often felt *judged* or *anxious* by comments that were made "It's not what they say – it's the way they say it". Finally, they agreed that their voices should be included in the development of a resource, with midwives and service users coming together to share their views "Get them [midwives] involved in something like this".

All women agreed that a nutrition resource for midwives was needed as they were dissatisfied with the advice they received. They wanted less focus on food safety/food to avoid and increased emphasis on food and essential nutrients to include. Involving the expertise of dietitians/nutritionists in the resource would help to address knowledge gaps and inconsistencies. Midwives would benefit from training regarding sensitive weight management advice too, as weight was rarely discussed or was approached in a distressing way. This has been documented elsewhere with the recommendation that training regarding sensitive weight management advice should be included in the midwifery curriculum and mandatory training ⁽³⁾. Support and expertise from a health psychologist would help to develop this aspect of the resource. Including the experiences and opinions of service users alongside midwives will be vital to the success of developing a suitable resource for midwives, so ongoing PPI activities need to be considered.

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OC30. Preconception health inequalities in Northern Ireland: a focus on obesity and folic acid supplement use from 255,117 pregnancies. *E.H. Cassinelli¹, L. Kent¹, M.C. McKinley¹, K.-A. Eastwood^{1,2}, D.A. J. M. Schoenaker^{3,4,5}, and L. McGowan¹* 1. Centre for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast, UK and 2. University Hospitals Bristol NHS Foundation Trust, Bristol, UK and 3. School of Human Development and Health, Faculty of Medicine, University of Southampton, Southampton, UK and 4. MRC Lifecourse Epidemiology Centre, University of Southampton, Southampton, UK and 5. NIHR Southampton Biomedical Research Centre, University of Southampton and University Hospital Southampton NHS Foundation Trust, Southampton, UK.

Obesity prevalence is rising globally. Living with obesity can lead to increased reproductive challenges and compromise preconception health, defined as the overall health of non-pregnant individuals of childbearing age (15-49 years)⁽¹⁾. Folic acid supplement use, considered a key *preconception* health behaviour, is pivotal for the prevention of neural tube defects in offspring⁽²⁾. Guidelines suggest women with obesity take a higher dose (5mg/day) to reduce the risk of fetal complications⁽³⁾. This research explored trends in Body Mass Index (BMI) in the preconception and early pregnancy period in Northern Ireland (NI) and the prevalence of folic acid supplement use across BMI categories, exploring differences based on deprivation.

Anonymised national data collected in the Northern Ireland MATernity System (NIMATS) were accessed via the UK Secure eResearch Platform Data, provided by the HSC Honest Broker Service. The NI Multiple Deprivation Measure (NIMDM) (2017) aggregates the rankings of seven specific domains into a single ranking, used to categorise deprivation into quintiles for comparison (Q1 highest deprivation vs Q5 least deprivation). Healthy weight, overweight, and obesity were classified as BMI 18.5–24.99kg/m², 25.00–29.99kg/m² and ≥30kg/m², respectively. Folic acid supplement use was self-reported. Multiple linear regressions explored trends in BMI between 2011 and 2021 and χ^2 tests explored associations between BMI categories and folic acid supplement use from 2014-2021. The 'Healthy Reproductive Years' Patient and Public Involvement and Engagement (PPIE) advisory panel (aged 18-45 years), were involved throughout the study.

The analyses included a total of 255,117 pregnancies, with missing data addressed per variable. The percentage of women entering pregnancy with a healthy BMI decreased between 2011 and 2021 (48.65%, n=12,144, and 39.55%, n=4,316, respectively), while the percentage of women with obesity increased over the same period (18.11%, n=4,520, and 27.36%, n=2,986, respectively). Regression models suggested an average increase of ~1 unit of BMI per calendar year in women entering pregnancy ($p < 0.001$). There were higher proportions of pregnancies conceived by women with overweight or obesity in the highest deprivation quintile (Q1, 53.57%) compared to the least deprivation (Q5, 46.37%). Folic acid supplement use was mostly initiated after conception (59.03%) rather than before (37.54%), as recommended. Among women living with obesity, preconception supplement use of 5mg of folic acid was low (8.74%, n=2,990). Lower proportions were observed for preconception supplement use of 400mcg among women in the quintile of greatest deprivation (Q1, 21.41%) versus least deprivation (Q5, 44.06%).

Analyses demonstrated an increased number of women entering pregnancy with an elevated BMI and suboptimal preconception folic acid supplement use, particularly for women with obesity. It highlights significant health inequalities according to NIMDM regarding obesity and folic acid supplement use. There is a need to address modifiable preconception health risks, particularly for those from lower socioeconomic groups.

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BSO and the Department of Health (DoH). The authors alone are responsible for the interpretation of the data and any views or opinions presented are solely those of the author and do not necessarily represent those of the BSO. Thanks also to the members of the Healthy Reproductive Years advisory panel.

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OC31. Facilitating healthy food practices during pre-conception and pregnancy: qualitative insights from across the UK. R. Fallaize¹, J. McClinchy¹, K. Parsons² and L. Whiting³ 1. School of Life and Medical Sciences, University of Hertfordshire, Hatfield, AL10 9AB, UK and 2. MRC (Medical Research Council) Epidemiology Unit, University of Cambridge, Cambridge, CB2 0QQ, UK and 3. School of Health and Social Work, University of Hertfordshire, Hatfield, AL10 9AB, UK.

Healthy diet during preconception and pregnancy is evidenced to benefit maternal health and reduce risk of non-communicable diseases in offspring (such as obesity, diabetes, hypertension, cardiovascular and mental health problems)⁽¹⁾. In the UK, population-based initiatives (e.g., Healthy Start Schemes, drop-in sessions at Family Hubs), and antenatal appointments (7-10) with midwives have the potential to influence dietary behaviours during pregnancy. However, despite policy, guidance and initiatives, nutritional recommendations in the prenatal period are not being met and healthcare professionals can struggle to support the delivery of nutritional advice⁽¹⁻³⁾. This study aimed to understand: the facilitators and barriers to healthy food and diet practices during pre-conception and pregnancy; how these barrier(s) could be addressed, and the changes required to facilitate good food practices.

The research used a qualitative exploratory approach. Women (aged > 18 years) living across the UK, who were trying to conceive, pregnant or had babies under 6-months old, were recruited to attend a virtual focus group. Focus groups were led using a topic guide including 'prompt' questions; they were audio recorded and transcribed verbatim by a professional agency, and thematically analysed according to the stages offered by Braun and Clarke⁽⁴⁾. Ethical approval was granted by the University of Hertfordshire Health, Science, Engineering & Technology Ethics Committee with Delegated Authority [protocol number: HSK/SF/UH/04840].

Five focus groups were conducted with 19 participants (aged 18-44 years). Participants were trying to conceive (n=3, 15.7%), pregnant (n=3, 15.7%) or had babies under 6 months old (n=15, 78.9%). Participants resided in England (n=6, 31.6%), Wales (n=4, 21.1%), Scotland (n=4, 21.1%) and Northern Ireland (n=5, 26.3%). The findings revealed three main themes (*Challenges of trying to eat healthily; Facilitators to eating healthily; Changes required*) and eight subthemes (*Mothers' load; Body sabotage; Food environment; Information not individualised; Planning skills; Family support; Co-creation and investment for the future; Access to professional advice*). Participants spoke of internal factors (such as tiredness and nausea) and external influences (for example, their financial situation and local food environment) that impacted their ability to eat healthily. There was a view that the one dimensional 'do not eat...' (P16) instruction was 'disempowering' (P1) and in pre-pregnancy and pregnancy women needed to be empowered to eat healthily. Participants identified online apps, group sessions (as part of antenatal courses) and/or one-to-one advice in GP practices from nutritionists or dietitians, as potential mechanisms for facilitating healthy diets.

There is a need for clear, consistent, engaging and culturally appropriate dietary information that is co-created with pregnant women and those trying to conceive, as well as access to professionals (such as nutritionists and dietitians) who can give both generic and tailored advice.

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OC32. Women's dietary changes before and during pregnancy: a systematic review update. SE. Hillier¹ and EK. Olander² 1. Centre for Midwifery and Women's Health, Bournemouth University, Bournemouth, UK and 2. Centre for Maternal and Child Health Research, City, University of London, London, UK.

Dietary intake before and during pregnancy has significant health outcomes for both mother and baby⁽¹⁾. Before developing effective interventions to improve dietary intake during pregnancy, it is important to understand what dietary changes pregnant women make without intervention. This study aims to provide an update from the Hillier and Olander, 2017⁽²⁾ systematic review, examining women's dietary changes before and during pregnancy and to identify characteristics of the women making these changes.

A systematic search strategy was employed using EBSCO database, from May 2016 to October 2023 to capture those published after the 2017 systematic review⁽²⁾. Search terms included those relating to preconception, pregnancy, diet and food intake. All papers were quality assessed using the Scottish Intercollegiate Guidelines Network methodology checklist for cohort studies. The search revealed 726 articles, narrowed to full-text review of 36 studies. In total, 11 research articles were included in the review. The findings were narratively summarised in line with the aims of the review.

The included studies continued to show marked heterogeneity, which impacts on the findings. Two studies that reported energy and macronutrient intake data, both describe a significant increase in energy intake (100-600 kJ) during pregnancy potentially explained through an increase in carbohydrate intake (%TEI). Of the studies who reported changes in food group analysis (n=10), a majority report an increase in fruit and vegetable intake with a reduction in fish, processed meat, fried food and caffeine consumption during pregnancy. Adherence to healthy eating index and diet diversity scores were reported in 6 studies and indicated minimal improvement between preconception and pregnancy scores. The characteristics of the women participating in these studies continues to suggest that increased age and education status remain associated with healthier dietary changes; with physical activity and screentime also to be considered however these factors were not assessed in all studies included.

The included articles show varied results in dietary intake during pregnancy as compared to before, this outcome was similar to the 11 studies included in the 2017 review⁽²⁾. The updated review demonstrates a development in data analysis strategy, including healthy eating index rather than limiting to specific changes in individual energy and macronutrients. Future research is needed on related changes women and their partners make to their eating behaviour before, during and after pregnancy, not solely what they eat at different time points⁽³⁾. These changes include frequency and quantity, time and place of eating, eating circumstance, eating preparation⁽³⁾. Above and beyond this, most determinants identified were on individual level⁽³⁾, and more focus on environmental and policy factors are important.

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OC33. Dietary fibre and fat intake in postpartum women and its association with income and ethnicity: the Supporting MumS cohort. E. Spyrelli¹, D. Gallagher¹, A.S. Anderson², S. Bridges³, C.R. Cardwell¹, E. Coulman⁴, S.U. Dombrowski⁵, C. Free⁶, P. Hoddinott⁷, F. Kee¹, C. McDowell⁸, E. McIntosh⁹, J.V. Woodside¹, M.C. McKinley¹ and on behalf of the Supporting MumS (SMS) research team 1. Centre for Public Health, School of Medicine, Dentistry & Biomedical Sciences, Queen's University Belfast, UK and 2. Centre for Research into Cancer Prevention and Screening, Cancer Division, Medical Research Institute, Ninewells Medical School, Dundee, UK and 3. Bradford Institute for Health Research, Bradford Teaching Hospitals NHS Foundation Trust, Bradford, UK and 4. Centre for Trials Research (CTR), School of Medicine, Cardiff University, Cardiff, UK and 5. Faculty of Kinesiology, University of New Brunswick, Canada and 6. Clinical Trials Unit, Department for Population Health, Faculty of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, London, UK and 7. Nursing, Midwifery and Allied Health Professions Research Unit, Faculty of Health Sciences and Sport, University of Stirling, UK and 8. Northern Ireland Clinical Trials Unit, Belfast, UK and 9. Health Economics and Health Technology Assessment, Institute of Health and Wellbeing, University of Glasgow, Glasgow, UK.

Good nutrition during the postpartum period, which is also the inter-pregnancy period for many women, has short and long-term health benefits for the mother and her offspring⁽¹⁾. Gaining a better understanding of mothers' dietary patterns at the postpartum stage will help shape appropriate strategies to encourage the adoption of a healthy and more varied diet. This exploration is a preliminary analysis that aims to assess intake of total fat and dietary fibre in a UK cohort of postpartum women with overweight and obesity and examine its relationship with income and ethnicity.

A sample of 892 postpartum women (up to two years after having a baby) with overweight or obesity were recruited from five UK locations (Belfast, Bradford, London, Stirling, Cardiff) to participate in the Supporting MumS (SMS) randomised controlled trial to examine the effectiveness of an automated text-based delivered weight management intervention. At baseline, researchers measured participants' height and weight and calculated their body mass index (BMI). Baseline diet was self-reported and assessed using the *Fat and Fibre Barometer* (FFB), a validated scale measuring the consumption frequency of 20 dietary sources of fibre or fat⁽²⁾. Items were scored from 1-5 and an average FFB score was calculated; greater values indicate a diet higher in fibre-rich foods and lower in fat-rich foods. Information on income and ethnicity was also collected. Multivariable linear regression analysis tested for associations between FFB scores and ethnicity and household income, accounting for BMI, age and study site.

Participants were from a range of ethnicities (Asian: 17%, $N=151$; Black: 11%, $N=100$; White: 66%, $N=589$; Mixed/Other: 6%, $N=52$). Household income distribution was: $\leq\pounds40K=41.5\%$, $N=370$; and $>\pounds40K=49.8\%$, $N=445$. Average age was 35 years ranging from 21-57 years. Thirty-nine per cent of women lived with overweight and 61% with obesity. The FFB score was calculated for the 856 of 892 participants who provided complete dietary information (Mean \pm SD = 3.03 ± 0.42 , range: 1.9-4.6). There was no statistically significant association between FFB score and ethnicity. There was a significant relationship between the FFB score and household income (0.015 , $P=0.025$, CI= $0.002-0.028$), with women from higher incomes having higher FFB scores.

Our results from a large, socioeconomically diverse sample of women with overweight or obesity in the postpartum period showed that mothers from higher income households consumed more fibre and less fat. This is consistent with results of national surveys highlighting the income gradient in food habits and in meeting dietary guidelines among women in the UK⁽³⁾. Addressing these dietary inequalities will require concerted action from a wide range of stakeholders.

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OC34. Using mixed methods to explore dietary intake in women with recurrent miscarriage: integrating Participant Public Involvement in the research design. *Fatima Koroma¹ Jayne Charnock² Katerina Bambang³ Julie Abayomi¹* 1. Faculty of Health, Social Care and Medicine, Edge Hill University and 2. Department of Biology, Edge Hill University and 3. Liverpool Women's NHS Foundation Trust.

Recurrent miscarriage (RM) is defined as 3 or more consecutive pregnancy losses, prior to 24 weeks gestation ⁽¹⁾. In the UK, RM currently affects 1 in 100 (1%) of couples who are trying to conceive ⁽²⁾. At present there is limited information regarding the role of nutrition in the occurrence of RM and on the dietary intake of women who have experienced RM. Thus, investigating links between dietary intake, gene expression, and pregnancy outcomes is crucial. Public and Patient Involvement (PPI) is considered important in health research since it enhances the quality, relevance, impact, and integrity of research activities ⁽³⁾. RM is a sensitive issue, so incorporating the views of service-users in the research design is important. The main aims of this study were to understand the views of women with RM on the proposed research and to strengthen the design by integrating their suggestions.

The main study will aim to use mixed methods to explore the dietary intake of women with RM to determine if there is a relationship between achieving Dietary Reference Values or not, placental health, and pregnancy outcomes (if pregnancy is achieved). For PPI, women were recruited from a specialised recurrent miscarriage clinic in a hospital located in North-West England. Four women participated in a virtual PPI session and were asked for their views on the proposed research design. The session was recorded and transcribed using Microsoft Teams transcription. The researcher initiated the session by presenting a breakdown of the study design, followed by an explanation of its aims and rationale. Participants were queried about their perspectives on the study design through a series of questions. Participants were sent a £20 e-voucher, aligning with INVOLVE guidelines ⁽³⁾.

Participants stressed the significance of the research given the absence of nutrition guidance for women with RM. They approved the sensitive recruitment approach and expressed interest in joining the study. However, concerns emerged regarding women who have experienced RM following IVF treatment, and whether they would be 'eligible for inclusion or not'. Participants suggested extending the food diary duration from 3 to 5 days for better accuracy in reflecting their eating habits. This was not viewed as overly burdensome, and they suggested that such activities could serve as 'a distraction' during 'early pregnancy anxiety'.

A limitation of this study was the small number of participants. However, this PPI approach further strengthened the research design, as the study design was revised to integrate the suggestions made by the women, including aligning the eligibility criteria to include women who had undergone IVF and experienced RM. Additionally, the food diary duration was extended from 3 to 5 days, which will result in the collection of better-quality dietary data, without risking compliance fatigue.

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Student Competition

OC35. Identifying barriers to maternal care in mothers from black, minority ethnic and refugee communities in Islington. *Aghili A.¹, Harding J.¹, Illingworth S.J.¹, Wood P.¹ and Bhakta D.¹. School of Human Sciences, London Metropolitan University and 2, School of Computing and Digital Media, London Metropolitan University.*

Maternal death rate in the UK has risen sharply and reached levels above those observed in the previous 20 years. Between 2020 and 2022 there were 13.41 deaths for every 100,000 maternity cases compared to 8.79 deaths per 100,000 cases in 2017–19⁽¹⁾. In conjunction with this, maternal mortality rates show significant disparities: women from black ethnic backgrounds have a three times higher risk of dying as mothers than white women⁽²⁾. The maternal death rate for women in the most deprived areas is twice that of those residing in the least deprived areas⁽³⁾ emphasising the need for ongoing efforts to close these gaps.

Located in Islington, Manor Gardens is a unique charity committed to improving maternal health by offering essential support services to expectant women. Their programmes include providing pre and postnatal care, mental health assistance, nutrition guidance, and access to health care professionals.

The aim of this study was to combine quantitative analysis of the charity's maternity information system with qualitative interviews to evaluate the maternity services provided by the charity. Specifically, the study sought to assess service utilisation, explore user experiences and perceptions of their maternity care experiences.

Ethical approval was obtained from the London Metropolitan University to analyse the data from the charity's maternity information system. We included women who used their services from 2019 to 2023. In addition to this, eight opportunistic face-to-face interviews were undertaken and thematically analysed to understand the impact of cultural and socioeconomic factors on their maternity care experience.

We identified 256 women had accessed the charity's services of whom 70 were included in our report due to incomplete data. Forty-nine percent (n=34) of women were identified as having minority ethnicities, 35% as other and 16% as white. Forty-six percent (n= 32) did not speak English or had basic English. Social isolation, domestic abuse, seeking asylum, unsuitable housing and not having a bank account were among the barriers which prevented access to healthcare. Only 19% confirmed they had registered with a GP.

The thematic analysis identified the following themes: Migration and Settlement Experience, Cultural Barriers, Healthcare Experience, Maternity Care and Postpartum Challenges and Support Systems. The interviews revealed the experiences of mothers, marked by social isolation, language and cultural barriers impacting understanding of healthcare procedures, struggles following childbirth magnified by impoverished living standards. These highlight the importance of effective support systems and culturally sensitive health care.

Our findings suggest that by supporting maternal health, Manor Gardens Charity has the potential to identify barriers which can adversely impact the lives of many women and their families within a deprived community.

Acknowledgments

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Student Competition

OC36. Consumer perceptions towards five popular alternative proteins. A systematic review across Western and Eastern countries. S. Dong¹, T. Benson¹, A. Nugent¹ and M. Dean¹. *Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, Northern Ireland, UK.*

Alternative proteins provide a better way to feed the world⁽¹⁾ and have great potential to support the United Nations' sustainable development goals in ending hunger, promoting sustainable energy use, protecting the climate, and promoting good health⁽²⁾. However, consumers' acceptance of alternative proteins is much lower than that of conventional meat⁽³⁾. With the alternative protein market consistently growing since 2021⁽⁴⁾, it is essential to summarise and update factors affecting consumer acceptance of alternative proteins to inform relevant organisations such as the government and support industry development. Using a systematic review, this study aimed to understand and compare consumers' acceptance of five popular alternative proteins (algae, pulses, plant-based alternative proteins, insects, and cultured meat) and identify research trends and essential factors influencing consumption of alternative protein foods. Specifically, the study compared familiarity and external factors in consumer acceptance.

Building upon an existing systematic which included studies published by 2020, five electronic databases were searched. This review followed PRISMA guidelines, covering Western and Eastern countries, and articles published between June 2020 and March 2023. A total of 112 articles from 40 countries were included. Following the innovation-decision process framework, factors between alternative protein types, products, and psychological and external variables are compared, and changes over time are identified.

Italy (n=15), China (n=13) and the United Kingdom (n=12) were the top 3 in publication numbers. Surveys (n=95) were the most used method in the studies. Insects (n=41) and cultured meat (n=21) were the most popular. The findings reveal that consumers show moderate acceptance of alternative proteins, but a relatively higher acceptance of food products made with these proteins. Tastiness emerged as the top concern in alternative protein consumption, highlighting the importance of sensory appeal. Environmental benefits plus health beliefs also played a significant role in consumer acceptance. Interventions to illustrate food safety and quality variables correlated to a higher willingness to consume alternative proteins. Food neophobia and diet showed distinguished value in consumer acceptance level. Participants who had experienced eating insects showed significant differences in food neophobia scores, subjective norms, attitudes, and intentions. Meal composition and trust in the chef increased consumers' willingness to consume. Many studies focused on developing alternative protein food products and determining their appropriateness for consumption in different contexts. Consuming alternative proteins with family or friends with positive emotions was more acceptable to consumers.

Consumers' different acceptance levels and critical factors of alternative protein consumption illustrated the essentials of focusing more on consumer categorisation. The fast expansion of the global alternative protein market and accelerated study output call for building a more complete standardised management and information supply system.

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Student Competition

OC37. LIFE Climate Smart Chefs; An Analysis of the Impact of Recipe Reformulation on Environment and Nutrition to Support Sustainable Menu Design (Editions 4 to 6). L. Geaney^{1,2}, H. Stack¹, A. Magnani³, M. Antonelli³, S. Castaldi^{3,4}, D. O'Kelly², F. Douglas², K. O'Brien² and L. B. Kirwan² 1. Munster Technological University, Bishopstown, Cork, T12 P928 and 2. Nutritics Ltd, 22C Town centre mall, Main Street, Swords, Dublin, K67 FY88 and 3. Barilla Foundation, via Madre Teresa di Calcutta, 3/a, Parma, Italy and 4. Università Degli Studi Della Campania "Luigi Vanvitelli", DISTABIF, via Vivaldi 43, 81100, Caserta, Italy.

2023 was reported as the warmest year on record, and the global mean temperature reached 1.45°C above the 1850 to 1900 pre-industrial average ⁽¹⁾. Emissions from food production are estimated to push global warming over the 1.5°C target set by the Intergovernmental Panel on Climate Change (IPCC) ⁽²⁾. The food industry contributes to one-third of greenhouse gas emissions (GHGe), and accounts for 70% of the world's fresh water use, through unsustainable practices within food production, packaging and transportation ⁽³⁾. The LIFE Climate Smart Chef (CSC) project was developed to support EU Climate Policy in line with the objectives of the Farm to Fork Strategy ⁽⁴⁾. This study aims to analyse the nutritional and environmental impact of recipe reformulation by chefs on the CSC project between January to May 2023.

Under the CSC project, 164 chefs were required to enter their recipes into Nutritics, complete a higher level training course on sustainable menu design, and then reformulate their recipes in an in-person workshop where the Nutritics "Foodprint" sustainability module was turned on. Foodprint profiles a recipe's carbon impact into a simple A to E grading system based on boundaries defined by the CSC project. 178 recipes from 27 chefs were entered into Nutritics software, and analysed for environmental impact (SuEatable LIFE database) and nutrition (energy, saturated fat, salt, sugar, and front of pack labels).

Environmental analysis showed a reduction in carbon (μ -40%; -20% to -75%) and water (μ -38%; -25% to -64%) following reformulation. While the number of A grade recipes remained the same, recipes with "Low" and "Medium" carbon grades B and C (B grades +7%, C grades +4%) and "High" carbon grade D recipes increased (+1%), "Very high" carbon E grade recipes (>1.2kg CO₂eq) decreased by 15%. For the nutrition analysis, there was a reduction in saturated fat content (μ -11%; 0 to +18g) and salt (μ -5%; 0 to +3.3g), whereas sugar increased after reformulation (μ + 16.3%; 0 to +32g). The Nutrition front of pack labels were impacted by reformulation; "red" labels decreased for salt and saturated fat, but increased for sugar (salt -17%; saturated fat -46%; sugar +50%), recipes labelled "amber" decreased for salt, but increased for saturated fat (salt -5%; saturated fat +6%; sugar 0%) and recipes labelled "green" increased for salt and saturated fat, but decreased for sugar (salt +7%; saturated fat +7%; sugar -1%).

Reformulation should consider multiple factors to ensure a net positive impact on environment and health. This analysis quantifies and provides insight into reformulation as a strategy in sustainable menu design. Quantifying impact may provide an evidence-based for food service reformulation strategies and targets. Future research should analyse additional factors such as cost and demographics, and in-depth statistical analysis.

Acknowledgments

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Student Competition

OC38. The environmental impact of diet in Latin American populations: a systematic review. C. Araya-Bastias¹, J. Garzillo², J. P. Pell³, D. Lee⁴, and C. Celis-Morales¹. 1. School of Cardiovascular and Metabolic Health, University of Glasgow, Glasgow, UK and 2. Department of Nutrition, School of Public Health, Center for Epidemiological Research in Nutrition and Health, University of São Paulo, São Paulo, Brazil and 3. School Health & Wellbeing, University of Glasgow, Glasgow, UK and 4. Mathematics and Statistics Building, University of Glasgow, Glasgow, UK.

Food production accounts for one third of global greenhouse gas emissions ⁽¹⁾. Similarly, the demand on the food system depends in part on people's food choices. Thus, several studies have estimated the environmental impact of dietary patterns based on food consumption data from developed countries ^(2,3). This has led to literature reviews comparing the evidence for the impact of different diets on the environment and health status ^(4,5). However, similar analyses from developing countries are scarce. In this context, this systematic review sought to analyse and compare the available literature on the environmental impact of the diet of Latin American populations.

A systematic review was conducted using the ©2024 Covidence online software. Searches were conducted in Medline, Embase, Web of Science and Scopus databases. Inclusion criteria were studies measuring different markers of environmental impact such as carbon, water or ecological footprint related to food consumption in Latin American countries. We narratively synthesized the evidence by country, environmental markers, socio-demographic factors and dietary intake reported by each country.

Out of 3007 papers, 30 were included in this review. Eight Latin American countries have reported the environmental impact of diet, with the majority coming from Brazil (n=8), followed by Mexico (n=6), Argentina (n=3), Chile (n=3), and Peru (n=2) while only study was available for Colombia, Costa Rica and Guatemala. Water and carbon footprint were the most commonly used measures of the environmental impact of people's diets. The average (IC 95%) carbon footprint reported were 2.3 (2.1; 2.3); 2.6 (2.6; 4.4); 3.4 (2.4; 4.7); 4.5 (4.4; 4.6) and 8.3 (4.5; 12.4) KgCO₂eq/person/day in Guatemala, Peru, Chile, Brazil and Argentina, respectively. In general, men, middle-aged adults and people with higher educational and socio-economic levels were positively associated with a higher diet-related environmental footprint. In addition, beef and vegetables were the foods with the highest and lowest environmental impact attribution, respectively.

Our review reveals a significant lack of research on the environmental impact of diet in Latin American populations. This underlines the need to establish a regional database documenting the environmental footprint of commonly consumed foods in Latin America. This would allow for the development of studies to provide evidence to promote public policies to achieve more sustainable diets in the region.

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OC39. Revisiting attitudes and awareness around sustainable diets after 10 years. E. Cleland¹, D. McBey¹, V. Darlene¹, B.J.J. McCormick¹ and J.I. Macdiarmid¹ 1. The Rowett Institute, University of Aberdeen, Aberdeen, UK.

While the impact of high meat consumption on the environment⁽¹⁾ and health⁽²⁾ have been studied for decades, public knowledge of these issues is less well understood. The aim of this study was to assess the awareness and knowledge of the environmental impact of food choices among the public, as well as people's willingness to reduce their consumption of meat. We sought to repeat the study conducted by Macdiarmid *et al.*⁽³⁾, which found limited knowledge of the link between meat and the environment, and a general unwillingness to change, to understand if public knowledge of and perceptions around sustainable diets have changed in the decade since the original study was conducted.

Nine in-person focus groups were conducted between March and August 2023. Adult participants (≥ 18 years old) were recruited in Scotland from populations matching the original study⁽³⁾ based on a balanced urban vs rural, locations and high vs low socio-economic status (SES) areas. Data was coded and analysed using a thematic approach.

Most participants (n = 60, ranging from 5-11 participants per group) believed that food choice impacts the environment and human health. Views diverged between the sociodemographic groups with urban/higher SES groups generally more knowledgeable of the impact of meat on the environment and rural/lower SES participants typically less aware. Willingness to reduce meat consumption was also split by SES and motivations were different. Higher SES groups were more willing to reduce meat consumption, and in some cases reported having already started to do so, than lower SES groups. The former groups discussed ethical, health and environmental reasons whereas the latter groups were more sensitive to the price of alternatives. Meat, variously defined, but generally ruminant meat, was considered an important part of a 'balanced' diet and most participants were reluctant to remove it entirely.

Although the language of dietary sustainability was not uniformly recognised or understood, there was greater understanding of the underlying concepts in 2023 compared to 2013. The environmental impacts of food choices were more often couched in terms of the physical environment (e.g., packaging) than climatic impacts (i.e., greenhouse gas emissions). There was a strong sense that local (i.e., Scottish) production was more 'sustainable' than imported food and there was broad willingness to reduce, but not remove, meat consumption in principle.

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OC40. Consumer ranked likely effectiveness of interventions to reduce meat consumption. D. McBey¹, G. Martínez Sánchez², B.J.J. McCormick¹, G.W. Horgan² and J.I. Macdiarmid¹ 1. The Rowett Institute, University of Aberdeen, Aberdeen, UK and 2. BioSS, Aberdeen, UK.

There are potential health and environmental benefits to reducing meat consumption among populations where consumption is high⁽¹⁾. However, meat is a staple part of the diet for many, and large-scale dietary shift is difficult to achieve. We sought to investigate current attitudes to meat and plant-based foods, intentions reduce meat consumption over the next three months, and potential policies and interventions current meat eaters believed could help them to eat less meat and more plant-based foods.

We conducted an online survey (n=1590) of people living in Scotland, stratified by age, gender, ethnicity, and educational attainment. Of this sample, 95% (n=1504) described their diet as either omnivorous (84%) or flexitarian (11%). In addition to questions about intentions to reduce meat we presented statements framed around the COM-B model of behaviour⁽²⁾ to measure people's perceptions of their Capacity, Opportunities and Motivation to change Behaviour, in this case reducing meat consumption. Latent Class Analysis (LCA) was conducted using these COM-B statements in order to identify disparate segments of the population based on underlying attitudes and beliefs. Current meat eaters were also asked to rank 25 different potential policies or interventions that have been identified in previous work^(3,4), using a best-worst scaling method where they were asked to choose the option they believed would be most effective for them personally, and the one which would be least effective, from a choice of four interventions. This was repeated ten times for each respondent, with a ranking then calculated using a conditional logit model.

Considering only meat eaters, sociodemographic variables such as age (Cramer's V = 0.1, p<0.001), gender (V = 0.09, p=0.03) and education (V = 0.09, p<0.001) were weak predictors of intentions to reduce meat. The LCA, based on responses to the COM-B statements, revealed four distinct groups. One group (14% of the sample) appeared unwilling to reduce consumption, one was more ambivalent (25%), another group was broadly willing (45%), and the last reported to be actively reducing consumption (14%). Regarding the perceived utility of potential policy and intervention options, there were broad similarities among the four population groups, with options related to the cost and improvement of current vegetarian options (taste and availability) considered most impactful for all. In contrast, interventions that sought to provide information and educate (e.g., leaflets or celebrity endorsement) were considered least likely to facilitate change by all four groups.

There is a willingness to reduce meat consumption among a majority (59%) of the population, and there appear to be concrete policy and intervention options that could target them. There are also potentially more targeted policy options, which could target those who currently consume more meat and are less likely to consider eating less.

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OC41. Food environment transformations and policy landscape in Zambia: a qualitative inquiry of the ongoing nutrition transition. P. Yiga¹, P.Y. Tan¹, C. Chomba², A. Menefe³, C. Shannon³, P. Kalenga³ and YY. Gong¹ 1. School of Food Science and Nutrition, Faculty of Environment, University of Leeds, UK and 2. Agricultural Consultative Forum, Lusaka, Zambia and 3. Care International Zambia and USA.

Zambia is experiencing a nutrition transition, owing to fast changing food environment⁽¹⁾. Some of the policy strategies in Zambia are perceived by stakeholders as not feasible, or effective due to gaps in contextualization⁽²⁾. The study aimed to explore the policy makers' perception of the food environment and map the current and potential policy strategies to address the transformations.

18 key informant interviews (KII) were conducted with policy makers in Zambia during February and March 2024. Interview guide was constructed based on a food environment framework comprising four dimensions including availability, accessibility, marketing, and desirability⁽³⁾. For each dimension, questions were asked on 1) perception of the food environment transformations, 2) existing policy strategies, and 3) potential policy strategies⁽⁴⁾. Ethical approval was granted by Universities of Leeds and Zambia.

Preliminary findings (from 5/18 KII), summarised according to the themes of food environment framework.

Availability: dietary shift towards consumption of unhealthy foods due to; 1) decreasing diversity of indigenous foods coupled with increasing cheap energy dense low nutrient foods, 2) mushrooming fast food chains including in school neighbourhoods, and 3) certain policy strategies (Vit A sugar fortification). Existing policy strategies: nutrition education based on food based dietary guidelines, capacity building in the context of obesity prevention and management (courses under development). Apart from sugar sweetened beverages tax, limited strategies targeted at physical food environment. *Potential strategies:* 1) public-private partnerships to agree on improved reformulations and labelling, 2) incentives to industries making reformulations, 3) restriction of unhealthy foods in school environments, and 4) promoting picking-up trend of local restaurants offering indigenous healthier menus.

Accessibility: wet markets still the main source especially for vegetables and fruits. Supermarkets have picked up, but mostly offer unhealthy options, often displayed in prominent locations. Vegetables and fruits offer is small and mainly exotic. Existing strategies: no policy to guide supermarkets operations / marketing strategies. Potential strategies include 1) public-private sector dialogues to come up with guidelines for supermarkets, e.g. on placements – capitalise on experience from breast milk substitutes, alcohol, and tobacco regulations, 2) making wet markets attractive through infrastructure improvements and enforcement of food safety standards.

Marketing; aggressive advertising mostly for unhealthier foods through social media and billboards in prominent locations. Existing *strategies:* no specific regulation. Potential strategies include advocating for regulations prohibiting advertising in key locations like school neighbourhoods.

Desirability: fashionable to eat fast foods especially the youth. Existing *strategies:* Nutrition education. Potential strategy; utilising multisectoral and stakeholder actors like the church and cultural institutions.

Current policy landscape and perception among policy makers is hinged on bottom-up approaches, that is improved consumer awareness to force the industry into fundamental changes. However, a combination with top-down approaches, e.g. regulatory strategies to unhealthier foods (reformulation and marketing) is key.

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OC42. Longitudinal change in diets among older Irish adults: considerations for sustainable diet transitions. C.L Leydon^{1,2}, J.M Harrington¹ and S.N McCarthy² 1. Centre for Health and Diet Research, School of Public Health, University College Cork, Cork, Ireland and 2. Department of Agrifood Business and Spatial Analysis, Teagasc Food Research Centre, Ashtown, Dublin, Ireland.

Achieving healthy, environmentally sustainable, equitable and culturally appropriate diets is the defining challenge for 21st-century food systems. Research has provided a reference for what a planetary diet should be⁽¹⁾, although concerns regarding the micronutrient adequacies have been raised⁽²⁾. Further, research on the robustness of sustainable diets to support healthy ageing is unknown. Other well-established healthy dietary patterns such as the Dietary Approaches to Stop Hypertension (DASH) have been shown to reduce diet-related greenhouse gas emissions (GHGE)⁽³⁾. In addition, maintaining healthy dietary habits can reduce the risk of chronic diseases, cognitive impairment, and physical disability as age advances⁽⁴⁾. Therefore, this study aimed to assess whether adherence to the DASH diet changed after a five year period and determine the impact on dietary GHGE and blue water use (BWU).

The 2010 baseline and 2015 follow-up of the Mitchelstown Cohort conducted in County Cork, Ireland consisted of 1256 males and females participants for which dietary data was available. Intakes were assessed with a validated food frequency questionnaire and, based on compliance with the DASH diet⁽⁵⁾, participants were assigned to quartiles. Those in quartile four (Q4) and quartile one (Q1) were the most and least adherent, respectively, to the recommendations. The dietary environmental impacts were estimated by assigning GHGE and BWU indicators to food items based on life cycle assessment data from a secondary source⁽⁶⁾. The difference between low and high DASH adherence at baseline and follow-up was analysed using a paired samples *t*-test or a Wilcoxon test. All analyses were carried out using SPSS (version 29.0).

The median age of the cohort was 65 years at follow-up. Females had higher adherence to the DASH diet compared to males at both baseline and follow-up. Of the participants with low adherence at baseline, only 26% of these participants improved their diet at follow-up. Conversely, among those with the highest adherence to DASH, around 74% of participants dropped to a lower quartile five years later. Those that improved their diet at follow-up had lower GHGE but higher BWU, while participants whose diets worsened, had higher GHGE and BWU compared to baseline.

There is a pressing need to establish and maintain healthy dietary patterns among older adults to support long-term healthy ageing. Although there was improvement in diets for some participants, the high percentage of participants who did not maintain their healthy dietary habits is a concern. Given that future diets need to not only be healthy but also sustainable, this study highlights the difficulty of achieving population adherence to any such recommendations.

Acknowledgments

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Student Competition

OC43. Environmental impact of blue water use by adults aged 18-64 on the Island of Ireland. V. Leighton¹, H. Griffin¹, B. A. McNulty², D. Wright³, L. Brennan² and A.P. Nugent^{1,2} 1. Queen's University Belfast, School of Biological Sciences, Institute for Global Food Security, Belfast, Northern Ireland and 2. University College Dublin, UCD School of Agriculture and Food Science, Dublin, Ireland and 3. Queen's University Belfast, School of Medicine, Dentistry and Biomedical Sciences, Belfast, Northern Ireland.

Blue water is sourced from rivers, lakes, and reservoirs and is used for drinking water, growing crops, and food production⁽¹⁾. Approximately 75% of blue water use (BWU) comes from food systems⁽²⁾. Dietary change is necessary to meet net zero BWU sustainability goals by 2050⁽³⁾. While there is some information on diet-associated BWU for the Republic of Ireland (ROI)⁽⁴⁾, BWU across the Island of Ireland is unknown. This study aimed to quantify the environmental impact of BWU of daily diets across adults aged 18-64 on the Island of Ireland, to determine population characteristics, nutrient intakes and key food sources influencing emissions.

The Northern Ireland sub cohort of the UK National Dietary Nutrition Survey (2016-2019)⁽⁵⁾ and the Irish National Adult Nutrition Survey (2008-2010)⁽⁶⁾ were analysed. Information on food and nutrient intakes was extracted from four-day food diaries for a total of 1,484 adults aged 18-64 years. BWU values were assigned for each food⁽⁷⁾ and the population was grouped into tertiles of low (T1), medium (T2), and high (T3) BWU. Differences in population characteristics, key nutrients (%TE or per 10MJ) and contributing food sources were examined across these tertiles. Statistical analysis was performed using chi-square and one-way ANOVA with covariates (age, BMI, Sex, Survey type and social class) and correcting for multiple comparisons as appropriate (P<0.001).

BWU for the Island of Ireland was 481.9 ± 440.4 L/day, 524.7 ± 448.0 L/day for Northern Ireland and 474.9 ± 438.6 L/day for the ROI and 100% of the population did not exceed the BWU planetary boundary of ≤786 L/day⁽⁸⁾. Males had a higher contribution to the total BWU than females on the Island of Ireland (513.3 ± 482.2 L/day vs 453.2 ± 385.8 L/day). 'Tea, coffee and water' (76%), 'rice and rice dishes' (4%) and 'fruit and fruit juice' (2.5%) were the greatest contributors to BWU. When tertile analysis was performed, BWU from 'tea, coffee and water' was significantly higher for T3 at 837 ± 468.8 L/day versus T1 (57 ± 50.9 L/Day), this was similar for 'rice and rice dishes', where BWU in T3 was 26.3 ± 44.0 L/Day versus T1 (13.3 ± 25.2 L/Day). When nutritional analysis was performed, differences (P<0.001) across tertiles of BWU were observed for energy (11% increase between tertile 1 and 3), magnesium (12% increase across tertiles) and potassium (8% increase across tertiles).

Overall, a shift to more sustainable diets is needed to prevent BWU boundaries being exceeded in the future. By filling a literature gap on the environmental impact of the Northern Irish diet, this study complements previous research on the ROI, offering a comprehensive view of the BWU footprint and providing a basis for the development of strategies to improve diet-related BWU on the Island of Ireland.

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Student Competition

OC44. Identifying barriers and facilitators to reducing free sugar intakes in consumers exceeding UK recommendations: A framework analysis. L. R. Boxall¹, H. Dalby¹, E. Arden-Close¹, J. James² and K. M. Appleton¹. 1. Department of Psychology, Faculty of Science and Technology, Bournemouth University, Bournemouth, UK and 2. Department of Nursing Science, Faculty of Health and Social Sciences, Bournemouth University, UK.

Despite dietary guidance in over 90 countries and resources like the UK's Eatwell guide, most individuals do not adhere to or achieve dietary aims^(1,2). Specifically in the UK, population intakes of free sugars remain above the <5% recommendation, at around ~10% of total energy intakes⁽³⁾. To improve adherence to messages such as 'reducing free sugars', it may be helpful to identify barriers and facilitators to adherence whilst individuals attempt to modify their dietary patterns.

Participants were randomly selected from a randomised controlled trial investigating the effects of three different types of advice to reduce free sugars vs control on reducing free sugar intakes⁽⁴⁾. A semi-structured interview explored barriers and facilitators to dietary adherence. Covariate adaptive randomisation ensured equal interviews at all timepoints across the 12-week study period and from participants in each trial arm. Data were analysed using framework analysis⁽⁵⁾.

Sixty-two interviews were conducted across a 12-month period between 2021-2022. Seven themes for barriers and facilitators to recommendation adherence, encompassing 14 subthemes, were identified: 1) Proof and impact; 2) Realities of life; 3) Personal balance and empowerment; 4) Habitual approach; 5) Is it possible?; 6) Extensive awareness and viewpoint; and 7) Power of knowledge. Emergent themes sit within a context where individuals were challenged to reduce their intakes of free sugars and/or accurately record dietary intakes, thus they relate specifically to a dietary recording and free sugar reducing scenario. Participant interviews detected both internal and external environmental factors contributing to approaches to change. These factors were interrelated to self and community awareness, describing how individuals may utilise knowledge and understanding. Intervention participants reported all themes more than control participants; excepting the sub theme 'limited impact.' There were no observable reporting differences between the three intervention groups. Over the 12 -week study period, the positive sub-theme 'enables' within the theme 'power of knowledge' was more prominent at intervention delivery (week-1) than week-12. Additionally sub themes 'active' and 'empower' were reported more in those with higher adherence scores. These results suggest that dietary recommendations may need to be adapted to incorporate the stage at which dietary behavioural change takes place, with some focus also on maintenance as well as change. Overall, participant reports revealed that dietary advice needs to be appropriate for the person receiving it, easily understood, applicable, and actively engaging.

Our findings, when considered with the wider literature, may help us to better understand attempts to make dietary changes based on dietary advice, and support an individualised approach to dietary management. This greater understanding will help future advice to reduce free sugar intakes, including policy and public health initiatives.

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Student Competition

OC45. Exploring uptake and adherence to ‘healthy eating’ interventions in low socio-economic communities via a thematic narrative synthesis. A. Stephen¹, J. Kyle², J. Allan³, O. Petre¹ and F. Thies¹. 1. The Rowett Institute, University of Aberdeen and 2. Institute of Applied Health Sciences, University of Aberdeen and 3. Division of Psychology, University of Stirling.

Low socioeconomic status (SES) is associated with an increased risk of overweight and obesity, consequently elevating the likelihood of non-communicable diseases such as cardiovascular disease and type II diabetes⁽¹⁾. Although dietary interventions offer a promising solution to address this issue, engaging low-SES groups is challenging; uptake and adherence tends to be suboptimal^(2,3). The aim of this review was to understand current levels of uptake and adherence and to identify the drivers of optimal uptake and adherence in community-based dietary interventions for populations with low socioeconomic status.

A systematic review of studies published prior to December 12, 2022, identified 114 relevant records. Full text screening, data extraction and coding was conducted by two independent reviewers. A thematic analysis and narrative synthesis was carried out to explore factors associated with uptake and adherence, alongside a basic descriptive analysis of current uptake and adherence rates.

Of the 114 included records, 88 reported uptake and 110 reported adherence. On average, uptake stood at 80%, indicating a 20% shortfall and potential compromise to validity. Adherence averaged 72%, with only 36 records meeting the recommended threshold of 80%⁽⁴⁾. Thematic analysis revealed barriers and facilitators to engagement. Participants faced various challenges hindering engagement, including logistical obstacles such as transportation issues and scheduling conflicts, alongside socioeconomic constraints like low income and competing life stressors. Lack of personal motivation and family resistance further impeded participation, reflecting the influence of social norms. Environmental barriers, including the availability of fast food and program fidelity challenges, also contributed to lower program uptake. Social support and community engagement played a pivotal role in enhancing intervention participation, fostering supportive networks and shared knowledge among participants. Practical support and accessibility measures, such as logistical assistance and intervention adaptability, facilitated retention by reducing barriers to engagement. Tailored interventions, incorporating cultural competence and personalized approaches, effectively addressed participants' specific needs and preferences. Additionally, motivational strategies, including goal setting and positive reinforcement, encouraged sustained engagement by boosting participants' self-efficacy and commitment to healthy behaviours.

The observed uptake and adherence rates highlight the persistent challenge of participant engagement and retention in dietary interventions among low-income populations. Interventions addressing logistical, socioeconomic, and motivational barriers, along with tailored and culturally competent interventions, are key for improving engagement and retention in future interventions, thereby enhancing their effectiveness in combating diet-related health disparities.

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Student Competition

OC46. Insights into knowledge, perceptions, and lifestyle barriers in obesity and type 2 diabetes prevention and management among Indian men: a small-scale survey. F. Patel¹ and G. Farhat¹.
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People from south Asian heritage are underrepresented in health research globally⁽¹⁾. They have a lower threshold for obesity and are at a higher risk of type 2 diabetes mellitus (T2DM) compared to the White population⁽²⁾. While south Asian women are often more included in research, there is a gap in understanding men's perceptions and knowledge regarding obesity and T2DM, as well as barriers to adhering to dietary and physical activity recommendations. Understanding these barriers will help design appropriate interventions to tackle the unique challenge of T2DM in this community. The aim of this survey was to explore perceptions and knowledge regarding obesity and T2DM, as well as barriers to adopting a healthy lifestyle amongst Indian adult men (>18 years) living in the UK.

An online survey was distributed in English language. Survey questions were based on the Health Belief Model (HBM). Participants rated statements on their perceptions and knowledge of obesity and T2DM as well as lifestyle barriers. Ordinal logistic regression was used to assess the impact of place of birth and educational level on the outcomes.

A total of 102 Indian men completed this survey. While most respondents are aware of the risks associated with obesity and T2DM and recognised the significance of diet and physical activity in lowering these risks, 27.5% of respondents did not believe in their effectiveness. Additionally, 24% perceived T2DM as difficult to control once it is diagnosed. Interestingly, 46.1% of participants do not think that their ethnicity puts them at a higher risk of T2DM. Perceived barriers to following a healthy diet and physical activity regimen were cultural and traditional dietary preferences (18.6%), lack of motivation and willpower (18%), lack of knowledge about healthy diet (17.6%) and limited access to healthy food options (16.4%). Furthermore, 57.8% of respondents do not feel that they have enough support to help them reduce obesity and T2DM risk. When asked about the most effective measure to reduce the risk of obesity and T2DM, 64.7% responded "regular visits to the GP". Additional respondents emphasized the importance of education, access to information regarding healthier options to traditional Indian foods as well as routine medical assessment. Birthplace (British-born vs. non-British-born) and educational level did not seem to impact perceptions and knowledge, but this outcome may be limited by the small sample size.

This small-scale survey highlights the importance of education in understanding obesity and diabetes risk, although it may not be the primary barrier for the lack of adherence to a healthy lifestyle. Rather, developing culturally specific health interventions and increased support can help overcome barriers and improve men's health in this population. Larger scale surveys may be able to corroborate these findings.

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OC47. Does how we eat affect how much we eat? Associations between covertly measured eating behaviours and food intake over 24 hours in a controlled residential setting. *R.K Price¹, H. Spence¹, S-D. Zhang², T. Redpath¹, F. Naseer¹, A. Boyd¹, M. Martin¹, A. Miras², C.W. Le Roux³, A.C. Spector⁴ and M.B.E Livingstone¹* 1. Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine, BT52 1SA, and 2. School of Medicine, Ulster University, Derry~Londonderry, BT48 7JL and 3. Diabetes Complications Research Centre University College Dublin, Ireland and 4. Department of Psychology and Program in Neuroscience, Florida State University, Tallahassee, USA.

Obesity is a complex condition which is significantly impacted by an individual's biology, environment and behavioural factors. Excess energy dense (ED)(kJ/g) food intake (1), higher eating rate (2), increased eating frequency (3) and eating later in the day (4) have all been linked with obesity, but findings are mixed and require clarification using robust and objective measures of food intake behaviour. The aim of this research was to investigate associations between these eating behaviours and energy intake (EI) within a controlled residential setting in 65 participants (BMI 36.4± 11.0 (range 17.6-65.2); 9 optimal weight, 15 overweight and 41 with obesity/severe obesity; age 44.3 ± 12.7 years (range 18.6-67.6 years), 44F,21M).

As part of baseline measurements for a larger study (5) participants were assessed for 36hrs (two-nights) within the Human Intervention Studies Unit at Ulster University, UK, and had ad lib access to a personalised menu (n 54 foods) representing a range of low/high fat macronutrient mix food groups with varying carbohydrate and protein content (6). Food intake and eating behaviour were measured covertly and validated by CCTV. Study outcomes were 24-hour EI (MJ), ED (kJ/g), % nutrient contribution to total EI, as well as parameters of eating including: size (g, kJ) speed (g/min; kJ/min;), number (n) and duration (mins) of eating occasions (defined as consumption of at least 210kJ separated by ≥5 minutes) and the timing of eating (epochs: 7-11am, 11:01-3pm, 3:01-7pm, 7:01-11pm). On the final morning, blood samples were collected before and 90mins after a standardised breakfast for the analysis of glicentin, a proglucagon-derived peptide. Associations between total EI and measures of eating behaviour were assessed using Spearman's Rank

Correlation analysis showed weak positive associations between total EI and fasting glicentin (r=0.296, p=0.024), ED (r=0.364, p=0.004), and moderate associations with number (r=0.419, p=0.001) and size of eating occasions (r=0.415, p=0.005) as well as total weight of food consumed (r =0.634, p<0.001). Of note, there was also a positive association between EI / eating occasion and a faster eating rate as expressed by [kJ/min (r=0.519; p<0.001)] but not g/min (r=0.276, p=0.07). There was also a stronger relationship between EI and lean mass (r=0.450, p<0.001) than bodyweight (r=0.291, p=0.023).

These findings suggest that food portion size and increased eating frequency may be a more important drivers of EI than dietary ED, and that the rate of eating higher ED foods may be linked to consuming a higher energy meal. These findings are skewed towards individuals with obesity but if confirmed highlight a need for weight management programmes to strengthen strategies to improve portion control and to limit grazing behaviours. There is also a need for robust randomised controlled trials to determine if eating slower reduces overall EI.

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OC48. Dietary recommendations for reducing free sugar intakes: A pilot study investigating effects following advice to substitute sweet high-sugar foods with different alternatives. K. M. Appleton¹, A. D. Bielat¹, D. J. Guy¹, N. Karami¹ and L. R. Boxall¹. *1. Department of Psychology, Faculty of Science and Technology, Bournemouth University, Bournemouth, UK.*

The World Health Organization (WHO) currently recommends reducing free sugar intakes for health benefits⁽¹⁾. Appropriate strategies to achieve these recommendations for the general public, however, remain unclear. While the WHO target is based on nutrients⁽¹⁾, food-based guidelines are currently recommended for public health⁽²⁾, and practical advice in the form of food substitutions may facilitate dietary change^(1,2).

Recommendations for reducing free sugar intakes based on nutrients (N, N=61), nutrients and foods (NF, N=60), and nutrients, foods, and food substitutions (NFS, N=63) were recently investigated in a large randomized controlled trial⁽³⁾. As a percentage of total energy intake (TEI), free sugar intakes reduced over 12 weeks following all three types of dietary advice, resulting in mean (s.e.) reductions of: Group N: 2.5 (0.8) %TEI; Group NF: 3.3 (0.8) %TEI; and Group NFS: 3.1 (0.7) %TEI; compared with no change (1.2 (0.8) %TEI) in the control group (N=58). Few differences between the three different types of advice however, were found. The pilot study presented here aimed to extend this original study through the additional investigation of three different types of dietary advice based on food substitutions.

For this pilot study, a total of 72 UK adults with >5%TEI from free sugars at baseline, were randomized to receive dietary advice to reduce free sugar intakes by: a) replacing sweet high-sugar foods with sweet-tasting low-sugar alternatives, e.g. fruit and low-calorie sweeteners (Group ST, N=24); b) replacing sweet high-sugar foods with non-sweet-tasting low-sugar alternatives, e.g. herbs, spices and nuts (Group T, N=24); and c) replacing sweet high-sugar foods with plain low-sugar alternatives, e.g. plain rice-cakes (Group NT, N=24). The advice was based on current NHS guidance and provided once. Participants were then followed for 4 (and 12) weeks, and between-group differences were investigated.

Free sugar intakes reduced in all three groups over 4 weeks ($F(1,69)=26.17$, $p<0.01$), with effect sizes comparable to those in the original study (mean (s.e.)): Group ST: 2.4 (1.2) %TEI; Group T: 3.8 (1.3) %TEI; Group NT: 3.3 (1.2) %TEI. No differences were found between groups ($F(2,69)=0.56$, $p=0.61$). Similar results were also found in a subset of participants who continued in the study for 12 weeks (N=29) ($F(1,26)=12.38$, $p<0.01$; group x time interaction $F(2,26)=1.07$, $p=0.39$) (mean (s.e.)): Group ST: 2.3 (0.7) %TEI; Group T: 5.2 (1.3) %TEI; Group NT: 2.3 (1.2) %TEI.

Our findings confirm those of the original study – that the provision of dietary advice to reduce free sugar intakes can result in reduced free sugar intakes in willing volunteers, but the exact nature of the advice provided seems less important.

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OC49. The use of social media for promoting nutrition in a conflict-affected country: Facebook Insights. SN. Nyi¹, A. Kaehne¹ and J. Abayomi¹ 1. Faculty of Health, Social Care & Medicine, Edge Hill University, Ormskirk, Lancashire L39 4QP, UK.

In Myanmar, exclusive breastfeeding amongst infants under six months is only 51%, although overall breastfeeding rate is almost universal at 98%. Only 16% of children aged 6 – 23 months meet the minimum acceptable dietary standards. In addition, 58% of children aged 6 – 59 months and 47% of women aged 15 – 45 years are anaemic⁽¹⁾. A Facebook page named “Dohmeetharsulay” was launched by a team of Burmese nutritionists and nurses (who also served as page administrators), in June 2019, aiming to contribute to closing the maternal and child nutrition promotion gap. A military coup happened on 1st February 2021 during the COVID-19 pandemic⁽²⁾ causing unrest, armed conflicts, and increasing the strain on the country’s health system. The military junta then imposed internet and media restrictions, including banning the use of Facebook⁽³⁾. The aim of this study is to explore the important role of using social media in nutrition education in a challenging context by measuring engagement with the programme.

Meta, previously known as Facebook, provides automatically calculated social media insight data on indicators such as page’s reach, audience demography and posts performance. Data for a three-year period, from 1 March 2021 (which is one month after the coup) to 29 February 2024, was reviewed and analysed numerically by the administrator team led by the main author (who is a nutritionist), to understand the page’s reach and overall performance in achieving its objective of promoting nutrition.

The Dohmeetharsulay page had 2.6 million reaches, during the study period; with only 121,171 from paid promotion. The page had 45,300 lifetime followers (82.6% women and 17.4% men). Myanmar was the top country represented by 86.5% of total followers followed by Thailand (5.8%), Malaysia (1.7%), Singapore (1.1%), United States (0.7%), India (0.5%), Japan (0.4%), China (0.3%), Indonesia (0.3%) and Nigeria (0.3%). The contents received 172,500 engagements including reactions, comments, shares and clicks on the posts.

Several authors have suggested that the use of social media has potential to improve positive health and nutrition behaviours, especially in hard-to-reach groups⁽⁴⁾. Dohmeetharsulay is the only social media page dedicated to promoting evidence-based nutrition knowledge in the Burmese language, without any commercial influence. Despite the challenges and restrictions under the dictatorship, the data indicated that the page continued to communicate nutrition messages to the intended audience. Although further investigations are needed, it can be assumed that educational messages from the page have been benefiting families who have migrated or are displaced from Myanmar, in addition to the families inside Myanmar. Thus, the use of social media has an important role in providing nutrition education for families especially in places like Myanmar where reach of traditional health communication is limited due to conflict.

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OC50. Triple burden of malnutrition and its key demographic and socioeconomic determinants among Vietnamese children: insights from the General Nutrition Survey 2020. P.Y. Tan¹, V. S. Som^{1,2}, S. D. Nguyen^{3,4}, X. Tan¹, D.T. Tran⁴, T.N. Tran⁵, V.K. Tran⁵, L. Dye^{1,6}, J. B. Moore¹, S. Caton⁷, H. Ensaff¹, X. Lin⁸, G. Smith⁹ and Y. Y. Gong¹ 1. School of Food Science and Nutrition, Faculty of Environment, University of Leeds, Leeds LS2 9JT, United Kingdom and 2. Section of International Health, Department of Health Sciences, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands and 3. Division of Human Nutrition and Health, Wageningen University and Research, Wageningen, Netherlands and 4. Nutrition Surveillance and Policy Department, National Institution of Nutrition, 48B Tang Ba Ho, Hai Ba Trung District, Ha Noi, Vietnam and 5. Department of Micronutrient, National Institution of Nutrition, 48B Tang Ba Ho, Hai Ba Trung District, Ha Noi, Vietnam and 6. Institute for Sustainable Food and Department of Psychology, University of Sheffield, S1 4DP, United Kingdom and 7. Sheffield Centre for Health and Related Research (SCHARR), School of Medicine and Population Health, University of Sheffield, S1 4DP, United Kingdom and 8. Global Sustainable Development, University of Warwick, Coventry, CV4 7AL, UK and 9. International Life Sciences Institute (ILSI) Southeast Asia Region, 18, Mohamed Sultan Road, #03-01, Singapore 238967.

The triple burden of malnutrition (TBM) is a growing public health issue worldwide. This study examined the prevalence and association between undernutrition, overnutrition and micronutrient deficiencies (MNDs), and the key demographic and socioeconomic determinants, among Vietnamese children, using the nationally representative General Nutrition Survey (GNS) 2020 ⁽¹⁾.

The GNS 2020 was reviewed and approved by the Ethical Committee of the National Institute of Nutrition, Vietnam. Written informed consent was obtained from each participant and/or their parents prior to data collection. Data on anthropometric parameters, micronutrients biomarkers, demographic and socioeconomic indicators for 7,289 children aged 6 months to 9 years old were analysed ⁽¹⁾. All analyses were weighted and accounted for complex survey design using svyset commands in STATA. Age-specific and region-specific prevalence of malnutrition were examined. Determinants of malnutrition were assessed using bivariate and multivariate logistic regressions, crude or adjusted odds ratio (OR/AOR) and respective 95% confidence intervals (CI) were reported.

Overall, the prevalence of stunting, underweight and wasting/thinness of children was 12.7%, 10.5%, and 4.7%, respectively, in 2020. This finding underscores that child stunting reduction in Vietnam is on track towards the target of 40% reduction by 2025 set by the Global Nutrition Targets ⁽²⁾ (<20%). Meanwhile overweight and obesity among school aged children is off track the target ⁽²⁾, with the prevalence in urban areas increasing from 8.5% in 2010 to 31% in 2020. Low serum zinc, anaemia and iron deficiency (ID) were the common MNDs observed, affecting 53.1%, 15.2%, and 13.9% of children. Prevalence of low serum retinol was relatively low (<7%). In the bivariate regressions, older child (2-4 years old) [OR (95% CI): 1.43 (1.20, 1.72)], ethnic minorities [5.94 (3.78, 9.36)], and living in mountainous areas [5.06 (1.18, 14.42)] had increased odds of stunting, whereas reduced odds were found in children from the richest quintile [0.13 (0.05, 0.32)]. Similar determinants were found to be associated with underweight and MNDs. Males [1.43 (1.16, 1.76)], older children (5-9 years old) [10.02 (6.71, 14.97)], and children from the richest quintile [2.91 (1.20, 7.05)] had increased odds of overweight. After adjusting for covariates including age, sex, region, wealth index and inflammation, children with anaemia, low serum retinol and low serum zinc had increased odds of stunting and underweight than non-micronutrient deficient children (AOR=1.43-1.71). Compared to children without MNDs, those with ≥ 3 MNDs had almost double the odds of stunting and underweight, whereas those with ≤ 3 MNDs had reduced odds of overweight (AOR=0.38-0.60).

TBM is becoming a major public health concern for Vietnamese children, and significant demographic variation and socioeconomic inequalities in malnutrition were observed. These findings suggest that national policies and programmes in Vietnam should address age-specific,

sex-specific, geographical and socioeconomic disparities to accelerate progress in reducing child malnutrition.

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OC51. Comparison of Food Accessibility and Acculturation among South Asians in the United Kingdom and India: A Photovoice Study. D. James¹, R.K. Vijayakumaran¹, G. Gayathri² 1.

Department of Rehabilitation and Sport Sciences, Bournemouth University, Bournemouth, UK and 2. Department of Clinical Nutrition, Faculty of Allied Health Sciences, Sri Ramachandra Institute of Higher Education & Research.

South Asian diaspora is one of the largest in the world, with India having the largest diaspora in the world at over 17.7 million ⁽¹⁾. In the United Kingdom, South Asian population increased from 56.1 million to 59.6 million between 2011 and 2022 ⁽²⁾. Presently, there is a rise of non-communicable diseases among the South Asians, both residing in the United Kingdom and India. Could migration have impact on the eating habit and level of participation in physical activity and subsequent influence on health and wellbeing of the South Asian was the main research question. Therefore, young South Asians in two different countries were recruited to explore their eating behaviour to promote and support better health and wellbeing practices.

This is qualitative research whereby photovoice was used with thematic analysis for the interview. For photovoice, after, the pre-trial photos were checked, participants were requested to take at least five pictures with captions to express their eating behaviour and related aspects such as that can best describe (i) the type of food they eat (ii) the place they eat their food or drink (iii) what influence what they eat.

Interviews were conducted among 7 South Asians (3 from UK and 4 from India, all female and aged between 24-35 years old) was conducted. Photovoice was followed up with interviews, discussing the photographs and taken by the participants. NVivo was used to manage and thematically analysed.

Four main themes emerged: *changes to eating behaviour, impact of culture on food habits, impact of eating behaviour on wellbeing and impact of eating behaviour on physical activity*. It was evident that their eating behaviour was deeply rooted in culture and shaped by their family habits. The impact of eating behaviour among the young adults were huge especially among the UK participants and many had to resolve to different means of coping with the changes. Some of the changes were evident in some students almost completely changing their food preference to foods that are available, affordable, acceptable and time-friendly. These factors were reported as negatively impacting on their health, mental health and wellbeing. They engaged in physical activity only when they have health challenges. Generally, they follow their family routine, which explains the reason the young adults were less interested in physical activity due to family influences and habits.

Moving away from the family home among participants in the UK and India impacts healthy food consumption, wellbeing, and physical activity. Food accessibility and acculturation was evidently an issue, which was emphasized through photovoice. Food insecurity remains to be explored, especially among those who move to the UK, as they prefer to consume food that they are familiar with and culturally based.

Acknowledgments

Sri Ramachandra Institute of Higher Education & Research

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OC52. The effects of different portion sizes on child food consumption and satiety: an exploratory study. L. Acolatse¹, C. Logue¹, L. K. Pourshahidi¹, M.T. McCann¹ and M.A.¹ Kerr¹. Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, Ulster University, Coleraine, Northern Ireland, UK.

The consumption of larger food portion size(s) (PS) can result in overconsumption and a reduced ability to self-regulate appetite, which has been implicated in the rising prevalence of childhood obesity globally⁽¹⁾. Larger PS of food have sustained effects on energy intake in children⁽²⁻⁴⁾, which has been attributed to the 'portion size effect', where more food is consumed when larger quantities are offered⁽⁴⁾. This study aimed to explore 3 different PS of a breakfast meal on consumption and satiety levels of children aged 7-10 years.

Parents with their children (n 25) were invited to participate in a within-subject, repeated measures, randomised cross-over study, to compare the PS of a typically consumed breakfast meal (ready-to-eat breakfast cereal [flakes, puffed rice or hoops] with milk) consumed by children under three different PS conditions: self-serve (SS) of typical PS; <25% than SS, and; >25% than SS, with at least 3 days between each experimental PS condition. The children were provided with a 10cm visual analogue scale to rate satiety post-consumption. Repeated measures ANOVA was used to assess differences between the PS consumed and satiety ratings, with paired samples t-tests used to compare differences between PS conditions.

Total PS of the breakfast meal consumed was greatest in the SS condition, followed by the >25% than SS with the least PS consumed in the <25% than SS (165.0±72.0g, 138.2±83.3g and 126.0±77.9g respectively, p=0.011). A significantly higher proportion of the breakfast meal was also consumed in the SS condition compared to both manipulated conditions - SS vs <25% than SS (84.2±19.9% vs 77.2±24.7%, p=0.030), SS vs >25% than SS (84.2±19.9% vs 68.9±28.9%, p<0.001), with a significantly higher proportion consumed in the <25% vs >25% than SS (77.2±24.7% vs 68.9±28.9%, p=0.027). Post-consumption, children reported feeling 'least satisfied' in the SS condition compared to both other conditions (6.2±2.5cm in SS, 7.5±2.1cm in <25% than SS condition, 7.9±2.1cm in the >25% than SS condition, p=0.011).

In this exploratory study, children aged 7 to 10 years did not consume a larger amount of food in response to exposure to larger PS. Results suggest that the presentation of smaller PS resulted in higher satiety ratings post-consumption, highlighting the potential of downsizing as a strategy for portion control in children of this age, where needed.

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OC53. Dietary patterns and risk of childhood overweight/obesity or metabolically unhealthy childhood obesity: A systematic review and meta-analysis. A. Kyrkili¹, G. Saltaouras¹, V. Bountziouka², M. Georgoulis¹, E. Bathrellou¹, M. Yannakoulia¹ and M. Kontogianni¹ 1. Department of nutrition and Dietetics, School of Health Sciences and Education, Harokopio University, Athens, Greece and 2. Computer Simulation, Genomics and Data Analysis Laboratory, Department of Food Science and Nutrition, School of the Environment, University of the Aegean, Lemnos, Greece.

Childhood overweight/obesity (Ov/Ob) and its combination with metabolic complications, known as metabolically unhealthy obesity (MUO), is a major public health problem¹. Diet is one of the most important modifiable determinants of weight status and health, but the relationship between dietary patterns and Ov/Ob or MUO in children and adolescents remains poorly studied^{2,3}. The aim of this study was to explore associations between adherence to dietary patterns and the risk of childhood Ov/Ob or MUO.

A literature search was performed following PRISMA guidelines⁴ in Scopus and Medline databases to identify longitudinal prospective studies, and randomized controlled clinical trials (RCTs) with ≥12-month follow-up, in children and adolescents (age: 2-19 years; regions: Europe, USA, Canada or Oceania, in English language, publication period: January 2013-June 2023). Studies' quality was also evaluated with the ROBINS-E and RoB-2 tools.

From the 2603 references initially identified, 29 prospective studies were included in this systematic review and meta-analysis. All studies reported on Ov/Ob risk. Dietary patterns were assessed with a-priori method in 15 studies and with a-posteriori method in 14 studies. Conceptually, dietary patterns were characterized as “healthy” (HDP) or “unhealthy” (UDP), however there were inherent differences in the way dietary patterns were defined/ extracted, the items loading high in each extracted pattern and the scoring system applied for the degree of adherence to each pattern. Limited evidence suggests that adherence to patterns during childhood, which are lower in fruits, vegetables, and whole grains, while higher in sweets, refined grains, fast foods, and processed meats are associated with higher BMI later in adolescence. Eighteen studies were included in meta-analysis. Adherence to a HDP was associated with lower odds of Ov/Ob [odds ratio (OR): 0.85 (95% confidence interval (CI): 0.80; 0.91) for the adjusted model] compared to non-adherence, while adherence to UDP was associated with higher odds of Ov/Ob [OR: 1.34 (95%CI: 1.17; 1.53) for the adjusted model] compared to non-adherence. Higher adherence to a HDP was associated with lower BMI [beta: -0.02 (95%CI: -0.04; -0.01) kg/m² for the adjusted model] and lower increase in BMI over time [beta: -0.11 (95%CI: -0.18; -0.04) kg/m² for the adjusted model], compared to lower adherence. No significant associations were found between adherence to a HDP and z-BMI, while a marginally significant association was revealed between adherence to UDP and z-BMI [beta: 0.04 (95%CI: -0.00; 0.08) kg/m² for the adjusted model].

Higher adherence to HDP exhibits preventive effect against Ov/Ob in children and adolescents. Results should be interpreted cautiously because of the heterogeneity in defining “exposure” and should be confirmed through future research both in prospective cohorts and RCTs.

Acknowledgments

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OC54. Comparison of dietary intake and physical activity in children and adolescents with or without non-alcoholic fatty liver disease. A. Kyrkil¹, G. Petsoukis¹, A. Vourdoumpa³, D. Koutaki³, G. Paltoglou³, C. Katsagoni², M. Rogalidou⁴, A. Papadopoulou⁴, M. Papadopoulou³, E. Charmandari³ and M. Kontogianni¹ 1. Department of nutrition and Dietetics, School of Health Sciences and Education, Harokopio University, Athens, Greece and 2. Department of Clinical Nutrition, “Agia Sofia” Children’s Hospital, Athens, Greece and 3. Division of Endocrinology, Metabolism and Diabetes, 1st Department of Pediatrics, National and Kapodistrian University of Athens Medical School, “Agia Sofia” Children’s Hospital, Athens, Greece and 4. Division of Paediatric Gastroenterology & Hepatology, 1st Department of Paediatrics, National and Kapodistrian University of Athens, “Agia Sofia” Children’s Hospital, Athens, Greece.

Non-alcoholic fatty liver disease (NAFLD) affects 5.5–10% of children worldwide, while in individuals with obesity, it increases to almost 34%^{1,2}. Long-term dietary habits, leisure-time physical activity and sedentary activities have been proposed as modifiable risk factors for developing NAFLD in children/adolescents^{3,4}, however, data to date remain limited. The aim of this study was to investigate differences in dietary intake and physical activity between children/adolescents with overweight/obesity and NAFLD and children/adolescents with overweight/obesity without the disease.

A total of 106 children/adolescents with overweight/obesity, aged 12.5 ± 1.8 years, were included in the study, of whom 48 were diagnosed with NAFLD and 58 belonged to the control group. Participants in the two groups were matched for age, gender, body mass index, and Tanner stage. The diagnosis of NAFLD was based on elevated alanine aminotransferase (ALT) and/or abdominal ultrasound, followed by exclusion of other causes of secondary liver fat accumulation⁵. Additionally, the dietary intake of the participants was assessed by four 24-hour recall method and analyzed for energy, macronutrients, and micronutrients using the Nutritionist Pro software program. The adherence to the Mediterranean Diet (MD) was assessed using the KIDMED index⁶. Physical activity was assessed using a questionnaire validated in the Greek population, the Self-Administered Physical Activity Checklist⁷. Each participant completed the above questionnaire 4 times together with the 24-hour recalls.

No significant differences in the energy intake and the intake of macro-/micro-nutrients were observed between children/adolescents with NAFLD and the control group (all p >0,05). Regarding adherence to MD, there was no significant difference between children/adolescents with NAFLD and children/adolescents without NAFLD, with only 5% of the total sample demonstrating a high level of adherence to MD (score >8). Children/adolescents with NAFLD spent fewer minutes per day on physical activity compared with children/adolescents without NAFLD [49 (29, 70) min/day versus 67 (44, 95) min/day, p=0.006]. In addition, children/adolescents with NAFLD spent more hours per day playing computer/video games compared with the control group [2.7 (1.4, 5.2) hours/day versus 1.9 (0.7, 3.3) hours/day, p=0.035].

In conclusion, no differences in dietary intake in terms of energy, macro- and micro- nutrients intake were recorded between overweight/obese children/adolescents with and without NAFLD. Participation in physical activities was significantly lower, and time spent in sedentary activities was higher, in children/adolescents with NAFLD compared with their counterparts without NAFLD.

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OC55. Exploring fruit and vegetable intakes in children in two areas of North Yorkshire - Cooking in Yorkshire Project. *M. Vidal¹, K. Vaughan¹, C. Nykjaer² and J. Cade¹* 1. School of Food Science & Nutrition, University of Leeds and 2. Faculty of Biological Sciences, University of Leeds.

Eating a healthy diet rich in fruits and vegetables (FV) throughout life is crucial for preventing various types of malnutrition, reducing the risk of non-communicable diseases, and promoting overall well-being. Childhood presents a prime opportunity to establish lifelong dietary habits. The World Health Organization advocates promoting healthy diets by integrating culinary skills development, especially in schools. The Cooking in Yorkshire Project (1), a cluster-randomized controlled trial, assessed the impact of the PhunkyFoods programme on dietary behaviour, nutrition knowledge, and cooking skills among primary-aged children (7-9 years) in two-areas of North Yorkshire. We performed a secondary analysis of baseline-data to explore FV intakes of children by deprivation level, provision of free school meals (FSM) and mealtimes at baseline.

The Child and Diet Evaluation Tool (CADET) (2) was used to assess the self-reported frequency of consumption of 13 fruits and 18 vegetables on the previous day, categorized by mealtime. Poisson regression was used to evaluate associations between FV consumption (portion/day), deprivation level (categorized based on a median level of 22,642 of the Index of Multiple Deprivation rank 2019 to determine high or low levels) and FSM percentage per mealtime and per day.

Twenty-six schools (n=333 children, 57% girls) completed the dietary assessment. 60% of children reported consuming FV 5 times a day. Significant differences were observed in the proportions of children's FV intake by mealtimes. During breakfast, 92% of children did not consume any vegetable, and 50% did not eat fruit ($p < 0.001$). At lunchtime, approximately 35% of children reported not consuming any fruits or vegetables. Overall, consumption of FV recorded (7 portions per day) was considerably higher than national average consumption (3 standard portions) (3). The school FSM index was negatively associated with child vegetable intake. For children in schools with high FSM percentage compared to low percentage, the frequency of vegetable intake was 31% lower at lunch (95%CI: 56, 85; $p = 0.001$) and 15% lower over the whole day (95%CI: 76, 94; $p = 0.003$), after adjusting for sex and area. No associations were observed in fruit intake by mealtimes or deprivation level.

North Yorkshire schools offer free meals to financially supported children, aligning with healthy eating policies. However, negative associations observed between FSM and vegetable intake indicate there may be room for enhanced FV promotion.

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OC56. Meal patterns and risk of childhood obesity and metabolically unhealthy obesity: a systematic review of the evidence, methodological issues and research gaps. G. Saltaouras¹, A. Kyrkilí¹, E. Bathrellou¹, M. Georgoulis¹, M. Yannakoulia¹, V. Bountziouka² and M. Kontogianni¹ 1. Department of nutrition and Dietetics, School of Health Sciences and Education, Harokopio University, Athens, Greece and 2. Computer Simulation, Genomics and Data Analysis Laboratory, Department of Food Science and Nutrition, School of the Environment, University of the Aegean, Lemnos, Greece.

Childhood overweight/obesity (Ov/Ob) is a major public health problem, of greater concern when accompanied with comorbidities such as hypertension, insulin resistance leading to metabolically unhealthy obesity (MUO). Current evidence suggests a linkage between meal frequency, diet quality and nutritional status^[1-3] in children and adolescents, however data regarding associations between meal patterns, Ov/Ob risk and MUO are limited. The aim was to explore associations between meal patterns and the risk of childhood Ov/Ob and MUO.

The PRISMA methodology was used to retrieve prospective studies and randomized controlled trials conducted in children/adolescents 2-19 years old in Europe, USA, Canada or Oceania, from 01/2013 to 06/2023. Exposures that were considered under the umbrella “meal patterns” included consumption of a meal, meal skipping, timing, format and context. The quality of the studies was assessed with the ROBINS-E and RoB-2 tools.

Of the 3,020 studies initially retrieved, 27 were included. All studies reported on Ov/Ob risk, whilst no studies on MUO were identified. All but one study had a longitudinal study design. Twenty-two studies (81%) had a high/very high risk of bias, mainly due to the methods measures of exposure were assessed. Consumption of/skipping breakfast was the most common exposure, followed by consumption of lunch (n=5), dinner (n=5), meal frequency/eating occasion (EO; n=5) and consumption of fast foods (n=4). Some studies reported on meal context (eating while watching TV; n=4). In most studies, frequent breakfast and evening family dinners (i.e. 7 days/week vs <7days/week) were associated with lower odds of childhood Ov/Ob, BMI and %body fat at follow-up (FU). Four studies also showed that skipping breakfast was associated with increased obesity markers, while three studies showed no associations. There was limited evidence of a positive association between eating while watching TV and weight trajectories (n=2). No associations were reported in relation to frequency of lunch and fast food intake. Results regarding meal frequency/EO and Ov/Ob at FU are conflicting, with differences attributed to the definition of an EO.

Evidence supports that frequent consumption of breakfast and family dinners may be associated with lower Ov/Ob risk in children and adolescents, while eating in front of TV with increasing weight trajectories. No studies were identified in relation to MUO, highlighting a significant research gap. Nevertheless, clear definition on EOs and improved methodological approach in the assessment of meal patterns emerged as a need, according to current review findings.

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OC57. A review of the sugar content in children's foods across major UK supermarkets, cookbooks, and online resources: progress and challenges in the UK's sugar reduction efforts. K. Olorunnisola¹, A. Setarehnejad¹, R.M Fairchild¹ 1. Department of Healthcare and Food/Food Industry Centre, School of Health Sciences, Cardiff Metropolitan University, Cardiff, UK.

Responding to rising concerns about obesity and health issues among children, the UK Government has advised manufacturers to reduce the added sugar content in key product ranges that have been identified to be the major sources of sugar in children's diets: baked products (cakes, cereal bars, biscuits, pastries), yoghurt, chocolate, and sweet spreads⁽¹⁾. Soft drinks were excluded in this review due to significant progress in this area⁽²⁾. This study aimed to review the total sugar content in these key food products, in major supermarkets, popular children's cookbooks, and website resources used by parents of children aged 6 months–5 years in the UK.

This cross-sectional market analysis study was conducted between January 2023 and March 2024.

1. Reviewed the total sugar content in these key product ranges from five major UK supermarkets and compared these findings with data from previous research⁽³⁾.

2. Analysed the same products from a website resource and 10 children's cookbooks, either mentioned by previously interviewed parents⁶ or UK bestsellers on Amazon⁷, as cooking is important in combating obesity but relies on ensuring popular recipes fit within healthy eating guidelines⁽⁴⁾.

Supermarket product total sugar content was determined by back-of-pack labelling⁽³⁾. Nutritics software was utilised for total sugar analysis of the selected recipes⁽⁵⁾.

A total of 440 products were analysed from the supermarkets, 115 recipes from children's cookbooks and 50 recipes from the BBC Good Food site. Supermarket chocolate and cake products contained the most total sugar per 100g ranging from 14–68g/100g (mean 51.79 ±10.06g/100g) for chocolate and 27–71g/100g (mean 37.41± 8.50/100g) for cake. Yoghurt contained the lowest amounts of sugar (1.9–19g/100g mean 9.11 ± 3.88g/100g). Cereal bars, often believed to be healthy were found to be medium to high in sugar 7.3–45g/100g (mean 25.99 ± 7.28g/100g).

These preliminary findings indicate a slight reduction in the average total sugar content of the reviewed supermarket products compared to 2016 levels³. However, a significant proportion of supermarket products (57.5%) and recipes still exceed the government's high sugar threshold of 22.5g/100g¹. More than 85% of cakes in children's cookbooks and 60% of cakes on BBC Good Food website have high sugar. Overall products and recipes classified as low in sugar (5g or less per 100g) remain limited, with the majority out of the 605 combined products and recipes, 55%, contained high sugar, 38% medium sugar and 7% low sugar content.

Many key food products and recipes intended for children remain high in sugar, highlighting a need for further reformulation/healthier recipe modifications. The persistence of high sugar content in children's diets highlights the complexity of addressing UK childhood obesity levels.

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Student Competition

OC58. Associations between socio-economic status in childhood and cardiovascular disease risk in adulthood. E. Molloy¹, C. Corish¹, A. Douglass¹ and C. Kelleher¹. 1. School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin 4, Republic of Ireland.

Cardiovascular disease (CVD) is a major national and international public health problem⁽¹⁾. Many factors contribute to the development of CVD including low socioeconomic status (SES), poor diet and obesity. Previous studies indicate that childhood SES may influence the development of CVD risk factors in adulthood⁽²⁾. Therefore, the aim of this study was to explore associations between SES, as measured by area of residence, occupation group and population dietary quality during childhood, and CVD risk in older adults in Ireland, and to illustrate how the mapping of data from previous studies based on SES information can offer insights into health outcomes.

The most recent clinical grandparent data from the Lifeways Cross-Generational Cohort Study (2001-2013)⁽³⁾ were used. SES (area of residence and occupation group) data from the Lifeways grandparent data were mapped to population dietary quality from the 1948 National Nutrition Survey (NNS)⁽⁴⁾, using the assumption that the grandparent's current area of residence was the same as in 1948. The 1948 NNS included the assessment of individual nutritional status by a trained clinician. Clinical signs related to inadequate nutrition were recorded. Dietary quality, based on the assessment of dietary signs by the clinician, was categorised into poor, fair or good and was presented as the percentage of the population with poor, fair or good dietary quality for a given combination of occupation group and geographical area. The CVD risk variables [BMI, waist-to-hip ratio (WHR) and waist-to-height ratio (WHtR)] in the Lifeways data were categorised based on World Health Organisation cut-offs. Blood pressure (BP) was categorised based on European Society of Hypertension/European Society of Cardiology guidelines. Relationships between the percentage of the population with poor, fair or good dietary quality in childhood and CVD risk factors were explored using Pearson's or Spearman's correlation as determined by the normality of data distribution. Chi-squared tests were used to investigate associations between age group, occupation group, area of residence and CVD risk factors. Binary logistic regression was used to test the predictive value of occupation group and area of residence independently on CVD risk factors.

Some CVD risk factors (elevated or raised BP, a diagnosis of diabetes and/or being prescribed diabetes medications) were significantly associated with area of residence ($p < 0.05$). Grandparents in the Lifeways cohort from an unskilled manual background in childhood were more likely to be overweight/obese in adulthood (OR 4.67, 95% CI 1.41-15.54, $p = 0.012$). Inverse associations were observed between good population dietary quality in childhood and all CVD risk factors in adulthood ($p < 0.05$).

This secondary analysis of Lifeways grandparent data mapped to the 1948 NNS highlights the role childhood SES and dietary quality play in the development of CVD risk factors in adulthood and older age.

Acknowledgments

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Student Competition

OC59. Effect of health and agriculture services integration on the nutritional status of 4-6 years old children in rural Ethiopia. *G.A Mersha¹, B.T Gutema³, S.D Henauw¹ and S. Abbeddou¹*

1. Department of Public Health and Primary Care, Ghent University, Belgium and 2. Food Science and Nutrition Research Directorate, Ethiopian Public Health Institute, Ethiopia and 3. School of Public Health, College of Medicine and Health Sciences, Arba Minch University, Arba Minch, Ethiopia.

Undernutrition and poverty reduction requires multisectoral interventions including sectors like food and nutrition security, health, education, and food systems^{1,2}. A program aimed at improving child nutritional status through enhanced household food security and promotion of dietary diversity was jointly implemented by health and agriculture extension workers in Ethiopia³. The intervention packages include counselling on infant and young child feeding practices, agricultural production diversity, gardening, water, hygiene and sanitation practices, community group dialogues and media campaigns, were provided for four years⁴. Both the control and the intervention arms continued with standard activities of health and agricultural extension works.

The study aims to evaluate the effect of joint health and agriculture interventions on the nutritional status and dietary intake of 4-6 years old children in agrarian regions of Ethiopia.

The study was a cluster randomized controlled trial. A multi-stage clustered sampling technique was implemented for selecting villages for both the intervention and control arms from the four regions of Ethiopia (Tigray, Amhara, Oromia and Southern Nations, Nationalities and Peoples, SNNPR). Baseline data were collected from 2,531 children aged 0-23 months in 2016. Post-intervention data were collected from 1,265 children in 2021, following four years of intervention (or no intervention). Our data analysis includes both baseline and follow-up data. Anthropometric measurements, hemoglobin concentrations, and dietary intakes were collected from children, mothers, and their households. Length/Height-for-age (LAZ/HAZ), weight-for-age (WAZ), and weight-for-height z-scores (WHZ) in standard deviations (SD) were computed following the 2006 WHO Child Growth Standards. The analysis was conducted using a linear regression mixed model, which adjusts for the clustering effects at the regional, district, and kebele levels.

At baseline, there was no significant difference in the prevalence of stunting (29.4%), underweight (17.7%), and wasting (5.9%), while the prevalence of anemia was significantly higher in control arm (35%) compared to the intervention arm (26.2%) p -value (<0.001). The mean children's diet diversity score was 21.5 and 22.4 food groups per week in the control and intervention arms, respectively. After adjusting for covariates, we found no significant mean difference (95% Confidence Interval, 95% CI) in children's HAZ (-0.04 SD, 95% CI: -0.28,0.20), WAZ by (-0.08 SD, 95% CI -0.25,0.09), WHZ (-0.08 SD, 95% CI: -0.28,0.13), hemoglobin concentrations (-0.01SD, 95% CI -0.22,0.21), and diet diversity score (-0.03 food groups,95%CI: -0.22,0.28) between intervention and control arms.

Joint health and agriculture integrated services have no effect on the reduction of undernutrition in children in agrarian regions of Ethiopia. Causes for no response should be explored and further research with stronger design is required to explore the additional benefits of nutrition-sensitive agriculture in addressing undernutrition.

Acknowledgments

We are grateful to the study participants and the Ethiopian public health institute staff. In addition, our appreciation goes to the health officials from central to community level, health, and agriculture extension workers for facilitating the implementation of the study. Finally, we would like to thank our data collectors and supervisors for their support.

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Student Competition

OC60. Differential Effects of Milk, Yogurt, and Cheese on Insulin Sensitivity, Hepatic Function, and Gut Microbiota in Diet-Induced Obese Mice. E. Yuzbashian¹, CB. Chan^{1,4} and S. Ussar^{2,3} 1.

Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada and 2. RU Adipocytes and Metabolism, Helmholtz Diabetes Center, Helmholtz Zentrum München, Germany Research Center for Environmental Health GmbH, Neuherberg, Germany and 3. German Center for Diabetes Research (DZD), Neuherberg, Germany and 4. Department of Physiology, University of Alberta, Edmonton, Alberta, Canada.

The prevalence of obesity and associated metabolic disorders, such as insulin resistance (IR) and fatty liver disease (steatosis), is often linked to a high-fat Western diet. Recent meta-analyses indicate that dairy consumption may mitigate these effects, particularly favoring low-fat dairy products. However, the underlying molecular mechanisms remain elusive. Dairy products vary in nutrient composition (calcium, fat) and structure, impacting digestion and nutrient absorption. Fermentation processes in cheese and yogurt introduce bacterial cultures with potentially positive metabolic effects. This study investigates the distinct effects of different dairy subgroups on insulin sensitivity, liver function, and gut microbiota in diet-induced obese mice, exploring potential mechanisms for mitigating Western diet-induced metabolic dysfunction.

C57BL/6 mice (n = 16/group) were fed a high-fat diet (HFD, 45% fat) mimicking a Western diet rich in saturated fatty acids (SFA), or HFD supplemented with: fat-free milk (MILK), fat-free yogurt (YOG), or reduced-fat cheese (CHE, 19% fat) for 8 weeks. These supplements were administered daily at 10% of total caloric intake, reflecting typical U.S. dietary patterns. We assessed insulin resistance using the insulin tolerance test (ITT) and the homeostasis model assessment (HOMA-IR). Weekly monitoring of food and water intake and body weight was conducted. After euthanasia, liver tissue was collected for Western blot analysis of key proteins in insulin signalling, gluconeogenesis, lipogenesis, lipid oxidation, uptake, and release pathways. Comprehensive lipidomics profiling of the liver and serum was performed using LC-MS, and fecal samples were analyzed for microbial diversity via 16S rRNA sequencing. Statistical analyses included QIIME2-DESeq2, MetaboAnalyst 5.0, and MicrobiomeAnalyst. One-way and two-way ANOVA with Tukey's post-hoc test were performed.

The MILK and YOG interventions significantly reduced body weight, fat mass, and epididymal fat pad weight ($p < 0.05$) compared to HFD alone. Enhancements in glucose clearance and insulin sensitivity were notable in the MILK and YOG groups, with associated upregulations in glycogen synthase (GS), phosphoenolpyruvate carboxykinase (PEPCK), and protein kinase B (AKT) signaling. Regarding hepatic steatosis, MILK and YOG increased protein levels involved in fatty acid oxidation (ACSL, CPT1) and lowered PPAR γ , suggesting reduced fat storage. Additionally, higher AMPK, PPAR α , ATGL, and HSL protein abundances supported enhanced fatty acid breakdown. Gut microbiota analyses revealed a higher bacterial species richness in the MILK and YOG groups, with distinct fecal microbiota compositions across all dairy interventions. Lipidomics identified unique and shared metabolic markers among the groups, implicating glycerolipid, glycerophospholipid, sphingomyelin metabolism, and inflammatory pathways.

This study demonstrates that different dairy products uniquely modulate metabolic health markers in diet-induced obese mice. Milk and yogurt particularly promote improved insulin sensitivity and hepatic functions, potentially mediated through alterations in metabolic pathways and gut microbiota composition.

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OC61. Iron bioaccessibility from fava bean-fortified white wheat flour following simulated *in vitro* gastrointestinal digestion. R. Wang¹, B.H. Bajka¹, G.O. Latunde-Dada¹ and P.A. Sharp¹.
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Wheat flour is a major dietary source of iron; however, during milling to produce white wheat flour, the mineral-rich aleurone layer is removed. In the UK elemental iron is added to white flour to replace iron lost during processing⁽¹⁾. Soy flour is also added to bread flour as a flour improver⁽²⁾. Legumes, including soy, are rich in iron and this raises the possibility that legume flour could be used to increase the iron content of white wheat flour products⁽³⁾. The aim of this study was to investigate iron bioaccessibility from fava bean-fortified white flour, and to test the hypothesis that fava beans have the potential to be natural iron fortificants for wheat white flour.

Dried fava beans were purchased from Hodmedods UK and were ground to a coarse flour using a coffee grinder. Experiments utilized white flour fortified with different weight percentages of fava bean flour (0%, 25%, 50%). Mineral content of all samples was measured by inductively coupled plasma optical emission spectrometry (ICP-OES). Phytic acid of the samples was measured by using Megazyme kit (Megazyme-K-PHYT). The bioaccessibility of iron was determined by ICP-OES following a simulated *in vitro* peptic (pH 2, 90 min) and pancreatin/bile (pH 7, 90 min) digestion⁽⁴⁾. Data are mean \pm SEM of 3 independent experiments and were analysed by one-way ANOVA and Tukey's post-hoc test.

The iron content of flours was increased significantly with the inclusion of 25% or 50% fava bean (FB) powder ($P < 0.0001$): 1.07 ± 0.01 (white flour control); 2.12 ± 0.07 (25% FB) and 3.15 ± 0.07 (50% FB) mg/100 g. Furthermore, the fava bean fortified flours had significantly ($P < 0.0001$) higher phytic acid content: 0.19 ± 0.01 ; 0.40 ± 0.01 and 0.56 ± 0.02 g/100 g, respectively. No significant difference was observed in terms of the molar ratios of phytic acid to iron (15.17 ± 0.36 , 15.94 ± 0.26 , 15.13 ± 0.38) or in iron bioaccessibility ($78.34 \pm 2.53\%$, $77.62 \pm 3.01\%$ or $72.56 \pm 1.91\%$) between the white flour (0%) and fava bean-fortified flour samples (25% and 50%).

The results from this study show that addition of fava bean flour significantly increased the iron content of the white flour samples; however, the phytic acid content was also increased. The molar ratio of phytic acid to iron is an important determinant of iron bioaccessibility and bioavailability. While this study demonstrates that fava bean flour can be used as a natural iron fortificant, it highlights the need for additional food processing steps to reduce phytic acid levels and enhance iron bioaccessibility from foods produced using fava bean-fortified white wheat flours.

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Student Competition

OC62. Sensory evaluation of pea and milk protein hydrolysates used to develop protein-fortified tomato soup. Mahrokh Jamshidvand¹, Richard J. FitzGerald² and Maria Dermiki^{1*} 1. Department of Health and Nutritional Sciences, Atlantic Technological University, Sligo, F91 YW50, Ireland and 2. Department of Biological Sciences, University of Limerick, V94 T9PX, Ireland.

Protein is a required macronutrient for maintenance of muscle mass. Current guidelines recommend daily intake of 0.8 g of dietary protein per kilogram body weight (kg bw), regardless of age⁽¹⁾. However, factors such as age and physiological changes may increase this requirement to 1.5g/ kg bw/day for older adults with sarcopenia ⁽²⁾. Therefore, protein-fortified foods are used to enhance the protein intake of older adults. Milk protein concentrate (MPC) and pea protein isolate (PPI) ingredients are used to increase the protein content of different foods ⁽³⁻⁶⁾. However, their addition changes the functional and sensory properties of the final protein-fortified product ⁽⁷⁾. Therefore, enzymatic hydrolysis is employed to improve the techno-functional properties of these ingredients, however, the bitterness of the resulting hydrolysates limits their application. This study aimed to investigate the effect of hydrolytic enzyme preparation on the taste properties of MPC and PPI hydrolysates when incorporated as ingredients in protein-fortified tomato soup.

Solutions of MPC and PPI containing 3% total solids (w/w) were hydrolyzed at 50°C for 30 min using Neutrase®, Umamizyme and Protease AN “Amano” 100SD at an enzyme-to-substrate ratio of 1%. Bitterness in the hydrolysates was assessed with 16 semi-trained participants using labeled magnitude scales (LMS) and by 44 participants using a ranking test. Both tests showed that the least bitter hydrolysates were those generated using Umamizyme and Protease AN “Amano” 100SD. These hydrolysates were used to develop protein-fortified tomato soup with 3% of protein powders, that were characterised by 38 naïve consumers using hybrid quantitative descriptive profiling.

ANOVA on the bitter taste revealed that soups containing hydrolysed MPC (regardless of the hydrolytic enzyme used) were significantly more bitter compared to the control unhydrolyzed protein-fortified tomato soup ($p < 0.001$). Bitterness in the protein-fortified tomato soup was masked using various ingredients, applying the principle of taste-taste interactions. A ranking test with 43 naïve participants showed that a combination of tomato puree and sucrose successfully reduced bitterness.

Overall, the enzyme preparation used affected the bitterness of the MPC and PPI hydrolysates and consequently the taste of the protein-fortified tomato soup. The use of Umamizyme and Protease AN Amano resulted in less bitter protein hydrolysates (both PPI and MPC) compared to Neutrase ($p < 0.001$). Taste-taste interactions resulting from a combination of ingredients could successfully be employed to reduce bitterness in the protein-fortified tomato soup. Since these soups are aimed to be consumed by older people, further work will aim to test their preference.

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Student Competition

OC63. Enhancing the acceptability of Stevia sweetened cookies through the addition of Inulin: A study on texture, chemical attributes, and taste perception. M. Watawana¹, A. Banu¹, G. Ryan¹, M. Pogorzalek¹, D. Granato^{1,2,3} and F. Hoffmann Sarda^{1,2,3} 1. Department of Biological Sciences, University of Limerick, Limerick, Ireland and 2. Health Research Institute, University of Limerick, Limerick and 3. Bernal Institute, University of Limerick, Limerick.

The increasing consumer interest in reduced-sugar, natural, sustainable options and healthier baked goods has prompted research into alternative non-caloric sweeteners of natural origin, like Stevia, as substitutes for conventional sugar in bakery items ⁽¹⁾. However, the bitter aftertaste associated with stevia is a significant challenge in its application as a sugar substitute ⁽²⁾.

This study delves into innovative baking, focusing on developing health-conscious oat-quinoa cookies sweetened with Stevia to evaluate the possibility of using Inulin to enhance acceptability.

Three types of Cookies were formulated using oats and quinoa flour: sugar-based (SuC), stevia-based (StC) and stevia+inulin-based (InStC). SuC served as the control. The optimised formulas were tested using physical, chemical, and sensory parameters.

After approval from the Ethics Committee Board, University of Limerick(06098S&E), sensory analysis was conducted to determine consumer preference (n=89). A 9-point hedonic scale was used to evaluate odour, taste, colour, sweetness, aftertaste, texture, and overall impression⁽³⁾. The fiber content of the cookies was calculated based on the nutritional information of the ingredients. After baking, water activity (a_w) and texture were also measured on days one and five. Antioxidant activity (DPPH, TPC, FRAP and Total Monomeric Anthocyanins) was also evaluated.

All data was statistically evaluated using IBM SPSS Statistics (Version: 28.0.1.1 (14)). One-way ANOVA test- LSD post hoc test was carried out for sensory, antioxidant and a_w assays.

Based on the sensory study results, there was no perceived difference between odour and colour for the three formulations. The average evaluation score for Overall Impression was $6.6 > 5.9 > 5.4$ ($p < 0.001$, $p = 0.016$) for SuC, InStC, and StC, respectively. For Texture, $7.0 > 6.3 > 5.5$ ($p = 0.818$, $p < 0.001$) for SuC, InStC, StC, respectively. For the Taste attribute, it was $6.5 > 5.9 > 5.5$ ($p < 0.001$, $p = 0.087$) for SuC, InStC, and StC, respectively. A statistically significant difference was observed for both overall impression and texture between InStC and StC.

Regarding fibre content, InStC had a significantly higher fibre content, 7.02%, compared to StC 3.36% and SuC 3.11%. A statistically significant difference in a_w was observed between the StC and InStC on day one and day 5 ($p < 0.05$), with the StC having a higher a_w . Texture analyser results correlated with the results of a_w . No statistically significant difference was observed between the samples for the antioxidant activity ($p > 0.05$).

These findings demonstrate the potential of incorporating functional ingredients such as inulin to improve stevia-sweetened baked goods' sensory acceptability and physical properties, aligning with the growing consumer preference for healthier baked products.

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Student Competition

OC64. From bean to bottle - A snapshot review of the caffeine-containing food supplements notified to the Food Safety Authority of Ireland between January 2023 and December 2023. S. Nic Sheoin^{1,2}, M.G. Hogan^{1,3}, N. Clarke¹, L. Farrell¹, S. Walsh¹, C. Grimes¹, C.B. O'Donovan¹. 1. The Food Safety Authority of Ireland, Dublin 1, Ireland. and 2. School of Biological Health & Sports Sciences, Technological University Dublin, Dublin 7, Ireland and 3. School of Agriculture and Food Science, University College Dublin, Dublin 14, Ireland.

Caffeine, a natural stimulant, is found in foods, beverages, and food supplements (FS). Excessive caffeine consumption has been associated with cardiovascular impairments, anxiousness and sleep disruptions¹. The European Food Safety Authority (EFSA) estimated safe intake levels of caffeine: a single dose of up to 200mg and a daily intake of up to 400mg, are considered safe for the general population². Regulation (EU)1169/2011 requires products containing caffeine to include additional labelling warnings, 'Contains caffeine' or 'High caffeine content'³. In Ireland, all FS placed on the market must be notified to the Food Safety Authority of Ireland (FSAI) via the Food Notifications System (FNS)⁴.

The aims of this study were to: (1) Identify caffeine-containing FS notified to the FSAI from January 1st to December 31st 2023, (2) Investigate whether these FS comply with relevant labelling requirements, (3) Assess the safety of these products in line with the EFSA safe intake levels.

Data on caffeine-containing FS notified to the FSAI in 2023 was extracted from the FSAI FNS. Information extracted included product name, contains caffeine/high caffeine content statements, amount of caffeine, ingredients list and directions for use. Analysis was conducted using IBM SPSS (version 29.0.01).

There were 325 caffeine-containing FS notified to the FSAI in 2023. This study identified 8 categories of caffeine-containing FS, based on their function: pre-workout (*n*163), botanicals (*n*14), vitamin and minerals (*n*12), gaming (*n*7), before and/or during exercise (*n*45), fat burners (*n*57), general stimulants (*n*23) and energy drinks (*n*4).

Over 80% of these FS (*n*276) used "contains caffeine" and 9% (*n*30) used "high caffeine content" statements on their label. The remaining 5% (*n*19) used neither statement. Less than a fifth (14%) (*n*45) of notified FS did not comply with legislative labelling warnings (these products contained incorrect or no caffeine labelling statements) while the remaining 86% (*n*280) were deemed compliant.

Notified FS contained information on directions for use and were either to be consumed once-a-day (*n*243) or multiple times throughout the day (*n*82). Over a quarter (*n*90) of the once-a-day FS exceeded EFSA's safe single-dose intake of 200mg. Additionally *n*2 of the FS contained caffeine in amounts exceeding EFSA's safe daily intake limit of 400mg.

This study identified FS on the Irish market with high caffeine content, exceeding both EFSA's safe single-dose and daily intake levels, before additional dietary sources of caffeine are considered. Labelling compliance rates in this study are high. The FSAI will continue to monitor this category of FS, as the market of caffeine-containing FS grows.

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Student Competition

OC65. A comparative assessment of specified nutrients and biochemicals in kimchi before and after freeze drying and powdering. J. Webster¹, K. Gordon-Smith¹, KR Ahmadi¹, H. Mathur², J. Leech² and T. Grassby¹ 1. School of Biosciences and Medicine, FHMS, University of Surrey, Guildford, GU2 7XH and 2 Teagasc Food Research Centre, Moorepark, Fermoy, 61 C996 Co. Cork, Ireland.

Our diet and its impact on the human gut microbiota in terms of composition and function are key determinants of human health across the life-course⁽¹⁾. Fermented vegetables can have enhanced functional and nutritional properties through substrate transformation by microbes and production of biochemicals during the fermentation process⁽²⁾. Kimchi is a traditional Korean vegetable ferment produced via spontaneous lactic acid bacteria fermentation. Plant nutrients and biochemicals, microbial metabolites and microbial cell components are present in kimchi⁽³⁾. As live products, fermented vegetables present challenges to commercial producers who need shelf/transport stability to deliver consistent products to consumers. We hypothesise that fermented vegetable health advantages will be preserved by freeze-drying, while enabling product stability, extended shelf and storage life, stable transportation and utility as food ingredients.

Utilising existing kimchi physicochemical data, we identified kimchi biochemicals (KBs) (benefit health but not essential to it) and kimchi nutrients (KNs) (essential to health). We quantified these components in 3-day old fresh kimchi (T3) and in 3-day old fresh kimchi that had been freeze-dried and powdered (T3 FDP). We sampled technical triplicates and calculated P values using an unpaired 2 tailed t-test.

The hypothesis that KBs and KNs in T3 FDP are preserved at levels not statistically significantly different to those in (T3) ($P > 0.005$) was disproved. Components of kimchi were affected differently by the FDP process, with decreases in some and increases in others. As a result, the overall profile of KBs and KNs in T3 FDP was different to T3. Based on a daily portion of fresh kimchi being ~50 g, there was 2.64 g KBs and KNs in 50 g T3 and 2.28 g KBs and KNs in equivalent portion T3 FDP (7.5 g), a reduction of 13.64% after FDP in KBs and KNs combined. Unexpectedly, soluble fibre and iron were significantly lower in equivalent sample T3 FDP compared to T3 ($P = 0.003$ and $P < 0.0001$ respectively) and vitamin B9 was significantly higher in T3 FDP compared to T3 ($P < 0.0001$). For KBs, acetic acid and lactic acid were significantly lower in T3 FDP ($P = 0.020$ and $P = 0.046$ respectively), but propionic acid was undetectable in T3 and the equivalent sample T3 FDP contained 1.44 g. Capsaicinoids were not detectable in T3, but were notably present in T3 FDP.

This study represents a critical first step in understanding the extent to which the functionality of fresh kimchi is preserved in its freeze dried and powdered form (termed a Fermentceutical™). Improving health through fermented foods is a critical concept for consumers, food manufacturers and healthcare professionals, alike.

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Student Competition

OC66. "Are ham sandwiches as good for you as they say? "A review of the compliance of nutrition and health claims on breads and deli meats on the Irish market. M.G. Hogan^{1,2}, S. Nic Sheoin^{1,3}, N. Clarke¹, L. Farrell¹, C. Grimes¹, S. Walsh¹, S. O'Mahony^{1,4} and C.B. O'Donovan¹ 1. The Food Safety Authority of Ireland, Dublin 1, Republic of Ireland and 2. School of Agriculture and Food Science, University College Dublin, Dublin 4, Republic of Ireland and 3. School of Biological, Health & Sports Sciences, Technological University Dublin, Dublin 7, Republic of Ireland and 4. Institute of Food and Health, University College Dublin, Dublin 4, Republic of Ireland.

Regulation (EC) No 1924/2006 outlines the rules for nutrition and health claims (NHCs), permitted in the European Union (EU)⁽¹⁾. Previously, the Food Safety Authority of Ireland (FSAI) completed work on the compliance of NHCs with Regulation 1924/2006 on yoghurts⁽²⁾. Potential non-compliant rates of 1.5% for nutrition claims and 74% for health claims were reported. The study highlighted further research in this area was needed to understand the overall rates of NHCs compliance of food products on the Irish market. Therefore, the aim of this study was to assess the compliance of NHCs made on delicatessen meats and similar (DM) and bread products (BP) on the Irish market.

Food product label and composition information was collected from the Irish market in 2021 as part of the EU Joint Action Best-ReMaP project. The inclusion criteria for this study were the presence of an Irish address and NHCs on the product label. Based on these criteria, 14.6% of DM and 47.9% of BP were eligible for inclusion in this study. A representative sample of 100 products per category were randomly selected, using the RAND Excel function, and compliance was assessed against Regulation 1924/2006. NHCs were considered either compliant, non-compliant or potentially non-compliant. Where definitive compliance could not be established using the Regulation, a claim was deemed potentially non-compliant. Analysis was conducted using Microsoft Excel.

There were 205 claims identified on the 100 DM products. The compliance rate of these claims was 85.4% (n=175) and the non-compliance rate was 14.6% (n=30). Of the 30 non-compliant claims observed across 9 DM products, 28 of these were non-compliant as the amount of the claimed nutrient was not labelled. The other 2 non-compliant claims were general health claims which were not linked to an authorised health claim. There were 293 claims on the 100 BP with a compliance rate of 85.3% (n=250), a non-compliance rate of 12.9% (n=38) and a potentially non-compliant rate of 1.7% (n=5). The 43 non-compliant and potentially non-compliant claims were observed across 23 products. Most (n=24) of which were due to non-compliant general health claims. The overall compliance of products was 91% (n=91) for DM and 77% (n=77) for BP.

Overall, this study demonstrates that there is a high rate of compliance for nutrition claims on DM and BP while identifying some key areas of non-compliance in health claims. This work provides important information for the FSAI as it identifies the issues faced by businesses in complying with the legislation and assists in understanding what compliance building resources are needed. Future work in this area is needed to assess the level of compliance of NHCs on other food categories on the Irish market.

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Student Competition

OC67. Gut and digestive health of Irish athletes post-concussion. E. Finnegan¹, E. Daly¹ and L. Ryan¹. 1. Department of Sport, Exercise and Nutrition, Atlantic Technological University (ATU), Galway, Ireland.

Sports-related concussions (SRC) may impact athletes at all levels, from recreational to professional. SRC disrupts brain function, initiating various transient, and subjective symptoms⁽¹⁾. Due to the gut-brain axis, gastrointestinal (GI) function is affected and may cause nausea, vomiting, and abdominal pain. Post-concussion GI symptoms may hinder digestion, nutrient absorption, and energy availability to the brain⁽¹⁾, and their prevalence among Irish athletes is unknown. This study aimed to investigate gastrointestinal disturbances experienced by Irish athletes post-concussion.

In January 2024, following ethical approval, an online survey was distributed to athletes and their support teams (coaches, nutritionists, physiotherapists, etc.) via social media, email, posters, and word of mouth. Eligible athletes had experienced a concussion/ mTBI. The survey included sections on general and GI-specific symptomology, demographics, injury history, digestive function, and gut health. Questions were retrospective and specific to the Time of Participation (ToP). Quantitative data analysis was performed using Excel.

This research presents preliminary data on fifty-three Irish athletes, (43% female) between 18 and 40 years (median=25). Athletes participated in a variety of sports, including Gaelic football (60%), rugby (53%), soccer (49%), hurling/camogie (30%), running (19%), equestrian (15%), field hockey (9%), athletics (11%), martial arts (11%), either at elite, recreational, or competitive levels. Athletes had sustained 1 to 6 concussions (median=2), between 10 days (February 2024) to 180 months (2009) before study participation (median=18 months).

Their ToP bowel function ranged from moving once (57%), 2-3 times (23%), 4-6 times (9%) daily, or once every 2-3 days to once a week (12%). Using the Bristol Stool Form (BSF) scale (4) at ToP, 45% were type 3 or 4, and 10% were type 2 (3). Acutely post-concussion participants' bowel function became more frequent, with 43% moving once daily, 30% 2-3 times, 6% 4-6, and 2% moving 7 times or more daily. 19% had experienced a reduction in bowel movements to once every 2-3 days, 4-6 days, or once a week post-concussion. Their stool forms ranged from hard, lumpy (type 1, 2), sausage-shaped (type 3, 4) to watery (type 5, 6, 7) on BSF (3). All participants identified prevalence of GI symptoms. Rating tiredness (55%), loss of/poor appetite (54%), and nausea/vomiting (47%) as most severe. Increased bloating, flatulence, urgency to open bowels, stomach gurgling, pain/discomfort, constipation, incomplete evacuation, diarrhoea, indigestion, reflux, heartburn, and increased cravings were also reported.

Athletes experienced increased bowel movements, irregularities, and constipation, alongside varying symptoms of appetite changes, nausea, vomiting, flatulence, and sensitivities, which resolved as most athletes began to recover.

Irish athletes encountered diverse GI disturbances post-concussion. Athletes and their professional support teams need to be mindful that head injuries affect GI function, causing symptoms such as a loss of appetite, vomiting, and changes in bowel habits.

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OC68. Nutrition beliefs, and practices of ultra-endurance runners in Ireland for gastrointestinal symptom management. T. Ryan¹, E. Daly¹, and L. Ryan¹ 1. Department of Sport, Exercise and Nutrition, Atlantic Technological University, Galway, Ireland.

Ultra-endurance running (UER) events are defined based upon duration, exceeding 4-6 hours, or distance, surpassing the 26.3-mile marathon ⁽¹⁾. Oftentimes event courses comprise of extreme environmental conditions, altitudes, temperatures, terrains, or a combination. UER poses significant short- and long- term health implications. UER athletes' risk chronic maladaptation of various systems, namely the cardiovascular, immune, and digestive ⁽²⁾. Research suggests that exercise-associated gastrointestinal symptoms (Ex-GIS) are among the leading cause of underperformance in distance running. Altered mesenteric blood flow, gastric emptying, and peristaltic activity from exercise are exacerbated by the conditions accompanying many ultra-events, impairing performance and recovery. Though Ex-GIS are generally temporary, there remains the potential for long-term medical conditions to arise, such as ischemic bowel disease and haemorrhagic gastritis. Ample nutritional planning and intake throughout training and racing is critical to enhance performance and recovery while minimizing Ex-GIS and its associated chronic conditions ⁽³⁾.

The aim of this research was to investigate the nutrition beliefs, and practices of ultra-endurance runners in Ireland.

An adapted electronic version of a validated questionnaire by Scrivin et al. ⁽¹⁷⁾ was used. A recruitment infographic of eligibility criteria (≥ 18 years old, healthy, no diagnosed health conditions except for irritable bowel syndrome, and training for/ competing in running events exceeding 4 hours) was distributed online and at events (Connemarathon, Kerry 50K ultra). Individuals that contacted the researchers and were deemed eligible for inclusion were directed to a Microsoft Forms page, where they gave consent and completed the questionnaire. Data were analysed using IBM SPSS Statistics version 28 (IBM Corporation New Orchard Road Armonk, NY 10504-1722, United States).

Sixty-eight (n=68) individuals completed the questionnaire with one excluded due to medical diagnosis. Remaining participants (n=46 males, n=21 females) ranged from 25-66 with one over 66 years old. Previous experience was the main factor influencing nutrition practices (N=30, 45.5%). N=3 (4.5%) sourced information from qualified professionals. N=42 (59.4%) experienced Ex-GIS, usually evenly throughout training and competition. Many had not implemented dietary or non-dietary strategies to manage Ex-GIS. Supplementing with nitrates (N=9) and probiotics (N=4) were the most common dietary practices to alleviate Ex-GIS, while other (N=14) and portion control (N=13) were the most reported non-dietary practice.

This research cohort reflects the broader UER community, with 81% being >35 years old "masters" athletes, and male. This study suggests that Ex-GIS are commonplace throughout. Similarly, this research highlights the range of symptoms experienced. The absence in dietary and non-dietary practices employed for Ex-GIS management suggests a shortfall in the availability of nutrition information specific to this problem. Further research is required to understand the mechanisms behind UER Ex-GIS, its management, and best practices for communicating these to the target audience.

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Student Competition

OC69. Exploring food choice influences in athletes and active populations in Ireland. *Conor C. Carey¹, Eve M. Creedon¹, Fionn Molloy¹, Morgan Lewis¹, Ben Leen Smith¹ and Elaine K. McCarthy^{1,2}* 1. School of Food and Nutritional Sciences, University College Cork, Ireland and 2. INFANT Research Centre, University College Cork, Ireland.

Food choice determinants in the general population are influenced by sociocultural, sensory, nutritional, and economic factors, among others⁽¹⁾. For athletes, these choices are further complicated by additional sporting and nutritional demands⁽²⁾. The objective of this study is to conduct the first large-scale analysis of the determinants of food choice in athletes and active individuals, and to conduct comparison of these determinants across competition levels and sporting categories.

Participants, aged over 18, residing in Ireland, and engaged in competitive sport or structured physical activity at least twice weekly, completed an online survey via Qualtrics. The survey included the previously validated Athlete Food Choice Questionnaire (AFCQ)^(3,4). The AFCQ comprises of 32 statements divided into 9 categories where athletes rate the frequency that their food choice is affected by various factors. Data were collected in February 2024, analysed using SPSS V28.0, with statistical significance set at $P < 0.05$.

A total of 1,148 athletes (38% male, 62% female), median [IQR] age 26 years [21-40 years], reported participating in 7 hours [5-10 hours] of structured physical activity per week, spanning 32 sports. Participation levels ranged from non-competitive (32%) to those involved in international competitions (6%). Sensory appeal was highlighted as the most influential factor on food choices ($P < 0.01$), followed by food and health awareness ($P < 0.01$)—encompassing cooking ability, nutrition knowledge, and food planning. Performance-related factors were joint second most influential, with no significant difference with food and health awareness ($P = 0.30$). This included statements related to choosing food that enhances fuelling for competition, recovery and feeling energetic during training.

Ordinal logistic regressions showed variables such as age, gender, education level, and sporting variables such as competition level, sport type and average hours of exercise per week showed distinct impacts on food choice. For example, the nutritional attributes of a food impacts choice more as participants got older (Odds Ratio (OR) 1.02, 95% CI [1.01, 1.04], $P = 0.01$). However, the nutritional attributes had less influence if the participant was born in the USA (OR 0.37, 95% CI [0.16, 0.86], $P = 0.02$) or the rest of the world (OR 0.38, 95% CI [0.18, 0.81], $P = 0.01$) compared with those born in Ireland, and if the participant was a team sport athlete rather than an endurance athlete (OR 0.55, 95% CI [0.37, 0.81], $P < 0.01$).

The determinants of food choice for athletes are multifaceted and more complex than those of the general population, attributed to additional exercise-related factors. Despite this complexity, sensory appeal remains the predominant influence across all sport types and competition levels. Understanding the dynamics of this food choice matrix in athletes allows for more personalised nutrition advice and identification of those at risk of poor dietary practices that may negatively impact upon their performance and health.

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OC70. Protein supplementation practices and the risk of low protein intake among athletes and active adults in Ireland. Morgan Lewis¹, Conor C. Carey¹, Ben Leen Smith¹, Kevin D. Cashman¹, Alice Lucey¹ and Elaine K. McCarthy^{1,2} 1. Cork Centre for Vitamin D and Nutrition Research, School of Food and Nutritional Sciences, University College Cork, Ireland and 2. INFANT Research Centre, University College Cork, Ireland.

Chronic low protein intake can negatively affect human growth, cardiovascular function, metabolic profiles, immunity and exacerbate deficiencies of other nutrients including iron⁽¹⁾. It's widely accepted that athletes and active individuals have an increased requirement for dietary protein, however to date little is known about the prevalence of low protein intake or protein supplementation practices within this population in Ireland.

This study aimed to examine the following in an Irish population of athletes and active adults: (i) the prevalence, frequency, and reasons for using protein supplements and protein-fortified foods; and (ii) the proportion of those at risk of consuming less than 1.0g of protein/kilogram bodyweight/day.

Participants, aged ≥ 18 years, residing in Ireland, and engaging in competitive sport or structured physical activities at least twice weekly, completed a self-administered, web-based questionnaire. A validated protein intake screening tool⁽²⁾ was included to estimate the risk of low protein intake based on self-reported food consumption over the previous 4-weeks. Data collection occurred in April 2024 and descriptives and Chi-squared tests were performed (IBM SPSS v29).

The questionnaire yielded 885 (median age = 40yrs, range = 18-77yrs; 57.6% female) completed responses. More than half (54.5%) of this population were athletes competing at either local (34.3%), regional (24.3%), national (25.8%) or international (15.4%) level, while the remaining 45.5% engaged in regular exercise only. Overall, 50.2% of this population used protein supplements, with a greater prevalence among men (55.5% vs 46.3%, $P < 0.01$) than women. There was no difference in the use of protein supplementation between athletes (55.5%) and active adults (53.7%, $P = 0.595$). The main reasons participants provided for using protein supplements were: 1) they found it difficult to meet daily protein requirements through diet alone (59.4%), 2) their training goals required higher intakes (47.7%), and 3) convenience (41.1%). Based on data from the protein intake screening tool, 36.5% of this population were at risk of low protein intakes from food alone, with no difference between athletes and active individuals ($P = 0.909$), but a higher risk among men (47.7% vs 28.2%, $P < 0.01$) than women. Those who were at risk of low protein intakes were no more likely to use protein supplements ($P = 0.972$) or protein-fortified foods ($P = 0.956$) than those not at risk. Of those at risk, 49.1% and 4.5% did not consume any protein supplements or protein-fortified foods respectively, while only 14.4% took protein supplements daily and 7.7% consumed protein-fortified foods daily.

Up to a third of this population may not consume adequate protein through their diet alone. While protein-fortified foods and supplements may be helpful, athletes and active adults should attempt to meet their daily protein requirements through a balanced whole food diet, where possible.

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OC71. A Cross-Sectional Exploration of Nutritional Wants and Needs of Female Athletes during Pregnancy and Postpartum in the United Kingdom and Republic of Ireland. C. V. Caro^{1,5}, Z. Bell¹, M. Renard^{1,2}, E. Brown¹, P. Kloskowska³, L. Edwards⁴, A. C. Flynn⁵, and F. Lavelle¹ 1. Department of Nutritional Sciences, School of Life Course & Population Sciences, King's College London, London, United Kingdom and 2. SHE Research Group, Department of Sport and Health Sciences, Technological University of the Shannon, Athlone, Ireland and 3. Department of Physiotherapy, School of Life Course & Population Sciences, King's College London, London, United Kingdom and 4. King's Sport & Wellness, King's College London, London, United Kingdom and 5. School of Population Health, Royal College of Surgeons Ireland, Dublin, Ireland.

Female athletes are increasingly participating in sport during pregnancy and returning postpartum. However, similar to the Sex Data Gap in sport and exercise research⁽¹⁾, there is limited evidence to support athletes during this life stage⁽²⁾ especially as it relates to nutrition. Therefore, as optimal nutrition is essential for long-term maternal and child health, the aim of this study was to investigate specific wants, needs and behaviours in relation to nutrition during pregnancy and postpartum return to sport in athletes.

King's College London provided ethical approval (Ref: LRU/DP-23/24-41676) and the study was pre-registered (<https://doi.org/10.17605/OSF.IO/NCSZK>). An exploratory cross-sectional online survey is being conducted and dissemination is occurring during April and May 2024. Primary variables are assessed using researcher developed and validated measures and included pregnancy and postpartum nutritional support needs, supplement use, athlete level, performance changes and sociodemographic characteristics. Residents of the UK or ROI, ≥ 18 years old, trained and/or competed as an athlete prior to and/or during pregnancy within the last eight years are eligible. All data was summarised using IBM SPSS Statistics. Due to the exploratory nature of the survey, preliminary descriptive evidence is shown and comparisons between groups (e.g. athlete level, region, number of pregnancies) will be presented.

35 eligible athletes (UK: 24 (68.6%); ROI: 11 (31.4%)) from 14 team and individual sports have completed the survey. Average age of participants was 34.2 ± 3.2 and 32 (91.4%) had ≥ 1 child. 9 participants (25.7%) were currently pregnant, and 7 (20%) had retired due to pregnancy. Only 9 participants (25.7%) received any nutrition advice during pregnancy, and, of the postpartum participants, one participant (3.8%) received nutrition advice during the postpartum period. During pregnancy, participants reported wanting to receive advice from NHS Midwives, Obstetricians and Gynaecologists (37.7%) and fellow athletes who've previously experienced pregnancy (21%). Whereas postpartum advice was preferable from NHS Midwives, Obstetricians and Gynaecologists (37.1%), sports-specific nutritionist/dietitian (37.1%) and general nutritionist/dietitian (37.1%). During pregnancy, 28 participants (80%) reported wanting athlete-specific nutrition advice related training needs during pregnancy and 19 participants (54.3%) reported wanting more information about pregnancy-specific supplement intake (e.g. folic acid). Postpartum, 22 participants (62.9%) reported wanting athlete-specific nutrition advice related training needs during postpartum and returning to sport and 20 participants (57.1%) reported wanting more information about breast or mixed feeding. The top listed challenges to returning to sport postpartum were childcare provisions (94.3%), infant feeding practices (85.7%) and sleep (82.9%).

The preliminary findings revealed that pregnant/postpartum athletes want further advice in areas such as nutrition advice specific to being an athlete and training during pregnancy and postpartum, pregnancy supplement intake, and infant feeding practices. These areas require further investigation so pregnant and postpartum athlete needs can be better met.

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OC72. An investigation into nutritional knowledge of Irish rugby coaches. *N Lynch¹, G Sweeney², K. Craddock¹, A Mullee¹, 1. Department of Health and Nutritional Science, ATU Sligo and 2. Irish Rugby Football Union, High Performance Centre, Abbotstown, Co. Dublin.*

Nutrition is an important factor for an athlete's overall performance and recovery. Previous research has demonstrated that sports nutrition knowledge is linked to balanced and healthy dietary practices ^(1,2). As coaches have an influential relationship with athletes, in relation to their dietary intake, understanding the nutritional knowledge of coaches is necessary in terms of supporting an athlete's overall nutrition plan ⁽³⁾. The aim of this study was to investigate the nutrition knowledge of rugby coaches within the Irish Rugby and Football Union (IRFU) responsible for coaching young players.

An online questionnaire was distributed by the IRFU via email to National and Provincial coaches (n=54) of 15-20 year old male and female players. The questionnaire consisted of two previously validated general and sports nutrition knowledge questionnaires ^(4,5). Ethical approval was provided by the ATU Sligo Department of Health and Nutritional Sciences Ethics Committee. Descriptive statistics were tabulated for coaches' demographic data and their total and sub-category mean scores. An Independent samples t-test assessed the difference in mean nutrition knowledge score for coaches who gave advice and those who did not give advice on sports nutrition.

Twenty-eight coaches participated in the study, yielding a response rate of 55%. Nearly two thirds of participants (64.1%) were within the age range of 29 – 39 years; the length of time coaching was relatively balanced with 25% having 2 – 5 years' experience, 35.7% had 5 – 15 years' experience and 39.3% had over 15 years coaching experience. Coaches responded correctly to over half of all the questions asked (55.3%), which is below the minimum score of 75% set to determine adequate nutrition knowledge ⁽⁶⁾. There was no significant difference in nutrition knowledge score between coaches who reported having a formal nutrition training compared to coaches with no formal nutrition training. Fifty seven percent of coaches reported that they provided nutrition advice to their players.

In conclusion, the coaches that participated in this study did not have adequate nutrition knowledge. However, over half of the coaches reported giving nutrition advice to players, highlighting that coaches could benefit from a formal ongoing nutrition training program to improve their knowledge.

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Student Competition

OC73. Exercise-induced sweating decreases 24-h sodium balance compared to rest in recreational exercisers. H. Z. Macrae¹, T. Cable¹, L. Mougin¹, H. Nuttall¹, E. Liddell¹, B. Bellisario¹, D. Locke¹, D. Miller¹, A. J. McCubbin², M. P. Funnell³, V. L. Goosey-Tolfrey⁴ and L. J. James¹. 1. School of Sport, Exercise and Health Sciences, Loughborough University, UK and 2. Department of Nutrition, Dietetics and Food, Monash University, Australia and 3. NIHR Applied Research Collaboration Centre - East Midlands, Leicester Diabetes Centre, UK and 4. Peter Harrison Centre for Disability Sport, Loughborough University, UK.

Daily sodium intake in England is ~3.3 g/day⁽¹⁾, with government and scientific advice to reduce intake for cardiovascular health purposes having varying success⁽²⁾. Eccrine sweat is produced during exercise or exposure to warm environments to maintain body temperature through evaporative cooling. Sweat is primarily water, but also contains appreciable amounts of electrolytes, particularly sodium, meaning sweat sodium losses could reduce daily sodium balance without the need for dietary manipulation. However, the effects of sweat sodium losses on 24-h sodium balance are unclear.

Fourteen active participants (10 males, 4 females; 23 ± 2 years, 45 ± 9 mL/kg/min) completed a preliminary trial and two 24-h randomised, counterbalanced experimental trials. Participants arrived fasted for baseline (0-h) measures (blood/urine samples, blood pressure, nude body mass) followed by breakfast and low-intensity intermittent cycling in the heat (~36°C, ~50% humidity) to turnover ~2.5% body mass in sweat (EX), or the same duration of room temperature seated rest (REST). Further blood samples were collected post-EX/REST (1.5-3 h post-baseline). During EX, sweat was collected from 5 sites and water consumed to fully replace sweat losses. During REST, participants drank 100 mL/h. Food intake was individually standardised over the 24-h, with bottled water available *ad-libitum*. Participants collected all urine produced over the 24-h and returned the following morning to repeat baseline measures fasted (24-h). Sodium balance was estimated over the 24-h using sweat/urine losses and dietary intake. Data were analysed using 2-way ANOVA followed by Shapiro-Wilk and paired t-tests/Wilcoxon signed-rank tests. Data are mean (standard deviation).

Dietary sodium intake was 2.3 (0.3) g and participants lost 2.8 (0.3) % body mass in sweat (containing 2.5 (0.9) g sodium). Sodium balance was lower for EX (-2.0 (1.6) g vs -1.0 (1.6) g; $P=0.022$), despite lower 24-h urine sodium losses in EX (1.8 (1.2) g vs 3.3 (1.7) g; $P=0.001$). Post-EX/REST blood sodium concentration was lower in EX (137.6 (2.3) mmol/L vs 139.9 (1.0) mmol/L; $P=0.002$) but did not differ at 0-h ($P=0.906$) or 24-h ($P=0.118$). There was no difference in plasma volume change ($P=0.423$), urine specific gravity ($P=0.495$), systolic ($P=0.324$) or diastolic ($P=0.274$) blood pressure between trials over the 24-h. Body mass change over 24-h was not different between trials (REST +0.25 (1.10) %; EX +0.40 (0.68) %; $P=0.663$).

Sweat loss through low-intensity exercise resulted in a lower sodium balance compared to rest. Although urine sodium output reduced with EX, it was not sufficient to offset exercise-induced sodium losses. Despite this, body mass, plasma volume and blood sodium concentration were not different between trials, suggesting sodium may have been lost from non-osmotic sodium stores. This suggests sweat sodium losses could be used to reduce sodium balance, although longer studies are required to confirm this thesis.

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Student Competition

OC74. Carbon footprint of food and beverage purchases: a preliminary analysis using loyalty-card transaction data from a UK supermarket. *M. Dineva^{1,2}, M.A. Green³, M.S. Gilthorpe⁴, M. Thomas⁵, N. Sritharan⁵, A.M. Johnstone⁶ and M.A. Morris^{1,2}* 1. School of Food Science and Nutrition, Faculty of Environment, University of Leeds, Leeds, UK and 2. Leeds Institute for Data Analytics, University of Leeds, Leeds, UK and 3. Department of Geography and Planning, University of Liverpool, Liverpool, UK and 4. Obesity Institute, Leeds Beckett University, Leeds, UK and 5. Sainsbury's PLC, London, UK and 6. The Rowett Institute, University of Aberdeen, Aberdeen, UK.

Globally, a third of total anthropogenic greenhouse gas emissions (GHGE) are produced by the food system⁽¹⁾. Estimating the carbon footprint of current diets is therefore important to consumers, businesses, and policymakers. With most home-consumed food in the United Kingdom (UK) purchased from supermarkets⁽²⁾, supermarket purchasing records represent a novel data source that can provide insights into dietary patterns⁽³⁾. These data are particularly useful in an environmental sustainability context as they provide information on the amounts of foods and beverages purchased, not just the amounts consumed (as in traditional dietary assessments). We estimated GHGE of foods and beverages purchased in Yorkshire and the Humber region of the UK using supermarket transaction data from primary-shopper loyalty cards over 12 months in 2022.

We mapped a UK retailer's food and beverage products to GHGE (kg CO₂.eq/kg) using data on the environmental footprint of food commodities⁽⁴⁾, and grouped the products according to the Living Costs and Food Survey (LCFS) categories. The sustainability mapping process was guided by product sales (i.e., prioritising the most sold products and categories) and involved three stages utilising mapping approaches with different complexity, resulting in 98.6% of >28,000 store products being mapped. We estimated total GHGE of each product by multiplying the final mapped GHGE by the product weight (as sold). We then used these product-level GHGE estimations (kg CO₂.eq/item) in conjunction with the sales data (number of items sold) to estimate the contribution of each product, and subsequently each LCFS category, to total GHGE from all purchases.

When incorporating sales, the LCFS categories with the highest contributions to total GHGE included 'beef' (19.6%), 'milk' (9.8%), 'cheese and curd' (8.6%), 'ready meals' (6.9%), and 'poultry' (5.5%). The LCFS categories among the lowest contributors to total GHGE included 'confectionery products' (0.2%), 'pasta products' (0.4%) and 'soft drinks' (0.5%). Although some LCFS categories had higher GHGE per kg for their products, they were sold in smaller quantities, and therefore, their contributions to total GHGE were lower in total. For example, 'lamb' was in the top five LCFS categories with the highest GHGE per kg (39.7 kg CO₂-eq/kg) but contributed to 1.4% of total estimated GHGE when incorporating sales information, which was less than 'bread' (2.2%) and 'yoghurt' (1.7%).

Our results highlight that although some foods might be very GHGE-intensive on a per weight basis, they have a lower overall GHGE impact if they are not frequently purchased in the population. These supermarket sales data are an important resource to understanding and subsequently tackling the environmental impact of the food system. Further research, including other environmental sustainability metrics (e.g., water and land use), is needed to provide a more comprehensive picture of the environmental footprint of foods and beverages purchased by UK consumers.

Acknowledgments

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Innovate UK and FSA (FIO-Food grant award: BB/W018021/1). The authors wish to express their thanks to the team collaborators and Sainsbury's as the retail partner.

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OC75. What do consumers want in a local and sustainable plant-based product? Findings from co-creation workshops on the island of Ireland. T. Benson¹, A. Nugent¹ and M. Dean¹ 1. Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, Belfast, Northern Ireland.

The production and consumption of food has a significant impact on our environment, with 20-30% of consumption impact on the environment relating directly to food and drink⁽¹⁻³⁾. One method of reducing this is to diversify protein intake e.g. reducing meat consumption in favour of more sustainable products. While the use of plant proteins is to be encouraged, on the island of Ireland this still has challenges⁽⁴⁾. There is therefore a need to diversify protein intake on the island of Ireland through products which are both sustainable *and* local.

Using co-creation methods, this study aimed to understand what consumers want as sustainable and local plant-based products. Specifically, the study focused on oat, wheat, barley, rye, and pea. Co-creation puts consumers at the heart of product development, ensuring their ideas are understood from the beginning, thus leading to greater acceptance and potential for product success. Four workshops plus a follow-up workshop (n = 38: 21 female, 17 male, age range 22-80 years old) were held across Belfast and Dublin to understand consumers' wants for a sustainable and local alternative protein product. Workshops discussed factors influencing food purchasing, current sustainability issues, and strategies to shift to a sustainable diet. Key co-creation tasks included drawing a local and sustainable product based on any (or any combination) of the 5 specified ingredients. Discussions were transcribed and initial findings using content analysis are presented.

For products made by participants through co-creation, pea was a popular ingredient, with the top 3 highest rating products based on pea. Products containing oats and wheat were also popular. Product types varied and included main meals (plant-based burgers, pastas etc.), snacks (crackers, crisps etc.), and drinks (milks and meal replacements). While popular in the main workshops, consumers in the follow-up workshop who were tasked with reviewing the products created in the other workshops, largely rejected pea-based products due to taste. The highest rated products were a bolognese product made with pea and barley, porridge oats, and wheat and barley pasta.

These findings corroborate wider research findings that taste is vital in new product development. Basic products based on similar products already on the market ranked high, in line with findings that familiarity is a key driver of acceptance of alternative proteins. Future research should use these findings to gauge the popularity and acceptance of these products at a wider level.

Acknowledgments

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OC76. Integrating sustainability considerations into dietary guidelines: country practices and global guidance. A. Islas-Ramos¹, L. Orlandi¹, T. Buendia¹, R. Wijesinha-Bettoni¹ and F. Hachem¹ 1. Food and Agriculture Organization of the United Nations Viale delle Terme di Caracalla sn 00153 Rome, Italy.

Dietary guidelines have emerged as a key tool with the potential to inform the transformation of food systems not only towards better nutrition but also towards sustainability⁽¹⁾. In the last few years, some countries have integrated different aspects of sustainability into dietary guidelines. However, there is lack of clarity on what this means or on how countries go about this integration. While there are multiple suggested approaches⁽²⁾⁽³⁾, there is no agreed methodology on how to do it. The aim was to investigate countries' conceptual understanding and practices for integrating sustainability into the dietary guidelines' development process.

Using the FAO/WHO sustainable healthy diets guiding principles⁽⁴⁾ as a conceptual framework, FAO surveyed the 27 countries that had reported, into the FAO online repository, integrating at least one aspect of sustainability. The responses were coded, and common themes identified by two different researchers and reviewed by a third. The statistical methods used for analysis consisted of means and frequency distributions.

So far, 16 countries have responded to the survey (59% response rate), however, among these, 3 skipped most of the questions (48% effective response rate). Preliminary results show that, for environmental sustainability, greenhouse gas emissions (GHGE) (54%) and food losses and waste (FLW) (54%) were the most common aspects included. For sociocultural sustainability, the most common aspects were local food culture (92%), followed by consumption patterns (85%) and local culinary practices (77%). Affordability was included by 61.5% of respondents. Some methods used by countries to integrate these different aspects included consideration of additional evidence and including additional data when performing linear programming for optimizing diets. Methods varied significantly among countries, the need for additional guidance is evident.

These results reaffirmed the need for guidance that was expressed in a 2018 survey (FAO, forthcoming) on how to successfully integrate sustainability considerations into dietary guidelines. FAO is introducing a new methodology to develop, implement and use dietary guidelines with a food systems approach. Developed with inputs from multiple experts and stakeholders, it provides "step-by-step" guidance to countries on integrating the different aspects of sustainability across environmental, economic, and social dimensions. Several countries have already started using the Food systems-based dietary guidelines (FSBDG) methodology.⁽⁵⁾

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OC77. Navigating Life Cycle Analysis (LCA) Databases; Insights for Shifting Towards Sustainable Dietary Patterns. E.O'Sullivan¹, D'O Kelly¹, S.Hogan¹ and L.B. Kirwan¹. *Nutritics Ltd, 22C Town centre mall, Main Street, Swords, Dublin, K67 FY88.*

Life Cycle Assessment (LCA) databases allow for the environmental impacts of food production and consumption to be quantified, thereby informing sustainable dietary choices⁽¹⁾. In the foodservice sector, LCA data is considered key to assessing environmental performance, accelerating sustainable practices, reducing impacts, and supporting sustainability managers in decision-making processes⁽²⁾. As nutrition research increasingly emphasises the importance of considering sustainability in dietary patterns⁽³⁾, developing guidelines for the food service sector and increasing understanding around LCA's are key to the transition towards sustainable practices. Nutritics developed 'Foodprint' a carbon and water grading system using data from LCA's⁽⁴⁾. The aim of this study was to analyse carbon and water Foodprint values, and to assess whether results were consistent across different LCA databases.

This study provides a quantitative analysis of data points on 6,614 foods across 11 open-access, peer-reviewed LCA databases. Analysis was conducted to examine the relationship between the carbon and water footprint values for foods and 13 food categories, accounting for differences in country of production (CP) and LCA databases. Foods were assigned a Foodprint carbon (A to E) and water grade (1 to 10) using Nutritics software. Descriptive statistics including univariate analysis of variance (ANOVA) were used to assess the relationship between CP and LCA database when analysing the carbon and water footprints of foods. Scheffe Post-hoc tests were used to identify specific differences between groups when results were significant. Statistical analysis was conducted using Microsoft Excel 2019 and IBM Statistical Package for Social Science Version 28 (SPSS).

LCA data was available for 6,614 foods across 14 master categories and 160 regional categories. 87% of items had carbon footprint values (n 5,755) and 23% had water footprint values (n 1,522). Significant differences were observed between food categories in terms of their carbon and water footprints ($P < .001$). There was no significant difference between LCA databases for the carbon and water footprint of food categories ($P > .001$). The category 'Animal Products' had the highest carbon footprint (μ 15.23 co2eq/kg) and the 'Cereals and Grain' category had the highest water footprint (μ 16247.37L/kg). Across all LCA databases, the highest variation in carbon grades was seen for 'Potatoes', 'Soups', 'Cakes & Desserts', 'Vegetables-General' and 'Grains', and the least variation was seen for 'Creams - Dairy' and 'Lamb'.

The findings suggest that the LCA databases provide consistent results on the carbon and water footprint of foods, and that certain food categories have the highest environmental impact regardless of the LCA database selected. Further research should analyse additional LCA databases that are not open-access, and assess the impact of using primary level product data on outcomes. Additional environmental impacts should also be assessed.

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OC78. Achieving SDG 12: impact of food choice, food waste and dignity. S. Sumpter¹, N. Nancheva², R. Ranta³, D. Bhakta⁴, and H. Mulrooney^{1,4}. 1. School of Life Sciences, Pharmacy & Chemistry, Kingston University London and 2. School of Arts, Humanities and Social Sciences, Roehampton University and 3. School of Law, Social and Behavioural Sciences, Faculty of Business and Social Science, Kingston University London and 4. School of Human Sciences, London Metropolitan University.

Increasing food insecurity (FI) in the UK has led to increased food bank usage ⁽¹⁾. This under-represents true levels of need, since many with FI utilise alternative coping strategies ⁽²⁾. Food banks are designed to provide emergency food for a limited time, requiring referral with proof of need. They have been critiqued for this and their limited food choices ⁽³⁾, which add to the stigma experienced by many clients ⁽⁴⁾. Their nutritional quality has also been criticised ⁽³⁾. The UN Sustainable Development Goals (SDG) require action to address socioeconomic drivers of inequity. Several are nutrition-related including SDG2 (zero hunger) and SDG12 (responsible production and consumption) ⁽⁵⁾. Part of SDG12 aims to halve per capita levels of food waste by 2030 ⁽⁵⁾. Surplus food is often used to feed those with FI through community support schemes like social supermarkets, alternatives to food banks. This study evaluated social supermarkets to identify client experiences and perceptions of surplus food, food waste and stigma.

Bespoke questionnaires were administered in two social supermarkets in Sussex on three site visits (n=111) . Additional optional telephone interviews (n=25) were conducted. Ethics approval was obtained from Kingston University London. Of particular interest were client views on quality and choice of food available, and implications of this for SDG12. Thematic analysis of qualitative data was carried out to identify key themes, while quantitative data were statistically analysed to explore impact of demographics using Kruskal Wallis tests with posthoc Dunn's and Bonferroni correction.

Of particular interest were client views on the quality and choice of food available, and the implications of this for SDG 12. The majority (n=102; 91.9%) agreed or strongly agreed that choosing what they ate rather than being given no choice mattered to them, while 76.6% (n=85) agreed or strongly agreed that the social supermarket helped them to reduce food waste. Interviews revealed these were linked, and the impact on food waste was not solely due to the use of surplus food but to offering food choice with clients choosing what they and their families liked and would eat; being given no choice increased the likelihood of foods being wasted.

[Social supermarket client quote] 'I think [choice] is important, I hate, absolutely hate waste, I don't agree with it, I don't agree with throwing things away that you could eat. And if someone made that choice for you, you might not be able to eat it and want to eat it'.

Food choice therefore increased client agency, reducing the potential for stigma and trauma. Using surplus food to feed those dealing with FI is problematic. Nonetheless, offering food choice represents a more client dignified experience with potential to reduce food waste, thereby arguably helping to achieve SDG12.

Acknowledgments

We are grateful to all those at the social supermarkets who took time to take part in our work.

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OC79. Impact of reducing dietary greenhouse gas emissions on micronutrient intakes: preliminary results from the MyPlanetDiet randomised controlled trial. *U. M. Leonard¹, E. Arranz^{1,2}, M. E. Kiely¹* 1. *Cork Centre for Vitamin D and Nutrition Research, School of Food and Nutritional Sciences, University College Cork, Cork, Ireland and 2. Autonoma University of Madrid, Ciudad Universitaria de Cantoblanco, 28049 Madrid, Spain.*

Simultaneously improving diet quality and minimising dietary environmental impacts are central to the development of sustainable healthy diets. Altering dietary patterns to increase the proportion of plant-based foods and reduce animal-source foods has the potential to reduce dietary greenhouse gas emissions (GHGEs) and other environmental indicators⁽¹⁾. However, data evaluating the impacts of these dietary changes on micronutrient intakes are scarce⁽²⁾.

The MyPlanetDiet randomised controlled trial (RCT) was conducted in healthy adults across the island of Ireland [NCT05253547]. Participants were randomly assigned to follow a diet with reduced GHGEs (intervention group), or a diet based on national dietary guidelines (control group), for 12 weeks. Otherwise, all study procedures were identical. Dietary intake was assessed at baseline and endpoint using three non-consecutive 24-hour recalls, collected remotely using the Foodbook24 web-based dietary assessment tool⁽³⁾. Dietary GHGEs and micronutrient intakes were calculated from food sources only. Data were analysed using paired t-tests to assess for within-group differences between baseline and week 12, and one-way analysis of covariance (ANCOVA) to test for differences between groups at week 12, whilst controlling for baseline intakes.

Here, we present data from one of three sites (University College Cork). Of the 127 participants enrolled, 108 completed the trial (n=57, intervention group; n=51, control group). The mean (SD) age of participants was 42.2 (11.9) years and 59% were female. Ninety-three percent of participants were white and 88% completed third-level education. At baseline, mean (SD) GHGEs were 7.3 (3.1) kg CO₂ equivalents/day. GHGEs reduced significantly in the intervention group (p<0.001), and GHGEs were significantly lower in the intervention group compared to the control group at week 12 (4.6 (1.5) vs. 6.8 (2.9) kg CO₂equivalents/day, p<0.001).

In the control group, intakes of carotene, vitamins B12 and C increased significantly from baseline (p<0.05), whereas vitamin E reduced significantly (p=0.005). In the intervention group, intakes of retinol, riboflavin, niacin equivalents, vitamins B6 and B12, biotin, pantothenate, calcium, phosphorous, zinc, and potassium reduced significantly (p<0.05).

Compared to the control group at week 12, the intervention group had significantly higher intakes of vitamin E (p=0.015) and significantly lower intakes of retinol, thiamin, riboflavin, niacin equivalents, vitamins B6 and B12, biotin, pantothenate, calcium, phosphorous, zinc and potassium (p<0.05). There were no differences in carotene, retinol equivalents, total folates, vitamin C, magnesium, iron, copper, or selenium.

Micronutrient intakes generally remained similar or improved in the healthy control group, whereas the low-GHGE diet resulted in reductions in some key micronutrients. Further analysis of dietary composition, the prevalence of inadequate intakes, and biomarkers of nutritional status will enable a more comprehensive understanding of the impacts of such a dietary transition on nutritional status.

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Student Competition

OC80. Unsupervised machine learning to determine dietary protein distribution among New Zealand vegans across time periods of the day. *Bi Xue Patricia Soh¹, Matthieu Vignes², Nick W Smith¹, Pamela R. von Hurst³ and Warren C. McNabb¹* 1. Sustainable Nutrition Initiative, Riddet Institute, Massey University, Palmerston North, New Zealand and 2. School of Mathematical and Computational Sciences, Massey University, Palmerston North, New Zealand and 3. School of Sport Exercise and Nutrition, College of Health, Massey University, Auckland, New Zealand.

Excluding all animal-sourced foods may be associated with increased risks of nutrient deficiencies. As indispensable amino acids (IAAs) cannot be stored or endogenously produced, consistent protein consumption throughout the day is important to improve protein quality for optimal metabolic function ⁽¹⁾. Assessment of protein adequacy needs to be undertaken at the meal rather than daily intake level because food combinations within each meal can be complementary and influence the overall amino acid profile of the meal ⁽²⁾.

Outcomes of our previous review found that among plant-sourced foods, soy, legumes, nuts and seeds provide greater protein content and quality ⁽³⁾. We hypothesise that variation in protein intake will exist both between vegan individuals and between observation days for the same individuals. Previous investigations of the relationship between meals and nutrient intake based on specified time windows for eating may have been subject to researcher bias in the definition of these windows. The main outcome of this study is to utilise time series clustering to determine the impact of dietary patterns on protein distribution, across the day.

Intake data was obtained using a four-day food diary from a cross-sectional survey of 193 New Zealand vegans (Ethical approval: HDEC 2022 EXP 12312). The inclusion criteria required participants to have followed an exclusive vegan diet for at least two years. A kernel density contour estimation was used to visualise protein distribution across eating occasions for all participants over four days. Dynamic Time Warping (DTW) was then used to align two temporal sequences (time series) to compute an output of distance ⁽⁴⁾ which was used for hierarchical clustering using the Ward.D2 method. An optimal cluster of 3 was identified using silhouette coefficient and domain knowledge.

Participants had a mean age of 39.4 years (SD = 12.3), with 90.1% having attained a tertiary-level education or higher. Overall, mean protein intake was 1.11 g/kg/d (SD = 0.39), with 8.29% of participants below the Estimated Average Requirements (EAR) and 24.3% of participants below the Recommended Dietary Allowance (RDA) for adults. The mean Acceptable Macronutrient Distribution Range (AMDR) for protein is 15.5% (SD = 4.16), with 96.9% of participants within the recommended AMDR range (10-35%). Peak protein consumption was observed at 1230 and 1900. Sequential colour scale representing density found higher distribution of data points representing protein intake of less than 10g per eating occasion. Time series similar in shape and amplitude were assigned to the same cluster. Preliminary findings identified three different protein intake profiles across the day.

A small percentage of participants has protein intake below the daily requirements for adults. More occasions with lower protein intake per eating moment was observed. This approach classifies dietary patterns objectively for analysis of daily protein and IAA intake.

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Student Competition

OC81. Using artificial intelligence to estimate the nutritional content of meal photos: an evaluation of ChatGPT-4. C. O'Hara¹, G. Kent¹, A.C. Flynn¹, E.R. Gibney^{2,3}, C.M. Timon¹. 1. School of Population Health, Royal College of Surgeons in Ireland, Dublin, Ireland and 2. UCD Institute of Food and Health, University College Dublin, Dublin, Ireland and 3. School of Agriculture and Food Science, University College Dublin, Dublin, Ireland.

Dietary intake assessment is an essential part of nutrition research and practice, with the use of digital technology now well established⁽¹⁾ and artificial intelligence (AI) in the form of image recognition readily available in research and commercial settings⁽²⁾. Recent advances in large language models (LLMs), such as ChatGPT, allow computers to converse in a human-like way providing text responses to typed queries. No studies, however, have utilised both the LLM and image recognition components of ChatGPT-4 to evaluate its accuracy to estimate nutritional content of meals.

The aim of this study was to evaluate the accuracy of the ChatGPT-4 LLM and image recognition model in estimating the nutritional content of meals.

Thirty-eight meal photographs with known nutritional content (from McCance and Widdowson's Composition of Foods) were uploaded to ChatGPT, and it was asked to provide point estimates for each of the meals for each of the following: energy (kcal), protein (g), total carbohydrate (g), dietary fibre (g), total sugar (g), total fat (g), saturated fat (g), monounsaturated fat (g), polyunsaturated fat (g), calcium (mg), iron (mg), sodium (mg), potassium (mg), vitamin D (mcg), folate (mcg), and vitamin C (mg). Comparisons were made between ChatGPT estimates and those from McCance and Widdowson using the Wilcoxon signed rank test, percent difference, Spearman's correlation, and cross-classification of quartiles. Interpretation of statistical measures was based on Lombard et al.⁽³⁾.

For estimating the content of meals, differences ($p < 0.05$) existed between the methods for 11 of the 16 nutrients, and 12 nutrients had a percent difference of $>10\%$, indicating poor agreement for most nutrients. ChatGPT underestimated 15 of the 16 nutrients. Conversely, when considering the ranking of meals, all nutrients had correlation coefficients which indicated good ($r_s \geq 0.50$)(11 of 16) or acceptable ($0.20 < r_s < 0.49$)(5 of 16) agreement. In the cross-classification of quartiles, $\geq 50\%$ of meals were classified into the same quartile by both methods for 9 nutrients and 10% of meals were classified into opposite quartiles for 14 nutrients, indicating good agreement. ChatGPT also provided caveats regarding its estimations such as "the caloric estimate assumes the butter is spread thinly" and "cornflakes can often be fortified with vitamins and minerals [...] and exact content could also vary based on the brand of cornflakes".

ChatGPT showed poor agreement for estimating the nutritional composition of meal photographs for most nutrients, but the correlation and cross-classification of quartiles indicate good ability to rank meal photographs according to nutritional composition. Further research is required with a wider range of meals and in real-world settings. Future work should consider the training of language models using high-quality nutrition data to improve accuracy and maximise the potential for their use in dietary assessment.

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OC82. Utilization of Extended Reality (XR) technology in nutrition studies: A systematic review.

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Extended reality (XR), which includes Virtual Reality (VR) as well as Augmented Reality (AR) technologies, has emerged as an innovative tool with potential applications in both the health and education sectors. For nutrition studies, XR technology offers alternative approaches to addressing challenges related to the prevention and management of chronic conditions such as overweight, obesity, diabetes, and cardiovascular diseases (CVD)⁽¹⁾. By simulating immersive environments and interactive experiences, XR technology presents the opportunity to influence dietary behaviours, modify eating habits, to improve health by reducing weight and body mass index (BMI). This review aims to explore the application of XR technology in nutrition studies, particularly focusing on diet-related non-communicable diseases (obesity, diabetes, and cardiovascular diseases), with an emphasis on managing relevant health outcomes.

A comprehensive search utilising multiple databases including PubMed, Cochrane, Web of Science, Scopus, CINAHL, Medline, and ProQuest was conducted (December to March 2024). Key search terms encompassed XR technology (e.g., virtual reality, augmented reality, Oculus, mobile app, immersive) in conjunction with nutrition-preventable terms (obesity, overweight, diabetes, CVD and health outcomes BMI). Following the search, duplicates were removed, and articles were screened against predefined inclusion criteria. Data extraction focused on study details, participant characteristics, interventions, outcomes, and results.

845 articles were identified, and five met the inclusion criteria^(3,4,5,6,7). These included one randomised cross-over study⁽⁴⁾ and four randomised controlled trials^(1,2,3,5). Of these articles, four studies explored VR-based approaches^(2,3,4,5), while one study used AR technology⁽¹⁾. The primary outcomes assessed across these studies focussed on the efficacy of VR and AR interventions in various domains, including portion size reduction, hunger, eating behaviour, food preferences, and weight management. Two studies showed improved portion size self-efficacy with VR interventions^(2,5). One study reported that even though eating a virtual meal does not appear to significantly reduce hunger in healthy individuals, meal duration was significantly shorter in the virtual meal, than in the actual or real meal, which led to a higher eating rate⁽⁴⁾. The use of XR interventions also showed the potential to support optimal portion size selection and reduction in implicit food preferences^(1,3).

XR interventions may be effective in addressing various aspects of eating behaviour and portion control. These findings suggest potential applications in nutrition education and obesity management, especially for those for whom technology usage is the norm, by offering innovative approaches for intervention and behaviour change. Further research in this domain is needed to elucidate the efficacy, feasibility, and long-term impact of XR/VR-based interventions in the prevention and management of chronic conditions.

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OC83. Predicting diet quality and food consumption using contextual factors: an application of machine learning models. *N.R Tran¹, Y. Zhang¹, R.M Leech¹ and S.A McNaughton²* 1. Institute for Physical Activity and Nutrition (IPAN), School of Exercise and Nutrition Sciences, Deakin University, Geelong, VIC 3220, Australia and 2. Health and Well-Being Centre for Research Innovation, School of Human Movement and Nutrition Sciences, University of Queensland, St Lucia, QLD 4067, Australia.

Poor diet quality among young adults contributes to increased rates of overweight and obesity⁽¹⁾. Improving diet quality requires small and achievable changes in eating behaviours⁽²⁾. Personalised nutrition interventions offer a promising strategy to modify behaviour and subsequently enhance diet quality but require input data on individuals past behaviour and their environmental contexts to ensure advice is relevant and effective⁽³⁾. Machine learning (ML) is a useful tool for predicting behaviours, but few studies have explored the integration of ML capabilities into precision nutrition applications⁽⁴⁻⁶⁾. Therefore, this study used ML to investigate whether contextual factors occurring at eating occasions (EO) predict food consumption and, consequently, overall daily diet quality.

Analyses were conducted on cross-sectional data from the Measuring Eating in Everyday Life Study (MEALS) (7-8). Participants (aged 18-30 years, n = 675) recorded dietary intakes at EO (i.e. meals and snacks) in near-real time (3-4 non-consecutive days) using a Smartphone food diary app. Contextual factors for each EO were recorded via the app and categorised as social-environmental factors (e.g. activity, persons present while eating) and physical-environmental factors (e.g. consumption location, purchase location). Person level factors describing participant characteristics were collected during an online survey. Intake (servings per EO) of vegetables, fruits, grains, meat, dairy, and discretionary foods were estimated, as per Australian Dietary Guidelines. Gradient boost decision tree⁽⁹⁾ and random forest models⁽¹⁰⁾ were chosen a priori; decision tree provide explainable ML, while random forest improves accuracy⁽¹¹⁾. Their performance was evaluated using 10-fold cross-validation, comparing mean absolute error (MAE), root mean square error (RMSE), and R squared. Feature importance analysis was performed to understand important variables for predicting food consumption. All analysis was performed using R.

Results indicate that ML can predict most food groups at EO using contextual factors, with an acceptable range in differences between actual consumption and predicted consumption (<1 serving per EO). For instance, MEA values for fruits, dairy, and meat were 0.35, 0.34, and 0.56 servings, respectively. This suggests that, on average, models' predictions are off by 0.35 servings of fruits per EO using contextual factors (RMSE values for fruit, dairy, and meat were 0.61, 0.50, and 0.80 servings, respectively). Notably, when investigating the influences of different contextual factors on models' predictions, feature importance analysis indicated that person level factors such as self-efficacy and age were considered highly important, while person presence and purchase locations ranked highly in importance within eating occasion-level factors across most food groups.

ML can offer valuable insights into the interplay between contextual factors and food consumption. Future research should investigate which contextual factors, when modified, lead to favourable dietary behaviours, and incorporate these findings into precision nutrition interventions.

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Student Competition

OC84. Comparison of online food composition databases including those in nutritional assessment tools. G. Williams¹, A. Hamilton¹ and J.E. Cade^{1,2} 1. *Dietary Assessment Ltd, Nexus Building, Leeds, UK* and 2. *Nutritional Epidemiology Group. School of Food Science and Nutrition, University of Leeds, UK.*

Measuring dietary intake accurately is essential in establishing relationships between food consumption patterns and non-communicable diseases. Researchers are now using online tools to replace traditional methods¹. New technologies provide a more flexible approach and are generally preferred by study participants. However, it is not known whether the underlying databases are reliable. Weight loss app energy calculations vary considerably compared to weighed food records². The aim of this work was to review the quality and compare the content of online food composition tables including those linked to assessment tools.

We undertook a Google search supplemented by expert knowledge to identify online food composition tables in the English language. Databases were either stand-alone online food and drink databases or associated with dietary assessment tools. Databases found were accessed; and we conducted a review of their features. Information on numbers and types of foods, their origin, nutrients and completeness of datasets were extracted using a standardised approach.

Twenty-two online food composition databases were reviewed from around the world. 12 (55%) of the databases were associated with dietary assessment software and 9 (41%) solely used an API to link with other systems. Numbers of food items included in the databases ranged from 18 million ('myfitnesspal') to 600 ('FoodDB'). The largest databases generally used crowd sourced data. 'myfood24' had the largest total number of variables (n=326) and 'Carbs and Cals' and 'Nutracheck' only had 8 nutrient variables. The source of food composition data is not clear for all of the datasets. 7 of the databases explicitly include the UK and 3 the US generic food tables, often in addition to branded data. Most databases do not state how they are checked for accuracy or completeness. Where databases state how missing data is infilled only 'myfood24' considers both macro and micronutrients. Eight of the databases were only relevant for one country, and 13 tools reported having food data for a range of countries. In addition to nutrients some databases also include non-nutrient phytochemicals, allergens or sustainability metrics. Food images were often used to assist with portion size estimation, although some tools only used general pictures or pictures that did not reflect the food. Searching for food items varied in accuracy and some systems allowed barcode scanning.

Online food composition databases allow for much greater differentiation of foods, including branded items compared to traditional tables. They range considerably in size and quality. Care should be taken to ensure databases underlying online assessment tools are reliable with limited missing data to ensure the application of such databases to research does not produce misleading results.

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OC85. Nutritics GB23 database: an enhancement of the McCance Widdowson's The Composition of Foods Integrated Dataset (CoFID) database. *Catriona Innih*^{1,2}, *D. O'Kelly*², *F. Douglas*², *C. Arenhart*², *K O'Brien*², *L. B. Kirwan*² 1. University College Dublin, School of Agriculture and Food Science, Dublin 4, D04 V1W8 and 2. Nutritics Ltd, 22C Town centre mall, Main Street, Swords, Dublin, K67 FY88.

Food composition databases (FCDs) play a vital role in nutrition research, providing essential data on the nutritional content of food and drinks, typically obtained through chemical analyses of representative samples. FCDs are used in dietary surveys, clinical practice, research, and policy development⁽¹⁾. Public Health England funds and systematically publishes a UK FCD McCance Widdowson's The Composition of Foods Integrated Dataset (CoFID). Some nutrients that are not available in the CoFID database including Omega-3 and 6, Folates, Amino Acids, and Vitamin D⁽²⁾ but are available in sources including the Quadram Institute Food Labelling 2021 dataset⁽³⁾ and National FCDs⁽¹⁾. To address this limitation, this study aims to enrich the CoFID database with additional nutrients and create a new database known as "GB23".

A reference hierarchy was established, including the CoFID 2021 dataset, the Quadram Institute Food Labelling Dataset 2021, and National Food Composition Databases. Nutrients were gap-filled where (a) data was represented as 'N' i.e. the nutrient is present in significant quantities, but the specific amount is unknown or not reliably documented or (b) the nutrient may be present in significant quantities, but the value was not reported. Nutrients were gap-filled, and the GB23 database was cross-checked against the previous CoFID database (GB15), and any outliers were identified. Aggregate nutrient values, nutrient breakdown and variability was analysed to ensure accuracy and consistency. Analysis was completed using Excel version V16.69.1.

2,887 foods and 34 unique nutrients were updated. 7 nutrients were gap-filled due to criteria (a) and 27 were updated due to criteria (b). 43,067 micronutrients values were gap-filled, including Omega 3 (*n* 84), Omega 6 (*n* 74), Folate (*n* 28), folateDFE (*n* 19), folicAcidFortified (*n* 19), folateFood (*n* 6), 21 Amino Acids (*n* 42,837), and Vitamin D (*n* 0). 5,553 macronutrients were updated based on re-calculated values from the Food Labelling 2021 dataset on Carbohydrate, Sugar, Fat, Saturated Fat, Fibre, Protein, Salt. Folic acid values (*n* 19) were taken from manufacturer and supermarket websites, and representative values calculated. 5 FCDs (2006 Norwegian FCD, 2014 German Nutrient DB, 2015 Canadian Nutrient File, 2014 NEVO online, and 2016 New Zealand FoodFiles) were identified as sources for Vitamin D values, but additional quality checks are required. 75 photos were added to new CoFID foods. Correlation between missing nutrients, foods, and food categories was analysed, e.g. 36 products were identified as sources of missing Omega-3 and 6 values.

This study enhances the CoFID database and identifies areas for improvement, including limited Vitamin D data, and increases transparency on the Nutritics GB23 database. As FCDs are and will remain central to nutrition, analysis on their limitations and areas for enhancements are key to ensuring robust nutrition analysis, research, and policy development.

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Student Competition

OC86. Influence of adiposity on the prevalence of iron deficiency in women of reproductive age: data from the UK National Diet and Nutrition Survey 2008-2019 (NDNS). *S.P. Demirdjian¹, M.A. Kerr¹, M.S. Mulhern¹, P. Thompson¹, M. Ledwidge² and M.T. McCann¹* 1. Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine, United Kingdom and 2. School of Medicine, University College Dublin.

Overweight/obesity and iron deficiency are highly prevalent, particularly in women of reproductive age (WRA)⁽¹⁾. Both can seriously affect women's health and cause severe complications in pregnancy⁽¹⁾. Obesity is associated with nutritional deficiencies but its influence on iron deficiency is unclear. This study aimed to investigate the influence of adiposity on the prevalence of iron deficiency in UK women of reproductive age.

Data from NDNS (years 2008-2019) was used including general characteristics, anthropometry, iron biomarkers; haemoglobin (Hb), ferritin, and C-reactive protein (CRP) as a marker of inflammation. WRA aged 18-49 years with BMI $\geq 18.5 \text{ kg/m}^2$ were included. Data were categorised as follows: Anaemia: Hb $< 120 \text{ g/L}$, Iron Deficiency Anaemia (IDA): Hb $< 120 \text{ g/L}$ and ferritin $< 30 \mu\text{g/L}$, Iron Deficiency (ID): ferritin $< 30 \mu\text{g/L}$, Iron Deficiency Without Anaemia (IDWA): Ferritin $< 30 \mu\text{g/L}$ and Hb $> 120 \text{ g/L}$ ⁽²⁾. Ferritin was adjusted for CRP (aFerritin)⁽³⁾. WRA were divided into two adiposity groups: BMI $< 25 \text{ kg/m}^2$ and $\geq 25 \text{ kg/m}^2$, waist circumference (WC) $< 80 \text{ cm}$ and $\geq 80 \text{ cm}$, waist-to-height (WHtR) < 0.50 and ≥ 0.50 , and waist-to-hip ratio (WHR) < 0.85 and ≥ 0.85 according to guidelines^(4,5). Weighting was applied to account for response differences between the surveys. Chi-square was performed to compare iron deficiency prevalence between adiposity groups and multiple logistic regressions adjusting for relevant covariates to evaluate the associations between adiposity and anaemia, IDA, ID and IDWA. P-value < 0.05 considered significant.

n=1098 WRA were included, n=496 with normal weight and n=602 with overweight/obesity (Ow/Ob). The overall anaemia, IDA, ID, and IDWA prevalence was 9.2%, 5.3%, 49.7%, and 42.9% respectively. Anaemia prevalence was greater in those with higher WHtR and WHR (11.9% vs 5.9% and 16.7% vs 6.5% respectively; both $p < 0.001$). Greater IDA prevalence was observed in those with higher WC, WHtR and WHR (8.5% vs 4.3%, $p = 0.005$; 9.4% vs 3.3%, $p < 0.001$; and 12.1% vs 4.9%, $p < 0.001$). Overall prevalence of ID was 43% using unadjusted ferritin and 49.7% using aFerritin, both with similar prevalence observed between adiposity groups. IDWA prevalence was higher in the low WC compared to the high WC group (46.5% vs 40.1%, $p = 0.030$), however, no association was found between ID or IDWA with any adiposity group. Logistic regression analyses showed that higher WHtR and WHR predicted anaemia and IDA (anaemia: WHtR aOR 1.74 $p = 0.045$, WHR aOR 4.05 $p < 0.001$; IDA: WHtR aOR 2.45 $p = 0.011$, WHR aOR 3.82 $p < 0.001$).

ID prevalence in a representative sample of UK WRA is high, at 43%, with higher rates of 50% observed when ferritin is adjusted for inflammation, indicating the increased sensitivity of aFerritin in ID detection. A greater central adiposity in WRA is a risk factor for IDA. Public health strategies are needed to address the high prevalence of ID in UK WRA, particularly those living with Ow/Ob.

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OC87. Effect of fish consumption on the interactions between the gut microbiota and inflammatory markers: Results from the iFISH study. Cealan O Henry¹ Emeir M McSorley¹ Marie C Conway¹ Alison J Yeates¹; Maria S Mulhern¹; Conall S Strain^{2,3}; Toni Spence¹; Edwin van Wijngaarden⁴; J J Strain¹; Philip J Allsopp¹. 1. Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine BT52 1SA, Ireland 2. Teagasc Food Research Programme, Moorepark, Fermoy, Co, Cork T12 YN60, Ireland 3. APC Microbiome Ireland, University College Cork, Cork, Ireland 4. School of Medicine and Dentistry, University of Rochester, Rochester, USA.

Dietary intake can influence immune function indirectly by affecting the gut microbiota composition and metabolism⁽¹⁾. Fish consumption has been shown to positively regulate the gut microbiota in humans^(2, 3); albeit in those studies fish was consumed in high amounts (500-750g/week) and immune function was not investigated. This study investigated the effect of consuming the UK dietary recommendation for fish⁽⁴⁾ (2 portions [140-280g/week], one of which is oily) on the gut microbiota alpha diversity. Further, we examined if changes (pre- to post-intervention) in the gut microbiota composition were associated with changes in immune cytokine concentrations.

An 8-week randomised controlled trial in low fish consuming women of childbearing age (n=41; median age 23y) investigated the effect of consuming 1 or 2 portions of fish (tuna or sardines)/week compared to not consuming fish. A blood sample was collected to measure inflammatory cytokines (tumour necrosis factor- α , interleukin [IL]-1b, IL-5, IL-6, IL-17A and IL-22) pre-and post-intervention. Faecal samples were collected at both timepoints and extracted DNA was used to determine gut microbiota compositional profiles using 16S metagenomic sequencing (Illumina, USA). Statistical analysis investigated significant differences in changes in gut microbiota alpha diversity and compositional relative abundances between fish intervention (N=26) and control (N=15), then secondary analysis stratified by portion size (1 vs 2 portions) and type of fish (tuna vs sardines). Differences in cytokines between fish intervention and control were assessed by Mann-Whitney U. Spearman rank coefficient assessed associations between the changes in gut microbiota relative abundances with cytokine changes in fish and control groups.

Fish consumption increased gut microbiota alpha diversity indices (Chao1 [7.37 \pm 41.23], Simpson [0.003 \pm 0.163], Shannon [0.07 \pm 0.33], phylogenetic diversity [0.35 \pm 2.59], observed species [9.00 \pm 40.06]), albeit this was not significant compared to the control group (p>0.05). Consumption of fish, specifically sardines, for 8 weeks significantly reduced Bacteroidetes (-4.77 \pm 4.88%) when compared to control (+4.15 \pm 7.58%) (p<0.01). No significant differences were observed between the change in relative abundances of gut microbiota at genus-level taxa or inflammatory cytokines between the fish intervention and control. In the fish intervention group, increases in IL-17A, IL-22 and IL-6 concentrations were positively correlated with changes in Alistipes, Rhodococcus, Haemophilus, Barnesiella and Akkermansia relative abundances (p<0.05).

Although not statistically significant, consistent findings suggest that fish intake, in line with dietary guidelines, may have favourable impact on gut microbiota. Sardines, oily fish rich in n-3 polyunsaturated fatty acids, may have health benefits in disease states where Bacteroidetes is elevated; nevertheless, further research is required in a larger cohort over a longer period.

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Student Competition

OC88. Associations of pulse-rich diets with risk of cancer incidence and mortality: findings from the UK Biobank prospective cohort study. Y Kaimila^{1,4}, O. Olotu¹, M Clegg^{1,2}, K.G Jackson^{1,2,3} and J.A Lovegrove^{1,2,3} 1. Hugh Sinclair Unit of Human Nutrition and 2. Institute of Food, Nutrition and Health and 3. Institute for Cardiovascular Metabolic Research, Harry Nursten Building, Whiteknights, University of Reading, Reading, RG6 6DZ. UK and 4. The University of Malawi, P.O Box 280, Zomba. Malawi.

Approximately 25% of deaths in the UK are caused by cancer⁽¹⁾. Studies have reported a lower risk of all site cancers, and specifically kidney, stomach, oesophagus, colorectal, oropharyngeal, and upper aerodigestive cancers in higher consumers of pulses compared to low consumers⁽²⁾. However, findings are inconsistent with others showing no association⁽³⁾. In view of the limited studies conducted to date, the objective of this data analysis was to assess the association of pulse-rich diets (beans, chickpeas, and lentils) with cancer incidence and mortality in UK adults.

This prospective cohort study of the UK Biobank included 115,011 participants (55%, n=62,977 females) aged 40-70 years at recruitment (2006 and 2010) who had undertaken at least two complete 24-hour dietary recalls and were followed up until 2022. Participants with cancer at baseline, extreme dietary energy intakes, or pregnant were also excluded from the analysis. Pulse consumption was split as non-consumers (NC, 0g/day, n=73,266), and three tertiles (T) according to the level of pulse intake (T1: 1-20.4g/day, n=14,035; T2: 20.5-40.4g/day, n=13,509; and T3: 40.5-360g/day, n=14,161). Using Cox proportional hazard models, the hazard ratios (HR) of the effect of pulse consumption on total and multi-site cancer incidence and mortality was conducted with sex, age, dietary energy, region, ethnicity, income, employment, smoking status, education, exercise level, body mass index (BMI), supplement use, alcohol intake, family history of cancer, intake of fruits and vegetables, processed meat, and dietary fibre as covariates in the fully adjusted model as appropriate for the cancer site.

The cohort had a mean±SD age of 55.9±7.0 years, BMI of 26.7±4.6 kg/m² and pulse intake of 13.3±20.5g/day. White people (n=110,890, 96.4%) had the lowest mean±SD pulse intake compared to all other ethnicities (13.2±24.4g/day vs 17.0±27.7g/day, p<0.001 respectively). After a mean follow-up of 12.4 years, there were 3281 cancer deaths and 17,415 incidences of cancer. There were inverse associations of pulse intake with the incidence of liver cancer (HR 0.39: 95% CI: 0.17, 0.90) and thyroid cancer (HR 0.40: 95% CI: 0.16, 0.99) in T2 compared to NC for both sexes and in NC compared with T1 for breast cancer in females (HR 0.55: 95% CI: 0.36, 0.86). No associations were observed for other cancer sites or for cancer mortality.

Compared with NC, our findings suggest that diets with an intake of pulses up to 40.4g/day are associated with lower incidence of liver, thyroid, and female breast cancer but not other cancers or mortality. The lack of association between diets containing higher pulse intake with cancer incidence and mortality was unexpected and suggestive of effects of other dietary components, studies on the dose dependent effects and types of pulse intake on cancer incidence and mortality are needed.

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OC89. Effect of prebiotic supplementation in markers of intestinal permeability, pH and mucosal immunity. L. Torquati¹, M. Batool¹ and J. Bowtell¹. *1. Public Health and Sport Science, Medical School, University of Exeter, Exeter, UK.*

Gut microbiome fermentation of prebiotic fibre increases short-chain fatty acids (SCFA), which can stimulate mucosal B-cells to express secretory IgA in distant tissues^(1,2), and can support gut barrier function. Secretory IgA levels have been associated with reduced upper-respiratory tract infections incidence in immune-compromised populations^(3,4). However, it is not known if prebiotic supplementation would be effective in healthy adults. This study investigated whether inulin can increase mucosal immunity (sIgA) and intestinal permeability markers, alongside acceptability of intervention.

Healthy adults (n=23, BMI: 23.85±3.2 kg.m⁻², age: 33.4±10.1 years) took part in this randomised-controlled cross-over trial. Participants were randomly allocated to inulin syrup (12g/day) or placebo syrup (20% diluted honey) for 2-weeks. This was followed by 2-weeks wash-out, and then conditions were switched for a final 2-week supplementation. Before and after each supplementation, faecal pH was measured with glass probe, and salivary sIgA and plasma lipopolysaccharide binding protein (LBP, marker of intestinal permeability) were measured with ELISA kits. Time to provide 2ml of saliva through passive drooling was recorded, and used to calculate saliva flow (ml/min) and thus IgA secretion rate (µg/min). Participants were asked to report on their diet intake (4-day food diary) before and after each supplementation phase, as well as reporting on any respiratory and gastrointestinal symptoms using a validated questionnaire. Differences between groups were analysed with one-way ANOVA on post outcome values, adjusted for outcome baseline values, and chi-squared for categorical data (SPSS software).

There was a significant reduction in LBP levels in inulin compared to placebo condition (-3.15, 95%CI -5.18, -1.12; p= 0.03). Mean differences between groups (inulin vs placebo) were not significant (p> 0.10) for pH (0.43 95%CI -0.32,0.41) and IgA secretion rate (31.80 µg/min 95%CI -150.90, 87.29). Gastrointestinal symptoms were not different between groups (p>0.05), except for mild bloating/rumbling (reported in 70.8% inulin vs 44.4% placebo, p=0.01). Respiratory symptoms were lower in inulin compared to placebo (runny nose 19.2% inulin vs 38.2%, p= 0.03). Inulin condition resulted in higher fibre intake compared to placebo, with no other differences in dietary intake (+5.43 g/day 95%CI 0.09, 10.86 p= 0.05). 90% of participants reported the intervention as acceptable and easy to follow.

Inulin was well tolerated with minimal side effects of gastrointestinal bloating and rumbling. While markers of mucosal immunity did not change, intestinal permeability markers improved suggesting that in healthy populations prebiotic supplements can support gastrointestinal health but not necessarily improve mucosal immunity.

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OC90. Reducing free sugar intakes: the effects of dietary sweet taste modification on sweet taste perceptions and sweet food intake. A. D. Bielat¹, P. J. Rogers², and K. M. Appleton¹ 1. *Department of Psychology, Faculty of Science and Technology, Bournemouth University, Bournemouth, UK and 2. School of Psychological Science, University of Bristol, Bristol, UK.*

The World Health Organisation currently recommends a global reduction of free sugar intakes to reduce diet-related ill-health ⁽¹⁾. One of the proposed strategies to achieve this reduction is to limit the consumption of all sweet-tasting foods and beverages, based on a rationale that regular exposure to dietary sweet taste increases preferences for all sweet-tasting foods and beverages, including those which contain free sugars ⁽²⁾. Limited studies, however, have directly examined the effects of repeated dietary sweet taste exposure on subsequent preferences and intakes of sweet-tasting foods and beverages, with the existing literature exhibiting contradictions and failing to investigate the effects of whole-diet-sweet taste exposure on the outcomes of interest ⁽³⁾.

This randomized controlled trial aimed to assess the effects of a whole-diet, six-day dietary sweet food and beverage intervention on sweet taste perceptions and intakes of sweet-tasting foods and beverages. A total of 104 adults were recruited and randomized to either: a) increase their sweet food intake ($n = 40$); b) decrease their sweet food intake ($n = 43$); or c) make no dietary change ($n = 21$); for six consecutive days. On day 0 (baseline) and day 7 (end), pleasantness, desire to eat, and sweet taste intensity were rated for six dietary items, and sweet food intake was measured in a buffet meal, as percentage weight and percentage energy consumed from sweet foods and beverages, weight of sugar consumed and percentage energy consumed from sugars.

Intention-to-treat analyses found no statistically-significant dietary exposure x time interactions for perceived pleasantness ($F(2, 101) = 2.04, p = .14, \eta^2 = .04$), desire to eat ($F(2, 101) = 1.49, p = .23, \eta^2 = .03$) or any measure of sweet food intake (largest $F = 2.53, p = .09$). A significant dietary exposure x time interaction was detected for sweet taste intensity ($F(2, 101) = 4.10, p = .02, \eta^2 = .08$), which showed that for participants in the decrease sweet food consumption group, sweet foods tasted sweeter post-intervention compared to baseline ($t(42) = 3.36, p < .01, M_{diff} = 6, SE = 2$). No effects were found in the increase sweet food consumption or no diet change groups (largest $t(39) = .38, p = .70$).

Our findings contradict the predictions made by public health institutions that dietary sweet taste exposure influences the intake of sweet-tasting foods and beverages, and that reduced exposure leads to reduced intakes ⁽²⁾. They also suggest that, whilst the extent of dietary exposure to sweet-tasting foods and beverages affects sweet taste intensity, it does not affect the perceived pleasantness of or desire to eat other sweet-tasting foods.

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OC91. Cross-comparison of diet quality scores in relation to cardiometabolic health, cognitive function, and ecological sustainability parameters: Results from the Rhineland Study. J. F. Tavares¹, U. Nöthlings² and M. M.B. Breteler^{1,3} 1. German Center for Neurodegenerative Diseases (DZNE), Department of Population Health Sciences, Bonn, Germany and 2. University of Bonn, Institute of Nutrition and Food Science, Nutritional Epidemiology, Bonn, Germany and 3. University of Bonn, Institute for Medical Biometry, Informatics and Epidemiology (IMBIE), Bonn, Germany.

Food systems significantly influence both human health and the environment. In 2019, the EAT-Lancet Commission introduced a universal, healthy reference diet aimed at enhancing environmental sustainability and preventing non-communicable diseases.⁽¹⁾ This diet, known as the EAT-Lancet reference diet (ELR-diet), has been associated with reduced risks of cardiometabolic diseases and mortality,⁽²⁻³⁾ as well as a diminished environmental impact.⁽⁴⁾ However, the distinctions between the ELR-diet and other dietary patterns—traditionally defined solely by their health benefits—remain less examined, particularly in the context of both health outcomes and environmental sustainability. This study evaluates hypothesis-driven diet quality scores—Alternate Healthy Eating Index (AHEI), Mediterranean-style Diet Score (MDS), Dietary Approaches to Stop Hypertension (DASH), Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diet, Nordic Diet Score, healthful Plant-Based Diet Index (hPDI), and the ELR-diet—across their effects on cardiometabolic health, cognitive function, and ecological sustainability.

We based our analyses on participants from the Rhineland study with available nutritional assessment, cardiometabolic markers, and cognitive function data at baseline (n=6473, age 56.1±13.4 years, 56% women). Based on dietary data collected through a semi-quantitative food frequency questionnaire, we estimated and compared adherence to seven diet quality scores, including the ELR-diet. Cardiometabolic risk markers included adiposity indicators, lipoprotein levels, and blood pressure. Cognitive performance was measured in multiple domains and averaged into a global cognitive function score. Diet-related greenhouse-gas emissions (GHGEs) and land use (LU) were calculated per participant's food intake, expressed as kgCO₂ equivalents and m²×year, respectively.⁽⁵⁾ Correlations between diet quality scores were quantified using Spearman correlation, and associations with outcomes were analyzed using multivariate linear models.

All diet quality scores were positively correlated with each other. The EAT-Lancet diet was most strongly correlated with the hPDI (r =0.43; p<0.001), and least with the Nordic diet (r =0.16; p<0.001). Higher ELR-diet adherence was associated with reductions in various adiposity markers, lipoprotein levels, and blood pressure although these reductions were generally smaller than those observed with the DASH and AHEI diets. ELR-diet adherence was also associated with better global cognitive performance (β= 0.03, 95%CI= 0.02;0.05), closely matching the MIND diet (β= 0.04, 95%CI= 0.03;0.05). Moreover, the ELR-diet was inversely associated with GHGE (β= -0.3, 95%CI= -0.33;-0.27) and LU (β= -0.37, 95%CI= -0.41;-0.33), yet the hPDI diet, was associated with the greatest decrease in both markers (GHGE β= -0.48, 95%CI= -0.51;-0.45; LU β= -0.58, 95%CI= -0.62;-0.54). Conversely, the Nordic diet was associated with increases in both GHGE and LU.

Our study provides evidence that higher diet quality, measured through different scores, is associated with favorable cardiometabolic health, better cognitive performance and reduced environmental impact. These findings support the generalizability of the beneficial effects of adherence to a healthy diet across both health-related and sustainability outcomes.

Acknowledgments

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Student Competition

OC92. Assessing the environmental impact of food consumption in Northern Ireland, a focus on greenhouse gas emissions. H. Griffin¹, V. Leighton¹, B. A. McNulty², D. Wright³ L. Brennan² and A.P. Nugent^{1,2} 1. Queen's University Belfast, School of Biological Sciences, Institute for Global Food Security, Belfast, Northern Ireland and 2. University College Dublin, UCD School of Agriculture and Food Science, Dublin, Ireland and 3. Queen's University Belfast, School of Medicine, Dentistry and Biomedical Sciences, Belfast, Northern Ireland.

There is evidence that human health and environmental sustainability are linked ⁽¹⁾ and a shift to more sustainable diets would be beneficial for both human and planetary health ⁽²⁾. Greenhouse gas emissions (GHGe) are an environmental metric that can be used to assess the environmental impact of diets ⁽³⁾. Research indicates that a nutritionally adequate diet low in GHGe can be achieved, but that a healthy diet will not always result in lower GHGe ⁽⁴⁾. To date, there is no information on the food choices driving GHGe in Northern Ireland. This study examined the food groups and derived nutrient intakes driving GHGe for Northern Ireland.

Analyses were performed on the Northern Ireland sub cohort of the UK National Dietary Nutrition Survey (NDNS 2016-2019) ⁽⁵⁾ on adults aged 18-64 years old (n=210). GHGe were sourced from Scheelbeek et al. 2020 ⁽⁶⁾. Mean daily intakes (MDI) for nutrients and GHGe for the total population were calculated and the population was divided into tertile groups based on low (T1), medium (T2) and high (T3) GHGe. Differences in population characteristics, MDI of energy and key nutrients (%TE or per 10MJ) and contributing food sources to GHGe were examined across these tertiles, using chi-square and one-way ANOVA with covariates (blue water use, sex and social class) and correcting for multiple comparisons as appropriate (P<0.001 for food groups and P<0.002 for nutrients).

Mean GHGe for adults were 4.3 ± 1.9 kgCO₂eq/d and 7% of the population fell below the GHGe planetary boundary of 1.87 kgCO₂eq/d ⁽⁷⁾. The food groups 'tea, coffee and water' (0.80 ± 0.56 kgCO₂eq/d), 'burgers, sausages, kebabs, meat pies and other meat and meat products' (0.39 ± 0.64 kgCO₂eq/d) and 'alcoholic beverages' (0.39 ± 1.02 kgCO₂eq/d) were the major contributors to overall GHGe. Across the tertiles, the difference of GHGe between T3 and T1 was 3.6 kgCO₂eq/d (6.3 kgCO₂eq/d vs 2.7 kgCO₂eq/d). The contribution of 'bacon, ham and dishes', 'beef, veal and dishes', 'lamb and lamb dishes', 'tea, coffee and water' and 'alcoholic beverages' were higher (P<0.001) in T3 versus T1. MDI of energy (kcal) was higher in T3 versus T2 and T1 (2141.3kcal, 1791.2kcal and 1368.9kcal, P<0.001). Significantly lower carbohydrate (%TE) intakes were reported in T3 compared to T1 (42.7%TE vs 47.5%TE, P<0.001). Protein and fat (%TE) were higher in T3 in comparison to T2 and T1, with protein at 17.4%, 17.1% and 16.7%TE respectively, and fat at 35.4%, 35.3% and 33.7%TE respectively.

In summary, the main food groups driving GHGe in NI were beverage and animal based. Differences in energy and carbohydrate intake were observed across the tertiles. These results will aid in the development of strategies to diversify foods within Northern Ireland to combat high GHGe.

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Student Competition

OC93. The nutritional profile of plant-based meat alternatives vs. traditional plant proteins: A product audit. L. Lindberg¹, J.V. Woodside¹, C. Kelly², M. Robinson² and A.P Nugent² 1. Centre for Public Health, Queen's University Belfast, BT12 6BJ, UK and 2. School of Biological Sciences, Queen's University Belfast, BT9 5DL, Belfast, UK.

Plant-based meat alternatives (PBMA) are products made from manufactured ingredients such as protein isolates, to replicate the organoleptic and functional properties of meat⁽¹⁾. Traditional plant proteins (TPPs) such as tofu, tempeh and legume-based dishes are whole plant foods and have been longstanding components of the protein group of food-based dietary guidelines (FBDGs)⁽²⁾. PBMA have been added to some recently revised FBDGs^(3,4), however, with considerable differences in ingredient composition, the objective of this study was to evaluate if these products are similar in terms of energy and macronutrients content.

An online audit of PBMA available in Tesco and Sainsbury's was completed (November 2023-January 2024). On-pack information was extracted, and similar products were grouped. Within eligible categories (burgers, beef-style dishes and seafood), products were further grouped according to their classification as a PBMA or TPP. Categories such as tofu and tempeh were combined and compared with PBMA chicken fillets/chunks and beef/pork products separately. Mean energy and nutrient contents were compared using independent sample t-tests, with P values ≤ 0.05 considered statistically significant. A-scores from the UK's Nutrient Profiling Model⁽⁵⁾ were calculated and the EU threshold for protein claims ($\geq 12\%$ energy from protein)⁽⁶⁾ was applied to determine the proportion of products within each category considered a protein source.

Within the burger category, PBMA (n=43) had a significantly higher mean energy (206.8 vs. 197.4 kcal/100g, P=0.008), total fat (11.2 vs. 8.4 g/100g, P=0.05), and saturated fat content (2.5 vs. 0.8 g/100g, P=0.02), and significantly lower carbohydrate content (10.4 vs. 23.5 g/100g, P=0.002) than TPPs (n=14). Within the seafood category, PBMA (n=11) had a significantly lower total fat content (9.9 vs. 11.4 g/100g, P=0.001) and significantly higher protein (6.6 vs. 4.5 g/100g, P=0.04) and salt content (1.0 vs. 0.8 g/100g, P=0.03) than TPPs (n=5). PBMA within the beef-style dishes category (n=19) were significantly higher in energy (174.2 vs. 111.5 kcal/100g, P=0.003) than TPPs (n=20). When PBMA chicken (n=81) and beef/pork (n=20) were compared with tofu, tempeh and jackfruit (n=17 and 20 respectively), PBMA chicken had a significantly higher carbohydrate content (12.2 vs. 2.6 g/100g, P<0.001) and PBMA beef/pork had a significantly higher protein content (17.2 vs. 13.1 g/100g, P= 0.005). PBMA had higher mean A-scores (6.4 - 8.5) than TPPs (3.2 - 6.6) in 4/5 categories indicating they are 'less healthy.' Very few TPPs within the burger and seafood categories met the protein threshold compared to PBMA.

Differences in energy, macronutrient content and A-scores, mean PBMA and TPPs cannot be considered nutritionally equal.

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Of food, the food is provided by protein. HIGH PROTEIN

Student Competition

OC94. An in-depth exploration of food sustainability practices in industry – from initial concept to development and evaluation. *S. O'Donovan¹, Aisling Moran¹, Maria McDonagh¹, and L. Ryan^{1.1}. Department of Sport, Exercise and Nutrition, Atlantic Technological University, Galway, Ireland.*

The food industry is intertwined in every continent and culture, shaping dietary habits and economies worldwide⁽¹⁾. Sustainability has become an increasingly important and widely discussed topic in the food industry influencing the decisions and actions of food industry companies and stakeholders worldwide. In an effort to become environmentally conscious and protect the earth for future generations, sustainability practices have been developed and integrated into food industry actions and policies which aim to meet present needs without compromising the ability of future generations to meet their own needs⁽²⁾. This study was part of a joint Erasmus KA2 European-funded project (2022-1-IE01-KA220-VET-000087508 Digitalisation of Sustainable Health Education) and aimed to explore current food sustainability priorities across the food industry in Europe and how initiatives are developed, implemented and evaluated to achieve food sustainability targets.

In-depth semi-structured, audio-recorded interviews were conducted with 21 employees in the Food Industry sector across Ireland, Poland, Lithuania and Cyprus. These participants were selected based on their knowledge and oversight of their company's sustainability practices. Interviews were transcribed and thematically analysed^(3,4), whereby the data were coded, themes identified and discussed by all authors.

Three themes were identified in the data: 1. sustainable practice challenges, 2. factors for consideration, and 3. thinking to the future. Sustainable practices were already implemented in all but one of the 21 participating companies. The main drivers reported behind development of sustainable initiatives included complying to the Science-Based Targets initiative (SBTi) and setting emissions targets such as being net zero by 2050 and minimising waste generation. Participants reported cost, time required for monitoring and evaluation, retaining quality of products, and employee engagement as the main challenges for initiative development and implementation. When developing a sustainability initiative, participants felt that employee and stakeholder understanding and acceptance were important to consider for the success of the initiative. Future goals and initiatives were positively discussed as expanding on current priorities to reduce emissions and implement sustainable procurement and production practices, and gaps in research were identified as the proliferation of environmental labels and exploration of greater inter-collaboration between companies to share sustainability data.

A focus on becoming more sustainable was at the centre of innovation development and future proofing for all participating companies, with plans to develop new or further enhance current policies to continue producing quality food in an environmentally sustainable way. Educating employees and stakeholders, including nutrition educators and graduates, on future initiatives and potential impacts is essential for raising awareness, strengthening implementation and ensuring long-term maintenance and success of food sustainability practices within industry. Future research into a policy for sharing of sustainability data, such as raw sustainability metrics between companies could strengthen initiative outcomes and inform nutrition education and research to meet market needs.

Acknowledgments

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OC95. Does sociodemographic strata determine local access to plant-based meat alternatives?

D. McBey, B.J.J¹, McCormick¹, M. Hussain¹ and J.I. Macdiarmid¹ 1. The Rowett Institute, University of Aberdeen, Aberdeen, UK

People with lower socio-demographic status (SES) tend to have less healthy diets, partly through access and affordability⁽¹⁾. As people are encouraged to reduce their meat consumption as part of a sustainable diet⁽²⁾, plant-based alternatives to meat are increasingly available. We hypothesised that lower SES populations may not be able to access plant-based meat alternatives (PBMA) from nearby shops.

A cross-sectional survey of food retailers in Aberdeen, a city of approximately 260,000 people with a wide range of SES, was conducted in 2023. For each decile of the nationally representative Scottish Index of Multiple Deprivation (SIMD)⁽³⁾, a postcode was randomly selected around the centroid of which a 0.5 mile area was identified and all food vendors were visited. All PBMA (e.g., plant-based sausages, cold cuts and chicken nugget replacements both frozen and chilled) were recorded along with descriptive characteristics of the shop (e.g., size, whether in a chain, proximity to public transport). Separately, to approximate the shopping habits of people in each SIMD decile, Kantar World Panel purchase data for the whole of Scotland (2017-2023) was used to model the proportion of monthly household visits to and spending in different food shops by household SIMD decile using a beta regression with mixed effects for repeated measures (n = 3054 households with median 30, IQR 1, 33 monthly observations).

Forty-one retailers were visited and a total of 267 different PBMA products identified. There was no association between the SIMD decile where a shop was located and the availability of PBMA. The only statistically significant predictor of PBMA sale was supermarket size (Chi-squared test, p = 0.002) and PBMA were only available in large or very large supermarkets (n=12/41). Larger supermarkets tended to be positioned in accessible locations with middling SIMD deciles (4th and 6th), albeit access may be more limited for vulnerable groups who may be less likely to own a car. From the household purchase data, there was no statistical difference in the proportion of monthly household spending on food in large supermarkets between SIMD deciles (0.01, 95%CI - 0.003, 0.022, p=0.14) and the proportion of visits to large supermarkets was not meaningfully different by SIMD (range 0.33 to 0.39), from which we infer that people from all SIMD deciles could access large supermarkets which stock PBMA.

We found no evidence to support our hypothesis that access to PBMA was driven by SIMD. Access was limited to large food shops, however, all SIMD deciles use large food retailers and could, in principle buy PBMA. We do not know, from these data, whether supermarkets are equally used by, or convenient for, consumers from different SIMDs, however, access to PBMA may not be one of the major barriers for consumers reducing meat consumption.

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OC96. Large-scale mapping of retail food and beverage products to environmental sustainability metrics. *M. Dineva^{1,2}, M.A. Green³, M.S. Gilthorpe⁴, M. Thomas⁵, N. Sritharan⁵, A.M. Johnstone⁶ and M.A. Morris^{1,2}*; 1. School of Food Science and Nutrition, Faculty of Environment, University of Leeds, Leeds, UK and 2. Leeds Institute for Data Analytics, University of Leeds, Leeds, UK and 3. Department of Geography and Planning, University of Liverpool, Liverpool, UK and 4. Obesity Institute, Leeds Beckett University, Leeds, UK and 5. Sainsbury's PLC, London, UK and 6. The Rowett Institute, University of Aberdeen, Aberdeen, UK.

Current dietary patterns are suboptimal for both human and planetary health^(1,2). With growing consumer and business concerns around food sustainability, estimating the environmental footprint of foods and diets is pertinent. In many countries, supermarkets are the primary provider of foods and beverages; therefore, supermarket purchasing records represent a novel source of population dietary data that offers advantages over traditional methods⁽³⁾. We developed a method for mapping greenhouse gas emissions (GHGE) to food and beverage products from a high-street retailer's portfolio, to enable the estimation of the environmental footprint of population diets when linked with sales information.

We used data from the food and beverage portfolio of a high-street retailer in the United Kingdom (UK), including product name/description, categorisation, ingredients, and weight. We mapped these products to GHGE (kg CO₂.eq/kg) using a global database on the average environmental footprint of food commodities⁽⁴⁾. This mapping process involved three stages utilising different mapping approaches, guided by product sales data, which we extracted from the retailer's loyalty-card transactions for Yorkshire and the Humber (UK) region during 2022. Stage 1 involved categorising the products into Living Costs and Food Survey food categories and mapping each category to GHGE, where possible (food-category approach). Stage 2 involved splitting selected food categories (based on complexity, necessity of a better mapping, and sales) and creating a sub-category-specific mapping based on an indicator product, which was selected as most popular using sales data (food-sub-category approach). The indicator-product mapping represented a weighted average GHGE value calculated using information on product ingredients and their estimated proportions (ingredient approach). Stage 3 utilised word-searches in product descriptions to distinguish further between product types within selected prioritised sub-categories. We used the estimated product-level GHGE (mapped GHGE × product weight) and sales data to estimate food-category contributions to total GHGE and assess how these estimations change by mapping stage.

Of >28,000 products, 77.7%, 98.0% and 98.6% were mapped to GHGE at the end of stages 1, 2 and 3, respectively. Of the final product mappings, 40% were at a food-category level and 60% at least at a sub-category level. We calculated 153 product-specific GHGE using ingredients information for prioritised indicator products. When using mappings from stage 3 vs 1, the contributions of 'savory snacks' and 'chocolate' to total GHGE were approximately four and two times higher respectively, due largely to improved mapping that accounted for product sub-category and ingredients.

Mapping environmental sustainability metrics to a retail product dataset is feasible when using a staged approach, guided and prioritised by sales data. However, mapping approach and the estimations' variability should be considered. This method could be used for estimating the environmental footprint from food purchasing data, helping to inform responses towards promoting healthier and more sustainable diets.

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OC97. A qualitative investigation into the digital competencies and food sustainability knowledge employers require of graduates in the food industry across Europe. A. Moran¹, M. McDonagh¹, S. O'Donovan¹, L. Ryan¹ 1. Department of Sport, Exercise and Nutrition, Atlantic Technological University, Galway, Ireland.

The food industry is experiencing a profound shift toward sustainability, defined by a growing emphasis on responsible sourcing, reducing environmental impact, and promoting social and economic well-being⁽¹⁾. This shift impacts food and nutrition graduate employability and the diverse skillsets required for success in this evolving industry. Skills including digital literacy and the ability to leverage technology for sustainable practices are increasingly valuable in the food industry. Food companies need graduates with the knowledge, abilities, and mindset to support these objectives as they work to incorporate sustainable practices into their operations. Graduates entering the food industry job market must be equipped with a solid understanding of sustainability principles and the ability to apply them in practical contexts⁽²⁾. The aim of this study was to investigate the digital competencies and food sustainability knowledge, employers require of graduates in the food industry.

This study was part of a joint Erasmus KA2 European-funded project (2022-1-IE01-KA220-VET-000087508 Digitalisation of Sustainable Health Education). In-depth semi-structured, audio-recorded focus groups were conducted with 24 employers in the food industry across project partner countries in Poland (n = 10), Ireland (n = 6), and Lithuania (n = 8). Interviews were transcribed and thematically analysed, using the Braun and Clarke method^(3,4) whereby the data were coded, and themes identified.

Three main themes were identified across the compiled data, these included: (1) perception of graduate preparedness for employability, (2) digital competence of graduates, and (3) food sustainability. The first theme highlighted that graduates from food and nutrition programmes are generally well prepared for employment in the food industry. There are a diverse array of industry roles on offer for graduates with employers reporting 'on-the-job' training as an integral part of graduates onboarding experience and career progression. The vast majority of participants felt graduates are currently meeting digital competency expectations when first entering the workforce however as digital competency is ever evolving it is essential to stay up to date. All employers highlighted sustainability as a key priority of their business however, there was no single common understanding for the term sustainability identified within the data. This finding emphasises the complexity of developing food and nutrition curricula that align to industry needs.

This study has highlighted the complex nature of the food industry and the need for graduates to possess a diverse skill set. It is evident that employment in the food industry requires a combination of technical expertise, digital competencies, and an understanding of sustainability practices. To ensure that food and nutrition graduates have the skills needed to succeed in this changing sector, collaboration between educational institutions and industry stakeholders, is a priority to ensure sector specific training and continuous professional development.

Acknowledgments

The research leading to these results has received funding from the "Digitalisation of Sustainable Health Education "(DiSHed)" project co-funded by the Erasmus+ Programme of the European Union under the Grant agreement number 2022-1-IE01-KA220-VET-000087508. We also want to thank the other partners in the DiSHed consortium including The Polish Farm Advisory and Training Centre not-for-profit, Kaunas Food Industry and Trade Training Centre and University of Cyprus, for their support with the study design and consultation on the research findings.

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OC98. Exploring the relationship between Nature connectedness and food-related behaviours: findings from a cross-sectional survey of Irish consumers. M. Brennan¹, E. Battersby², S. Dekkar², S. Mulligan¹, K. McAdoon³ and A. Moore Heslin³ 1. School of Biological, Health, and Sports Sciences, Technological University Dublin, Grangegorman, D07 EWV4 Dublin, Ireland and 2. School of Agriculture and Food Science, University College Dublin, Belfield, D04 V1W8 Dublin, Ireland and 3. Airfield Estate, Overend Way, Dundrum, D14 EE77 Dublin, Ireland.

The global food system is the primary driver of biodiversity loss ⁽¹⁾ and the source of a third of greenhouse gas emissions ⁽²⁾. Physical and psychological connectedness to nature are associated with improved health and sustainability-related outcomes, including increased pro-environmental behaviours and values ⁽³⁾. Nature connectedness refers to a person's belief about the extent to which they are part of nature and include nature as part of their identity ⁽³⁾. Higher levels of nature connectedness have been associated with increased fruit and vegetable intake and the consumption of a more diverse diet ⁽⁴⁾.

This study aimed to assess the relationship between nature connectedness and food-related behaviours amongst Irish consumers.

A cross-sectional online survey was created to assess the attitudes, awareness, and behaviours of Irish consumers regarding the link between nature and food. Nature connectedness was assessed using the validated Nature Connection Index (NCI) scale ⁽⁶⁾. The online survey assessed food-related behaviours regarding food waste, the purchasing of local, seasonal, and organic food, and the frequency of consumption of a variety of food groups. Covariate-adjusted general linear models and regression analyses were used to assess relationships between NCI scores and food-related behaviours. Analyses were adjusted for age, level of educational attainment, and employment status.

The survey was completed by 400 participants (74% female, age range=18-92 years, Median age=46±31). The median NCI score for the total population was 86 (IQR ±27). NCI score was positively associated with increased purchasing of organic foods (B=0.312, p<0.001), seasonal foods (B=0.155, p=0.021) and foods produced in Ireland (B=0.158, p=0.012). NCI score displayed an inverse relationship with the frequency of consuming beef ($\beta = -0.136$, p=0.010), pork ($\beta = -0.118$, p=0.027) and lamb/mutton ($\beta = -0.133$, p=0.011). There were positive associations between NCI score and frequency of consuming legumes ($\beta = 0.147$, p=0.004), green leafy vegetables ($\beta = 0.195$, p<0.001) and fruits of the Solanaceae family (tomatoes, peppers, aubergine) ($\beta = 0.121$, p=0.022). NCI score also displayed a positive relationship with the frequency of reducing household food waste ($\beta = 0.218$, p<0.001) and choosing food with minimal packaging ($\beta = 0.238$, p<0.001).

This study highlights a positive relationship between nature-connectedness and more sustainable, nature-positive food behaviours amongst Irish consumers. The results of this study indicate that increasing the public's nature connectedness and time spent in nature may help to foster more healthy and sustainable food-related behaviours to contribute to reducing the detrimental impact of the current food system on nature and the climate.

Acknowledgments

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Student Competition

OC99. Associations between the EAT-Lancet Index, nutrient intake and compliance with UK dietary guidance in UK adults. D. Alabtain¹, M. Weech¹, R. Fallaize^{1,2}, F. Hwang³ and J.A. Lovegrove¹. *1. Hugh Sinclair Unit of Human Nutrition and Institute for Cardiovascular and Metabolic Health, University of Reading, Whiteknights, Reading, RG6 6DZ, UK and 2. School of Life and Medical Science, University of Hertfordshire, College Lane, Hatfield, AL10 9AB, UK and 3. Biomedical Engineering Section, School of Biological Sciences, University of Reading, Whiteknights, Reading, RG6 6DH, UK.*

The EAT-Lancet Commission has identified a diet that aims to optimise both human health and environmental sustainability, known as the “planetary health diet”, which aims to improve the health of the population and meet sustainable food production targets by 2050⁽¹⁾. However, evidence suggests that following the planetary health diet may lead to micronutrient deficiencies associated with a plant-based diet⁽²⁾. This research explores associations between adherence to the planetary health diet (assessed by the EAT-Lancet Index), habitual diet and adherence to dietary guidance in UK adults.

Data from disease-free UK adults aged ≥ 18 years ($n=425$) was pooled from five cross-sectional analyses that recorded habitual dietary intake using the eNutri food frequency questionnaire (FFQ)⁽³⁾. Using daily nutrient and food group intakes from eNutri, EAT-Lancet Index scores were calculated⁽⁴⁾, where higher scores represent greater adherence to the planetary health diet, which were then stratified into quartiles (Q), with the highest scores in Q4. Nutrients of interest were energy, total fat, saturated fats (SFA), protein, carbohydrates and free sugars, (all percentage of total energy (%TE)), long-chain n-3 polyunsaturated fats, fibre, sodium, potassium, calcium, iron, zinc, iodine, selenium, and vitamins B12 and D. ANCOVA (adjusting for sex, age, physical activity, ethnicity, employment status, and body mass index (BMI)) compared nutrient intakes across quartiles. If significant ($p \leq 0.01$), pairwise comparisons with Bonferroni correction identified significant differences between Q1 and Q4 ($p \leq 0.01$ accounting for multiple comparisons; results shown below). Percentages of each quartile group (Q1-Q4) meeting UK dietary guidelines were also calculated and compared using Chi-square tests ($p \leq 0.05$ for significance).

Study participants had a mean (SD) age of 44 (19) years and a BMI of 25.7 (6.0) kg/m² and 79.6% were female. Compared to Q1, Q4 had lower intakes of energy (-335 kcal/d), SFA (-3.0 %TE), free sugars (-4.2 %TE), sodium (-454 mg/d), and vitamin B12 (-2.2 mg/d) (all $p \leq 0.006$), while intakes of dietary fibre were 8.8 g/d higher ($p < 0.001$). Furthermore, those with the highest EAT-Lancet scores were more likely to meet the UK dietary recommendations for total fat (36.2% in Q4 vs 24.3% in Q1, $p = 0.035$), free sugars (29.5% vs 13.0%, $p = 0.001$), sodium (66.7% vs 46.1%, $p = 0.008$), and potassium (61.9% vs 49.6%, $p = 0.02$).

The highest EAT-Lancet Index scores were associated with more favourable intakes of dietary fibre and lower energy, SFA, free sugars, and sodium, and more participants met the UK dietary recommendations for free sugars and sodium compared with the lowest scores. Although intakes of vitamin B12 were lower with higher EAT-Lancet scores, the percentage of participants consuming the recommended intakes did not differ between quartiles. These findings suggest that greater adherence to the planetary health diet is associated with a more healthful diet that aligns more closely with dietary guidance in UK adults.

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Student Competition

OC100. Adolescent boys and protein: a first cut at developing environmentally sustainable food-based dietary guidelines. M. G. Thompson^{1,2}, R. De Luca^{1,3}, M. G. Hogan^{1,4}, S. Nic Sheoin^{1,3}, O. C. Lyons^{1,2} and M. A. T. Flynn^{1,2} 1. Food Safety Authority of Ireland, Dublin 1, Republic of Ireland and 2. School of Biomedical Sciences, Ulster University, Coleraine, Northern Ireland and 3. School of Biological, Health & Sports Sciences, Technological University Dublin, Dublin 7, Republic of Ireland and 4. School of Agriculture and Food Science, University College Dublin, Dublin 4, Republic of Ireland.

Male adolescence (10–19 years), is a critical life-stage for adequate nutrition due to the rapid growth and development that occurs during this period. Additionally, this population sub-group may begin to engage in muscle-building exercises due to socially established body image ideals⁽¹⁾, which fuel their desire to increase protein consumption. Currently, Irish diets are not sustainable, and exceed all planetary boundaries apart from freshwater use⁽²⁾. Thus, there is a need to incorporate sustainability into Ireland's food-based dietary guidelines (FBDG). The aim of this study was to develop FBDG for adolescent males to meet their nutritional needs more sustainably, whilst exploring protein intakes.

Commonly consumed foods ($\geq 10\%$ of consumers) and patterns of consumption were identified from secondary analysis of the National Children's Food Survey II and the National Teens' Food Survey II⁽³⁾. Using the Henry equation⁽⁴⁾, energy requirements were calculated, informed by actual height and weight data. Following the food consumption patterns and using foods commonly eaten, four-day omnivore meal patterns (including one lacto-ovo-vegetarian day) were developed within energy requirements for males at nine age-points (9y, 10y, 11y, 12y, 13y, 14y, 15y, 16y, 17–18y), covering five UK90 growth percentiles (5th, 25th, 50th, 75th, 95th), and four physical activity levels (PAL) (1.4, 1.6, 1.8, 2.0). To improve environmental sustainability, diet modelling reduced current FBDG recommendations on meat and dairy for adolescent males. The nutritional composition of modelled meal patterns was assessed using Nutritics software. Nutritional intakes provided by diet modelling were compared with macronutrient and 13 key micronutrient intake goals. The protein digestibility-corrected amino acid score (PDCAAS) was used to record the proportion of high-quality protein foods contributing to protein intake.

A total of 180 four-day meal patterns were developed in the diet modelling process, which included vitamin D supplementation. Regardless of variations in energy requirements due to body size and PAL, modelled diets met all macronutrient and micronutrient goals (exceeding target intake levels for calcium, Dietary Folate Equivalents, and vitamin C). Inadequate modelled vitamin D provided from foods only (median 4.8 $\mu\text{g}/\text{day}$; range 9–11 years 1.7–6.5 $\mu\text{g}/\text{day}$; range 12–18 years 1.8–14.0 $\mu\text{g}/\text{day}$) were resolved by existing 10–15 μg supplement recommendations⁽⁵⁾. Protein intakes (g/kg body weight) were 316% above recommendations, despite the reduction of red meat and dairy in modelled meal patterns. Examination of foods in modelled meal patterns showed that 49–76% of protein food sources were high-quality (PDCAAS ≥ 60), and 48–76% of calcium food sources were bioavailable dairy products.

In conclusion, FBDG for male adolescents in Ireland have been developed considering environmental sustainability, whilst keeping nutritional requirements at the forefront. This study shows lower dairy and red meat intakes than currently recommended, combined with extra lacto-ovo-vegetarian days, provide adolescent males with nutritionally adequate, high protein (quality and quantity) diets.

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Student Competition

OC101. Stakeholders' perspectives on promoting sustainable and healthy dietary behaviours within the university setting: qualitative insights from the PLAN'EAT study. *L.D. Devine¹, A.M. O'Sullivan¹, P.S. Elliott¹, M.F. O'Neill¹ and E.R. Gibney¹. 1. Institute of Food and Health, School of Agriculture and Food Science, University College Dublin, Dublin 4, Ireland.*

Evidence indicates that diets are suboptimal and unsustainable, and thus, dietary interventions are needed to reverse these trends and optimise both health and environmental outcomes. The university setting is receiving increasing attention as a promising environment to intervene and promote positive dietary change; in particular, among those in 'emerging adulthood' who are experiencing increasing independence and autonomy over their dietary decisions and are susceptible to a decline in dietary quality⁽¹⁾. This study aimed to explore stakeholders' perspectives on the factors influencing students' dietary choices on campus and identify potential solutions to promote improved sustainable and healthy dietary behaviours within the university setting.

A purposive sample of stakeholders on or connected to University College Dublin (UCD), Belfield Campus, were invited to participate in one-to-one interviews. Stakeholders included policymakers, academic, healthcare and food industry professionals, local researchers, and food service providers. Interviews were conducted from August to November 2023 and a semi-structured topic guide was used to facilitate discussions. Interviews were audio-recorded and transcribed verbatim. All transcripts were coded on NVivo20 software and analysed via an inductive thematic approach⁽²⁾. Sub-themes were then mapped to each level of the socio-ecological model, namely individual, interpersonal, physical environmental and policy, where applicable⁽³⁾. Ethical approval was granted by UCD's Research Ethics Committee and informed consent was obtained prior to conducting the interviews.

Twenty-two stakeholders (n=9 male; n=13 female) took part in the interviews. Preliminary analysis identified several sub-themes at the individual (convenience and time constraints; personal preferences; sensory appeal; financial concerns (e.g., price, satiety value, portion size, value for money)), interpersonal (social influences (e.g., peer influence; home eating habits)), and physical environmental (food availability/accessibility) level that may influence students' dietary choices. Proposed solutions to promote improved sustainable and healthy dietary behaviours in the university setting were identified at each level to include: individual (educational strategies and awareness campaigns (e.g., resources, talks/webinars)), interpersonal (student involvement in initiatives), physical environmental (improved physical and financial access to appealing sustainable and healthy options; improved campus facilities to accommodate students cooking or consuming their own meals; food environment manipulations (including nudge strategies, e.g., labelling schemes)) and policy (whole-campus collaborative approach; support at university level) recommendations.

Several influential factors on students' dietary choices and how the university could potentially facilitate the transition toward improved sustainable and healthy dietary behaviours on campus were identified and could be considered in the design of future dietary interventions targeting the university population. The next step is to compare the stakeholders' perspectives with students' perceptions. These findings will aid in informing the development of tailored sustainable and healthy diet intervention strategies that will be delivered and evaluated in UCD throughout 2024 to 2026 as part of the UCD PLAN'EAT Living Lab.

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OC102. Global Trends in Vitamin D Fortified Food Product Launches. SN McCarthy¹ and ME Kiely² 1. Department of Agrifood Business, Teagasc Food research Centre, Dublin, Ireland and 2. Cork Centre for Vitamin D and Nutrition Research, School of Food and Nutritional Sciences, University College Cork, Cork, Ireland.

The challenge of meeting nutritional requirements for vitamin D because of low supply in the food system means that substantial proportions of the population have low vitamin D intakes and status⁽¹⁾. Naturally rich sources such as oily fish are consumed infrequently and foods such as eggs do not have sufficient quantities to meet Dietary Reference Values. Usually, fortification is voluntary and a premium price can be achieved for the fortified product. Hence, there may be a role for mandatory fortification to ensure equal access to healthy, fortified foods for all.

The aim of this study was to profile food product launches to the global market over the last 15 years to determine if product launches can potentially meet Vitamin D requirement. The GlobalData⁽²⁾ is an industry specific intelligence platform that can be accessed to identify and analyse food product launches based on specific inputs such food-type, country, nutrients, health claim etc. This database was mined to retrieve and analyse all food products launched in the 15-year period from January 2009 to March 2024 with at least 0.01µg of vitamin D listed in the nutritional content.

The search returned a database with a total of 2,203 products launches. From 2009, there was a steady increase in product launches until it peaked in 2012 with 320 products. Thereafter it decreased with a low in 2016 at 50 product launches. Although not exceeding the high in 2012, there has been a steady increase since 2016 with 150 launches reported for 2023. The top three countries for product launches were USA at 11.8% (n=261) followed by UK at 7.2% (n=159) and India at 6.6% (n=146). The market is dominated by dairy foods with nearly half of all launches this category (47%). This was followed by drinks (15%), bakery and cereals (15%) and baby foods (10%).

Countries such as the USA and India have voluntary fortification strategies in place which may explain higher proportion of product launches seen in these countries^(3,4). The implementation of a national vitamin D food fortification strategy may help to increase the launch/supply of fortified foods on the market to increase the potential to achieve recommended intakes. The dominance of vitamin D fortification within a small number of food categories such as dairy⁽⁵⁾ highlights the opportunities and untapped potential for other food categories such as pasta and sauces to also undertake fortification. It is also important to accommodate the diversity of the diet and provide vitamin D fortified foods for non dairy consumers. Studies have shown that food fortification can increase vitamin D status⁽⁶⁾ Therefore additional and more diverse food fortification should be considered to improve vitamin D intakes in the population.

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OC103. Consumer attention to labelling and market potential of vitamin D-(bio)enriched meat products. *E.J. Rosbotham¹, S. Gallagher², E.J. Taylor¹, C.I.R. Gill¹, E.J. McDonald³, W.C. McRoberts⁴ and L.K. Pourshahidi¹* 1. *Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, Ulster University, Coleraine, UK and 2. School of Psychology, Ulster University, Coleraine, UK and 3. Humanativ, Mitchelstown, Ireland and 4. Agri-Food and Biosciences Institute, Belfast, UK.*

Vitamin D-(bio)enriched meat products may complement current market offerings to produce value-added foods without altering consumer dietary habits⁽¹⁾. However, a paucity of information exists regarding consumer insights in relation to nutrition/health claims, animal welfare considerations and appropriate purchase price of vitamin D-(bio)enriched foods. The aim of this research was to assess consumer attention to front-of-pack labelling and market potential of vitamin D-(bio)enriched chicken goujons and pork sausages.

Two independent studies were conducted using a mixed-methods approach; eye tracking (study 1) and qualitative elicitation (study 2). Consenting adults aged 18–65 years were recruited for study 1 ($n=50$) and study 2 ($n=32$). In study 1, participants viewed $n=5$ front-of-pack food labels of both vitamin D-enriched meat products in a random order (20s/label)⁽²⁾ using a Tobii T60 eye tracker (Tobii Technology, Stockholm, Sweden). Images for each (bio)enriched product label included a variation of nutrition/health claims, animal welfare certification and various price points. Eight areas of interest (AOI) were defined on labels of both vitamin D-(bio)enriched meat products: product name, nutritional information, serving size, price, enriched with vitamin D, source of vitamin D, animal welfare and health claim. Total duration of fixations, number of fixations, time to first fixation and duration of first fixation (ms) were determined for each AOI⁽³⁾. Statistical analysis was performed using IBM SPSS Statistics 29 for windows, Chicago, IL, USA one-way ANOVA with Tukey post-hoc test, $p < 0.05$ significant. In study 2, transcripts from focus groups ($n=7$; total $n=32$ participants) were analysed thematically⁽⁴⁾ (NVivo version 12, Lumivero, Denver, CO, USA) to identify emerging ideas such as evaluation of product concept, attitudes to health/nutrition claims and willingness to purchase vitamin D-(bio)enriched meat products.

Eye tracking results in study 1 demonstrated that product name, serving size and nutrition information gained the greatest consumer attention across both vitamin D-(bio)enriched meat products. Nutrition claim 'source of vitamin D' showed greater (mean \pm SD) total duration of fixations compared to 'enriched with vitamin D' for pork sausages, (1185.6 ± 1098.2 vs 677.0 ± 685.9 , $p < 0.05$). There was no difference in gaze fixation parameters between nutrition claims for chicken goujons. Consumer attention also indicated that health claims, animal welfare and price may influence consumer purchasing decisions of vitamin D-(bio)enriched meat products. Study 2 reported that consumers cited a preference for 'naturally enriched' opposed to 'enriched' nutrition claim. In addition, stronger preferences were apparent for the 'immune function' health claim compared to 'muscle function'. Furthermore, approximately half of consumers were willing to pay a premium for the products.

Overall, consumers had a positive attitude to vitamin D-(bio)enriched meat products, suggesting market potential within the agri-food industry to help address low vitamin D status.

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Student Competition

OC104. Vitamin D content of products recently launched on to the marketplace – findings from the MINTEL Global New Products Database. E.J. Taylor¹, R.K. Price¹, L. Hollywood² and L.K. Pourshahidi¹. 1. Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, Ulster University, Coleraine, UK and 2. Business School, Ulster University, Belfast, UK.

Vitamin D deficiency is a cause for concern among the UK population, with many failing to achieve the recommended daily amount of 10µg/day⁽¹⁾. Sunlight exposure is not sufficient in the UK to maintain year-round vitamin D status so therefore the population rely heavily on dietary sources, including fortified foods⁽²⁾. In the absence of standardised and/or mandatory vitamin D fortification policies in many countries⁽³⁾, such products often contain variable amounts of vitamin D⁽⁴⁾, however this has not been investigated to-date on a global scale. Therefore, the aim of this study was to explore the vitamin D content of newly launched products worldwide over a 5-year period.

Data were extracted from Mintel's Global New Product Database across all regions. Search criteria were filtered by nutrient and/or ingredient, to only include products launched from December 2018 to December 2023, and containing >0.1µg vitamin D per 100g/ml. Of the total 2,963 products identified, 608 were excluded owing to missing data, resulting in 2,355 products included in the final dataset for analysis. Vitamin D content was quantified as µg per 100g/ml (µg = IU / 40, when required). Data were compared by food category (n=12) and between branded vs private label (own-brand) products, using ANOVA (with Tukey post-hoc tests) and independent samples t-tests, respectively.

The overall mean ± SD vitamin D content of newly launched products was 12.5 ± 71.2 µg per 100g/ml (range: 0.01-2380 µg per 100g/ml). By category, the mean ± SD vitamin D content of products (µg per 100g/ml) were as follows: baby food (7.1 ± 20.3), bakery (210.4 ± 683.3), breakfast cereals (9.4 ± 21.2), chocolate confectionary (134.4 ± 135.1), dairy (6.0 ± 23.7), desserts and ice cream (1.8 ± 2.1), rice and noodles (4.4 ± 0.1), processed meat and fish (20.9 ± 39.0), sauces and seasonings (39.3 ± 123.5), snacks (6.7 ± 9.3), sugar confectionary (101.4 ± 90.9) and sweet spreads (56.7 ± 95.5). Products in the bakery, chocolate confectionary and sugar and gum confectionary categories had a significantly higher vitamin D content per 100g/ml, compared to all other categories. In the total dataset, branded products (n=2832; 96%) had a significantly higher vitamin D content than private label products (n=131; 4%) (12.7 ± 72.5 vs. 6.1 ± 11.3 µg per 100g/ml, respectively; P<0.001).

This preliminary analysis has demonstrated a wide range in the vitamin D content of newly launched products worldwide, which varies significantly between food categories and is higher in branded compared to private label products. Future research using this dataset will explore changes over time, as well as regional differences in the vitamin D content of new products, both between and within the different categories. Such evidence may help to inform future new product development opportunities and vitamin D fortification policies.

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Student Competition

OC105. Prevalence of vitamin D insufficiency and associations between 25(OH)D concentrations and health outcomes in children aged 4 – 11 years in the north of Ireland. Emily Royle¹, Emeir M. McSorley¹, L. Kirsty Pourshahidi¹, David Armstrong², and Pamela J. Magee¹ 1. Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, Ulster University, Coleraine, Northern Ireland, BT52 1SA and 2. Department of Rheumatology, Altnagelvin Hospital, Western Health and Social Care Trust, Londonderry, UK.

Optimal vitamin D status is important for growth and development during childhood⁽¹⁾. Children with a circulating concentration of 25-hydroxyvitamin D [25(OH)D] below 25 nmol/L are at increased risk of rickets. In order to maintain 25(OH)D > 25nmol/L, a dietary intake of 10µg/d vitamin D is recommended for children aged 4 years and above^(2,3). The aim of this study was to determine vitamin D status in healthy children and to investigate associations between 25(OH)D concentrations and muscle health, cognitive function, and parental knowledge of vitamin D, vitamin D habits, perceptions, and practices.

A cross-sectional study of healthy children aged 4 – 11 years conducted between 2019 – 2023 examined vitamin D status by measuring plasma 25(OH)D via the gold standard liquid chromatography tandem mass spectrometry and parathyroid hormone concentrations. Muscle strength (hand grip and balance) was determined by dynamometer, single and tandem stance balancing whilst cognitive function was assessed using the Cambridge Neuropsychological Test Automated Battery. Parents completed questionnaires to assess vitamin D knowledge, and perceptions, habits, and attitude towards vitamin D.

A total of 192 children (91 boys; 101 girls) with an average age of 8.2 years were recruited. Plasma 25(OH)D concentrations were 61.10 ± 18.75 nmol/L (n=190), with 68.4% of children defined as vitamin D sufficient (25(OH)D>50nmol/L). When stratified by winter months, only 58% of children were vitamin D sufficient. In single linear regression, plasma 25(OH)D concentrations were positively associated with dominant hand grip strength, single leg balance and the cognitive test '5-choice movement time' (p<0.05). Overall, there was a reported mean score of 41.9% for parental vitamin D knowledge and 68% of parents thought there was no harm in giving their child vitamin D fortified foods.

Approximately 70% of this sample of children were vitamin D sufficient, however insufficiency was prevalent in almost half of the cohort during the winter months. Benefits of optimal vitamin D for muscle and cognitive function were evident. These results support the promotion of the existing vitamin D dietary recommendations during the winter months for optimal child growth and development.

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Student Competition

OC106. The effect on habitual dietary vitamin D intake of changing to a plant-based diet. *TM Robertson¹, C Baldwin¹, E Green¹, F Hammond¹, AL Darling¹, K Hart¹, MM Raats², J Li³, C Martin³, SA Lanham-New¹ and MJ Warren⁴* 1. Department of Food, Nutrition and Exercise Sciences, School of Biosciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, UK and 2. Institute of Sustainability, University of Surrey, Guildford, UK and 3. Department of Biochemistry and Metabolism, John Innes Centre, Norwich, UK and 4. Food Microbiome and Health, Quadram Institute Biosciences, Norwich, UK.

The number of people following a plant-based (PB) diet has increased in recent years. This has led to concerns regarding vitamin D intake, as natural dietary sources of vitamin D are primarily animal based⁽¹⁾ and cross-sectional studies have reported lower intakes amongst vegetarians and vegans⁽²⁾. Some PB foods, primarily dairy alternatives, are now fortified with vitamin D. Whilst vitamin D is synthesised in the skin following exposure to UV light, this does not happen in the autumn and winter months in areas of northern latitude (such as the UK). Hence, dietary supply of vitamin D becomes particularly important. This study aimed to investigate whether it is possible to maintain dietary vitamin D intake when transitioning to a PB diet, through careful choice of PB alternatives.

A subset of 4-day diet diaries, from 81 women (72 Caucasian and 9 South Asian, mean age 52±12 y) living in South East England, was randomly selected from those collected for the D-FINES study (Vitamin **D**, Food **I**ntake, **N**utrition and **E**xposure to **S**unlight in Southern England, 2006–2007; FSA funded Project N05064, NHS REC 06/Q1909/1)⁽³⁾ and analysed for vitamin D intake. No subjects followed an entirely PB diet at baseline. Data modelling was carried out to substitute animal-based foods with equivalent amounts of PB alternatives. For dairy products, the equivalent fortified PB alternatives were chosen. Meat, fish and eggs were replaced with equivalent amounts of protein from PB sources, such as lentils and tofu, as no fortified direct alternatives were found. The diaries were then re-analysed. Pre- and post-substitution intakes were compared by paired *t* test, and ethnic groups by independent *t* test.

There were no differences in Vitamin D intake between ethnicities either at baseline ($p=0.087$) or post-substitution ($p=0.361$). Vitamin D intake increased in the South Asian group post-substitution (from 2.4 ± 1.3 to 4.3 ± 1.8 $\mu\text{g}/\text{day}$, $p=0.002$), with no change observed in the Caucasian group (3.6 ± 2.0 to 3.7 ± 1.8 $\mu\text{g}/\text{day}$, $p=0.660$). There was no difference between vitamin D intake pre- and post-substitution overall (3.5 ± 2.0 and 3.8 ± 1.8 $\mu\text{g}/\text{day}$ respectively, $p=0.222$). Twenty cases decreased by ≥ 1 $\mu\text{g}/\text{day}$, all in the Caucasian group, with the largest decrease being from 9.6 to 2.2 $\mu\text{g}/\text{day}$.

This study demonstrates that it is possible to move to a PB diet, whilst maintaining existing dietary patterns, without a reduction in vitamin D intake, but it is largely dependent on dairy intake in the original diet, as no meat/fish substitutes in the UK are currently fortified. It also requires care when choosing PB dairy substitutions as many, including organic options, are not fortified. Mean daily intakes, both pre- and post-substitution, were substantially below the recommended intake of 10 $\mu\text{g}/\text{day}$ ⁽⁴⁾, suggesting that supplementation may be necessary, particularly during winter months.

Acknowledgments

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OC107. The effect of vitamin D3 supplementation on vitamin D status and associated health outcomes in children. Emily Royle¹, Emeir M. McSorley¹, L. Kirsty Pourshahidi¹, David Armstrong², and Pamela J. Magee¹ 1. Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, Ulster University, Coleraine, Northern Ireland, BT52 1SA and 2. Department of Rheumatology, Altnagelvin Hospital, Western Health and Social Care Trust, Londonderry, UK.

Sufficient vitamin D status is required in childhood for normal skeletal health and the development of muscle and motor function (¹). Vitamin D primarily acts through the promotion of calcium absorption from the gut and mobilisation from bone tissue (²). Childrens' vitamin D dietary intakes are currently below the recommended guidelines within the UK and Ireland suggesting a need for vitamin D₃ supplementation to prevent the risk of developing vitamin D deficiency (³). The aim of this study was to examine the effect of 12 weeks' supplementation with 10µg/d vitamin D₃ vs placebo control on vitamin D status and to determine if improved vitamin D status impacted muscle function and cognition in children aged 4-11 years.

In the D-VinCHI randomised, double-blind, placebo-controlled trial, healthy children (n=118; mean age 8.1 ± 1.8 y; 51% girls) were randomly assigned to either placebo or 10µg/day of vitamin D₃ for 12 weeks (year-round). Baseline and endpoint measures included anthropometric measures, hand grip strength, balance, and cognitive assessment. Blood samples were analysed for plasma 25-hydroxyvitamin D [25(OH)D], and parathyroid hormone. Vitamin D consumption from food sources was assessed via a 13-item food frequency questionnaire.

Following the 12-week intervention vitamin D status [25(OH)D concentration] increased in the treatment group from 66.31±17.25 nmol/L to 69.04±16.92 nmol/L. Change in status was significantly different compared to the placebo group within which a decrease in 25(OH)D was observed from 63.67±19.48 to 56.29±18.58 nmol/L, p<0.001. Supplementation with vitamin D₃ prevented deficiency of plasma 25(OH)D during the winter months. Vitamin D₃ supplementation had a positive effect on cognitive function, improving simple movement time from 707 ± 380 to 599 ± 207 milliseconds, compared to the placebo group within which time increased from 680 ± 284 to 728 ± 372 milliseconds, p=0.017. Vitamin D mean dietary intake from food sources alone was 2.68µg/day. There was no effect of supplementation on muscle function.

Vitamin D₃ supplementation maintained year-round sufficiency in children and importantly, prevented deficiency during the extended winter months. Vitamin D supplementation may enhance cognitive function via improvements in attention and psychomotor speed. The reported intakes of vitamin D food sources were low and were well below the current dietary reference value for this age group. Further health promotion policies and (bio)fortification strategies should be considered within this age group to maximise vitamin D status for optimal growth and development.

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Student Competition

OC108. Vitamin D supplementation and bone health in menopausal women: a systematic review of randomised controlled trials. V. Riordan¹ and S.Nally^{1,2} 1. Department of Biological Sciences, University of Limerick, Limerick, Ireland and 2. Health Research Institute, University of Limerick, Limerick, Ireland.

Serum 25(OH)D (vitamin D) plays an important role in skeletal and muscle function⁽¹⁾. Menopausal women are at an increased risk of reduced bone mineral density (BMD) and fracture due to a decline in oestrogen levels⁽²⁾. A low circulating 25-hydroxyvitamin D (25(OH)D) level during menopause is a common problem and has been associated with changes in dietary intake and body composition⁽³⁾. While vitamin D supplementation has been shown to increase serum 25(OH)D levels, its isolated effects on bone health in menopausal women is largely misunderstood. A systematic review was conducted to identify, appraise, and synthesise available studies to assess the impact of vitamin D supplements and bone health in menopausal women.

Four electronic databases (PubMed, EMBASE, Scopus, and Cochrane Library) were searched from inception to 8 December 2023. Only randomised controlled trials (RCTs) examining the efficacy of vitamin D supplementation in menopausal and/or post-menopausal women were included. Studies published in English and measuring BMD, fracture risk, calcium absorption, or serum 25(OH)D levels were eligible. Animal/lab trials, studies involving pharmaceutical co-treatments or vitamin K and/or calcium supplements were excluded. Two researchers independently extracted data according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines⁽⁴⁾ and assessed possible bias using the Cochrane risk of bias tool v2. A narrative approach was used to synthesise the data.

In total, 243 studies were retrieved through initial database searches. Following the elimination of duplicates and screening stages, six RCTs involving 696 menopausal women met the eligibility criteria. The studies varied in intervention length (range 4 wks-4 yrs) and were conducted across four different countries including: Brazil, Bangladesh, Japan, and the USA. Study samples ranged from 38 to 230 participants. A variety of vitamin D supplements (dosages/frequencies) were used across the included studies. Despite heterogeneity in study methods and vitamin D dosages, significant improvements were observed in BMD, risk of falls, and calcium absorption following vitamin D supplementation. Results also found that vitamin D supplementation may improve postural balance and muscle function, improving mobility for menopausal women.

This systematic review demonstrates that vitamin D supplementation can enhance BMD, calcium absorption, reduce the risk of falls, and improve postural balance in menopausal women. However, the optimal dosage of vitamin D has not been determined. Limitations include methodological heterogeneity and lack of long-term follow-up, highlighting the need for further large-scale RCTs with rigorous methodology. These findings underscore the importance of ongoing research to better understand the role of vitamin D supplementation and bone health in menopausal women.

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Student Competition

OC109. A pilot cross-sectional study of vitamin D status, demographic factors, and SARS-CoV-2 infection in a diverse south-east London patient population at the start of the COVID-19 pandemic.

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Vitamin D deficiency and insufficiency have been associated with increased risk and severity of SARS-CoV-2 infection.⁽¹⁾ These conditions are prevalent among older adults, Asian and Black populations, and in individuals with high body mass index (BMI),⁽²⁾ all of whom comprised a significant proportion of critically ill patients with SARS-CoV-2 infection in the UK.⁽³⁾ This study investigated vitamin D status and its relation to BMI, ethnicity, sex, and in a hospital patients.

This study investigated vitamin D status by measuring serum 25-hydroxyvitamin D (25(OH)D) concentrations and its relation to BMI, ethnicity, sex, and laboratory data in a large sample (N=17,628) from St Thomas' Hospital, London, UK, collected close to the start of the COVID-19 pandemic between January and June 2020. We also identified 485 patients positive for SARS-CoV-2 RNA/IgG between March 2020 and January 2021 from those 17,628 patients.

The prevalence of vitamin D deficiency (25(OH)D <25 nmol/L) was 25% in Black, 21% in Asian, and 17% in White patients. Vitamin D insufficiency (25(OH)D 25-50 nmol/L) was observed in 36%, 34%, and 33% of these groups, respectively. The lowest concentrations of 25(OH)D were observed in individuals aged 17-21 years across all ethnicities, with levels increasing with age and stabilising after 60 years. The highest prevalence of vitamin D insufficiency was in overweight (33%, BMI 25.0-29.9) and obese individuals (35%, BMI 30.0-34.9). The deficiency rates were 18.5% for females and 22.4% for males. Notable disparities in BMI and age were observed among Black patients but not in Asian and White groups. Differences in 25(OH)D concentrations were also observed between sexes across different ethnicities, with the exception of South Asian individuals (Bangladeshis, Indians, Sri Lankans). SARS-CoV-2 RNA/IgG screening indicated 485 patients had previously been infected with SARS-CoV-2. Of these patients, the median 25(OH)D concentration was 42 nmol/L (IQR 25-66 nmol/L); 24.1% were vitamin D deficient, and 36.7% were insufficient (total 60.8% deficient/insufficient). Of those with deficiency, 40% were Black and 43% were White. It is well documented that vitamin D negatively regulates pro-inflammatory cytokines such as TNF- α ,⁽⁴⁾ which are involved in the pathogenesis of SARS-CoV-2 infection.⁽⁵⁾ In a subset of the SARS-CoV-2 infected patient cohort (N=45), we found a significant negative correlation between 25(OH)D concentration and TNF- α levels (Pearson's $r=-0.395$, $P < 0.01$).

In conclusion, this study highlights a high prevalence of vitamin D deficiency among individuals of Black ethnicity, young adults (17-21 years), males, and those with obesity during the early part of the COVID-19 pandemic in south-east London. Vitamin D deficiency may be a preventable risk factor for SARS-CoV-2 infection and linked to hyperinflammation. Because TNF- α is known to be elevated in obesity,⁽⁶⁾ further analysis of this pro-inflammatory cytokine and vitamin D in patients with SARS-CoV-2 infection and concomitant obesity is warranted.

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Student Competition

OC110. A systematic review to evaluate the efficacy and safety of high-dose vitamin D supplementation in adults with cystic fibrosis. *J Hutchinson¹, M Dunnage², D Bhakta¹, A Aghili¹, S Illingworth¹* 1. School of Human Health Sciences, London Metropolitan University, London, UK and 2. St. Bartholomew's Hospital, London, UK.

Cystic fibrosis (CF) is an autosomal-recessive condition that is caused by a mutation in the CFTR gene^[1]. As CF patients' prognoses are improving due to highly effective modulator therapy, (HEMT) managing comorbidities such as bone disease is pertinent. This could be exacerbated by vitamin D insufficiency which has been estimated to be as high as 98% in adults with CF^[1]. This systematic review aimed to evaluate the efficacy and safety of high-dose cholecalciferol (vitamin D₃) supplementation in correcting inadequate serum 25-hydroxyvitamin D (serum 25(OH)D) concentration in adults with CF.

The systematic search included studies that examined the impact of high-dose cholecalciferol on serum 25(OH)D concentration. Eligible RCTs included study designs that involved adults with CF and a high-dose cholecalciferol supplementation protocol (defined as any dose above basal) compared with basal doses (800IU-1000IU/day)/no supplementation. A systematic search was conducted and a meta-analysis of RCTs was produced to calculate the change in serum 25(OH)D concentration in the intervention group in comparison to control as the primary outcome measure.

The systematic search yielded five RCTs that were collated and analysed. The results of the meta-analysis demonstrated that the high-dose cholecalciferol group and control group achieved a serum 25(OH)D concentration of 40.19ng/ml ±10.21ng/ml and 28.50ng/ml ±7.35ng/ml respectively (p<0.01), indicating that high-dose cholecalciferol is an effective intervention to achieve optimal serum 25(OH)D concentration (>30ng/ml). A high heterogeneity was observed across the studies (I² = 87%)^{[2][3]}. Doses varied from daily supplementation of 1,700IU to a 250,000IU single dose. There were minimal adverse effects reported in the RCTs from high-dose cholecalciferol and there were no instances of hypervitaminosis D or hypercalcaemia reported^[3].

The results infer the effectiveness of high-dose cholecalciferol in correcting low serum 25(OH)D concentration in adults with CF. The most effective regimen identified was a single weekly dose of 50,000IU for 12 weeks, which achieved serum 25(OH)D concentration of 45.91ng/ml ±11.24ng/ml (control: 23.61ng/ml ±4.37ng/ml) (p<0.01) after a 12-week intervention^[2].

The key findings suggest that annual monitoring of serum 25(OH)D concentration would be beneficial with a tailored high-dose cholecalciferol protocol. A high level of heterogeneity was observed across the studies, with small sample sizes, meaning a larger multi-centre, multi-nation RCT study that considers the context of advances in HEMT should be conducted to corroborate the results before implementation into clinical guidelines.

High-dose cholecalciferol supplementation is an effective and safe method to increase serum 25(OH)D concentration in adults with CF that may lead to improved bone health outcomes. More studies are required before revising current vitamin D supplementation guidelines. Future research should focus on establishing dosing guidelines to optimise vitamin D status, exploring the long-term health outcomes of sustained adequate serum 25(OH)D concentration.

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Student Competition

OC111. Body composition, body mass index, waist circumference and perimenopausal symptoms in women living in Ireland. M.B. Murphy¹, R. Owens², L. Edwards³, G.J. Cuskelly⁴ and P.M. Heavey⁵
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Menopause, as signified by 12 months of amenorrhea, marks the end of female fertility⁽¹⁾. The perimenopausal stage preceding this event, is frequently symptomatic, with previous research suggesting that a higher body mass index (BMI) may be associated with more severe menopausal symptoms⁽²⁾. Changes to body composition have also previously been linked to the decline in hormones that accompany this midlife transition⁽³⁾. This cross-sectional, observational study aimed to shed light on this underexplored area in Ireland.

Approval was granted by the Technological University of the Shannon Research Ethics Committee. A convenience sample of perimenopausal women (>40 years old) were recruited via social media and workplaces. Participants self-reported their symptom severity using the previously validated Menopause Rating Scale (MRS)⁽⁴⁾. Psychological, somatic, and urogenital symptom categories were rated from 0 (no symptoms) to 4 (very severe symptoms), with a potential maximum score of 44. An overall score and a sub-score for each of the 3 symptom categories was generated. Participants self-identified their perimenopausal stage (early or late) based on descriptions of the STRAW+10 criterion⁽⁵⁾. A range of anthropometric measurements were taken including height, weight, waist circumference (WC) and body fat (BF) percentage (using TANITA MC-580 tetrapolar bioelectrical impedance scales). Following descriptive analysis, Spearman's correlation coefficient was utilised to test the relationship between MRS and anthropometric measurements.

Participants (N=112) had a mean age of 48.05 ± 3.48 years, a mean WC of 95.2 ± 16.9 cm, a mean BF percentage of 34.9 ± 7.3 . Prevalence of healthy, overweight, and obesity BMI amongst participants was 29%, 36% and 36% respectively, with a mean of 29.0 ± 6.6 kg/m² amongst the sample. Overall mean MRS symptom score was 15.3 ± 6.9 . There was a positive correlation between participant's overall symptom rating and, their BF percentage ($r=0.30$, $P=0.001$), WC ($r=0.30$, $P=0.002$), and BMI ($r=0.31$, $P=0.001$). This relationship was also observed in the symptom sub-score categories. Somatic sub-score positively correlated with BF percentage ($r=0.24$, $P=0.010$), WC ($r=0.31$, $P<0.001$) and BMI ($r=0.31$, $P<0.001$). Urogenital sub-score was similarly positively correlated to all 3 anthropometric measurements, BF percentage ($r=0.24$, $P=.010$), WC ($r=0.24$, $P=0.011$), and BMI ($r=0.23$, $P=0.014$). Psychological sub-score was correlated positively with BF percentage ($r=0.23$, $P=0.015$) and BMI ($r=0.21$, $P=0.026$), but not WC.

The findings from this study suggest that a higher BF percentage, WC and BMI may be associated with a more symptomatic perimenopausal stage. Further studies are warranted to further explore this, and how to target interventions.

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Student Competition

OC112. Reduction in menopause symptom severity following a personalised app-based dietary intervention program: a pre-post longitudinal analysis of the ZOE PREDICT 3 study. G. Pounis¹, K. M. Bermingham^{1,2}, J. Capdevila², W. J. Bulsiewicz^{2,3}, A. Roomans², A. Creedon², F. Amati², J. Wolf², T. D. Spector^{1,4}, W. L. Hall¹ and S. E. Berry¹ 1. Department of Nutritional Sciences, School of Life Course Sciences, King's College London, London, UK and 2. Zoe Ltd, London, UK and 3. Emory University School of Medicine, Atlanta, USA and 4. Department of Twin Research and Genetic Epidemiology, King's College London, London, UK.

Digital health technologies delivering dietary and lifestyle advice^{1,2} may offer a contemporary approach to menopause symptom mitigation in a large population base³. This study aimed to evaluate alterations in both diet quality and menopause symptom burden following the implementation of an app-based, personalised dietary intervention in peri- and postmenopausal participants.

Baseline and follow-up data (mean follow-up time, 207±72 days) on diet, menopause symptom number (from 20 vasomotor, sexual, psychological and somatic symptoms), symptom severity (0-not at all, 1-a little, 3-quite a bit and 5-extremely) and other characteristics of 4,287 UK based participants of the ZOE PREDICT 3 study (1,000 perimenopausal and 3,287 postmenopausal) were analysed (NCT04735835). Dietary assessment was performed through an app-based food frequency questionnaire (PREDICT-FFQ)² and diet quality assessed using the Healthy Eating Index-2020 (HEI, score 0-100)⁴. A novel Menopause Symptom Tracker Score (MSTS 0-100, Copyright © 2024 Zoe Limited) was used to capture symptom number and severity.

There was a modest increase in diet quality after the intervention in both peri- and postmenopausal participants; mean HEI from 76.4±8.4 to 79.7±6.8 (P<0.001) and from 78.7±7.8 to 81.1±6.4 (P<0.001), respectively. Baseline MSTS was higher in peri- versus postmenopausal participants 28.9±15.1 vs. 18.1±15.0 (P<0.001). However, both groups showed a significant decrease in mean MSTS after the intervention compared to baseline; mean change (95%CI) in perimenopausal was -8.7 (-9.5, -7.9; 30.1% reduction) and in postmenopausal was -6.6 (-6.9, -6.2; 36.5% reduction) (P for both <0.001). The reduction in the overall MSTS was greater in perimenopausal compared to postmenopausal (P<0.001). Reductions in domain-specific MSTS for peri- and postmenopausal groups respectively, were as follows: vasomotor -0.56 (-0.71, -0.40; 24.9% reduction) and -0.47 (-0.54, -0.41; 31.8% reduction), sexual -0.72 (-0.87, -0.57; 18.6%) and -1.08 (-1.16, -0.99; 28.7%), psychological -2.3 (-2.5, -2.0; 35.0%) and -1.2 (-1.3, -1.1; 44.2%), somatic -5.1 (-5.6, -4.7; 31.5%) and -3.8 (-4.0, -3.6; 37.5%) (P for all <0.001). The reduction in the psychological and somatic domain-specific MSTS was greater in peri- compared to postmenopausal group (P for both <0.001).

This study supports the potential of personalised app-based dietary interventions in the mitigation of menopausal symptoms during menopause transition and its potential to affect the health and quality of life of millions. Further studies should investigate their efficacy in a randomised, controlled dietary intervention setting.

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OC113. Diet quality is associated with lower prevalence of menopausal symptoms: the ZOE PREDICT 3 study. G. Pounis¹, K. M. Bermingham^{1,2}, J. Capdevila², W. J. Bulsiewicz^{2,3}, A. Roomans², A. Creedon², F. Amati², J. Wolf², T. D. Spector^{1,4}, W. L. Hall¹ and S. E. Berry¹. Department of Nutritional Sciences, School of Life Course Sciences, King's College London, London, UK and 2. Zoe Ltd, London, UK and 3. Emory University School of Medicine, Atlanta, USA and 4. Department of Twin Research and Genetic Epidemiology, King's College London, London, UK.

The role of diet in the prevention and management of menopausal symptoms is poorly understood^{1,2}. Digital health platforms have the potential to optimise collection of population-level menopause symptom data particularly in a rapidly changing environment^{2,3}. This study explored the prevalence of menopause symptoms utilising data collection capabilities of a mobile app in a large population of peri- and postmenopausal women and to investigate novel associations between diet quality and symptoms.

Baseline data on diet, 20 menopause symptoms (i.e. 3 vasomotor, 3 sexual, 4 psychological and 10 somatic) and other characteristics of 70,412 participants of the ZOE PREDICT 3 app-based study in UK (n=27,932 peri- and n=42,480 postmenopausal) were analysed (NCT04735835). Dietary assessment was performed through an app-based food frequency questionnaire (PREDICT-FFQ)⁴ and diet quality assessed using the Healthy Eating Index-2020 (HEI, score 0-100)⁵.

The burden of menopausal symptomatology was high; with 99.8% and 92.7% of peri- and postmenopausal participants reporting 1 or more symptoms respectively and 66.0% and 41.2% of peri- and postmenopausal participants experiencing >12 symptoms, respectively (P<0.001). Mean (\pm SD) symptom number was greater in the peri- versus postmenopausal group; 13.5 \pm 3.8, vs. 10.5 \pm 5.5 (P<0.001). HEI (mean \pm SD) was slightly lower in the peri- versus postmenopausal group; 73.9 \pm 9.7 vs. 76.6 \pm 8.9 respectively (P<0.001). Logistic regression analyses showed that a 20 unit increase in HEI was associated with reduction of 6%-37% and 12%-43% in likelihood of symptom presence (dependent on the symptom) in peri- and postmenopausal participants, respectively (P<0.05). ORs remained significant in adjusted models (for age, BMI, use of hormone replacement therapy, total energy intake and home environment (urban, rural) showing reductions of 7%-19% and 6-21%, respectively (P<0.05). Logistic regression analyses revealed that a similar increase in HEI (20 units) was associated with 17% and 19% reductions in the number of symptoms reported by peri- and postmenopausal women after multiple adjustments (P<0.05).

This large observational study confirms the high prevalence of menopausal symptoms among peri- and postmenopausal women and provides new evidence between adherence to healthy eating and reduced likelihood of menopausal symptoms, increasing the potential for symptom reduction by specific dietary approaches. Further studies should examine this relationship in longitudinal and dietary intervention settings.

Acknowledgments

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OC114. Partial replacement of milk and dairy products with plant-based alternatives – would fortification of bread reduce the impact on iodine intake? K. Nicol¹, A.P. Nugent² J.V. Woodside³, K.H. Hart¹ and S.C. Bath¹ 1. School of Biosciences, University of Surrey GU2 7XH and 2. School of Biological Sciences, Queen's University Belfast, BT9 5DL, and 3. School of Medicine, Dentistry and Biomedical Sciences. Queen's University Belfast, BT12 6BJ.

Plant-based dairy alternatives (PBDAs) consumption has assumed a more significant role in populations shifting to more sustainable eating habits. However, PBDAs do not necessarily replace the nutrient value of cow's milk and dairy products, particularly that of essential micronutrients such as iodine⁽¹⁾. Cow's milk and dairy products are the primary source of iodine in the UK diet⁽²⁾, and substituting with PBDAs may negatively affect iodine intake. Here, we aimed to (i) investigate the implications for iodine intake and adequacy of partial replacement of milk, cheese, and yoghurt with commercially available PBDAs per UK Net Zero recommendations⁽³⁾ and (ii) evaluate the potential of introducing bread products made using iodised salt as prophylaxis against iodine deficiency in population intakes due to the proposed changes.

The present study used the dietary modelling software DaDiet⁽⁴⁾ to examine iodine intake in the diets of children aged 1.5-13 years and females aged 14-49 years. We used data from the National Diet and Nutrition Survey (2016-2019) and brand-level iodine concentration data⁽⁵⁾. Firstly, several scenarios that accounted for the population impact of replacing 20% or 35% of milk and dairy product consumption with PBDAs were modelled. Secondly, we modelled the changes by substituting salt in bread with iodised salt at a 30 µg/kg concentration. Relative to the usual diet, we calculated the change in iodine intake and the proportion with intake below the UK Lower Reference Nutrient Intake (LRNI) or above the Upper Limit (UL).

Replacing 20% of dairy products with PBDAs would result in a meaningful decrease in usual iodine intake in all population groups, except females aged 14-18 years, without impacting the population proportion below the LRNI. A 35% replacement would result in a meaningful decrease in iodine intake (9-20%) compared to the usual diet for all population groups. A 35% replacement would also increase the proportion of females aged 19-49 years with iodine intakes below the LRNI to 21%. Adding iodised salt to bread products would increase the usual iodine intake across all population groups and decrease the proportion of intakes below the LRNI (2-14% change). Particularly for females aged 14-18 years, where 40% increases in iodine intake were observed (97 to 136 µg/day) and would not have a meaningful impact on the proportion above the UL in any population group.

Introducing iodised salt in bread products would counteract the negative effect of PBDAs on iodine intake in all population groups. Replacing milk and dairy products with PBDAs per current UK Net Zero goals would reduce population iodine intake unless measures are implemented to minimise the impact on usual iodine intake. Introducing iodised salt to bread products is one countermeasure that would minimise the impact on iodine intake without increasing the population above the UL.

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Student Competition

OC115. Iodine fortification of plant-based dairy and fish alternatives – changes over a four-year period and implications for consumer health. *K. Nicol¹, A.P. Nugent², J.V. Woodside³, K.H. Hart¹ and S.C. Bath¹* 1. School of Biosciences, University of Surrey GU2 7XH and 2. School of Biological Sciences, Queen's University Belfast, BT9 5DL, and 3. School of Medicine, Dentistry and Biomedical Sciences. Queen's University Belfast, BT12 6BJ.

Iodine is an essential trace mineral and a key component of thyroid hormones, which are essential during pregnancy and infancy for brain and neurological development⁽¹⁾. The main dietary sources of iodine in the UK are seafood and dairy products, particularly milk⁽²⁾. Recently, plant-based alternatives to seafood and dairy products have increased in popularity, particularly among young adults⁽³⁾. Unless adequately fortified, these alternatives have a lower iodine content than their animal-based counterparts⁽⁴⁾. This is a concern because consumers of plant-based alternatives are exposed to highly variable products and might be at risk of iodine deficiency. The number of alternative products on the market is rapidly expanding. Therefore, we aimed to investigate changes in the iodine fortification of plant-based alternatives to milk, yoghurt, cheese, and fish between 2020 and 2023.

This study was a cross-sectional market survey of the eight leading UK supermarkets conducted in four annual waves (2020-2023) to evaluate the availability and composition of plant-based alternatives in the UK. The market was surveyed in December each year using online store data to search for plant-based products (milk, yoghurt, cheese, fish). Data was extracted from the product nutrition information and ingredient list.

We found a 49% increase in plant-based products over the four years. During the 2023 wave, we identified 446 products, including plant-based milk (*n* 241), yoghurt (*n* 79), cheese (*n* 97) and fish alternatives (*n* 29). The number of products has grown in all categories since 2020, with the largest increase of 141% in plant-based fish alternatives. After excluding organic products, which cannot be fortified, only 35% (*n* 70) of milk alternatives, 6% (*n* 4) of yoghurt alternatives and 3% (*n* 3) of cheese alternatives were fortified with iodine in 2023, compared with 85% (*n* 169), 52% (*n* 46), and 55% (*n* 52), respectively, with calcium. Compared with 2020, there was no significant change in the proportion of milk, cheese or yoghurt alternatives fortified with iodine in 2023 ($p > 0.05$). No fish alternatives were fortified with iodine. The range of iodine fortification of milk alternatives remained stable from 2020 to 2023 (11.3–45 µg/100mL), and the mean fortification all four years (25.4–27.4 µg/100mL) was lower than the average iodine concentration of conventional cow's milk (30 µg/100mL)⁽⁵⁾. Yoghurt and cheese alternatives were fortified at 22.5–45 µg/100g, similar to cow's milk cheese and yoghurts.

Our study highlights that most plant-based alternatives are not iodine-fortified and that using unfortified alternatives puts consumers at risk of iodine deficiency. Due to their increasing popularity, manufacturers of such alternative products should consider fortifying their products with an appropriate amount of iodine. Consistent and adequate fortification, accurate labelling and nutrition education are needed to help consumers make healthy and informed choices.

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Student Competition

OC116. Plant-based dairy alternatives in Ireland: identifying best choices for consumers and the planet. R. De Luca^{1,2}, M. G. Thompson^{1,3}, O. C. Lyons^{1,3}, M. A. T. Flynn^{1,3} 1. Food Safety Authority of Ireland, Dublin, Ireland and 2. Technological University Dublin, Dublin, Ireland, 3. Ulster University, Coleraine, UK.

Consumers are increasingly switching to plant-based dairy alternatives (PBDA) for environmental sustainability⁽¹⁾. Dairy products are important sources of protein, calcium, iodine, and vitamin B12 for the Irish population⁽²⁾, whereas PBDA have variable nutritional composition. The aims of this study were to compare nutritional composition of PBDA marketed in Ireland with dairy counterparts; identify the most nutritionally equivalent plant-based beverage to dairy milk and compare the environmental impact of both.

A survey (online and in-store) of grocery outlets (92% of Irish market share) was conducted in summer 2023. Data collected included labelling information (brand, nutritional content, and organic status) of PBDA products; and micronutrients added to fortified low-fat dairy milks. The PBDA products were compared with the nutritional composition of counterpart dairy products, obtained using CoFID⁽³⁾ and data collected. Greenhouse gas emissions (GHGe; kgCO₂eq/100g) and water use (L/100g) in the production of dairy milk and the most nutritionally equivalent plant-based beverages were compared using Foodprint⁽⁴⁾. SPSS (version 25) was used for statistical analysis.

Out of 214 PBDA identified, 72% (n153) were alternatives to milk, 14% (n30) to cheese and 14% (n31) to yoghurts. A total of 32% (n68) PBDA were unfortified (no added micronutrients) of which just over half (54%, n37) were labelled organic. Of the 153 PBDA to milk, 67% (n102) were fortified with at least one micronutrient. The most common fortification was calcium (65%, n100), followed by vitamin D (59%, n90). Iodine was added to 22% (n34) of products. Fortified plant-based beverages, compared with milk, provided lower amounts of calcium and iodine (115.7mg/100ml vs. 142.5mg/100ml; and 7.7µg/100ml vs 30µg/100ml for calcium and iodine respectively). PBDA to cheese (n30) were lower in energy, total fat and saturated fat compared with dairy cheese but contained low amounts of protein (0.8g/100g vs. 24.1/100g for PBDA and dairy counterparts respectively). Among PBDA to cheese, 60% (n18) were fortified; 37% (n11) with vitamin B12 and 30% (n9) with calcium. Unfortified products contained negligible amounts of micronutrients. Of the 31 PBDA to yoghurts, only soya-based (71%, n22) products were comparable to dairy yoghurts in terms of protein (4.0g/100g vs. 4.5g/100g, respectively). Coconut-based products (26%, n8) compared to dairy yoghurts provided over nine-fold higher saturated fat (6.7g/100g vs. 0.7g/100g, respectively). The majority (84%, n26) PBDA to yoghurts were fortified with calcium and one product was fortified with iodine. GHGe were lower for soya-based beverages compared to milk (0.09kgCO₂eq/100g vs. 0.15kgCO₂eq/100g, respectively), however water use was higher (29.7L/100g vs. 0.64L/100g).

Due to protein content, fortified soya-based products represent the best PBDA choices nutritionally in Ireland, where such beverages are environmentally comparable with dairy milk. Micronutrient fortification, in terms of nutrients and amounts added, was identified as a key factor in ensuring the adequacy of PBDA.

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Student Competition

OC117. Iodine concentration of fortified and unfortified plant-based alternatives to milk, dairy products, eggs and fish. S. C. Bath¹, K. Nicol¹, L. Soutter¹, B. Benny¹, D. Y Yilmaz¹, H. Goenaga-Infante², S. Hill² and M. P. Rayman¹. 1. Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, and 2. LGC, Queens Road, Teddington, Middlesex.

Animal foods, especially dairy products, eggs and fish, are the main source of iodine in the UK. However, the use of plant-based alternative products (PBAP) is increasing owing to issues of environmental sustainability. We previously measured the iodine content of milk-alternatives⁽¹⁾ but data are lacking on the iodine content of other plant-based products and there is now a greater number of iodine-fortified products. We aimed to compare: (i) the iodine concentration of fortified and unfortified PBAP and (ii) the iodine concentration of PBAP with their animal-product equivalents, including those not previously measured such as egg and fish alternatives.

The iodine concentration of 50 PBAP was analysed in March 2022 at LGC using ICP-MS. The products were selected from a market survey of six UK supermarkets in December 2021. Samples of matrix-matched (e.g. soya/oat) fortified and unfortified alternatives to milk (n=13 and n=11), yoghurt (n=2 and n=7) and cream (n=1 and n=5) were selected for analysis, as well as egg- (n=1) and fish-alternatives (n=10). We compared the iodine concentration between PBAPs and data on their animal-product equivalents⁽²⁾.

The iodine concentration of fortified PBAPs was significantly higher than that of unfortified products; the median iodine concentration of fortified vs. unfortified milk alternatives was 321 vs. 0.84 µg/kg (p<0.001) and of fortified and unfortified yoghurt alternatives was 212 µg/kg vs 3.03 µg/kg (p=0.04). The fortified cream alternative had a higher iodine concentration than the unfortified alternatives (259 vs. 26.5 µg/kg). The measured iodine concentration of the fortified products differed from that of the product label (both lower and higher); overall, the measured iodine concentration was significantly higher than that stated on the label (mean difference 49.1 µg/kg; p=0.018).

Compared to the animal-product equivalents, the iodine concentration of unfortified PBAPs was significantly lower for milk (p<0.001) and yoghurt (p<0.001), while there was no difference with fortified versions of milk (p=0.28) and yoghurt (p=0.09). The egg alternative had an iodine concentration that was just 0.6% of that of chicken eggs (3.38 vs. 560 µg/kg). Three (30%) of the fish alternatives had kelp/seaweed as ingredients and the median iodine concentration of these products was (non-significantly) higher than those without (126 vs 75 µg/kg; p=0.83). However, the iodine content of all fish-alternative products was ten-times lower than that of fish (median 99 vs. 995 µg/kg; p<0.001).

The majority of PBAP are not fortified with iodine but those that are fortified have a significantly higher iodine concentration than unfortified products and are closer to the value of their animal equivalents. From an iodine perspective, unfortified plant-based alternatives are not suitable replacements and consumers should ensure adequate iodine from other dietary sources. Manufacturers should consider iodine fortification of a greater number of plant-based alternatives.

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OC118. Modelled replacement of meats by dairy products and incident coronary heart disease: Evidence from the UK Biobank Study. Y.D. Vogtschmidt^{1,2}, S.S. Soedamah-Muthu^{2,3}, D.I. Givens² and J.A. Lovegrove^{1,2} 1. Hugh Sinclair Unit of Human Nutrition and Institute for Cardiovascular and Metabolic Research, Department of Food and Nutritional Sciences, University of Reading, Reading, UK and 2. Institute for Food, Nutrition and Health, University of Reading, Reading, UK and 3. Center of Research on Psychological Disorders and Somatic Diseases (CoRPS), Department of Medical and Clinical Psychology, Tilburg University, Tilburg, the Netherlands.

There is uncertainty about the impact of replacing meats by dairy products (milk, yogurt, cheese) on the risk of coronary heart disease (CHD)^(1,2). Our objective was to examine the modelled replacement of red meat (unprocessed), processed meat, and poultry meat by milk, yogurt, and cheese in relation to CHD incidence in the UK adult population.

Prospective longitudinal data were used of 117,216 participants in the UK Biobank Study, who were free of CHD at entry, had completed at least two 24hr dietary assessments and had complete covariate data. We modelled the replacement of 1 serving of red meat (unprocessed) (100 g/d) or processed meat (50 g/d) or poultry meat (100 g/d) by 1 serving of milk (200 g/d), yogurt (120 g/d) and cheese (30 g/d). These portion sizes were chosen based on previously reported portion sizes⁽³⁾. Information on the incident cases of non-fatal or fatal CHD events were obtained from hospital inpatient admissions and death registries. The hazard ratios (HR) and 95% confidence intervals (CI) were derived from Cox regression models and multivariable adjustments included sociodemographic, lifestyle, family history, total energy, dietary factors, and BMI.

In our study population, 57% were female. The mean \pm SD was 56 \pm 7.8 years for age and 26.6 \pm 4.6 kg/m² for BMI. During a median follow-up of 11 years, a total of 7060 cases of incident CHD were found. There was a lower risk of CHD for the modelled replacement of 1 serving of red meat (unprocessed) by 1 serving of cheese (HR: 0.90; 95% CI: 0.84, 0.97), but not by milk (0.93; 0.87, 1.00) or yogurt (0.94; 0.87, 1.02). Similarly, replacement of 1 serving of poultry meat by 1 serving of cheese was associated with lower risk of CHD (0.92; 0.85, 0.98) and no significant associations were observed with replacement by milk (0.97; 0.90, 1.04) or yogurt (0.98; 0.90, 1.05). Replacing 1 serving of processed meat by 1 serving of milk (0.92; 0.87, 0.97), yogurt (0.93; 0.87, 0.99) or cheese (0.87; 0.82, 0.92) was associated with lower CHD incidence.

Our study findings support current recommendations for CVD prevention of limiting intake of meats, especially processed meat. Data suggest benefits of dairy foods, in comparison with meats, for reducing the risk of CHD. These findings should be replicated in other cohorts with different intake ranges.

Acknowledgments

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Student Competition

OC119. The nutritional contribution of dairy intakes to the diets of Irish adolescents: based on data from the National Teens' Food Survey II. Emma Kane¹, Maria Buffini¹, Laura Kehoe^{2,3}, John M Kearney⁴, Albert Flynn³, Janette Walton² and Breige McNulty¹ 1. UCD Institute of Food and Health, School of Agriculture & Food Science, University College Dublin, Dublin, Ireland and 2. Department of Sciences, Munster Technological University, Cork, Ireland and 3. School of Food and Nutritional Sciences, University College Cork, Ireland and 4. School of Biological, Health & Sport Sciences, Technological University Dublin, Dublin, Ireland.

Dairy foods offer essential nutrients and bioactive compounds crucial for growth and development ⁽¹⁾, as such they are an important component of a balanced diet. However, despite their benefits, the consumption of dairy has declined in recent years, especially among adolescents ⁽²⁻⁴⁾. In this regard, this study aims to evaluate the nutritional contribution of dairy intakes to the diets of adolescents in Ireland.

Analyses were based on data from the nationally representative National Teens' Food Survey II (NTFS II; 2019-2020) in Ireland (www.iuna.net) ($n=428$; 13-18yrs, 50% female). Food and beverage intake data were collected using a four-day weighed food diary. Dairy intake was classified as the intake of milk, yogurt and cheese and calcium fortified non-dairy alternatives in line with the Irish food based dietary guidelines. Whole foods that contain milk, cheese and yogurt and any relevant dairy components of composite dishes were included in the estimation of dairy intakes. Diet quality was assessed using the Diet Quality Index for Adolescents ⁽⁵⁾. Descriptive statistics and covariate-adjusted univariate general linear models were used to analyse dietary intakes. Trend analysis was conducted to identify patterns in nutrient intakes and anthropometric measurements across tertiles of dairy intake.

Overall, 98% of Irish adolescents consumed dairy products and the mean daily total dairy intake was 245 ± 227 g/d, with males having higher intakes per day compared to females (319 ± 272 g/d vs 171 ± 152 g/d respectively). The average daily servings of dairy were 1.9 servings/d, with only 4% of teenagers achieving the recommended intake of 5 servings of dairy per day. Dairy contributed to the majority of nutrients investigated and was a high contributor to intakes of micronutrients calcium (36%), vitamin B12 (31%) and iodine (49%). Higher consumers of dairy had significantly greater mean daily intakes of protein, total sugar, saturated fat, trans fat, folate, vitamin B12, calcium, iodine, magnesium, potassium, and phosphorus compared to those in the lowest tertile of dairy intake ($p < 0.001$). Higher consumers of dairy also had an overall higher diet quality compared to low consumers (48.0 versus 39.4%; $p < 0.001$). No differences were noted in body weight, body mass index, percentage body fat or waist and hip circumference across tertiles of dairy consumption.

In summary, while almost all Irish adolescents consumed dairy, only 4% achieved the recommended 5 servings of dairy per day. In those consuming higher amounts of dairy, a significantly higher diet quality was observed. While this study offers valuable insights into adolescents' intake of dairy products, its cross-sectional nature highlights the need for continued monitoring of dairy consumption patterns and nutrient intakes in this population, particularly due to the observed decline in dairy consumption noted in this age group across Europe.

Acknowledgments

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OC120. Consumption of a milk low in lactose high in intrinsic fiber is associated with improved nutrient intake adequacies in Chinese adults: a diet modelling study. F. Zhang¹, C. Debras², J. Matta² and D. Wang² 1. Nestlé Institute of Health Sciences, Nestlé Research, Beijing, China and 2. Nestlé Institute of Health Sciences, Nestlé Research, Lausanne, Switzerland.

Despite national dietary guidelines, dairy intakes remain low in China, partially because of high prevalence of lactose malabsorption¹. The fibre intake adequacy is also low comparing to the recommendation in China². Milk-N is a new range of fortified and non-fortified low-lactose/high-fibre milk products. In this study we analyzed the associations between consumption of Milk-N products and nutritional status using diet modelling³.

We used data from China Health and Nutrition Survey-2011⁴, participants above 20y were included in the analysis (n=12127, 47% men, 53% women). Nutrient intakes were estimated through 3 days dietary record and household food inventory. Two diet scenarios were modelled: A) Adding a serving (200ml) of generic milk or of Milk-N to participants not meeting the dairy recommendation, and B) Substituting dairy food intakes with Milk-N in equivalent amount for dairy consuming participants. Paired t-test and Pearson's Chi-squared test were used to compare the amount of intake and prevalence of nutrient intake adequacy between the two types of addition, and before and after the substitution.

Overall, 17.4% of participants consumed dairy foods with an average intake of 160.5g/day, among those 81.2% consumed milk. Only 1.1% of the population met dairy intake recommendations.

In the addition scenario, compared to the addition of generic milk, adding one serving of fortified or non-fortified Milk-N increased fibre intake by 25-35% (from 17.6g/day to 22-23.8 g/day), leading to increased fibre intake adequacy from 16.4% to 27.0-32.8%, i.e. 65-100% increase. Addition of fortified Milk-N improved daily average intakes of calcium, iron, zinc, vitamins A and C by 27-31%, 9%, 8%, 3%, and 16%, respectively. Consequently, the proportion of the population with inadequate intakes decreased ($p < 0.01$) for generic milk vs fortified Milk-N as follows, for calcium (66.3% vs. 23.4-29.6%), iron (5.5% vs. 2.2%), zinc (28.1% vs. 18.9%), vitamin A (61.7% vs. 52.7%) and vitamin C (62.4% vs. 51.5%).

In the substitution scenario, replacing current dairy food intake with fortified or non-fortified Milk-N increased fibre intake by 20-27% (from 18.4 to 22.0-23.4g/day), leading to increased proportion of dairy consumers with adequate fibre intake from 18.7% to 28.2-32.3%, i.e., 51-73% increase. Substitution with fortified Milk-N improved intakes of calcium, iron, zinc, vitamins A and C by 23-27%, 7%, 7%, 10%, and 12%, respectively. Consequently, the proportion of dairy consumers with inadequate micronutrient intakes significantly decreased ($p < 0.01$) for calcium (from 72.9% to 50.3-53.3%), iron (from 7.5% to 4.7%), zinc (from 33.0% to 26.1%), vitamin A (from 56.9% to 47.4%), and vitamin C (from 60.2% to 50.8%).

In addition to the reduced lactose that helps to address lactose malabsorption, consumption of any Milk-N alternative could improve fibre intake, while fortified Milk-N could also contribute to reducing micronutrient inadequacies in Chinese adults.

Acknowledgments

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OC121. Comparison of mineral profiles between cows' milk and plant-based beverages in the UK.

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Cows' milk (CM) and plant-based beverages (PBB), used as milk alternatives, are not nutritionally equivalent⁽¹⁾ and PBB composition is highly varied⁽²⁾. However, assessing the potential nutritional risk for UK populations after dietary replacement of milk with PBB is challenging, because analytical determination of PBBs' nutrient profiles is lacking⁽³⁾. This study determined and compared the mineral concentrations of milk and PBB in the UK market.

Ultra-heat treated and pasteurised samples (n=178), including 20 brands of semi-skimmed milks and 69 brands of fortified PBBs (based on almond (17; ALMO), coconut (14; COCO), oat (19; OAT) and soya (20; SOYA)) were collected in summer 2023 and winter 2024. All PBB samples had added Ca and Na, but only 62 were fortified with I. Minerals concentration was determined using microwave assisted digestion, inductively coupled plasma-optical emission spectrometry (for microminerals) and inductively coupled plasma and mass spectrometry (for trace elements and heavy metals). Data were analysed using Minitab®22.1, with linear mixed effects models using ingredient, thermal treatment and season, and their interactions, as fixed factors, and brand ID as a random factor.

The main ingredient affected all mineral concentrations ($p < 0.001$), except Ca and Co. SOYA had more Mg than milk (+27.5mg/kg), and milk had more Mg than ALMO, COCO, and OAT (+41.7-83.3mg/kg). Milk and SOYA had more P and K than other PBB (P, +411 mg/kg and +381mg/kg; K, +920 mg/kg, and +631 mg/kg, respectively). Milk had less Na than PBB (-126-64 mg/kg) with the exception of COCO. Milk contained more I (+157-200.4 µg/kg) and Zn (+1.41-3.71 mg/kg) than PBB. SOYA contained more Cu, Mg, and Mo than other PBB (for Cu 65-70 mg/kg; for Mn +1.00-1.06 mg/kg; for Mo +46-93.5 µg/kg, respectively) and milk (Cu +0.77 mg/kg; Mn +1.44 mg/kg; Mo +84.1 µg/kg). Overall, SOYA contained the most Cd, Cr, and Ni (although difference to OAT was not significant for Cr and Ni), while milk had the lowest concentration of Cd. Concentrations of Mg, P, Cu, I, Mn, Mo, and Co varied according to season ($P < 0.05$). When compared with summer, winter PBB and milk had more Mg (+4.4 mg/kg), Cu (+0.04 mg/kg), I (+41 µg/kg), and Mo (+9.8 µg/kg), but less P (-76 mg/kg), Mn (-0.08 mg/kg), Zn (-0.21 mg/kg), and Co (-5.21 µg/kg). There were no differences in mineral concentrations due to thermal processing (UHT, pasteurisation; $P > 0.05$).

The minerals composition of fortified PBB varied between main ingredient, and compared to milk, and seasonal variation was high. To prevent micronutrient inadequacies from the substitution of milk for PBB (in particular for I and Zn), consumers should be aware of differences in the intrinsic nutrient composition between PBB derived from different ingredients and milk, as this study showed and adopt suitable dietary and supplementation adjustments.

Acknowledgments

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Student Competition

OC122. Iodised salt in the UK: a review of its availability and presence in processed foods.

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There is no salt iodisation policy in the UK, and the majority of iodine intake is from milk and dairy products⁽¹⁾. The availability of iodised table salt in the UK was last investigated in 2009, and was found to be low⁽²⁾. As table salt contributes only approximately 15% to total salt intake, it is important to know whether any of the salt in processed foods is iodised. This study therefore aimed to update the availability of iodised table salt and review its use in processed foods that are available in the UK.

Iodised table salt availability was investigated in ten supermarket chains (nine online and one in-store), covering 96.6% of the market share⁽³⁾. Data was collected on price per kilogram for iodised and own-brand table salt. A Google-site search of the supermarket websites was conducted between 28 February and 4 April 2024; both the terms "iodised" and "iodized" were searched to identify all processed foods containing iodised salt. Data on product name, ingredients, salt content per 100 g and per portion, and country of origin were extracted. Duplicate products and items no longer available were removed. Salt per portion was calculated using serving sizes on the product label or equivalent products, and estimated portion sizes were used if these were unavailable. Iodine per portion was then calculated by assuming that salt was iodised at a concentration of 20 mg/kg.

Iodised table salt was available in three of the ten (30%) supermarkets (as one brand). Iodised salt was over four-times more expensive than own-brand table salt (£4.17/kg vs. £1.02/kg); the difference was smaller than in 2009 when it was six-times the price. The iodine concentration of the iodised table was 20 mg/kg, an increase from 2009 when it was 11.5 mg/kg⁽²⁾.

A total of 240 processed foods containing iodised salt were identified across all supermarkets. The country of origin was mostly unspecified (46.7%, n=112) but where it was, most products were from Germany (19.6%, n=47). The most common (35.4%, n=85) food group containing iodised salt was meat products (including hot dogs, pâté, salami), followed by stock/sauce/spices/condiments (22.5%, n=54) and pasta/noodle products (12.9%, n=31). Average iodine per portion was 19.4 µg (range 0.44-94 µg), which would provide 13% (range 0.3-63%) of adult recommendations (150 µg/day).

Iodised table salt is available at fewer supermarket chains than in 2009. Iodised salt is used in some processed foods available in the UK though the iodine content is not provided on the nutrition label. When estimating iodine intake in dietary assessments, the potential contribution from iodised salt in some processed foods should be considered. Salt intake, even if iodised, should not exceed recommendations.

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Student Competition

OC123. Application of the Prime Diet Quality Score to the EPIC Food Frequency Questionnaire: baseline data from the Personalising Advice to improve Diet Quality (PAD-Q) trial. M. Ferrari¹, S.F. Brennan¹, T. Grohmann², R. Finlay², A. Courtney², L. Brennan² and J.V. Woodside¹ 1. Centre for Public Health, Institute for Global Food Security, Institute of Clinical Sciences A, Queen's University Belfast, Belfast, UK and 2. UCD Institute of Food and Health, UCD Conway Institute, UCD School of Agriculture and Food Science, University College Dublin, Dublin, Ireland.

The Prime Diet Quality Score (PDQS) is a rapid dietary screener that assesses diet quality. It has been associated with cardiovascular disease (CVD) in a US population⁽¹⁾ and validated in a UK/Irish population against 4-day food dairies⁽²⁾. Food Frequency Questionnaires (FFQ) are the most commonly used dietary assessment instrument in large epidemiological studies⁽³⁾. To reduce the burden of standard dietary assessment methodology, having a valid screener such as the PDQS that can be applied to FFQ data may be especially relevant to public health^(4,5). This study aimed to explore how the PDQS applied to EPIC FFQ data compares to the PDQS collected directly to assess diet quality in a population at risk of CVD on the Island of Ireland.

The PAD-Q trial is a six-month, parallel, randomised, controlled, single-blinded intervention study conducted at Queen's University Belfast and University College Dublin. Volunteers at risk of CVD by being overweight and either having hypertension, hypercholesterolaemia and/or smoking, and who had a low PDQS score (≤ 21) were recruited. PDQS provides a total score ranging 0-42 derived from the sum of intake level scores of 21 healthy and unhealthy food groups. To apply the PDQS to the FFQ data, the FFQ food items were matched to the most appropriate PDQS food group or left uncoded when no appropriate match could be made. Intakes from FFQ were calculated into an estimation of weekly portions to enable calculation of scores according to PDQS categories. Pearson correlation coefficients, ICCs and weighted kappa were used to analyse correlation and agreement between total PDQS scores, and Spearman correlation coefficients for individual PDQS food items. Comparison of scores from individual PDQS groups were analysed via Wilcoxon test, with p-values < 0.05 considered statistically significant.

In total, n=152 participants completed baseline questionnaires. Mean age of participants was 49 years (SD: 12), 70% were female, 29.5% were classified with overweight and 70.5% with obesity. PDQS total score derived from FFQ data (15.0 (SD: 3.7)) was correlated ($r=0.69$, $p<0.01$) with PDQS total score at baseline (15.5 (SD: 4.2)). Similar association was observed via ICC (0.68 (95%CI: 0.58-0.76)). Weighted kappa indicated moderate agreement between measures (0.52 (SE: 0.05)). In the analysis of individual food group scores, correlation (r) ranged 0.32 - 0.68 ($p<0.01$). PDQS applied to FFQ demonstrated higher scores for most (9/13) of the healthy PDQS food groups and lower scores for all the unhealthy PDQS food groups (7/7) compared to PDQS data.

Diet quality assessed via PDQS applied to FFQ data was significantly moderately correlated with diet quality assessed via PDQS at baseline in the PAD-Q trial. Results are comparable with dietary questionnaire validation studies. FFQ data higher estimated the intake of both healthy and unhealthy PDQS food groups compared to PDQS data.

Acknowledgments

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Student Competition

OC124. Association between empirically driven dietary patterns and cardiometabolic disease risk factors: A cross-sectional analysis in UK adults. A. Yilmaz¹, M. Weech¹, K.G. Jackson¹ and J.A. Lovegrove¹. *Hugh Sinclair Unit of Human Nutrition, Institute of Food, Nutrition and Health and Institute for Cardiovascular and Metabolic Research, Department of Food and Nutritional Science, University of Reading, Reading, RG6 6DZ, UK.*

Extensive research has investigated the impact of individual foods and nutrients on development and progression of cardiometabolic disease (CMD)⁽¹⁾. However, there are only limited data on the influence of overall dietary patterns on CMD within the UK population. Therefore, this analysis aimed to empirically identify dietary patterns and explore their association with CMD risk factors in UK adults.

For this secondary data analysis, habitual dietary data was collated from four randomised controlled trials (DIVAS, DIVAS-2, SATgenε, RESET) and one observational study (BODYCON) conducted at the Hugh Sinclair Unit of Human Nutrition, University of Reading. This dietary data was categorised into 38 food groups before performing principal component analysis to identify specific dietary patterns. After stratifying the principal components into increasing quartiles (Q) and determining the eNutri-DQS (a measure of diet quality), ANCOVA was performed to assess variations in estimated marginal means of CMD risk factors and eNutri-DQS between quartiles of dietary pattern adherence.

The dataset included 646 individuals, 58% female with a mean \pm SD age of 44 \pm 14 years, and body mass index (BMI) of 25.2 kg/m² (SD 4.0). Two main dietary patterns (DP) were identified which explained 11.7% of the total variance of food intake. Higher adherence to DP1 (Q4), characterised by diets rich in fermented dairy, fruits, wholegrains, vegetables and lower in red/processed meat products, was associated with lower BMI, waist circumference, diastolic blood pressure, fasting triacylglycerol, non-high-density lipoprotein (HDL)-cholesterol and higher HDL-cholesterol concentrations compared with the lowest quartile of adherence (Q1) (P<0.01). DP2, characterised by high consumption of sugar, honey and jam and other sweet spreads, refined grains and cereals with lower intakes of vegetables, nuts and wholegrains, was associated with lower HDL-cholesterol concentrations compared to those with lower adherence (P=0.006). Relative to Q1, diet quality, as measured by the eNutri-DQS, was significantly higher across increasing quartiles of adherence to DP1 (P<0.001), whereas the eNutri-DQS was significantly lower in Q4 versus Q1 of DP2 (P<0.001).

This analysis has revealed two main dietary patterns in disease-free UK adults. Greater adherence to a diet higher in fermented dairy, fruits, wholegrains, and vegetables and lower in red and processed meat was associated with a higher diet quality and favourable associations with CMD risk markers.

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Student Competition

OC125. Gender-specific effects of 3-month nutrition intervention on lipid profiles and insulin sensitivity. N. Samiilenko¹, K. Mazanko¹, H. Bielokoz¹, S. Shpak¹, O. Zinchenko¹, Y. Muzyra¹, D. Zubach¹, O. Aleksieieva¹, D. Tsomko¹ and O. Bocharova¹ 1. LLC Samoilenko Clinic, Kyiv, Ukraine.

Dyslipidemia and insulin resistance are pivotal in diabetes mellitus and cardiovascular disease (CVD) pathogenesis, underscoring the necessity for lifestyle interventions⁽¹⁾. Previous research has highlighted the efficacy of dietary modifications in improving metabolic parameters and reducing CVD risk^(2,3). However, understanding the gender-specific responses to such interventions remains underexplored. This study aims to investigate the gender-specific effects of a 3-month nutrition intervention, aimed at improving lipid profiles and insulin sensitivity in patients with dyslipidemia and insulin resistance.

107 patients (pts), 53 men (49,5%), 54 women (50,5%), mean age 44,6±11,3, mean BMI 33,1±6,8, with dyslipidemia and insulin resistance were studied, 58 pts (54,2%) were with obesity. During the intervention, participants were provided with a dietary plan consisting of 3 meals, each of which contained vegetables (starchy and non-starchy), carbohydrates (whole grains, fruits, berries), proteins (poultry, fish, seafood, eggs, legumes, dairy products) and fats (olive oil, flax seeds, tree nuts). Pts were restricted on red and processed meat, butter, milk, trans fat, sugar, white flour products, and alcohol. The dietary intervention durated 12 weeks, during which pts maintained self-reported diet records to monitor their dietary intake. No pharmaceutical interventions were employed throughout this duration. Statistical analysis were based on using paired t-test with assessment of the dynamics of clinical indicators with 95% CI and calculation of the standardized effect size based on mean comparison.

Among women after 12 weeks the mean reduction in serum low-density lipoprotein cholesterol (LDL-C) was -0.79 mmol/L (from 4.16±0.85 to 3.37±0.72) or -18.9%; triglycerides -0.33 mmol/L (from 1.51±0.77 to 1.18±0.45) or -21,85%; Homeostatic Model Assessment for Insulin Resistance (HOMA-IR) index decreased on -2,23 or -43,47% (from 5.13±4.59 to 2.9±2.56), insulin level dropped by 35,25% (from 17.87±12.76 to 11.57±7.89).

Among men the reduction in values was the following: for LDL-C -0,85 mmol/L or -18,44% (from 4.16±1.08 to 3.76±0.88); for triglycerides -0,68 mmol/L or 33,66% (from 2.02±1.07 to 1.34±0.52); for HOMA-IR index -2,03 or -38,01% (from 5.34±4.34 to 3.31±2.74), for insulin -8,17 or -39,78% (from 20.54±15.26 to 12.37±8.66).

The dynamics for these indicators are statistically significant ($p < 0.05$).

Dietary intervention led to significant reductions in serum LDL-C, triglycerides, HOMA-IR index, and insulin levels among both women and men, highlighting the effectiveness of dietary modification in improving lipid profiles and insulin sensitivity.

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OC126. Association of sarcopenic obesity with multimorbidity: cross-sectional study of UK Biobank cohort. M. Guerrero-Wyss¹, A Alsowail¹, F Ho², B. Jani², S. Grey¹, C Celis-Morales¹. 1. School of Cardiovascular and Metabolic Health, University of Glasgow, Glasgow, UK. 2. School of Health and Wellbeing, University of Glasgow, Glasgow, UK.

Sarcopenic obesity is associated with higher risk of falls, hospitalizations, mortality, and a wide range of poor health outcomes⁽¹⁾. However, its relationship with multimorbidity is less explored. This study aimed to investigate the association between sarcopenic obesity and multimorbidity across sexes.

In this cross-sectional analysis of the UK Biobank, we included 171,448 participants (53.1% women, mean age 55 years). Sarcopenic obesity, defined according to the EWGSOP2 classification⁽²⁾, was analysed as the outcome. Multimorbidity was the predictor, determined by self-reported chronic conditions and categorized into none, 1, 2, 3, 4, and 5+ diseases. Poisson regression with robust error was used to estimate the risk ratio and its 95% confidence intervals (RR, 95%CI). Analyses were adjusted for sociodemographic and lifestyle factors.

The prevalence of sarcopenic obesity increased with the number of chronic diseases in both men and women but varied significantly by sex (p-interaction =0.030). Compared to individuals without chronic diseases, those with 5+ diseases exhibited prevalences of 55.7% in men and 51.2% in women. The prevalence of sarcopenic obesity increased by 94% (95% CI: 1.89, 2.00) for each additional chronic disease in women and 117% (95% CI: 2.09, 2.25) in men. Relative to those with no chronic conditions, individuals with 5+ diseases had 41.5 and 68.7-times higher prevalence of sarcopenic obesity in women and men, respectively.

Our findings showed a robust association between sarcopenic obesity and multimorbidity, which varies by sex, further studies is needed to examine the predictive utility of using multimorbidity to identify sarcopenia.

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Student Competition

OC127. Association between predicted hsCRP score and hyperlipidemia among women: the Korea Nurses' Health study. Soomin Lee¹, Chiyoung Cha², Jung Eun Lee^{1,3*} 1. Department of Food and Nutrition, College of Human Ecology, Seoul National University, Seoul, Republic of Korea and 2. College of Nursing, Ewha Womans University, Seoul, Republic of Korea and 3. Research Institute of Human Ecology, Seoul National University, Seoul, Republic of Korea.

Hyperlipidemia is known to be closely associated with diet and inflammation.⁽¹⁾ This study aimed to examine the relationship between predicted hsCRP score and hyperlipidemia among women in the Korea Nurses' Health Study.

In this prospective cohort study, a total of 6,921 women aged 21-50 years were included from the Korea Nurses' Health Study (KNHS)⁽²⁾ module 1 to 11. The predicted hsCRP score was derived from demographic, lifestyle, dietary, and anthropometric factors.⁽³⁾ Dietary factors were derived based on a validated food frequency questionnaire (FFQ).

Hyperlipidemia was defined as the presence of any one of the following: 1) total cholesterol ≥ 240 mg/dl, 2) HDL-cholesterol < 50 mg/dl, or 3) triacylglycerol ≥ 200 mg/dl.⁽⁴⁾ We also considered participants with a history of diagnosed hyperlipidemia or current use of hyperlipidemia medication as having hyperlipidemia. Cox proportional hazard regression analysis was used to calculate relative risk (RRs) and 95% confidence intervals (CIs) with adjustment for potential confounding factors.

During a mean follow-up of 5.81 person-years, 1,862 cases of hyperlipidemia were identified. After multivariable adjustment, the RRs (95% CIs) for hyperlipidemia comparing the highest predicted hsCRP score with the lowest predicted hsCRP score were 1.22 (1.04-1.43), 1.12 (0.96-1.32), 1.27 (1.08-1.49), and 1.61 (1.37-1.89), respectively (P for trend < 0.001).

Our results support that increasing predicted hsCRP scores were associated with increased risk of hyperlipidemia. These findings suggest that dietary and lifestyle changes aimed at reducing inflammation may help prevent hyperlipidemia.

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Student Competition

OC128. Blood pressure by age group in type 2 diabetics mellitus users of primary health care centres in Copiapó (Chile): a cross-sectional study. *J Rojas¹, JC. Fernández-Cao¹, C. Doepking¹, C Aguirre², G. Fernández³, D. Trigo⁴, K. Cremer³, G. Vergara³, N. Varas³, C. Cuadra³, V. Garrido³, M Quinteros³ and C Rojas²* 1. Department of Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapó, Chile and 2. CODIACO Study, University of Atacama, Copiapó, Chile and 3. Bachelor's Degree in Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapó, Chile and 4. Bachelor's Degree in Kinesiology, Faculty of Health Sciences, University of Atacama, Copiapó, Chile.

Diabetes mellitus is a serious worldwide public health problem due to its high prevalence. In Chile, 1.7 million people have been diagnosed with diabetes mellitus, of which 90% are type 2 diabetes mellitus (T2DM) cases ⁽¹⁾. It is well known that blood pressure (BP) control is essential to prevent future complications and to ensure a positive prognosis for this disease ⁽²⁾. Moreover, studies in Chile have shown a significant increase in systolic and diastolic blood pressure (SBP, DBP) levels in T2DM subjects compared to the non-diabetic Chilean population ⁽³⁾. Therefore, this study aimed to determine and compare SBP and DBP levels according to age group in T2DM patients of primary health care centres (PHCC) in Copiapó, Chile.

Cross-sectional study within the CODIACO cohort. Data were collected from April to August 2023 on 161 patients with T2DM from eight PHCCs of Copiapó. Patients diagnosed with T2DM, of both sexes and aged between 30 and 65 years were included. Pregnant and lactating women, patients with diabetic neuropathy or nephropathy, cancer and severe inflammatory or infectious diseases were excluded. To estimate BP, three measurements were taken every five minutes. Three age groups were established: ≤ 50 (n=36), 50-60 (n=74) and ≥ 60 years old (n=51). Blood pressure results were expressed as mean and standard deviation of mmHg unit. Normal distribution was analysed using the Kolmogorov-Smirnov test corrected for Lilliefors. In addition, the one-way ANOVA test was used to compare SBP and DBP between age groups. Bonferroni was used for post hoc testing. A P-value < 0.050 was considered statistically significant. Data were analysed using SPSS software. The study was conducted according to the ethical standards of the Declaration of Helsinki and its subsequent modifications. The CODIACO study was approved by the Scientific Research Ethics Committee of the University of Atacama. The project was funded by FONDECYT N° 11180794

The mean of systolic blood pressure (SBP) for the ≤ 50 , 50-60 and ≥ 60 year groups, was 123.92 ± 14.38 ; 133.23 ± 18.36 ; 135.88 ± 15.02 mmHg ($p=0.003$); respectively. Bonferroni test indicated a significant difference in SBP between the group ≤ 50 and 50-60 ($p=0.019$) and ≥ 60 year groups ($p=0.003$), but not between 50-60 and ≥ 60 year groups ($p=1.000$). The ANOVA did not show a significant difference in diastolic blood pressure (DBP) between groups ($p=1.000$).

The results suggest that SBP levels of T2DM patients in PHCCs of Copiapó are higher in older age groups (50-60 and ≥ 60 y) compared to the younger age group (≤ 50 y). No significant differences were found in DBP.

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OC129. Investigating the postprandial metabolic and inflammatory phenotypes of healthy subjects and patients with metabolic dysfunction-associated steatotic liver disease and metabolic-dysfunction associated steatohepatitis to understand disease progression. *Sinéad M. Mullin¹, Christopher E. Shannon², Méabh B. Ní Chathail¹, Pamla Singh³, Suzanne Norris³ and Helen M. Roche⁴* 1. *Nutrigenomics Research Group, UCD Conway Institute, Institute of Food and Health and School of Public Health, Physiotherapy and Sports Science, University College Dublin* and 2. *Nutrigenomics Research Group, UCD Conway Institute, and School of Medicine, University College Dublin* and 3. *Hepatology Department, St James's Hospital, Dublin* and 4. *Nutrigenomics Research Group, UCD Conway Institute, Institute of Food & Health, School of Public Health, Physiotherapy & Sports Science, University College Dublin, and Institute for Global Food Security, Queen's University Belfast.*

Metabolic dysfunction-associated steatotic liver disease (MASLD), considered as the hepatic component of the metabolic syndrome, is the leading cause of chronic liver disease around the world ⁽¹⁾. The MASLD disease spectrum begins with isolated steatosis. A subset of patients will develop metabolic dysfunction-associated steatohepatitis (MASH) which is characterized by steatosis and inflammation, resulting in hepatocyte injury with or without fibrosis. MASH is regarded as a progressive phenotype, as it can advance to cirrhosis and subsequently to hepatocellular carcinoma ⁽²⁾. Compared with fasting measurements alone, postprandial responses to nutrient challenges offer a greater insight into the phenotypic heterogeneity that occurs across health and disease ⁽³⁾. To better understand the phenotypes that occur across the spectrum of MASLD, we have characterized the postprandial metabolic and inflammatory responses to different dietary challenges in healthy individuals and patients with MASLD and MASH.

10 healthy individuals, 18 patients with MASLD, and 15 with MASH were recruited. Body composition was assessed using bioelectrical impedance analysis (Tanita). Liver fat and stiffness were measured by FibroScan in patients only. All participants completed a high fat mixed meal challenge containing 655kcal, 46g fat, 33g saturated fat, 50g carbohydrates, 45g sugar, and 10g protein. Patients with MASLD and MASH also completed a high-fructose challenge containing 400kcal, 75g fructose and 25g glucose. Fasting and postprandial blood samples were drawn at each challenge at 0, 30, 60, 90, 120, 180, 240 and 360-minutes. Glucose was measured in whole blood using a HemoCue Glucose 201+ analyzer. Serum insulin and plasma IL-6 and CRP will be measured by ELISA. Plasma triglycerides, non-esterified fatty acids (NEFA), and glycerol will be measured by colorimetric assay.

Bodyweight ($p=0.0247$), BMI ($p=0.0448$), and hip circumference ($p=0.0237$) were greater in MASH vs MASLD. Healthy participants had significantly lower bodyweight, BMI, and waist and hip circumferences vs both MASLD and MASH ($p<0.0001$ for each variable). Liver fat was similar between MASLD and MASH, whereas liver stiffness was greater in MASH ($p<0.0001$). Alanine transaminase (ALT) was increased in MASH vs MASLD ($p=0.0408$), while concentrations of other liver enzymes were similar between groups. Total cholesterol ($p=0.0492$) and LDL-cholesterol ($p=0.0197$) were also higher in MASH vs MASLD, but there was no difference in triglyceride concentrations or HDL-cholesterol. There was a significant impact of group on glucose response to the HFMM ($p=0.0321$), and glucose responses varied between the 3 groups across different time points ($p<0.0001$).

The HFMM, which is more representative of a typical meal, revealed glucose intolerance in MASLD and MASH which was also greater in MASLD. Analysis of the full cohort will enable greater characterization of the phenotypes that occur across the spectrum of MASLD.

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Student Competition

OC130. A systematic review of dietary modifications to Mediterranean-style diets. Leigh Chester¹, Fotini Tsofliou¹, Paul Fairbairn¹ and James Brooks¹ 1. Faculty of Health and Social Sciences, Bournemouth University, Dorset BH1 3LT, United Kingdom.

The global pandemic of overweight and obesity is linked to non-communicable disease (NCD) risk, incidence, and outcomes ⁽¹⁾. Moderate weight-loss (5-10%) has considerable benefits, yet high quality diets can offer protective nutritional factors for NCD while encouraging nutritious, sustainable, and empowering dietary/lifestyle change. Evidence supports Mediterranean-style diet (MD) efficacy, yet adherence and adoption are becoming low even in countries of the Mediterranean basin ⁽²⁾. Obesogenic environments, ultra-processed foods, and social factors are implicated in low adoption. An adapted MD could improve adherence and adoption for UK populations ⁽³⁾. This systematic review aims to investigate substitutions and adaptations to MD.

The following databases were searched for articles published between inception and December 2023: the Cochrane Library, EMBASE, CINAHL, Scopus, and MEDLINE. Risk of bias was assessed using the Revised Cochrane v2 tool for randomized trials. Articles were included if they met the following criteria: (1) study type was experimental or quasi-experimental; (2) mean participant age between 18 and 65 years (3) healthy or pre-clinical population (4) modification, adaptation, or tailoring of MD to specific populations.

The databases identified 4,478 results. Forward citation searching returned two eligible results. A total of seventeen articles were included in the analysis. Fourteen were RCTs, one each of crossover and uncontrolled trials, and one protocol. Six studies were reported as part of the PREDIMED multicentre trials, while the protocol represented the RESMENA-S trials (hypocaloric, low glycaemic index diets). Ten were independent. PREDIMED studies supplemented MD with either extra virgin olive oil or nuts, with control group following a low-fat American Heart Association diet. Remaining interventions demonstrated heterogeneity of MD design; a ketogenic MD with phytoextract supplementation; three studies required aerobic exercise (i) daily (walk ≥30 minutes), (ii) weekly (150 minutes), or (iii) trainer-led resistance programme, with MD [(i) MD with EVOO and pistachios, (ii) low-carbohydrate MD with walnuts (iii) hypocaloric macronutrient-percentage-adjusted MD]. A further three studies (two hypocaloric and one ketogenic) required no change to habitual physical activity levels. Five studies (PREDIMED) recorded leisure-time physical activity. Three studies [(i) PREDIMED (ii) personalised hypocaloric MD (iii) isocaloric MD] had no activity information. Only one study [personalised low-calorie MD] applied a psychological behaviour change model. No studies specifically reported hydration levels or conviviality intervention; uncertain whether this information was included in professional-led education.

The present systematic review finds paucity of evidence in RCTs of MD customisation for specific countries in healthy or pre-clinical individuals. Interventions have largely focused on augmenting MD with extra consumption of specific foods. Other components of the MD and lifestyle such as conviviality, hydration, adequate rest, seasonal and traditional ingredients, and lack of sedentarism were not reported.

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Student Competition

OC131. Evaluating Modifiable Hypertension Risk in Nigerian Adults – The Nigerian Diet Risk Score. Nimisoere P. Batubo¹, Carolyn I. Auma¹, J. Bernadette Moore¹, and Michael A. Zulyniak^{1,2,3} 1. Nutritional Epidemiology Group, School of Food Science and Nutrition, University of Leeds, Leeds, UK and 2. School of Medicine, Faculty of Medicine and Health, University of Leeds, Leeds, UK and 3. Food, Nutrition and Health, University of British Columbia, Vancouver, BC, Canada.

Cardiovascular diseases account for 31% of all global deaths, the majority (80%) of which are associated with hypertension.^(1,2) As of 2019, hypertension is expected to affect 1 in 3 adults living in West Africa, with prevalence standing at 36.1% In Nigeria.^(3,4) Poor dietary habits, including high intakes of salt, processed meat, ultra-processed foods, and unhealthy fats and oils and low intakes of vegetables, fruits, fibre, and nutrients such as potassium and omega-3 fatty acids, account for 9–17% of cases of hypertension globally, and our recent meta-analysis confirms their contribution in Nigeria and other West African countries.^(1,5,6) This study aimed to develop and deliver a culturally-appropriate diet risk score for clinical practice that can (i) rapidly and accurately identify and stratify individuals at risk of hypertension and (ii) support clinicians and other healthcare professionals to provide tailored and effective personalised dietary advice.

We used a culturally-appropriate Nigerian Dietary Screening Tool (that we recently designed and validated^(7,8)) to assess the dietary intake among 151 patients in a Nigerian hospital and used methods similar to Framingham and INTERHEART to: (i) construct and validate a Nigerian Dietary Risk Score (NiDRS) for hypertension, and (ii) evaluate the NiDRS against a panel of clinical biomarkers of hypertension, using multiple logistic regression models, internal validation using measures of discrimination and calibration, decision analysis curve and mediation analysis to facilitate its use in clinical practice.

Each incremental increase in the overall NiDRS was associated with a 2-fold increase in odds of overall hypertension (OR: 2.04, 95%CI: 1.16, 1.16, p=0.01), with the highest score category associated with >18-food increased odds of hypertension, compared to lowest NiDRS (OR: 18.27, 95%CI: 1.33, 251.21, p=0.03). The NiDRS demonstrated good discrimination with an AUC of 0.92%, high sensitivity (0.85), specificity (0.94), calibration (with a Brier score of 0.1) and a positive net benefit. In addition, via mediation analysis, total cholesterol (50%), triglycerides (47%), LDL-c (49%), VLDL-c (17%), CRP (68%), and homocysteine (71%) were mediators of the NiDRS-hypertension pathway in a positive direction.

The NiDRS is an accurate and valuable tool for clinicians to identify and stratify individuals at risk of hypertension and discuss dietary prevention strategies to address the rising prevention of hypertension and its associated cardiovascular complications in Nigeria.

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Student Competition

OC132. Understanding Searches for 'Weight Loss' Using Google Trends. M. Iqbal^{1,2}, M.A. Morris^{1,3} and J.E. Cade¹ 1. Nutritional Epidemiology Group, School of Food Science and Nutrition, University of Leeds, UK and 2. Politeknik Negeri Jember, Indonesia and 3. Leeds Institute for Data Analytics, University of Leeds.

It is common for individuals to seek information online when facing health and nutritional problems, particularly those with lower education level and nutritional knowledge⁽¹⁾. One way to access such information is through search engines, with Google being the most popular, currently used by 92% of the world's population, with an average of 85.59 billion monthly visits⁽²⁾. Google Trends is a tool provided by Google, freely accessible, allowing users to observe patterns in internet searches⁽³⁾. The aim of this study is to identify patterns to predict trends related to weight loss at specific times.

Data were extracted from Google Trends over the past 20 years, from 2004 to 2024, using the keywords "weight loss" and "diet." In Google Trends, users may input a keyword consisting of words or phrases that are relevant to the chosen issue or cases. The duration of time that users wish to examine can be specified. Furthermore, users can explore geographical regions or search worldwide. Figures generated represent search interest based on the highest points on the graph for specific regions and times. The popularity of search terms is relative and depends on the category: search term or topic. Data is normalised and presented on a scale from 0-100, where each point on the graph is divided by the highest point, or 100. A value of 100 indicates peak popularity, 50 indicates half popularity, and 0 indicates insufficient data for the term.

Over the past 20 years, there has been an increasing trend in searches for websites using the keyword "weight loss," with an average interest score of 31. This differs from the keyword "diet," which has shown a tendency towards stagnation in popularity, although it briefly peaked with a score of 100 in early 2014 and has an average interest score of 53. Both keywords exhibit similar search patterns, reaching their highest peaks each year in January and lowest points in December. For the keyword "weight loss," the most searches were from South Africa (100), Romania (96), and Vietnam (91), while the lowest were from Italy (4), Japan (5), and the Netherlands (9). For the keyword "diet," the most searches were from Poland (100), Kuwait (87), and Greece (85), while the lowest were from Japan (2), Thailand (7), and France (11). Users also searched for other related topics or queries including ozempic and intermitten fasting.

Our data indicates a consistent increasing trend in searches for weight loss over the last 20 years via Google Trends. New Year resolutions may be linked to peak searches which occur in January. While this data may prove useful for researchers and policymakers, further validation of its validity and reliability is necessary.

Acknowledgments

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Student Competition

OC133. Low-carbohydrate vs low-fat diets for the secondary prevention of cardiovascular diseases. A meta-analysis. K. Nikitara¹, M. Kontogianni², AB. Haidich³, V. Bountziouka¹ 1. *Computer Simulation, Genomics and Data Analysis Laboratory, Department of Food Science and Nutrition, School of the Environment, University of the Aegean, Lemnos, Greece and 2. Department of Nutrition and Dietetics, School of Health Science and Education, Harokopio University, Athens and 3. Department of Hygiene, Social-Preventive Medicine and Medical Statistics, School of Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki.*

The scientific evidence surrounding the efficacy of low-carbohydrate diets (LCDs) compared to low-fat diets (LFDs) in the secondary prevention of cardiometabolic diseases is diverse. While some studies indicate that LCDs can lead to superior cardiometabolic outcomes ⁽¹⁾, others conclude that higher intakes of MUFA, or PUFA could have a better impact on the risk of CVD ⁽²⁾. However, despite inconclusive findings, only a limited number of reviews have employed precise meta-analytical methods and used the most recent scientific evidence to derive quantitative estimates of the relative effect of these two diets.

This study aims to exploit the advantages of meta-analysis to compare the efficacy of LCDs (CHO <30% of total energy intake) and LFDs (FAT <35% of total energy intake) against cardiovascular diseases (CVDs), based on the most recent scientific evidence.

A systematic review was performed by retrieving studies from 5 bibliographic databases from January 2013 to 31 May 2023. The studied population included adults at high risk for CVDs, and the outcomes covered indicators for glycemic control, adiposity, lipidemia, and inflammation. Data were extracted in a pre-defined template and a meta-analysis was performed, along with sensitivity analyses. This abstract provides a preliminary analysis of outcomes from a subset of identified studies, focusing on two specific parameters, including triacylglycerols (TGs) and Body Mass Index (BMI).

Six studies (769 subjects) were included in the meta-analysis. Overall, participants in the LCD had on average 0.30 mmol/L lower TG levels at the end of the intervention (95% CI: -0.43; -0.17) whilst for participants in the LFD the magnitude of the effect was smaller (i.e., -0.22 (-0.36; -0.08) mmol/L). However, we found no evidence of a significant impact of the LCD on TG levels against the LFD (change in mean difference (95% CI): -0.096 (-0.245; 0.053) mmol/L), whilst study heterogeneity was moderate ($I^2=56%$). Moreover, participants in the LCD achieved a reduction in BMI of -2.04 kg/m² on average (95% CI: -2.77; -1.31), whilst those in LFD achieved on average a reduction of -1.20 kg/m² in BMI (95% CI: -1.95; -0.44), with the reduction in BMI being greater for participants in the LCD compared to the LFD (-0.47 kg/m² (-0.91; -0.04), $I^2=12%$).

The findings of this pairwise meta-analysis underscore the complex interplay between dietary composition and metabolic outcomes and will provide the best practices for the risk reduction of developing CVDs.

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OC134. Pulse-rich diets and risk of cardiovascular diseases: findings from the UK Biobank prospective study. O.A Olotu¹, Y Kaimila^{1,4}, M.E Clegg^{1,2}, K.G Jackson^{1,2,3} and J.A Lovegrove^{1,2,3} 1. Hugh Sinclair Unit of Human Nutrition and 2. Institute of Food, Nutrition and Health and 3. Institute for Cardiovascular Metabolic Research, Harry Nursten Building, Whiteknights, University of Reading, Reading, RG6 6DZ. UK and 4. The University of Malawi, P.O Box 280, Zomba. Malawi.

Cardiovascular diseases (CVDs), including ischemic heart diseases (IHD) and stroke, are a leading cause of death globally and significantly impact quality of life ⁽¹⁾. Current guidance suggests increasing the consumption of pulses rich in fibre and iron, to reduce CVD risk ⁽²⁾. However, long-term observational studies investigating pulse consumption and CVD incidence are limited ⁽³⁾. In the current analysis, the UK Biobank, a prospective cohort study of over 500,000 UK adults was used to investigate the association between pulse consumption and CVD incidence ⁽⁴⁾.

A total of 119,914 (males: 51,540 and females: 68,374) participants with \geq two 24-hour dietary recalls, not pregnant and free from CVD at baseline were included. Total CVD was defined as IHD and cerebrovascular diseases. Multivariable-adjusted Cox proportional hazard regression models were used to estimate the incidence of CVD by pulse consumption, reported as hazard ratios (HR) and 95% confidence intervals (CI). Pulse consumption was modelled as a categorical variable with non-consumers (0g/day, n=76,531) and 3 tertiles (T) of pulse intake T1 (1-20.4g/day, n=14,785); T2 (20.5-40g/day, n=14,015); T3 (40.5-360g/day, n=14,583). The fully adjusted model was controlled for sex, age, dietary energy, region, ethnicity, smoking status, physical activity level, education, income, employment, body mass index (BMI), alcohol intake, supplement use, processed red meat intake, sodium intake and trans-fatty acids intake, family history of stroke, heart disease and diabetes, insulin use, blood pressure or cholesterol-lowering medication use. The analysis was performed in STATA 18.

The cohort had a mean \pm SD age of 55.9 \pm 7.8 years, BMI of 26.6 \pm 4.5 kg/m² and pulse intake of 13.2 \pm 24.3 g/day. There were 8,937 incidences of CVD after a mean follow-up of 12.4 years. Compared with non-consumers, pulse intake was not significantly associated with the incidence of total CVD, T1 (HR: 0.95, CI: 0.89–1.01), T2 (HR: 0.98, CI: 0.92–1.05), T3 (HR: 0.97; CI: 0.91–1.04).

In conclusion, pulse-rich diets were not significantly associated with a lower total CVD incidence in middle-aged adults participating in the UK Biobank compared to non-consumers. Further work will model the replacement of red and processed meat with pulses on CVD incidence and mortality.

Funding was received from BBSRC (BB/W017946) for the project “Raising the Pulse: Systems analysis of the environmental, nutritional and health balance of staple foods”. This research has been conducted using the UK Biobank Resource under application number [101928].

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Student Competition

OC135. The cardiovascular implications of low energy availability in physically active females: a systematic review. *L Pope¹, D M. Roche¹, Z A. Marshall¹, N Alwan² & R J. Webb¹. School of Health and Sports Sciences, Hope Park Campus, Liverpool Hope University, Liverpool, UK and 2. Department of Sport and Health Sciences, Oxford Brookes University, Oxford, United Kingdom.*

Low energy availability (LEA) is a state in which the body lacks sufficient energy to support normal bodily functions required to maintain health¹. While LEA is frequently associated with a plethora of cardiovascular abnormalities, supporting research is limited and largely comprised of studies that are small and preliminary in nature². To date, there has been no comprehensive synthesis of the evidence regarding the cardiovascular implications of LEA in female athletes and our review aims to address this.

This review followed the Cochrane Collaboration PRISMA protocol³. Various online databases (PubMed, One Search, Web of Science, Google Scholar) and manual searches were used, with a cut-off publication date set at November 2023. Search keywords were devised using the PICO framework³. Medical Subject Headings (MeSH) terms were used in PubMed. Boolean logic was applied to filter relevant results. Eligibility criteria included physically active to elite-trained female athletes, LEA risk determination, and cardiovascular measures (including cardiovascular disease (CVD) risk, biomarkers and/or non-invasive measures). Articles were screened, extracted, and quality assessed using the NIH Quality Assessment Tool. Three researchers were blinded to each other's decisions to reduce potential biases and queries were resolved through reviewer discussion.

A total of nine studies were included. After evaluating the studies using the quality assessment tool, five studies were found to be moderate quality and four low-quality, due to factors including the inability to blind subjects or testers. The studies examined multiple cardiovascular health indicators and had mixed findings regarding the connection between LEA and potentially increased cardiovascular risks, aligning with previous research. Two studies suggested LEA leads to unfavourable blood lipid profiles which are known to lead to an increased risk of CVD⁴, while three others found no significant difference in blood lipids due to LEA. One study identified twenty detrimental associations between lipids and clinical markers of hormone imbalance, dyslipidemia, and altered body composition, which are characteristic issues of LEA. These associations reflect the underlying metabolic disruptions caused by LEA typically involved with cardiovascular issues. Regarding autonomic control, vascular function and morphology, two research studies showed no significant association in heart rate variability, brachial flow-mediated dilation, pulse wave velocity, carotid artery reactivity, carotid-intima media thickness, or biomarkers reflecting endothelial activation with LEA. Although one study indicated abnormalities in flow-mediated dilation among those with LEA. Additionally, one study determined female athletes with LEA were more than 2.5 times more likely to experience cardiovascular issues (e.g., arrhythmias, valvular heart disease, coronary artery disease, and cardiomyopathy) as determined by the preparticipation examination.

This review highlights LEA's potential to elevate CV risks in female athletes. To validate these implications, further future larger-scale longitudinal studies with robust study designs are necessary to confirm the cardiovascular implications of LEA in female athletes.

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Student Competition

OC136. Consumption of fish and seafood in patients with type 2 diabetes mellitus according to nutritional status in Copiapó (Chile). *J. Rojas-Calisto¹, JC. Fernández-Cao¹, C. Doepking¹, MJ. Castro², J. Delgado², V. Cayo², K. Balboa², G. Correa², V. Garrido², C. Cuadra², M. Quinteros², C. Rojas³ and M. Bustos³* 1. Department of Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapó, Chile and 2. Bachelor's Degree in Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapó, Chile and 3. CODIACO Study, University of Atacama, Copiapó, Chile.

Chile has the third highest prevalence of diabetes mellitus America, with 12.7% of the population aged 20-79 years, whose 90% have type 2 diabetes mellitus (T2DM)⁽¹⁾. Diet plays an important role in the management of this disease⁽²⁾. According to the 2016-17 National Health Survey in Chile, only 9.2% of the population consume fish and seafood (9.5% women and 8.8% men)⁽³⁾. However, no studies have investigated the frequency of fish and seafood consumption in T2DM population from Chile, or whether consumption differs between normal weight, overweight, and obese subjects. This study aims to compare the frequency of fish and seafood consumption in normal weight, overweight, and obese subjects with T2DM in primary health care centres (PHCC) in Copiapó-Chile.

A descriptive cross-sectional study was conducted in patients with T2DM, of both sexes, aged 30-65 years, from the CODIACO cohort, recruited in PHCCs, during 2023. Pregnant and lactating women, diabetic neuropathy or nephropathy, cancer, and severe inflammatory or infectious diseases patients were excluded. Participants were administered a food consumption frequency questionnaire (never/rarely, occasionally and usually) of oily and white fish, and seafood. The nutritional status (normal-weight, overweight, and obese) was defined based on WHO criteria⁽⁴⁾. The results on the frequency of food consumption were expressed as percentages and the age of the participants as mean and standard deviation. Chi-square test was used to study the relationship between the frequency of fish and seafood consumption and nutritional status. A P-value less than 0.05 was considered statistically significant. The CODIACO project was approved by the Scientific Research Ethics Committee of the Universidad de Atacama. Project funded by FONDECYT N°11180794.

The mean age of the 153 participants, 106 women and 47 men, was 55.45 ± 7.56 years. Of the participants 9.8% were normal-weight, 32.0% were overweight and 58.2% were obese. Those who reported an usually consumption of oily fish according normal-weight (53.3%), overweight (28.6%) and obese patients (29.2%), were significant ($P = 0.021$). From the total number of subjects who never/rarely consumed oily fish, 2.2 % were normal-weight, 26.1% were overweight and 71.7% were obese. Regarding white fish, it was usually consumed by 46.7% of normal-weight, 32.7% of overweight and 29.2% of obese patients, but not significant ($P = 0.059$). Furthermore, white fish was never/rarely consumed by 5.1% of normal-weight, 23.1% of overweight and 71.8 % of obese subjects. Finally, seafood consumption reported was not significant ($P=0.571$). Those who declare a never/rarely seafood consumption, 6.0% had a normal-weight, 30% were overweight and 64% were obese subjects.

The results suggest that obese patients with T2DM in the PHCCs of Copiapó consume significantly less fish, especially oily fish, than normal-weight and overweight diabetic patients. A better oily fish consumption could be a protector factor to prevent obesity in T2DM.

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OC137. Overweight prevalence among incarcerated individuals: A systematic review and meta-analysis including data from developed and developing countries. *L. Mosomi¹, M. Aceves-Martins¹, A. M. Johnstone¹ and B. de Roos¹*. *The Rowett Institute, University of Aberdeen, AB25 2ZD, UK.*

Incarcerated individuals are vulnerable and might face more health challenges as their dietary intake and physical activity are limited to what their national or institutional policies offer or allow. Excess weight might increase the risk of metabolic disorders, affecting the overall health status and increasing the financial burden on medical care within prisons and the community once incarcerated individuals are released after incarceration.⁽¹⁾ Some reports show a high prevalence of overweight and obesity among incarcerated individuals in developed countries.⁽²⁾ However, evidence from developing countries is underreported.⁽³⁾ The aim of this systematic review and meta-analysis was to assess the nutritional status of incarcerated populations in developing and developed countries.

Systematic searches were conducted in Embase, Medline and Cochrane databases for cross-sectional studies or baseline data from longitudinal or intervention studies of adults who were incarcerated. Studies that reported on nutritional status (body weight, body height, or BMI), as well as the prevalence of overweight or obesity, were included. Overweight and obesity proportions within studies were pooled into a meta-analysis and compared with national prevalence rates. First, the proportion of overweight and obesity within prisons in each study sample and the 95% confidence intervals (CI) were estimated by sex and stratified according to each country's income categories (World Bank 2023 fiscal year income⁽⁴⁾). Then, national overweight and obesity prevalence data were retrieved from the World Obesity Federation Global Obesity Observatory⁽⁵⁾ for each country and adjusted for sex and year of data collection of the studies included in the meta-analyses. The proportion of incarcerated individuals with overweight and obesity was then compared with that of the general population using national data through a risk difference (RD) meta-analysis. The heterogeneity of studies included in the meta-analyses was assessed through I^2 , and a random or fixed-effect model was fitted accordingly.

Overall, 71 studies met the inclusion criteria, and 38 were included in the meta-analysis. Studies in high-income countries reported higher proportions of overweight and obesity (73.3%, CI 73.1, 73.5) compared to upper-middle-income countries (65.9%, CI 64.1, 67.7) and lower-middle-income countries (52.8%, CI 47.1, 58.1). The prevalence of overweight and obesity in female incarcerated individuals was higher than that in the general population (RD 11.7%, CI 9.1, 14.3), especially in low and middle-income countries (RD 35.1%, CI 29.4, 40.7). The prevalence of overweight and obesity in male incarcerated individuals was lower than that in the general population in all income categories (RD -10.8%, CI -13.2, -8.4).

Thus, the prevalence of overweight and obesity in incarcerated populations differed between developed and developing countries. Future research on managing overweight and obesity should consider female incarcerated individuals, especially in lower-middle-income countries.

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Student Competition

OC138. The experiences of people with Type 2 diabetes (T2DM) who recently induced remission by low-carbohydrate diets (LCDs) in primary care settings. A.N. Aksoy¹, J. Abayomi¹, N. Relph¹ and T. Butler^{1,2}. 1. Faculty of Health, Social Care and Medicine, Edge Hill University, St Helen's Road, Ormskirk, United Kingdom, L39 4QP 2Cardiorespiratory Research Centre, Edge Hill University, St Helen's Road, Ormskirk, United Kingdom, L39 4QP.

Low-carbohydrate diets (LCDs) can be effective in inducing Type 2 diabetes (T2DM) remission⁽¹⁾. Although there are large interventional studies conducted on quantitative outcomes for remission, qualitative aspects -primarily patient experiences- are less likely to be explored. This study aimed to investigate experiences of participants who recently induced remission using a LCD in primary care.

Participants were recruited from two GP practices in England after receiving advice to follow a LCD by their GP and recently achieved T2DM remission. Semi-structured interviews were performed virtually, audio recorded and transcribed. The interview questions focussed on barriers and facilitators when adopting a new diet and lifestyle for inducing remission. Verbatim transcripts were analysed using Braun&Clarke's⁽²⁾ guide. Ethical approval was granted from Edge Hill University and the NHS (ETH2122-0228 and 22/SC/0451, respectively).

Twelve participants (4 female/8 male) completed the study. Mean (\pm SD) age of participants was 69 ± 8 years. Duration of T2DM prior to remission was 66 ± 54 months. Mean (\pm SD) HbA1c was 44 ± 2 mmol/mol. Thematic analysis yielded four overarching themes: 1) motivation, 2) empowerment and autonomy, 3) challenges and 4) integrating LCD into daily life.

The analysis indicated that a *behaviour* change in participants was observed as evidenced by theme 4 integrating LCD into daily lives. In this theme, participants mentioned they built new habits such as reading food labels and cooking fresh meals, with new and more mindful attitudes towards food. Especially on days where they deviated from LCD, usually due to social events, they strived for balance and continued to follow LCD the next day.

"I just went for it. I just ate everything that was there. I sort of a budgeted in my head. So, OK, let's go for this. This is for your birthday and enjoy it. Embrace it and then back to it tomorrow. Back to sensible eating tomorrow. I'm really proud of myself for what I've achieved so far. But you know when those moments come, I'll probably just go with it." P01

The findings aligned with a UK study⁽³⁾ where participants who followed LCD found enjoyment in their food and they viewed LCD as a lifestyle change rather than a short-term fix, as well as allowing for some flexibility (*striving for balance*) within LCD. These factors were similarly observed in our study, and this facilitated adherence to LCD.

This study suggests that LCD advice by GPs was well-received by patients and was associated with positive lifestyle changes. Participants report that having some flexibility with LCD, such as taking breaks for special occasions, aided long term compliance. Initiatives that aim to encourage long-term compliance need to consider the importance of flexible management allowing participants to plan and recover from relapse.

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Student Competition

OC140. Diet quality according to age group of subjects with type 2 diabetes mellitus from primary health care centres in Copiapó (Chile). *Fernández-Cao JC¹, Doepking C¹, Rojas Calisto J¹, Aguirre C², Vigorena A², Quinteros M³, Vergara G³, Varas N³, Cuadra C³, Garrido V³, Bustos M² and Rojas C²* 1. Department of Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapo, Chile and 2. CODIACO Study, University of Atacama, Copiapo, Chile and 3. Bachelor's Degree in Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapo, Chile.

Globally, 537 million adults (20-79 years) had diabetes mellitus in 2021 (10.5%), and the estimate is projected to rise to over 643 million (11.3%) by 2030 ⁽¹⁾. The estimated prevalence for Chile was 12.7%, 90–95% of which were type 2 diabetes mellitus (T2DM) cases ⁽¹⁾. In the last decades, it has been shown the importance of diet quality in the management and prognosis of T2DM ⁽²⁾. Therefore, this study aimed to evaluate diet quality in subjects with T2DM from primary health care centres (PHCC) in Copiapo according to age group.

A cross-sectional study was performed within the CODIACO cohort, with data collected on 160 participants during 2023. This population-based study involved women and men from 30 to 65 years, with T2DM, and users of PHCCs of Copiapo. Pregnant and lactating women, patients with diabetic neuropathy or nephropathy, cancer, and severe infectious or inflammatory diseases were excluded. Sociodemographic data were recorded, and diet quality was measured through a Mediterranean dietary index (MDI) validated in the Chilean population ⁽³⁾. Participants were categorised by age (≤ 50 years, 50-60 years, ≥ 60 years). The following categories were considered for MDI score: high (9-14 points), moderate (5-8.5 points), and low (<5 points) adherence. One-factor analysis of variance with the Bonferroni correction test and Chi-square test were used to assess differences in MDI according to age groups. The results were expressed as percentages or mean and standard deviation. A p-value of less than 0.050 was considered statistically significant. The CODIACO study was approved by the Scientific Ethics Committee of the University de Atacama. The project was funded by FONDECYT (N° 11180794).

The mean age of the participants was 55.64 ± 7.48 years, and the MDI score was 6.28 (moderate diet quality). 19.4% of subjects (≤ 50 years, 13.7% of those aged 50-60 years, and 27.5% of those ≥ 60 years) had low diet quality. Moderate diet quality was found in the majority of individuals from the three groups, with 72.2%, 78.1%, and 60.8%, respectively. Only 8.3% of the subjects ≤ 50 years, 8.2% of those aged 50-60 years, and 11.8% of those ≥ 60 years had high diet quality. No significant differences were observed between the means of the MDI scores of each group ($p=0.578$), nor in the proportion of subjects with low, medium or high diet quality in each group ($p=0.325$).

The findings of the present study showed subjects with T2DM and users of the PHCCs of Copiapo (Chile) had a moderate diet quality, mainly. The proportion of patients with low, moderate, and high diet quality was similar among those ≤ 50 years, those 50-60 years, and those ≥ 60 years. Further investigations are needed to evaluate in depth the diet in this population.

Acknowledgments

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OC141. Food consumption frequency in patients with type 2 diabetes mellitus users from primary health care centres of Copiapo (Chile). *Fernández-Cao JC¹, Doepking C¹, Rojas J¹, Cayo V², Barraza A¹, Vigorena A³, Correa G², Cremer K², Aguirre C³ and Rojas C³ 1. Department of Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapo, Chile and 2. Bachelor's Degree in Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapo, Chile; 3 CODIACO Study, University of Atacama, Copiapo, Chile.*

Currently, diabetes mellitus is a major health problem affecting 12.7% of people between ages 20 and 79 years in Chile, 90-95% of whom have type 2 diabetes mellitus ⁽¹⁾. Diet is a cornerstone in the management of this pathology ⁽²⁾. Therefore, the aim of this study was to describe the food consumption frequency in subjects with type 2 diabetes mellitus and users of primary health care centres in Copiapo (Chile).

A cross-sectional study was conducted on 160 participants of the control of diabetes cohort (CODIACO) study in 2023. Women and men from 30 to 65 years with type 2 diabetes mellitus and users of primary health care centres of Copiapo were selected for the investigation. Pregnant and lactating women, and patients with diabetic neuropathy/nephropathy, cancer, and severe infectious or inflammatory diseases were excluded. It was administered a questionnaire about the frequency of consumption of certain food groups (fresh fruits; raw, cooked, precooked and frozen vegetables; nuts; legumes; blue and white fish; seafood; red and white meats; viscera; sausages; sweet ultra-processed foods; water; juices; carbonated drinks; coffee and tea), recording the frequency with which they were consumed (never, seldom, occasionally and usually). The results were expressed as mean and standard deviation or percentages. The CODIACO study was approved by the Scientific Ethics Committee of the University de Atacama. The project was funded by FONDECYT (N° 11180794).

The age of the 160 participants was 55.64 ± 7.48 years. Usual consumption of raw or cooked vegetables (80.0%), fresh fruit (71.3%), legumes (55.6%), and white meat (75.0%) was reported by the great majority of the individuals. To a lesser extent, nuts (36.3%), white fish (31.9%), blue fish (30.6%), and red meat (30.0%) were also widely consumed on a regular way in these subjects. In contrast, pre-cooked (66.9%), frozen vegetables (57.6%), seafood (55.0%), sausages (65.7%), offal (84.4%), juices (55.7%), carbonated beverages (65.0%) and coffee (57.2%) were seldom or never consumed, mostly.

The results suggest relatively regular consumption of fruits, vegetables, legumes, and white meats in subjects with type 2 diabetes mellitus, users of primary health care centres in Copiapo (Chile). Otherwise, viscera, sausages, and precooked and frozen vegetables, as well as juices and carbonated beverages seem to be relatively little consumed in this population. Additional studies are required to know in depth the dietary habits of subjects with type 2 diabetes mellitus from the north of Chile.

Acknowledgments

We thank all the participants of the CODIACO study for their enthusiastic collaboration, the CODIACO personnel for their excellent assistance, and the bachelor's degree students for their important cooperation. Thanks also to the Municipal Health Directorate, the Municipal Laboratory and the personnel of the primary health care centres of Copiapo for their invaluable collaboration. We are also grateful to the Bruno Zabala Fredes School, the Hernán Márquez Huerta School, the Rosario Central Neighborhood Council, the Professional Technical School of Copiapo (ETP), as well as the Faculty of Medicine, the Faculty of Health Science, and the Department of Nutrition and Dietetics for all their support. This study was funded by the Chilean Ministry of Science, Technology, Knowledge and Innovation (FONDECYT 11180794).

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OC142. Prevalence of non-dipping amongst adults with normal clinic blood pressure. C.A Goland¹, P.M Heavey¹ and G.J Cuskelly^{1,1}. SHE (Sport, Health and Exercise) Research Group, Department of Sport and Health Sciences, Technological University of the Shannon, Athlone, Ireland.

Hypertension is the leading risk factor for cardiovascular disease (CVD), responsible for approximately 12.8% of global deaths^[1]. Twenty-four hour ambulatory blood pressure monitoring (ABPM) is effective in detecting, confirming, and monitoring hypertension^[2]. In comparison to seated clinic blood pressure (CBP), ABPM assesses overall blood pressure (BP) variability across 24 hours, identifying specific additional components such as nocturnal hypertension and altered daytime to night-time BP profiles (i.e. non-dipping pattern of BP). Furthermore, a non-dipping BP profile is an independent risk factor for CVD^{[3][4]}. This study aimed to measure the prevalence of non-dipping in apparently healthy males and females aged >50 years.

After approval by TUS Research Ethics Committee, 100 participants not on antihypertensive medication were recruited from various workplace locations in Athlone, Ireland. ABPM was measured using a Welch Allyn 7100 ABPM and CBP was measured using an Omron M3 BP monitor. CBP was measured on the day immediately after the ABPM was performed (same arm for both measurements). Standard protocols for ABPM were employed using the NICE Guidelines^[5]. Awake and asleep BP levels were computed as the mean of all readings during each period. Night time was determined according to patient reported sleep period. Nocturnal hypertension was defined as an asleep SBP/DBP $\geq 120/70$ mmHg and non-dipping was defined as a decline in SBP from wakefulness to sleep of <10%.

Of 92 participants recruited, 85 completed both ABPM and CBP measurements of which n=30 male. Participants were stratified into BP categories according to the International Society of Hypertension (ISH) reference ranges for CBP^[6]. BP category was defined according to seated CBP and by the highest level of BP, whether systolic or diastolic^[6]. Hypertensive BP groups (grades 1 and 2) were merged into one group and renamed as “hypertensive”

Thirty-seven participants had normal CBP (43.5%), 24 had high normal CBP (28.2%), and 24 were classified as hypertensive (28.2%) of which 16 (43.2%), 2 (8.3%) and 9 (37.5%) were non-dippers, respectively. Data analysis shows a significantly higher proportion of non-dippers than dippers in the normal CBP group (Chi square, $p = 0.024$) when compared to the higher CBP groups.

There is a high prevalence of non-dipping amongst adults with normal CBP. Therefore, CBP and ABPM classify adults differently with regard to BP status. Our results show the importance of using a combination of both CBP and ABPM to comprehensively determine BP status in adults over 50 years.

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Student Competition

OC143. Physical activity in users with Type 2 Diabetes in Family Health Centres in Copiapó.

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Physical activity has been demonstrated to be an effective intervention for the prevention and treatment of type 2 diabetes mellitus (DM2) ^(1,2). However, only 13.3% of the Chilean population are physically active^(3,4). To our knowledge, there is no data on the physical activity performed by the diabetic population in Chile. Therefore, this study aimed to describe the level of physical activity in patients with DM2 in the Family Health Centres (CESFAM) of Copiapó (Chile).

The study employed a cross-sectional design, utilizing data from 25 participants in the CODIACO cohort. The study population comprised individuals of both sexes, between 30 and 65 years of age, diagnosed with DM2 and users of the CESFAMs of Copiapó, and who also had mobile devices capable of installing the accelerometry application 'Physics Toolbox Sensor Suite'. Pregnant and lactating women, patients with diabetic neuropathy or nephropathy, cancer, and severe inflammatory or infectious diseases were excluded. They were asked to activate and deactivate the application for 7 to 12 days, This mean the device had to be turned on at the beginning of an activity (waking) and off at the end of the day (bedtime), registering all daily activities. The percentages of time spent in each of the four body positions (upright, sitting, crouching, and lying down) were obtained from the total time spent using accelerometry ⁽⁵⁾. Once the Shapiro-Wilk test was $P > 0.05$, all comparisons were made between times spent in each of the body positions using a one-factor ANOVA, with post-hoc analysis using Tukey's test. A P-value of less than 0.05 was considered statistically significant. The CODIACO study was approved by the Scientific Research Ethics Committee of the Universidad of Atacama. The project was funded by FONDECYT N° 11180794.

There was an average daily activity of 9.6hr (upright=2.2;sitting=4.9;crouching=0.7; supine=1.6hr) in the sample. The one-factor ANOVA showed significant differences between all positions ($P < 0.001$). The pos-Hoc test revealed a significantly longer time was observed in the sitting position, according to the z-axis position ($51.32 \pm 12.5\%$ of the total time) compared to the upright ($23.5 \pm 8.7\%$), supine ($17.4 \pm 3.2\%$) or crouching ($7.78 \pm 0.6\%$) positions ($P < 0.050$). Furthermore, differences were observed in the time spent in the upright position and the time spent in the supine ($P < 0.05$) or crouching ($P < 0.05$) positions, and between sitting and crouching positions ($P < 0.05$).

This study demonstrated that patients diagnosed with DM2 at the CESFAM of Copiapó spent a significant portion of their daily activity in a sedentary and low position, with minimal engagement in an upright one. Since upright positions are associated with physical activities such as walking, climbing stairs, toileting, and cooking, obtaining 23.5% in this position suggests a lack of engagement in these activities.

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School of COPIAPO (ETP), the Bruno Zabala Fredes School, the Hernán Márquez Huerta School, the Rosario Central Neighborhood Council, the Faculty of Medicine, and the Faculty of Health Science for all their support. This study was funded by the Chilean Ministry of Science, Technology, Knowledge and Innovation (FONDECYT 11180794).

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OC144. Characterisation of sedentary lifestyle in patients with Type 2 Diabetes Mellitus in Family Health Centres. Jiménez S¹, Fernández-Cao JC², Doepking C², López A³, Vega F³, Fernández G⁴, Balboa K⁴, Trigo D³, Flores J³ and Bustos M⁵. 1. Department of Kinesiology, Faculty of Health Sciences, University of Atacama, Copiapo, Chile and 2. Department of Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapo, Chile and 3. Bachelor's Degree in Kinesiology, Faculty of Health Sciences, University of Atacama, Copiapo, Chile and 4. Bachelor's Degree in Nutrition and Dietetics, Faculty of Health Sciences, University of Atacama, Copiapo, Chile and 5. CODIACO Study, University of Atacama, Copiapo, Chile.

Diabetes Mellitus (DM) represents a significant public health concern with a global impact^(1,2). According to the International Diabetes Federation, in 2021 the global prevalence of this pathology was 10.5% and 12.7% in Chile⁽³⁾. Of these cases, 90% are cases of type 2 Diabetes Mellitus (DM2). One of the risk factors for its management and prognosis, once diagnosed, is a sedentary lifestyle⁽³⁾. A sedentary lifestyle rate of 86.7% has been reported in Chile⁽⁴⁾. However, to our knowledge, there is no data on sedentary lifestyles in the diabetic population of the commune of Copiapó. Therefore, this study aimed to describe and compare the level of sedentary lifestyle in women and men with DM2 in the Family Health Centres (CESFAM) of Copiapó (Chile).

A cross-sectional study was conducted using data obtained from participants in the CODIACO cohort. Twenty-five individuals, comprising both sexes and aged between 30 and 65 years, diagnosed with DM2 and users of the CESFAMs of Copiapó, were included. These individuals also had mobile devices capable of installing the accelerometry application 'Physics Toolbox Sensor Suite'. Pregnant and lactating women, patients with diabetic neuropathy or nephropathy, cancer, and severe inflammatory or infectious diseases were excluded. They were asked to activate and deactivate the application for 7 to 12 days, at waking and bedtime, respectively. Physical activity and sedentarism were determined when the accelerometer was over or below 0.6 mm/sec² respectively from the total daily activity (%). WhatsApp transmitted the information recorded to estimate each participant's sedentary lifestyle level. A Student's t-test for independent samples was employed to compare the percentage of sedentary behaviour between women and men. The results were expressed as the mean and standard deviation. A P-value of less than 0.05 was considered statistically significant. The CODIACO study was approved by the Scientific Research Ethics Committee of the Universidad de Atacama. The project was funded by FONDECYT N° 11180794.

The number of women in the sample was 19 (76%) and the number of men was 6 (24%). The values of sedentary lifestyle for women were 85.32 ± 9.5%, which was similar to those found in men, 82.5 ± 10.31%. Although women show a higher tendency to increase sedentary lifestyle behaviour, The T-test did not determine differences between sexes (p>0.05), maybe, due to the high number of women compared with men in the sample.

The level of sedentary lifestyle in patients diagnosed with DM2 in the CESFAM of Copiapó is high and is in line with that observed in the general population in Chile. Furthermore, no differences are observed between men and women. Further studies are required to confirm this result and to investigate its cause to generate strategies to help reduce sedentary lifestyles in this population.

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OC145. Prospective association between ultra-processed food consumption and incidence of type II diabetes: the UK Whitehall II cohort study. *M.E.Wang¹, C. Llewellyn², M.Kastoulis³ and A.Britton¹*. *Research Department of Epidemiology and Public Health, Institute of Epidemiology and Public Health, University College London, London, UK and 2. Research Department of Behaviour Science and Health, Institute of Epidemiology and Public Health, University College London, London, UK and 3. MRC Unit for Lifelong Health and Ageing, Institute of Cardiovascular Diseases, University College London, London, UK.*

Ultra-processed foods (UPFs) consumption, characterized by high levels of sugars, unhealthy fats, and additives, yet low in nutrients, has increased significantly in recent decades ⁽¹⁾. Previous studies have demonstrated the link between UPF consumption and Type 2 diabetes (T2D) ⁽²⁾. Considering the variation in these food categories across studies and the scarcity of large-scale studies focusing on specific UPF subgroups, this study aims to explore the prospective association between UPFs, their subgroups, and the incidence of T2D in a UK based cohort study.

A total of 7,774 participants aged 40-69 years without T2D (69% men and 31% women) from the Whitehall II cohort, who had dietary intake data at baseline (1993/1994) and follow-up data on T2D incidence available, were included in the analyses. Food intake was assessed using a validated 127-item food frequency questionnaire (FFQ). We applied the NOVA classification to categorize FFQ items into four classes based on the level of processing. The intake of UPFs per day was calculated as a percentage of the total daily food intake in grams to account for UPFs that do not provide energy. The incidence of T2D was evaluated from 1993/1994 to 2007/2009 through self-reports and oral glucose tolerance test results. Multivariate Cox regression models were employed to assess the prospective association between UPFs consumption (in quintiles) and T2D risk, adjusting for socioeconomic factors, family history of T2D, lifestyle characteristics, total energy intake, and indicators of nutritional quality.

During the 15-year follow-up, 954 cases of T2D were confirmed. In multivariable models adjusted for family history of T2D, socioeconomic, and lifestyle factors, the highest UPF consumption quintile [mean 33% of total daily intake (grams)] was associated with an increased risk of T2D [HR: 1.35, 95% CI: 1.06-1.71] compared to the lowest quintile [mean 9.6% of total daily intake (grams)]. Adjustment for total energy intake slightly increased the risk of T2D [HR: 1.46, 95% CI: 1.12-1.91]. Additional adjustments for sugar, sodium, and fat intake further increased the risk of T2D [HR: 1.51, 95% CI: 1.15-1.98]. Among UPFs subgroups, only the intake of soft drinks was significantly associated with an increased risk of T2D [HR: 1.02, 95% CI: 1.01-1.08], whereas no significant associations were found for other UPFs subgroups. Similar results were found after multiple imputation of missing values.

In UK midlife adults, higher UPF consumption tends to be prospectively associated with an increased risk of T2D, with notable variations across UPFs subgroups. These findings suggest that the association between UPFs intake and T2D might be independent of nutritional quality and energy intake, indicating that food processing itself could be a contributing factor. This study provides evidence to support efforts to limit UPF consumption as a strategy to alleviate the population burden of T2D.

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Student Competition

OC146. Weight Recurrence Trends Among Participants Post Laparoscopic Sleeve Gastrectomy: A 13-Year Single-Centre Retrospective Study in Kuwait. A. Alfailakawi^{1,2}, S. Al-Sabah³, V. Nlebedim¹, J.B. Moore¹ and S. Moore¹. *1. School of Food Science and Nutrition, University of Leeds, Leeds, UK and 2. Food and Nutrition Administration, Ministry of Health, Kuwait City, Kuwait and 3. Faculty of Medicine, Kuwait University, Kuwait City, Kuwait.*

Weight recurrence (WR) is a frequent complication in patients post metabolic and bariatric surgery (MBS) ⁽¹⁾. However, there is no consensus on WR definitions ⁽²⁾. Patients' preoperative characteristics are believed to have an association with WR ⁽¹⁾. This study aimed to evaluate WR 3 to 13 years after laparoscopic sleeve gastrectomy (LSG) using three commonly used definitions and investigate potential risk factors.

A retrospective analysis examined data from patients' medical records who underwent primary LSG between 2008 and 2019. Inclusion criteria were patients aged 18 years or older, eligible for MBS, and with at least three years of follow-up. Those with previous MBS, revised surgical procedures post-LSG, or who had the surgery in 2019 were excluded. Dividing the analysis into three post-LSG periods (1st year, 2nd year and >2nd year). The primary outcome was WR over time utilizing three definitions: >10% increase in nadir weight, >10% increase in nadir weight (nadir 1 to 2 years), and percentage of excess weight loss (EWL) <50% with a body mass index (BMI) >35 kg/m². Survival analysis techniques were used to assess the occurrence and timing of WR. Potential risk factors of WR including age, gender, BMI, obesity-related comorbidities, duration post-LSG, and attendance to follow-up visits were assessed using binary logistic regression.

Only 219 out of 2982 patients met the inclusion criteria and were included in the analysis. Patients' mean age and BMI were 37.21 ± 10.44 years and 45.92 ± 6.99 kg/m², respectively, with females constituting the majority (64%). Weight recurrence varied between different definitions, ranging from 31% to 61%. The estimated median time for WR was significant starting from 9 years when applying the nadir weight definitions while from 6 years when EWL<50% & BMI>35 kg/m² definition was used. Binary logistic regression analysis identified several risk factors for WR considering the definition of EWL <50% with BMI >35 kg/m²: older age [OR 1.104, 95% CI (1.059-1.151), *p*-value <0.001] and higher preoperative BMI [OR 1.352, 95% CI (1.242-1.473), *p*-value <0.001]; while male gender [OR 0.314, 95% CI (0.137-0.720), *p*-value 0.006] and frequent follow-up visits [OR 0.528, 95% CI (0.382-0.730), *p*-value <0.001] were protective factors against WR. Other definitions did not demonstrate significant associations except for a longer duration post-LSG as a risk factor for WR when applying the definition of >10% increase from nadir weight (nadir weight 1 to 2 years) [OR 1.153, 95% CI (1.050-1.267), *p*-value 0.003].

This study explored factors that influenced WR post-LSG. Potential risk factors including age, gender, BMI, and time varied according to the WR definition applied. More research is necessary to establish a consensus on a suggested definition that aligns with the clinical parameters and comorbidity status of patients for application in upcoming research and clinical settings.

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Student Competition

OC147. Information seeking behaviours of parents engaging with information about complementary feeding in the southwest of England. K, Spurlock¹, Dr Toity Deave¹ and Dr Sally Dowling² 1. School of Health and Social Wellbeing, University of the West of England, Bristol, UK. 2. Bristol Medical School, University of Bristol, Bristol, UK.

Complementary feeding describes the transition from milk feeding to family foods or 'solids' and should occur around six months of age⁽¹⁾. Diet in the early years can influence health in later life by shaping food preferences¹ and may increase the risk of obesity and metabolic disorders later in life^(2,3). Parents can find the period of complementary feeding stressful due to experiencing a lack of support for parents during this stage⁽⁴⁾. This study investigated how parents of infants under two years of age engaged with information about complementary feeding using qualitative methods informed by critical realism and information behaviour theories.

Dyadic, semi-structured interviews were conducted with parents of infants aged four to twenty-four months in southwest England to explore their information needs. Interviews were conducted in person or online at the convenience of the participant. Data were recorded and transcribed verbatim and analysed using thematic analysis.

Ten interviews were conducted and four overarching themes were identified:

1) *"I don't really remember them giving advice about weaning"*

Although parents initially relied on NHS resources, gaps led them to seek additional guidance from online platforms or commercial sources. They required both practical support for infant feeding but also emotional support as transitioning onto solids could be a stressful experience.

2) *"Just done what you're expected to do"*

Parents' perceptions of societal expectations regarding infant feeding could influence their feeding practices. This sometimes conflicted with their knowledge of complementary feeding, leading to dual beliefs and behaviours, such as altering feeding behaviours in public to adhere to social norms.

3) *"This is what works for us"*

Parents found that following complementary feeding guidance was challenging. Many parents followed their child's appetite and discussed finding balance in their children's diets. Parents also referred to balancing the idealised version of complementary feeding they strived for while remaining realistic to practicalities.

4) *"I had done the research and he just kinda went along with it"*

Complementary feeding practices were linked to perceptions of good parenting. Mothers, in particular, adhere to societal norms and ideals of infant care, which influenced their information-seeking patterns. This adherence to societal constructs often resulted in gendered disparities, with mothers primarily responsible for seeking information while fathers played a supportive role.

Findings suggest that current services are not meeting parents' information needs about complementary feeding. Accessible information from credible sources is required to enable parents to make informed feeding decisions and to follow them confidently during the critical phase of complementary feeding. Policymakers should address the impact of social media and commercial baby food companies, considering parental emotional well-being and ensuring

information accessibility regardless of gender.

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Student Competition

OC148. Influences on the dietary patterns and eating behaviours of 18–36-month-old toddlers in Ireland. Ben Leen Smith¹, Mairead E Kiely^{1,2} and Elaine K McCarthy^{1,2} 1. Cork Centre for Vitamin D and Nutrition Research, School of Food and Nutritional Sciences, University College Cork, Ireland and 2. INFANT Research Centre, University College Cork, Ireland.

Inadequate dietary intakes are widespread amongst pre-school aged children, with 56% of pre-school children worldwide suffering from a deficiency in at least one of iron, zinc or vitamin A⁽¹⁾. The neurological and physical development of children is sensitive to changes in micronutrient status, with nutrient deficiencies at this age likely to have irreversible effects on childhood development⁽²⁾. This study aims to evaluate the major influences on the dietary patterns, feeding practices and eating behaviours of young children in Ireland.

A self-administered, web-based survey was administered to parents/guardians of 18-36 months old children. The survey consisted of 103 questions, delivered across 5 sub-sections (demographics, parental nutrition knowledge, feeding practice, barriers to healthy eating and dietary patterns). Validated questionnaires were used to assess fussy eating (Child Eating Behaviour Questionnaire, CEBQ) and parental feeding practice (Child Feeding Questionnaire, CFQ)^(3,4,5). Adherence with the 2020 FSAI *Scientific Recommendations for Food-Based Dietary Guidelines for 1-5-Year-Olds in Ireland* was evaluated using FFQ-style questions to estimate consumption patterns of food groups.

Parents/guardians (n=1141) answered with respect to 608 male and 529 female toddlers, with a mean (\pm SD) age of 26.2 \pm 5.8 months. The greatest barriers to healthy eating reported by parents/guardians were *food fussiness* (49%), *time to prepare healthy foods* (47%), *provision of unhealthy foods by caregivers outside the home* (47%), *the short shelf life of “healthy foods”* (42%) and *the marketing of unhealthy foods to children* (42%). The children’s food pyramid was recognised by 76% of parents. A large number of toddlers met the FSAI’s dietary recommendations for consumption of fish (70%) and fruit and vegetables (97%). Fewer children met the FSAI’s recommendations for consumption of processed meat (24%), beverages (40%), red meat (52%) and confectionary (57%).

Using the CEBQ food fussiness scale, 36% had a score indicative of moderate to severe fussy eating (Score \geq 3). Higher levels of food fussiness were noted among children who did not meet recommendations for consumption of red meat (2.81 vs 2.64, $p=0.001$), fish (2.82 vs 2.68, $p=0.010$) and confectionary (2.85 vs 2.62, $p<0.001$). The nutrition knowledge assessment showed that parents had a mean (\pm SD) knowledge score of 58.0 \pm 14.6%. Higher knowledge scores were observed among parents/guardians of toddlers who met the dietary recommendations for dairy (64% vs 47%), fish (59% vs 56%), red meat (59% vs 57%), confectionary (59% vs 57%) and fruit and vegetables (58% vs 55%) (all $p<0.05$).

This study highlights a multitude of interrelated and dynamic factors, particularly fussy eating and parental nutrition knowledge, that influence the dietary intakes and patterns of toddlers. Understanding these factors may help to guide the development of targeted multi-factorial interventions to improve dietary quality among toddlers.

Acknowledgments

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Student Competition

OC149. Comparing compliance of the UK and Kyrgyzstan baby food products with WHO Nutrient and Promotion Profile Model guidelines. C. Bozki¹, K. Esin^{2,3}, D. Threapleton², H.L. Rippin⁴, K. Wickramasinghe⁴, N. Aidralieva⁵, N. Tilenbaeva⁵, T. Mamyrbayeva⁶, J. Artykbaeva⁶, G. Gumagulova⁶ and J.E. Cade² 1. Nutrition and Dietetic Department, Faculty of Health Sciences, Inonu University, Malatya, Türkiye and 2. Nutritional Epidemiology Group, School of Food Science and Nutrition, University of Leeds, Leeds, UK and 3. Nutrition and Dietetic Department, Faculty of Health Sciences, Tokat Gaziosmanpasa University, Tokat Türkiye and 4. Special Initiative on NCDs and Innovation, WHO Regional Office for Europe, Copenhagen, Denmark and 5. WHO Country Office Kyrgyzstan and 6. Ministry of Health of the Kyrgyz Republic, Bishkek, Kyrgyzstan.

Optimal nutrition during infancy and early childhood is crucial for promoting healthy growth, development, and overall well-being ⁽¹⁾. Concerns arise regarding commercially available Food Products for Infants and Young Children (FIYC) due to potential imbalances in sugar, salt, fat content, and inappropriate promotion. The World Health Organization's (WHO) Nutrient and Promotion Profile Model (NPPM) assesses the nutritional quality and promotional practices of commercial baby foods for children under 36 months. This study evaluates and compares the compliance of FIYC products in the UK and Kyrgyzstan with the NPPM guidelines.

This study evaluated the compliance of FIYC products in the UK and Kyrgyzstan with the WHO's NPPM guidelines. Data on commercially available FIYC products for children aged 6-36 months were collected from both countries (UK: n=469 products, 21 brands; Kyrgyzstan: n=203 products, 20 brands). The NPPM website was utilized to assess nutritional composition (energy, sugar, protein, salt) against WHO guidelines and evaluate labelling information (ingredient lists, nutrient/health/marketing claims, breastfeeding recommendations) for adherence to NPPM criteria ⁽²⁾. Data analysis for comparison across the two countries employed SPSS v29.

Analysis of 672 FIYC products using the NPPM website revealed distinctly different compositions between the UK (n=469) and Kyrgyzstan (n=203). The UK dataset contained a higher proportion of meals (38%) compared to fruits and vegetables (30%). Conversely, Kyrgyzstan had a higher percentage of fruits and vegetables (52%) and cereals (26%). Nutrient assessments displayed varying pass rates. Pass rates for products in the model were higher for the UK compared to Kyrgyzstan for energy density (75% vs. 47%), total fat (98% vs. 67%), and sodium (69% vs. 10%). However, Kyrgyzstan had a higher protein pass rate (96% vs. 94%). Regarding sugars, the UK achieved a 50% pass rate for total sugar compared to only 7% in Kyrgyzstan, with free sugar addition pass rates of 81% and 73% respectively. Promotion assessments revealed a similar compliance for the lower age recommendation (from 6 months) (85% UK, 76% Kyrgyzstan). However, *all products* failed the total marketing, health, and promotional claims evaluation. Breastfeeding instruction compliance was also low, with only 5% (UK) and 35% (Kyrgyzstan) passing.

In conclusion, the study identified both strengths and weaknesses in FIYC product compositions and nutritional profiles across the UK and Kyrgyzstan. However, more work is needed in adhering to marketing, health claims, and breastfeeding instruction guidelines in both countries. Stronger policies to improve FIYC are needed across the WHO European Region promoting child health and reducing future disease risk.

Acknowledgments

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OC150. An examination of factors that influence infant growth in the first weeks of life.

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Childhood obesity is a serious public health concern worldwide. One in five children are overweight or obese in Ireland ¹. Suboptimal growth, either in pregnancy or infancy, can increase the risk of obesity in childhood ². National policy fails to recognise early life exposures as potential contributors to Ireland's obesity epidemic. This research examines the impact of 'Labour and Birth', 'Birth Weight Status', and 'Maternal BMI' on infant growth in the first weeks of life.

This research is a secondary analysis of data collected as part of the WellFed study, a randomised placebo-controlled trial investigating the effect of a maternal dietary supplement comprised of a milk protein hydrolysate and yeast beta-glucan (Wellmune®) (LS-23-07-O'Sullivan). The supplement does not influence the present findings. Mother and infant anthropometrics were measured during two study visits, at approximately 4 and 8-weeks postpartum. Participants completed a series of questionnaires to obtain basic demographic, birth and lifestyle data. Infant weight and length percentiles were calculated using the UK-WHO 0-2 years: weight-for-age percentiles and the UK-WHO 0-2 Years: length-for-age percentiles for both males and females. Statistical analysis was performed using IBM SPSS Statistics (version 27).

Data from 51 mother-infant dyads show infants delivered via cesarean section weighed less at the 4-week (4.1 ± 0.4 vs 4.5 ± 0.5 kg, $p=0.015$) and 8-week follow-up (5.1 ± 0.5 vs 5.5 ± 0.6 kg, $p=0.021$) and were shorter at the 8-week follow-up (56.3 ± 1.9 vs 57.7 ± 2.0 cm, $p=0.030$) compared to infants born vaginally. Infants born following induction were significantly heavier at the 8-week follow-up compared to those not-induced (5.8 ± 0.7 vs 5.2 ± 0.5 kg, $p=0.006$). In this cohort, 40% of infants were classified as large-for-gestational-age (LGA). Across the 8-week study period, 50% of LGA infants dropped two or more growth percentiles.

Observations from this study highlight a high prevalence of LGA infants in this cohort which raises concern for the national prevalence of LGA infants in Ireland. Interventions during labour and birth were shown to influence infant growth in this study. These findings highlight the need for further investigation into the relationship between early life exposures and growth during infancy and childhood. Implementing healthcare policies focusing on reducing the number of elective birthing procedures performed and targeting obesity amongst women of reproductive age are possible measures that can be implemented to help tackle the obesity crisis in Ireland.

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Student Competition

OC151. A parent's perspective of the diagnosis and management of cow's milk allergy in infants in the healthcare setting in Ireland. E. Lynch¹, J.L. O'Neill², M. Gray², K. O'Connor², Z. O'Regan², and S. Wilkinson² 1. Technological University Dublin, Dublin, Ireland and 2. Danone Nutricia Specialised Nutrition, Dublin, Ireland.

Cow's Milk Allergy (CMA) is estimated to affect 2-3% of infants, typically developing in the first year of life⁽¹⁾. The risks of misdiagnosing CMA include acute reactions, micronutrient deficiencies, growth faltering, increased burden on healthcare systems, and reduced quality of life for infants and caregivers⁽²⁾. The guidelines for diagnosis and management are not always followed due to lack of awareness, or difficulties with implementation^(1,3). The aim of this study was to obtain parent-reported data on the diagnosis and management of CMA in Ireland.

A 23-item questionnaire was developed and distributed through an online parenting club, targeting parents of infants aged 0-12 months with CMA. The quantitative and qualitative data was analysed on SPSS (V29) using descriptive statistics and cross-tabulation tests.

A total of 62 parents with an infant under 12 months responded that their infant currently has (n=56) or previously had CMA (n=6). Five cases were self-diagnosed and were partially excluded from analysis. General practitioners (42%) and paediatricians (39%) were the most common healthcare professionals (HCPs) to diagnose CMA.

The number of visits it took before receiving a CMA diagnosis ranged from 1-15 visits, with a median of 2 visits. Some infants were diagnosed on their first appointment (n=11) while others took 4-5 months before being diagnosed (n=2). Only 23% of infants underwent a skin-prick / blood test, suggesting most HCPs were using symptom resolution to decipher a diagnosis.

An extensively hydrolysed formula (EHF) was recommended as first-line management to most formula-fed infants (82%, n=40), while 14% (n=7) were initially recommended an amino acid formula (AAF). Of the 17 suspected non-IgE infants who did not exclusively breastfeed, only 41% were given advice to reintroduce standard infant formula after 2-4 weeks of being on a hypoallergenic formula, to assess if symptoms reappeared. Of this 41%, only 57% followed this advice. Of breastfeeding mothers (n=30), 87% were advised to eliminate cow's milk from the maternal diet, however 57% were not advised on reintroduction upon symptom resolution⁽¹⁾. Faltering growth was reported in 11% (n=5) of formula-fed infants and all were prescribed an EHF, despite guidelines recommending an AAF if faltering growth is evident⁽¹⁾. After diagnosis, 26 infants (46%) had no follow-up with their HCP. Of the 22 infants diagnosed by a paediatrician, 77% received a follow-up appointment which was significantly greater compared to follow-up rates from other HCPs ($P=0.006$). Limitations include the use of a small convenience cohort and self-reporting of data.

These results indicate a clear gap between CMA diagnosis and management guidelines, and their practical implementation within the Irish healthcare setting. Any strategy to further educate and support HCPs in this specialist area of healthcare could mitigate risk of misdiagnosis, delayed diagnosis, and inappropriate management.

Acknowledgments

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Student Competition

OC152. Psychosocial predictors of infant and young child feeding practices among mother-infant dyads in Malawi. T.J. Smith¹, C. Mchazime², P. Makaka², F. Nantongwe², E. Namaheya², A. Kadama², G. Ghillia¹, T. Mazubane³, Z. Goolam Nabi³, M.R. Zieff³, K.A. Donald^{3,4}, E. Mbale^{2*} and M.J. Gladstone^{1*} 1. Department of Women's and Children's Health, Institute of Life Course and Medical Sciences, University of Liverpool, UK and 2. Department of Paediatrics and Child Health, Kamuzu University of Health Sciences, Malawi and 3. Department of Paediatrics and Child Health, University of Cape Town, South Africa and 4. Neuroscience Institute, University of Cape Town, South Africa * Contributed equally to this work.

Suboptimal feeding practices in the first two years of life are risk factors for poor child growth and development⁽¹⁾. Sociodemographic predictors of infant and young child feeding (IYCF) practices are well documented (maternal age, education, marital status, sociodemographic status)⁽²⁾. However, psychosocial factors have received less attention, and few studies have considered complementary feeding practices. Therefore, this study aimed to explore associations between maternal depression, exposure to intimate partner violence, perceived social support, and stimulating home environments, and IYCF practices among mother-infant dyads in Malawi.

Khula is a longitudinal birth cohort that aims to characterise brain development across the first 1,000 days of life⁽³⁾. At the third study visit, when infants were approximately 10–16 months of age, mothers completed a series of psychosocial questionnaires: Edinburgh Postnatal Depression Scale (EPDS; score 0–30), Intimate Partner Violence Questionnaire (IPV), Multidimensional Scale of Perceived Social Support (MSPSS). The Family Care Indicators (FCI) was used to assess stimulation and support for early learning within the home (score 0–17). Information on infant's dietary intakes during the previous 24 hours was used to determine the WHO IYCF indicators: minimum dietary diversity (MDD), minimum meal frequency (MMF) and minimum acceptable diet (MAD)⁽⁴⁾. Logistic regression modelling was used to identify significant associations between maternal psychosocial measures and IYCF indicators.

Data were analysed for 153 dyads. Mean maternal age was 27.0±6.0 years, 84.1% were married, 52.8% had some/completed secondary education, and the majority were either employed (45.1%) or housewives (41.7%). The median (Q1, Q3) EPDS score was 2 (0, 6), 12% of women had been exposed to IPV in the previous 12 months, and mothers reported medium levels of perceived social support. The median FCI total score was 6 (5, 8). Among infants (mean age 13.3±1.7 months), 97.4% were still being breastfed, and 54.2%, 73.2% and 45.1% achieved MDD, MMF and MAD, respectively. Women with higher EPDS scores were less likely to breastfeed at around 1 year (OR 0.53, 95% CI 0.29, 0.96; p=0.04). However, this relationship was not significant after controlling for maternal age, education, marital status, and socioeconomic status. Exposure to IPV in the previous 12 months, MSPSS score and FCI total score were not associated with any IYCF indicators. Stimulation within the home environment was positively associated with dietary diversity score in unadjusted multiple regression (β 0.17, 95% CI -0.002, 0.15; p=0.05), although this was no longer significant in adjusted analyses.

In this study, we found little evidence of associations between psychosocial factors and IYCF practices. Early screening for postnatal depression may benefit women and infants and should potentially be considered during infant feeding counselling in low-resource settings. The indications of improved dietary diversity with greater familial interactions should be examined in larger, diverse populations.

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OC153. Infant feeding practices: an analysis of sociodemographic characteristics and dietary patterns in early life. K. Dalrymple¹, S. Gallagher¹, A. Flynn², L. Poston³ 1. Department of Nutritional Sciences, School of Life Course Sciences, King's College London, London and 2. School of Population Health, Royal College of Surgeons in Ireland, 3. Department of Women and Children's Health, School of Life Course Sciences, King's College London, London.

The significant rise in childhood obesity is a public health challenge, and it is estimated that nearly 25% of children in England start school with overweight or obesity¹; those from ethnic minorities and more disadvantaged areas are disproportionately affected². The transition from exclusive milk feeding to the introduction of solid foods is an important stage in a child's growth and development as eating habits and behaviours established in early life have been shown to continue into late childhood³. Given the increase in prevalence of childhood obesity, the aim of this study was to describe the weaning diet of infants and explore associations between sociodemographic characteristics.

The analysis included mother-infant pairs from the UK Pregnancies Better Eating and Activity Trial (UPBEAT), an antenatal diet and physical activity intervention which recruited women with obesity from ethnically diverse inner-city settings⁴. Maternal sociodemographic characteristics were recorded at baseline (15-18 weeks' gestation). Infant dietary patterns were derived using factor analysis of a parent reported interviewer-administered food-frequency questionnaire at 6-months of age. To explore relationships between infant dietary patterns and sociodemographic characteristics, a multiple linear regression model was developed and included the following maternal exposures; age, body mass index (BMI), time spent in education, ethnicity, parity, smoking and breastfeeding prevalence at the 6-month follow-up. The model was also adjusted for age of introduction of solids and the UPBEAT intervention arm.

720 mother-infant pairs were recruited at 6-months postpartum, and 542 were included in this analysis as weaning had started. There was no effect of the UPBEAT intervention on infant dietary patterns. The average age of introduction of solid foods was 5±0.87 months. Two dietary patterns were identified in the infants. The first pattern defined as 'Processed' was high in rusks, baby pouches, porridge, fruit puree, yoghurt, juice, desserts, snacks and meat, fish or savoury-based meals. The second pattern, defined as 'Healthy' was high in breakfast cereals, potatoes, yoghurt, biscuits, fruit, vegetables, bread, meat and fish-based meals and pasta. The Processed pattern in the infant was associated with lower maternal age (beta-coefficient -0.01; 95% confidence interval -0.03, -0.003), higher maternal BMI (0.02; 0.003, 0.04), less time spent in education (-0.06; -0.09, -0.02), lower breastfeeding prevalence (-0.28; -0.51, -0.05) and a lower infant age of introduction of solid foods (-0.20, -0.30, -0.10). Women of Black ethnicity were less likely to adhere to a Healthy pattern (-0.40, -0.63, -0.15).

A processed dietary pattern at 6-months of age is associated with several maternal sociodemographic factors, including lower educational attainment, lower age at birth and higher BMI. These results support the need to for targeted public health programmes which promote healthier weaning practices.

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OC154. An investigation into the parental attitudes and challenges faced when introducing solid foods to infants in Ireland. A. Goff-Stuart¹, J.L. O'Neill¹, E. Lynch¹, K. O'Connor¹, Z. O'Regan¹ and S. Wilkinson¹. Danone Nutricia Specialised Nutrition, Dublin, Ireland.

The introduction of complementary foods, also known as 'weaning', refers to the process of introducing solid foods into an infant's diet, alongside breast milk or infant formula milk⁽¹⁾. According to the Food Safety Authority of Ireland (FSAI) guidelines, weaning should commence around 6 months of age, with no earlier or later than 17 or 26 weeks, respectively⁽²⁾. These guidelines provide evidence-based recommendations aimed at promoting optimal infant health, growth, and development⁽³⁾. The aim of this study was to gain an insight into parental attitudes towards weaning and the common challenges faced when introducing solids.

Data was collected using a 16-item questionnaire. Parents of infants aged 0–12 months were recruited through an online parenting club and descriptive statistics were performed using IBM SPSS (V29) to determine percentages.

Of the 215 participants, 64% (n=137) had initiated solid food introduction to their infants, with the age of these infants ranging from 4–12 months. Of those, the majority (80%, n=109) followed FSAI guidelines⁽²⁾, introducing new foods daily or every few days. The main factors guiding this decision were signs of readiness and developmental milestones, cited by 76% of respondents (n=104). Among those who began weaning (n=137), 70% reported a positive experience, though the majority (92%, n=126) encountered challenges along the way. These included infant's refusal to eat (34%, n=47), allergy concerns (41%, n=56), and difficulty determining appropriate portion sizes (48%, n=66). Our findings showed that 12% (n=16) of infants aged 6–9 months and 2% (n=3) of infants aged 10–12 months had not yet been introduced to meat, poultry, or fish. Additionally, 4% of parents (n=6) waited until their infants were at least 9 months old to introduce these foods, despite guidelines recommending early exposure to iron-rich foods⁽²⁾.

Most parents with infants aged 0–6 months (64%, n=78) had not started weaning. Among them, 26% (n=20) felt very confident about beginning the process, while 25% (n=19) lacked confidence in introducing solid foods to their infants.

Among all participants, information on weaning commonly came from family/friends (68%, n=147), healthcare professionals (60%, n=128), and social media (46%, n=99). When asked about resources they would like access to, nearly two-thirds of parents (64%, n=138) expressed interest in weaning recipe ideas. Additionally, 53% (n=114) highlighted the need for guidelines on the appropriate amount of milk to give during weaning.

In conclusion, our findings indicate that while most parents appear compliant with the recommended timing of weaning, challenges still persist. Moreover, there is a notable reliance on various sources for weaning information, with a demand for resources like weaning recipes and milk quantity guidelines. These insights highlight the importance of tailored support and education to facilitate a positive weaning experience for both parents and infants.

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OC155. A qualitative study of barriers and facilitators of parental adherence to the Food Safety Authority of Ireland's dietary guidelines for 1-to-5-year-olds. O. Eslami¹, G.J. Cuskelly¹, M. Cantwell¹ and Á. O'Connor¹. 1. SHE Research Group, Department of Sport & Health Sciences, Faculty of Science and Health, Technological University of the Shannon, Ireland.

In 2020, the Food Safety Authority of Ireland (FSAI) published, for the first time, food-based dietary guidelines for 1 to 5-year-olds. The guidelines highlight suboptimal intakes of vitamin D (VitD) and iron in toddlers and preschoolers. To help parents meet their child's daily nutrient requirements, the FSAI recommends parents of 1-5 year-olds offer their child (1) a low-dose (5 µg/day) VitD-only supplement during the extended winter months (2) 30 g red meat three days a week and (3) 30 g ready-to-eat cereals (RTECs) with added iron (≥ 12 mg iron per 100 g) five days a week⁽¹⁾. Findings from our previous survey of parents of 1- to 5-year-olds (n = 185) revealed low awareness of, and adherence to, the FSAI recommendations⁽²⁾. The present qualitative study aimed to gain insight into factors influencing parental guideline adherence.

One-to-one, online, semi-structured interviews were conducted among a sample of 15 parents of 1-to-5-year-olds who had completed our online survey⁽²⁾. Participants were college-educated mothers, with the majority being Irish and within the age range of 36 to 45 years old. The interviews investigated participants' attitudes towards the recommended items and perceived barriers and facilitators of adherence to the recommendations. Qualitative data were analysed using Braun and Clarke's six-phase thematic analysis framework⁽³⁾, facilitated by NVivo 12 Plus software.

Thematic analysis identified five themes capturing factors that were perceived to influence guideline uptake by parents: (1) Perceptions of healthy eating (i.e., eating a varied, balanced, and nutrient-dense diet); (2) Impact of the community food environment on the accessibility of the recommended items (i.e., food price and availability in community settings); (3) The interplay between family members' dietary preferences and meal choices within the familial food setting (e.g., child food dislikes and picky eating habits, as well as parents' preferences and experiences about the recommended items); (4) Convenience in food preparation and supplement use (i.e., time, energy, and skills required to adhere to the recommendations); and (5) Gaps in communicating the guidelines and opportunities to promote them (i.e., visibility of credible nutrition-related information).

Overall, this study showed that guideline adherence is a complex, multi-dimensional phenomenon that is affected by individual factors, the food and nutrition environment. It highlights the need for implementing a holistic approach, such as the socio-ecological model, to improve guideline adherence that involves families, healthcare professionals, policymakers, and the food industry to create a supportive, positive food environment for parents.

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OC156. Maternal and infant food insecurity: A qualitative investigation into women's experiences during and after pregnancy in South London. A. Flynn¹, J Marshall², L Davies², Lambeth HDRC³, F. Lavelle², S. Harding⁴ and Z. Bell² 1. Royal College of Surgeons in London, Ireland and 2. King's College London, School of Life Course and Population Sciences, Department of Nutritional Sciences, UK and 3. Lambeth Council Health Determinants Research Collaborative, UK, and 4. King's College London, School of Life Course and Population Sciences, Department of Population Health Sciences, UK.

A period of the life course where optimal nutrition and food security are crucial for the life-long health and wellbeing of women/birthing parents and infants is preconception, pregnancy, and infancy.⁽¹⁾ It is estimated that nearly one in every four households with pre-school children (0-4 years) experience food insecurity (FI) in the UK.⁽²⁾ Yet, we lack an evidence-base exploring experiences of FI in this life course stage.^(3,4) This study aimed to explore women's experiences of food insecurity during and after pregnancy, including its influence on infant feeding decisions.

This study was ethically approved (Ref No: LRS/DP-23/24-39437) and pre-registered on OSF Registries (<https://osf.io/9hn6r>). Semi-structured mixed format individual interviews were conducted between November 2023 and February 2024. Pregnant individuals, those who had given birth ≤ 12 months ago, ≥ 18 years old, food insecure, residing in South London and with recourse to public funds were recruited through purposive sampling. The topic guide was informed by FI, pregnancy and postpartum related literature and piloted (n=2). Interviews were audio-recorded and professionally transcribed. Demographic data was summarised using SPSS. Inductive thematic analysis was used to analyse the data and was completed using NVivo.

Eleven food insecure participants (2 pregnant, 9 new mothers; 2 White European, 9 Black African/Caribbean/British women) participated in the study. Six women were 0-6 months postpartum, and 3 women were between 6-12 months postpartum. The preliminary findings are represented by three themes: 1) A dichotomy: knowing vs affording, 2) Adaptive food coping strategies, and 3) Infant feeding practices. Participants shared detailed accounts of valuing a healthy diet and adapting food practices, yet they still were unable to meet their dietary needs and desires during and after pregnancy. Participants described worry around breastmilk supply; quality and quantity. Complimentary feeding was also identified as a source of worry. *"She is still breastfeeding fully. I don't want to change to milk, which maybe, sometimes, I might not be able to afford it...I won't stop until she is 1."* Whilst the cost of formula feeding was a driver of a more severe experience of FI.

Policy and practice recommendations include enhancing local breastfeeding support to address FI specific concerns around breastmilk supply and at national level, advocating for greater support for adequate healthy food provision and for a price cap on infant formula. Future interventions must support maternal mental health given the high cognitive stress identified with living with FI during and after pregnancy. Further high-quality research is needed 1) amongst asylum seekers and refugees and non-English speakers who may also experience FI, and 2) exploring cultural influences on breastfeeding and the relationship with FI.

Acknowledgments

We gratefully acknowledge the contribution of all the women who took part in this study. This study was conducted with the support of Lambeth public health team and a range of staff and volunteers from both statutory and voluntary community services. The authors would like to thank all those involved who dedicated time to support this study.

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OC157. The association between breastfeeding duration and adiposity using waist-to-hip ratio and mid-upper arm circumference in South African children aged between one and five years. N. Khanyile^{1,2}, S. McLaren¹ and U. Fairbrother² 1. Department of Human Nutrition and Dietetics, School of Human Sciences, London Metropolitan University, London, and 2. Department of Biosciences, School of Human Sciences, London Metropolitan University, London, UK.

According to WHO estimates, in 2022, over 37 million children aged five and younger were overweight¹. Emerging evidence is linking excessive weight gain before the age of 3 years with later cardiometabolic risks². Breastfeeding has been reported to be protective against early obesity in children between 2 and 6 years of age³. Additionally, breastfeeding infants reduces rapid weight gain at the end of infancy⁴. Waist-to-hip ratio (WHR) and mid-upper-arm circumference (MUAC) are cost-effective methods of measuring adiposity distribution. Studies employing these methods in children, particularly in South Africa (SA) are lacking. This study investigates the association between the duration of breastfeeding and WHR and MUAC among a small South African cohort.

A cross-sectional study consisting of 262 Black African children aged 1-to-5 years of age was conducted. Children were recruited from local SA clinics via the convenience sampling technique during routine immunisation clinic visits. Data were analysed using R (R-core team 2022) & SPSS-VS28 (IBM 2021). The London Metropolitan University sub-ethics committee, the Durban University of Technology (SA University) and the KwaZulu-Natal Department of Health granted ethics for the study. The relevant authorities granted gatekeeper permission from all the facilities before the commencement of data collection. Participants gave informed consent in the local language and were made aware that they could withdraw at any time without any consequences. The waist and hip circumference in centimetres were measured using anthropometric tape, WHT was then calculated by dividing the waist circumference by the Hip circumference. The MUAC was measured using a MUAC tape. The measurements were taken by trained personnel. Duration of breastfeeding (weeks) was used as the outcome variable and the WHR and (MUAC) were used as predictor variables. Pearson's correlation test was used to measure the relationship between the predictor variables. A p-value of <0.05 was considered significant.

Of the total 262 children that participated in our study, 50.5% were male while 49.5% were female. The average age of the participants was three years. Our data (both WHR & MUAC) was normally distributed according to the generalised linear model. The minimum breastfeeding duration was zero weeks while the maximum duration was 104 weeks (24 months). The mean waist-to-hip ratio was 0.9143, while the mean MUAC was 16.13cm. According to the Pearson correlation test, breastfeeding duration is negatively associated with both WHR ($r=-0.18$, $p < 0.768$) and MUAC ($r=-0.17$ $p < 0.790$), but this association is not statistically significant.

Increasing breastfeeding duration was weakly associated with a decrease in both WHR and MUAC. In our study, although there is a trend in the correlation between breastfeeding duration, WHR and MUAC, the relationship between these predictors is not significant. Further studies, with larger samples, are needed to validate these findings.

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Student Competition

OC158. Socioeconomic status, demographic factors and dietary quality of Lifeways study grandparents mapped from the 1948 National Nutrition Survey: associations with growth outcomes in their grandchildren at birth, 5, and 10 years. *A Mullen¹, C A Corish¹, A Douglass¹ and C Kelleher¹. School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin 4, Republic of Ireland.*

Early-life experiences play a crucial role in shaping later-life outcomes, potentially impacting the health of multiple generations⁽¹⁾. The 'Developmental Origins of Health and Disease (DOHaD)' theory underscores the significance of early environmental factors in influencing immediate and future well-being⁽²⁾; evidence dating back to the 1980s links exposures such as malnutrition to epigenetic changes and the development of chronic diseases⁽²⁾. Despite increasing interest in multigenerational associations, further empirical evidence is needed to fully understand the connection between grandparents' early-life experiences and the growth outcomes of their grandchildren. The objective of this research was to examine the relationship between grandparents' occupation group, population dietary quality (PDQ), and geographical area of residence in early-life and their grandchildren's growth outcomes at birth, 5- and 10-years, and to illustrate how the mapping of data from previous studies to recent studies based on socioeconomic status and demographic information can offer significant insights into health outcomes.

Data from the Lifeways Cross-Generational Cohort Study (2001-2013)^(3,4) were used to identify children with at least one grandparent born after the foundation of the Irish Free State; thus, ranging from infancy to young adulthood when the 1948 National Nutrition Survey (NNS)⁽⁵⁾ was conducted. The data from the grandparents of these children were then linked to the NNS categories of occupation group, PDQ and geographical area, based on information collected through the Lifeways baseline questionnaire. Associations between socioeconomic factors pertaining to maternal and paternal grandparents' and grandchildren's growth outcomes were tested statistically.

Significant associations were observed between female grandchildren's waist-z-scores (WACZ) at age 10 and the occupational group of the paternal grandmother ($p=0.030$). Female grandchildren of skilled workers exhibited larger median waist circumferences (67 cm) compared to those with professional paternal grandmothers (58.6 cm) ($p=0.049$). Poor PQD in both maternal grandmothers and grandfathers was positively associated with ponderal index (PI) in their female grandchildren ($p=0.022$, $r=0.169$; $p=0.002$, $r=0.252$ respectively) but not in their male grandchildren ($p=0.176$, $r=0.108$; $p=0.800$; $r=0.022$, respectively). Conversely, good PQD in maternal grandparents was inversely associated with PI in their grandchildren ($p=0.041$, $r=-0.111$; $p=0.035$, $r=-0.125$). No association was observed between the early-life geographical area of residence of grandparents and their grandchildren's growth outcomes at any age.

This study contributes insights into the relationship between the socioeconomic factors and population dietary quality of grandparents and growth outcomes in their grandchildren. The study highlights the importance of grandparents' early-life experiences in shaping some growth outcomes in their grandchildren. This research also highlights how the mapping of data from prior studies to recent studies based on socioeconomic status and demographic data can provide valuable insights into health outcomes. Further research using this approach could lead to meaningful public health findings and is required to corroborate these study findings.

Acknowledgments

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Student Competition

OC159. Co-designing a nutritional navigation guide for people with psoriasis: a user-centred design approach. P. Hawkins¹, K. Earl¹, T.G. Tektonidis², and R. Fallaize¹ 1. School of Life and Medical Sciences, University of Hertfordshire, Hatfield, AL10 9AB, UK School of Sport, Nutrition and Allied Health Professions and 2. Oxford Brookes University, Oxford, OX3 0BP, UK.

In the absence of specific dietary guidelines and perceived inadequate dietary support from healthcare professionals (HCPs), people living with psoriasis (PLwP) often make restrictive or misinformed dietary changes ⁽¹⁾ Following self-prescribed dietary modifications without the guidance of HCPs could negatively impact health and well-being ⁽²⁾. There is high demand for dietary advice among both HCPs involved in psoriasis care and PLwP ⁽³⁾. Research suggests that online content about psoriasis treatment is frequently inaccurate and typically not produced by HCPs ⁽⁴⁾. Therefore, PLwP need easily accessible support to help them navigate the nutritional information they may encounter, to enable them to make evidence-based informed decisions. This study aimed to develop a user-friendly and evidence-based guide to help PLwP in the UK navigate nutritional information.

A 4-phase User-Centered Design (UCD) approach was employed, utilising the UCD-11 ⁽⁵⁾ framework, to co-design a guide that provides evidence-based information for nutritional navigation support for PLwP. Phase 1 involved the establishment of an expert panel which included experts in dermatology, nutrition and individuals with lived experience of psoriasis. The expert panel defined the scope and focus of the guide and from this the initial version of the guide was developed. The subsequent phases involved iterative design and content refinement, incorporating feedback from potential users through think-aloud methodology. Subsequently, the expert panel reviewed and provided input to complete the formation of the final guide.

The UCD-11 framework effectively engaged prospective users in the design and development of the guide and ensured a user-centered focus. The expert panel provided insights that enhanced the accuracy and relevance of the guide. Iterative design phases incorporated continuous user feedback, improving the quality, usability and visual design of the guide. The think-aloud methodology provided real-time insights into the guide's clarity and functionality. Participants found the format clear and wording easy to read but made suggestions to improve usefulness. This included: "It would be useful to have more information on what dairy alternatives are and further sign-posting" and "explain what nightshades actually are". Furthermore, participants highlighted other dietary recommendations they commonly see, and the need for clearer information on these. This feedback facilitated further refinements based on user insights.

Developing evidence-based dietary support materials using a co-design approach and UCD framework, resulted in a tailored guide that met the needs of service users. This approach facilitated the creation of user-friendly, evidence-based advice with input from experts and key stakeholders in psoriasis care. Future research should focus on exploring the value of the guide to healthcare professionals involved in psoriasis care. Additionally, monitoring effectiveness and use of the guide, by PLwP and HCPs, will help improve implementation, identify barriers to effective use and inform any necessary updates to the guide.

Acknowledgments

We really appreciate and would like to thank all members of the expert panel and all participants that took part in this study.

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Student Competition

OC160. Is diet quality associated with comorbidity and severity of psoriasis? A cross-sectional analysis of data from UK Biobank. Y. Xu¹, S. Zanesco¹, K.V. Dalrymple¹, T. Maruthappu¹, C.E.M. Griffiths², A. Dregan³, R. Gibson¹, and W.L. Hall¹ 1. Department of Nutritional Sciences, School of Life Course and Population Sciences, Faculty of Life Sciences and Medicine, King's College London, London, UK and 2. Department of Dermatology, King's College Hospital, King's College London, London, UK and 3. Department of Psychological Medicine, Institute of Psychiatry, Psychology and Neuroscience, Faculty of Life Sciences and Medicine, King's College London, London, UK

Psoriasis has been linked to various diet-related comorbidities such as metabolic syndrome, type 2 diabetes, and cardiovascular disease⁽¹⁾. Evidence for the role of diet in the management of psoriasis and its comorbidities is lacking, and there is no dietary guidance for people with psoriasis. This study aimed to characterise the dietary patterns and quality by adherence to the UK Eatwell guide and a Mediterranean-style diet in UK individuals living with psoriasis and assessed associations between diet quality and risk of psoriasis comorbidities, psoriasis severity and cardiometabolic risk markers.

Using the UK Biobank cohort, we identified 2,615 patients with psoriasis by self-report or health records at baseline, with a comparison group of 122,572 non-psoriasis participants who have valid dietary data. The dietary intake was assessed through online 24h-recalls (Oxford WebQ) conducted every 3-4 months over one year. The average nutrient and food groups intake were calculated from at least 2 recalls to determine adherence to the UK Eatwell Guide (Eatwell Score, range: 0-9⁽²⁾) and the Mediterranean-style diet (alternative Mediterranean diet (aMED) score⁽³⁾, range: 0-9). Associations between diet quality and the risk of 13 selected comorbidities, psoriasis severity (assumed from treatment type), and cardiometabolic risk markers were evaluated using multivariate regression models, adjusted for confounders including age, sex, Townsend deprivation factor, physical activity levels, smoking, alcohol, supplement use and the reporting source of psoriasis.

Both psoriasis and non-psoriasis groups showed similar average scores for Eatwell (3.9 ± 1.7 for both groups) and aMED (3.6 ± 1.8 and 3.3 ± 1.7 , respectively). Higher Eatwell scores were associated with a 15% reduced risk of myocardial infarction (OR=0.85, 95%CI: 0.74-0.98, $P=0.025$) and 23% increased risk of osteoporosis (OR=1.23, 95% CI: 1.05-1.45, $P=0.010$) in participants with psoriasis. Additionally, higher Eatwell scores were associated with lower BMI (StdBeta, adjusted P : -0.049, 0.013) and improved plasma lipid profiles (cholesterol: -0.058, 0.004; LDL: -0.068, 0.001; triglycerides: -0.076, <0.001). A higher aMED score is positively associated with better plasma lipid profiles (cholesterol -0.051, 0.012; LDL -0.051, 0.012) in individuals with psoriasis fully adjusted. No significant association was found between diet quality and psoriasis severity. However, participants with the highest severity (on systemic treatment) had a 34% lower chance of meeting guidelines for fruit and vegetable intakes (5 servings/day) compared with those on no treatment or topical treatment only (OR=0.66, 95% CI: 0.46-0.95, $P=0.024$).

Our findings suggest that higher dietary quality is associated with a reduced risk of certain cardiometabolic diseases in people with psoriasis, emphasising the importance of dietary management in this population. Longitudinal and intervention studies are needed to further explore the role of diet in psoriasis and its associated health outcomes.

Acknowledgments

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OC161. Associations between diet quality indices and psoriasis severity: results from the Asking People with Psoriasis about Lifestyle and Eating study. *Sylvia Zanesco¹, Thiviyan Maruthappu¹, Christopher E.M. Griffiths², Kathryn V. Dalrymple¹, Rachel Gibson¹ and Wendy L. Hall¹*. 1. King's College London, School of Life Course and Population Sciences, Department of Nutritional Sciences, London and 2. King's College Hospital, Department of Dermatology, King's College London.

Psoriasis is a chronic inflammatory skin condition arising from gene-environment interactions⁽¹⁾. The role of diet in individuals living with psoriasis is poorly understood with research to date confined to relationships with Mediterranean diet adherence in southern European populations⁽²⁾. Studies are yet to explore the role of dietary patterns in relation to psoriasis severity within a UK-based population. The Asking People with Psoriasis about Lifestyle and Eating (APPLE) study investigated associations between four diet quality indices and psoriasis severity, hypothesising that individuals with more severe psoriasis would report lower diet quality scores.

The APPLE study is an online cross-sectional study (King's College London Research Ethics Committee LRS/DP-21/22-29257; NCT05448352). Eligible participants included adults residing in the UK with diagnosed psoriasis. Participants were recruited using social media (June 2022-January 2024). Validated questionnaires were used to evaluate: 1) psoriasis severity, by the self-assessed simplified psoriasis index, and 2) diet quality, using a 147-item food frequency questionnaire (FFQ) to calculate the Mediterranean Diet Score (MDS), the Dietary Approaches to Stop Hypertension (DASH) score, the Healthy Diet Score (HDS) and the Plant-based Diet Indices (PDIs). Diet-psoriasis associations were adjusted for age, sex, smoking status, energy intake, alcohol use, anxiety/depression diagnosis, and body mass index (BMI)

A total of 270 participants completed the study, of which 82% were female, 85% of White-British ethnicity, with a median (interquartile range (IQR)) age of 40 years (20.0), and a median BMI of 25 kg/m² (8.2). Univariate regression analyses revealed significant negative associations between the HDS, DASH, healthy PDI, original PDI and MDS and psoriasis severity following adjustment for all covariates except BMI ($\beta = -0.179$ to -0.254 , $P < 0.05$). Only the HDS remained statistically associated with psoriasis severity when adjusted including BMI ($\beta = -0.152$, $P < 0.05$). Stepwise multiple linear regressions identified meat and poultry from the MDS as predictors for psoriasis severity ($\beta = 0.158$, $P < 0.05$), whilst fruits and nuts ($\beta = -0.140$, $P < 0.05$) and legumes ($\beta = -0.130$, $P < 0.05$) were negatively associated with disease severity.

Participants with lower diet quality scores report more severe psoriasis, with meat/poultry and fruit/nuts revealed as key dietary components that merit further investigation. Previous findings showed that olive oil and fish were independent predictors for psoriasis severity in a smaller Italian sample population⁽³⁾, which were not replicated in this population, possibly due to very low fish intakes in the UK population⁽⁴⁾.

This study contributes to the evidence examining the diet-psoriasis relationships. Randomised controlled trials are required to evaluate causal inferences in relation to the effect of dietary patterns on psoriasis severity.

Acknowledgments

The authors are grateful to the volunteers who took participated in the study and to the Psoriasis Association for funding the study.

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Student Competition

OC162. Associations between macronutrient sources and psoriasis severity in a UK-based population: results from the Asking People with Psoriasis about Lifestyle and Eating study.

Sylvia Zanesco¹, Thiviyan Maruthappu¹, Christopher E.M. Griffiths², Kathryn V. Dalrymple¹, Rachel Gibson¹ and Wendy L. Hall¹. King's College London, School of Life Course and Population Sciences, Department of Nutritional Sciences, London and 2. King's College Hospital, Department of Dermatology, King's College London.

Psoriasis is a chronic dermatological disease often linked with systemic conditions such as cardiovascular disease, obesity, and type 2 diabetes⁽¹⁾. Unlike many other systemic diseases, psoriasis lacks specific dietary recommendations for its management⁽²⁾. To develop evidence-based dietary advice, profiling dietary intakes in this population group is paramount. As part of the Asking People with Psoriasis about Lifestyle and Eating (APPLE) study, we aimed to quantify macronutrient intakes and their food group sources and assess associations with psoriasis severity.

The APPLE study is a web-based cross-sectional survey recruiting UK-based adult volunteers with psoriasis (King's College London Research Ethics Committee LRS/DP-21/22-29257; NCT05448352). Recruitment was between June 2022 and January 2024 through social media. Participants self-reported age, weight, height, and alcohol use, depression or anxiety diagnosis, as well as psoriasis severity by responding to the self-assessed Simplified Psoriasis Index (possible score range 0-70 points). Diet was self-reported with a validated 147-item food frequency questionnaire. Nutritional composition was determined using the Composition of Food Integrated Dataset⁽³⁾. Linear models tested associations between food groups sources and psoriasis severity.

The final sample (n=270) primarily constituted mid-life (median (IQR) 40 (20) years), White-British (85%), female participants (82%) with psoriasis, of which 51% were living with overweight or obesity. Protein intake from animal sources (processed meat, poultry, and red meat) was significantly positively associated with psoriasis severity, adjusted for age, gender, smoking, alcohol use, energy intake, and diagnosed depression/anxiety (β between 0.133 and 0.225, $P < 0.05$). Plant-based (excluding tree nuts) and tree nut sources of protein were inversely associated with psoriasis severity (adjusted β between -0.145 and -0.131, $P < 0.05$). Protein from red meat and plant-based protein remained significantly associated with psoriasis when adjusting for BMI. Poultry and processed meat sources of *n*-6 polyunsaturated fatty acids were also positively associated with psoriasis severity (β between 0.125 and 0.133, $P < 0.05$), whilst tree-nut sources were inversely associated with disease severity ($\beta = -0.144$, $P < 0.05$), but associations were no longer significant when adjusting for BMI.

Our findings highlight that associations between psoriasis severity and protein and *n*-6 polyunsaturated fatty acids intakes depend on their source, suggesting that healthy plant-based diets warrant further investigation by randomised controlled trials for the dietary management of psoriasis.

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The authors are grateful to the volunteers who took participated in the study and to the Psoriasis Association for funding the study.

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Student Competition

OC163. Associations between micronutrient intakes and psoriasis severity: the Asking People with Psoriasis about Lifestyle and Eating cross-sectional study. Sylvia Zanesco¹, Thiviyan Maruthappu¹, Christopher E.M. Griffiths², Kathryn V. Dalrymple¹, Rachel Gibson¹ and Wendy L. Hall¹. 1. King's College London, School of Life Course and Population Sciences, Department of Nutritional Sciences, London and 2. King's College Hospital, Department of Dermatology, King's College London.

Psoriasis is a chronic debilitating skin disease driven by pro-inflammatory immunological pathways. Research examining the effect of micronutrient supplementation on the severity of psoriasis has extensively focused on vitamin D and magnesium, yielding conflicting findings⁽¹⁾. As part of the Asking People with Psoriasis about Lifestyle and Eating (APPLE) study; micronutrient intakes were estimated in people with psoriasis for comparison with Reference Nutrient Intakes (RNIs) and to examine associations with psoriasis severity.

The APPLE study was a cross-sectional internet-based survey recruiting adult volunteers with psoriasis residing in the United Kingdom (King's College London Research Ethics Committee LRS/DP-21/22-29257; NCT05448352). Volunteers were recruited between June 2022-January 2024 through social media. Psoriasis severity and diet were self-reported with validated tools, the self-assessed Simplified Psoriasis Index and a 147-item food frequency questionnaire. Micronutrient constituents were determined using the Composition of Foods Integrated Dataset (<https://www.gov.uk/government/publications/composition-of-foods-integrated-dataset-cofid>).

The demographic characteristics of the study population (n=270) comprised of a White-British (88%), middle-aged (median (IQR) age of 40 (20.0) years), female majority (82%), reporting a median body mass index (BMI) of 25.8 (8.2) kg/m². Two-thirds (66%) of both males and females reported intakes below sex-specific RNIs for calcium. Approximately 80% of both males and females reported an iodine intake below 140 µg/day and more than 90% did not meet the 10 µg/day dietary recommendation for vitamin D. Most males (93%) and females (80%) did not meet the RNI for selenium intake. Two-thirds of women aged 18-50 years reported dietary iron intakes below the RNI of 14.8 mg/day. Intakes for other vitamin and minerals met dietary requirements. Magnesium ($\beta=-0.197$, $P<0.01$), copper ($\beta=-0.174$, $P<0.01$) and iron ($\beta=-0.127$, $P<0.05$) were significantly inversely associated with psoriasis severity, adjusted for age, sex, smoking, alcohol use, and diagnosed depression/anxiety. These associations with psoriasis severity were no longer significant when additionally adjusted for BMI.

There is a lack of studies examining dietary mineral intakes in populations with psoriasis, although some reports suggest people with psoriasis have a lower iron and magnesium status compared with control groups⁽²⁻³⁾. Our preliminary data suggests that dietary screening of micronutrient intakes as part of routine care may be beneficial in people with psoriasis. Additional research is warranted to explore the effects of mineral intakes and physiological mineral status in people living with psoriasis. Minerals are key regulators of cellular and immunological responses which is of relevance to population groups with underlying immune-mediated conditions such as psoriasis.

Acknowledgments

The authors are grateful to the volunteers who took participated in the study and to the Psoriasis Association for funding the study.

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Student Competition

OC164. Dietary flavonoid intakes are associated with lower risk of NAFLD: a UK biobank study.

W.Bell¹, A.Jennings¹, A.S. Thompson¹, N.P. Bondonno^{1,4,5}, A.Tresserra-Rimbau^{1,6,7}, T.Kühn^{1,2,3} and A.Cassidy¹ 1. The Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, Northern Ireland, UK and 2. Department of Nutritional Sciences, University of Vienna, Vienna, Austria and 3. Center for Public Health, Medical University of Vienna, Vienna, Austria and 4. Danish Cancer Institute, Copenhagen, Denmark and 5. Nutrition and Health Innovation Research Institute, School of Medical and Health Sciences, Edith Cowan University, Joondalup, Western Australia, Australia and 6. Department of Nutrition, Food Science and Gastronomy, XIA, School of Pharmacy and Food Sciences, INSA, University of Barcelona, 08921 Barcelona, Spain and 7. Centro de Investigación Biomédica en Red Fisiopatología de la Obesidad y la Nutrición (CIBEROBN), Institute of Health Carlos III, 28029 Madrid, Spain.

Mechanistic studies and short-term randomised trials suggest that higher intakes of dietary flavonoids may protect against non-alcoholic fatty liver disease (NAFLD)⁽¹⁻³⁾. However, little research has been conducted at a population level, and to date no long term prospective study has assessed the associations between flavonoid intakes and NAFLD risk⁽⁴⁾. We aim to perform the first population-based study with long-term follow-up on flavonoid consumption and NAFLD incidence.

In a prospective study, we assessed the associations between flavonoid intakes based on ≥ 2 24-hour dietary assessments and NAFLD risk among 121,563 adults aged 40 to 69 years by multivariable regression analyses. Flavonoid intakes were assessed on three levels: a novel flavodiet score (FDS), flavonoid rich foods, and flavonoid subclasses. Cox proportional hazard models were used to assess NAFLD risk, and linear trend tests were used to test for significance. Additional sensitivity analysis was conducted using both a FDS excluding red wine, and non flavonoid containing equivalent foods as negative controls.

Over 10 years of follow-up, 1090 cases of NAFLD were observed. When compared to the lowest Quartile, the highest quartile (Q4) of the Flavodiet Score (FDS) was associated with a 20% lower risk of NAFLD (HR (95%CI): 0.80 (0.66-0.96), P trend = 0.02). Additionally, higher apple intake was associated with a 22% lower risk of NAFLD (HR (95%CI): 0.78 (0.66 - 0.92), P trend = <0.01), while higher tea consumption was associated with a 13% lower risk of NAFLD (HR (95%CI): 0.87 (0.73 - 1.03), P trend = 0.046). Of the flavonoid subclasses, we observed that higher intakes of proanthocyanidins, theaflavins and thearubigins, flavonols and flavan-3-ols were also associated with lower risk.

In a large UK cohort, we demonstrate for the first time that flavonoid-rich diets, containing approximately 6-servings of flavonoid rich food per day, are associated with lower risk of NAFLD. As such, the consumption of flavonoid-rich foods may reduce the risk of NAFLD and its sequelae among middle-aged adults.

Acknowledgments

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Student Competition

OC165. Adherence to a healthful plant-based diet and risk of chronic kidney disease among individuals with diabetes: A prospective cohort study. A. S. Thompson¹, A. Tresserra-Rimbau^{1,2,3}, A. Jennings¹, N. P. Bondonno^{1,4,5}, C. J. Canduss^{6,7}, J. K. O'Neill¹, C. Hill⁸, M. Gaggli⁷, A. Cassidy⁷ and T. Kühn^{1,6,7} 1. The Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, Northern Ireland, UK and 2. Department of Nutrition, Food Science and Gastronomy, XIA, School of Pharmacy and Food Sciences, INSA, University of Barcelona, 08921 Barcelona, Spain and 3. Centro de Investigación Biomédica en Red Fisiopatología de la Obesidad y la Nutrición (CIBEROBN), Instituto de Salud Carlos III, 28029 Madrid, Spain and 4. Danish Cancer Institute, Copenhagen, Denmark and 5. Nutrition & Health Innovation Research Institute, School of Medical and Health Sciences, Edith Cowan University, Joondalup, WA, Australia and 6. University of Vienna, Department of Nutritional Sciences, Vienna, Austria and 7. Medical University of Vienna, Center for Public Health, Vienna, Austria and 8. Centre for Public Health, Queen's University Belfast, Belfast, United Kingdom.

Chronic kidney disease (CKD) is highly prevalent among people with diabetes^(1,2). While identifying modifiable risk factors to prevent a decline in kidney function among those living with diabetes is pivotal, there is limited evidence on dietary risk factors for CKD. In this study we examined the associations between healthy and less healthy plant-based diets (PBDs) and the risk of CKD among those with diabetes, and to identify potential underlying mechanisms.

We conducted a prospective analysis among 7,747 UK Biobank participants with prevalent diabetes (Type 1 and Type 2). Multivariable Cox proportional hazard regression models were used to examine the associations between healthful and unhealthful plant-based indices (hPDI and uPDI) and the risk of CKD. Fruits, legumes, nuts, tea and coffee, vegetables and whole grains were classified as healthy plant-based foods, whereas fruit juice, potatoes, refined grains, sugary drinks as well as sweets and desserts were classified as unhealthy plant-based foods. Animal-based foods used for the PDIs were grouped into meat, eggs, dairy products, animal fat, seafood or fish, and miscellaneous animal-based foods. Causal mediation analyses were further employed to explore the underlying mechanisms of the observed associations.

Among 7,747 study participants with diabetes, 1,030 developed incident CKD over 10.2 years of follow-up. The mean (SD) age was 58.8 (7.2) years, 6,910 (89.2%) were White, and 3,829 (49.4%) had a BMI over $\geq 30\text{kg/m}^2$. Higher adherence to a healthy PBD was associated with a 24% lower CKD risk ($\text{HR}_{\text{Q4 versus Q1}}$: 0.76 [95%CI: 0.63-0.92], $p_{\text{trend}} = 0.002$), while higher adherence to an unhealthy PBD was associated with a 35% higher risk ($\text{HR}_{\text{Q4 versus Q1}}$: 1.35 [95%CI: 1.11-1.65], $p_{\text{trend}} = 0.006$). The observed associations were predominantly mediated by markers of body fatness (proportion mediated: 11-25%) and kidney function (23-89%).

In this prospective cohort study of UK adults with diabetes, adherence to a healthy PBD was associated with lower CKD risk, whereas adherence to an unhealthy PBD was associated with a higher CKD risk. Associations were primarily mediated by markers of lower body fatness and improved kidney function.

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Student Competition

OC166. Association between carrot intake and cancer risk in a prospective observational study of >85-year-olds does not deviate from other age groups. Charles C Ojobor¹, Antoneta Granic², Gerard M O'Brien¹ and Kirsten Brandt¹. 1. Human Nutrition & Exercise Research Centre, Population Health Sciences Institute, Faculty of Medical Sciences, Newcastle University, UK and 2. AGE Research Group, Translational and Clinical Research Institute, Faculty of Medical Sciences, Newcastle University, UK.

Carrot consumption reduces tumour development in several animal models, possibly as sources of polyacetylenes, resistant starch, carotenes or other active constituents. In a recent systematic review and meta-analysis of prospective studies⁽¹⁾, we showed that carrot intake measured directly or using α -carotene as a marker of carrot intake was associated with reduced risk of cancer incidence. However, since the incidence of cancers among very old people (aged 85 and over) is lower than in those aged 65 to 85⁽²⁾, it is of interest to understand how carrot intake affects cancer risk across different age groups. Here we compare the results from the Newcastle 85+ study³ and a meta-analysis of prospective studies¹ of older adults aged 65-85 years at baseline.

In the Newcastle 85+ study⁽³⁾ (n=387, 65% women), baseline dietary carrot intake was assessed using a multiple-pass recall tool (2x24 h recalls) and α -carotene concentration measured in plasma samples by reverse phase high-performance liquid chromatography. Cancer incidence data were ascertained from medical records, and the association between carrot intake and α -carotene and cancer risk (any type) tested using multivariable Cox proportional hazard regression models. For the meta-analysis⁽¹⁾, mean \pm SD of the reported upper age range at baseline in 50 studies (with 52000 cases) with data on carrot intake reported directly or indirectly (as α -carotene intake) was 68 \pm 12 years, and in 30 studies (9331 cases) reporting plasma concentration of α -carotene it was 69 \pm 9 years.

In the Newcastle 85+ study, the summary risk ratio (RR) for cancer incidence was 0.82 (95% CI: 0.24 – 2.79, n= 129 cases, 258 non-cases) for consumption of ≥ 1 vs < 1 serving/day of carrots after adjusting for key confounders. RR for cancer for the highest compared with lowest quartile of plasma α -carotene was 0.68 (0.33 –1.39). The corresponding values comparing highest versus lowest exposure groups for the younger age groups in the meta-analysis⁽¹⁾ were: RRs (95% CI) for carrot intake 0.90 (0.87–0.94) and 0.80 (0.72–0.89) for plasma α -carotene. For most (67 of 80) of the individual studies included in the meta-analysis, the RRs were not statistically significantly different from 1, as was the case for the Newcastle 85+ study, due to small sample size and limited duration of the dietary records. However, the similarity of the RR values from the Newcastle 85+ study with the two corresponding independent datasets in the meta-analysis means that the results do not support a difference in effect between the age groups.

The association of carrot consumption with incident cancer in the very old does not differ from younger age groups of older adults. Carrot consumption should be encouraged among the very old, and the causal mechanisms further investigated.

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Student Competition

OC167. Effect of Beta- and Alpha-Carotene Intake on Tumour Formation in the Intestines of APC^{Min/+} Mice. N. H. Smith¹, C.C. Ojobor¹, L. Huang² and K. Brandt¹ 1. Human Nutrition & Exercise Research Centre, Population Health Sciences Institute, Newcastle University, Newcastle upon Tyne, UK and 2. Immune Metabolism Laboratory, Translational and Clinical Research Institute, Newcastle University, Newcastle upon Tyne, UK.

Carotene-rich vegetables like carrots have been consistently associated with lowered cancer risk in observational studies⁽¹⁾. Beta-carotene, a phytochemical found in fruits and vegetables, is known for its antioxidant properties. In rodent trials, supplementation with carrot (containing both carotenes and polyacetylenes) significantly reduced tumour numbers in the APC^{Min/+} mouse model⁽²⁾. However, human intervention trials with pure beta-carotene showed more adverse effects than benefits⁽³⁾. This study aimed to investigate the impact of beta- and alpha-carotene supplementation (without polyacetylenes) on colorectal cancer using the APC^{Min/+} mouse model, which spontaneously develops intestinal tumours and an enlarged liver⁽⁴⁾.

APC^{Min/+} mice were fed either a daily supplement of 10mg/kg mouse of a polyacetylene-free extract from carrots containing a beta- and alpha-carotene mixture, in a dose corresponding to the beneficial carrot supplementation, or the control diet, with a very low beta-carotene content (providing approx. 0.02mg/kg mouse/day). The 8-week supplementation commenced at 5 weeks of age. Tumour quantification in the small intestines of APC^{Min/+} mice was performed by histology of the entire small intestine, with one slide per 0.3mm, using the H&E staining method and Imagescope software.

Supplementation with carotenes had no significant effect on the total number of tumours (≥ 0.5 mm), showing no discernible difference between the control (n=6) (20.5, 95% CI [14.69, 26.31]) and treatment (n=8) (24.5, [19.21, 29.79]) group (P=0.237). However, the liver weight, in % of body weight, showed a significant 25% decrease in the treatment group (n=7) (4.78 95% CI [4.45, 5.15]) compared to controls (6.42, [5.71, 7.13]) (P<0.0003), reaching a level comparable with wildtype mice (4.48, [4.13, 4.83]).

These findings confirm the results from the human intervention trials by indicating that beta- and alpha-carotene do not confer any benefit for cancer prevention, while the decrease in liver weight suggests a potential beneficial effect on another aspect of liver health. Additional research is necessary to fully understand these relationships and uncover the underlying mechanisms behind these results. Specifically, beta- and alpha-carotene from carrots do **not** provide the reduction in tumour numbers in a mouse model of colon cancer found when feeding the corresponding dose of freeze-dried carrot. However, the carotenes significantly attenuate the liver enlargement also seen in this model.

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Student Competition

OC168. The effect of a polyphenol supplement on iron absorption in Thai adults with non-transfusion-dependent thalassaemia: a stable iron isotope study. *J. Baumgartner*¹, *S. Gowachirapant*², *P. Joompa*², *K. Paiboonsukwong*³ and *M. B. Zimmermann*⁴ 1. Department of Nutritional Sciences, King's College London and 2. Institute of Nutrition, Mahidol University, Salaya and 3. Thalassaemia Research Center, Institute of Molecular Biosciences, Mahidol University and 4. Weatherall Institute of Molecular Medicine, John Radcliffe Hospital, University of Oxford, Oxford, United Kingdom.

Genetic disorders, including haemochromatosis and thalassaemia, can lead to iron overload and related adverse health outcomes, such as liver and cardiovascular disease^(1,2).

Thalassaemia is one of the most common genetic blood disorders worldwide⁽¹⁾. It is characterized by impaired production of haemoglobin resulting in chronic anaemia. This, in turn, leads to an upregulation of dietary iron absorption causing iron overload. Standard treatment therefore includes iron chelation therapy with frequency depending on the velocity of body iron accumulation⁽¹⁾.

Some polyphenolic compounds have strong iron-chelating properties^(3,4). We recently showed that a polyphenol supplement (PPS) consisting of grape juice extract, black tea and cocoa powder taken with an iron-rich meal or iron-fortified drink reduces iron absorption by ~40 % in European adults with haemochromatosis⁽⁵⁾.

Here we investigated the effect of this natural PPS on iron absorption from an iron-rich meal or iron-fortified drink in Thai adults with non-transfusion-dependent thalassaemia.

We performed a single-blind, placebo-controlled, cross-over study in 20 Thai adults with iron-loading, non-transfusion-dependent thalassaemia. Each participant consumed, in partially randomized order, an iron-rich test meal (8 mg native iron) or an iron-fortified test drink (8 mg iron as FeSO₄) extrinsically labelled with a stable iron isotope (2 mg ⁵⁸Fe or ⁵⁷Fe as ferrous sulphate [FeSO₄]) with the PPS (2 mg grape juice extract, black tea and cocoa powder in equal parts) or the placebo (2 g maltodextrin). Fractional iron absorption (FIA) from each of the four test conditions was determined by measuring the incorporation of stable iron isotopes into erythrocytes using inductively coupled plasma mass spectrometry (ICP-MS)⁽⁶⁾. Effects of treatment and matrix, as well as treatment x matrix interactions, were determined using 2-factorial repeated-measures ANCOVA.

Median (IQR) age of participants (n=12 female; n=8 male) was 26 (20–34) years; 12 (60 %) were alpha-thalassaemia and 8 (40 %) were beta-thalassaemia carriers. The PPS lowered FIA from the iron-rich test meal and iron-fortified test drink by 70 % and 35 %, respectively (treatment, p=0.016; matrix, p=0.116; treatment x matrix, p=0.089; model adjusted for baseline haemoglobin). Median (IQR) FIA from the test meal consumed with the PPS and placebo was 0.36 (0.12–3.44) % and 1.37 (0.68–2.64) %, respectively. FIA from the test drink consumed with the PPS and placebo was 4.22 (2.42–15.3) % and 6.47 (3.00–14.0) %, respectively.

The findings from our study suggest that intake of this natural PPS alongside meals or drinks high in iron has the potential to lower iron absorption in people with non-transfusion-dependent thalassaemia. It remains to be investigated if long-term use of the PPS can reduce body iron accumulation and frequency of iron chelation therapy, as well as elicit potential cardioprotective effects, in people with non-transfusion-dependent thalassaemia.

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OC169. Exploring the causal link between iron levels and pernicious anaemia: A mendelian randomisation study. Alfie Thain¹, Guillermo Comesaña Cimadevila¹, Kath Hart¹, Marie-Joe Dib² and Kouros R Ahmadi¹ 1. School of Biosciences and Medicine, University of Surrey, Guildford, UK and 2. Division of Cardiovascular Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia.

Pernicious anaemia (PA) is characterised by vitamin B₁₂ deficiency due to autoimmune-mediated destruction of gastric parietal cells and the consequent loss of intrinsic factor, a specific transporter for the intestinal uptake of vitamin B₁₂. The aetiology of PA remains largely unknown, although genetic and environmental factors have been proposed to underpin the onset of PA⁽¹⁾. A significant proportion of PA patients exhibit iron deficiency, with approximately 50% of PA patients presenting with it before or at diagnosis and 61% subsequently, suggesting an association between the two⁽²⁾. However, findings from traditional epidemiological studies are subject to confounding and reverse causality. For instance, these associations do not clarify whether iron deficiency contributes to the development of PA or is a consequence of the disease process. Given the profound prevalence of iron deficiency at diagnosis, we hypothesised that reduced iron levels may play a causal role in the onset of PA. We used a Mendelian randomisation (MR) approach to test the causal relationship between iron status and PA.

MR leverages the naturally randomised allocation of genetic variants among the population as instrumental variables to gauge the causal effect of an exposure on an outcome of interest⁽³⁾. We conducted two-sample MR analyses to assess the association between genetically predicted iron levels and PA risk. We obtained genetic association data on iron status from the deCODE study⁽⁴⁾. PA genetic association data was sourced from the R10 release of FinnGen as our main analysis. The participant data consisted of 3,694 cases of PA and 393,684 controls. Our primary MR analysis method was the inverse-variance weighted approach with additional sensitivity analyses, including leave-one-out, Egger and weighted median analyses.

Four single nucleotide polymorphisms (SNPs) were strongly associated with systemic iron status and used as genetic instruments to proxy iron status in two-sample MR analyses. We found that genetically predicted higher iron status was not significantly associated with risk of PA (odds ratio per 1 standard deviation increase in serum iron: 1.12, 95% confidence interval 0.80 to 1.57, $P=0.49$). Sensitivity analyses had consistent results, indicating that MR assumptions were not violated and that no single SNP drove the association.

This is the first study to test the hypothesis that iron deficiency is causally associated with an increased risk of PA. Our results show that genetically predicted lower iron levels were not associated with an increased risk of PA among individuals of Finnish ancestry. Further investigation is required to understand the manifestation of iron deficiency in PA. Iron deficiency may only be a consequence of PA due to the loss of parietal cells, which produce hydrochloric acid necessary for iron absorption. The frequent presence of iron deficiency before or at diagnosis may also reflect delays in diagnosing PA.

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OC170. The prevalence of inadequate micronutrient intakes and risk of excessive intakes in adults in Ireland: Findings from the National Adult Nutrition Survey II. L. Kehoe^{1,2}, M. Buffin³, B. McNulty³, J.M. Kearney⁴, A. Flynn² and J. Walton¹. 1. Department of Biological Sciences, Munster Technological University, Cork, Ireland and 2. School of Food and Nutritional Sciences, University College Cork, Ireland and 3. Institute of Food and Health, University College Dublin, Belfield, Dublin 4, Ireland and 4. School of Biological, Health & Sport Sciences, Technological University Dublin, Dublin, Ireland.

Adequate nutrition is important for health at all life stages with micronutrients having an important role in long term health, cognition, healthy development and ageing⁽¹⁾. The aim of this study was to estimate the prevalence of inadequate intakes and risk of excessive intakes of micronutrients among adults aged 19-64 years and 65 years and over, from a nationally representative sample of adults in Ireland.

Analyses were based on the National Adult Nutrition Survey II (NANS II) (2020-21) of 19-92 year olds in the Republic of Ireland (*n* 1000) (19-64y: 718, ≥65y: 282) (www.iuna.net). Food and beverage intake data (including nutritional supplements) were collected via two independent 24-hour telephone dietary recalls (at least 7 days apart, with each day of the week accounted for in the sampling plan). To assist with the recall, older adults (≥65years) were asked to record their foods the day before the dietary recall and all participants were provided with a photographic food atlas before the scheduled dietary recall. Nutrient intakes were estimated using Nutritics[®] based on UK food composition data which was updated to include recipes of composite dishes, nutritional supplements, fortified foods and generic Irish foods that were commonly consumed. Usual intakes of micronutrients were calculated via the NCI-method using SAS[®] Enterprise Guide. The prevalence of inadequate intakes of micronutrients (excluding energy under-reporters)⁽²⁾ was estimated using estimated average requirements established by the US Institute of Medicine (IOM) (vitamin D)⁽³⁾, the UK Department of Health (DOH) (thiamin, vitamin B12)⁽⁴⁾ and the European Food Safety Authority (EFSA) (all other micronutrients)⁽⁵⁾. The risk of excessive intake was evaluated by comparing intakes to tolerable upper intake levels (ULs) established by the US Food and Nutrition Board (vitamin C, iron)⁽⁶⁾ and EFSA (all other micronutrients)⁽⁷⁾.

Among those aged 19-64 years, a large proportion of adults had inadequate intakes of vitamin D (61%), vitamin C (41%), folate (37%), calcium (32%), zinc (28%), vitamin B6 (26%), riboflavin (23%), vitamin A (16%) and iron (8%; up to 14% for females). Similarly, a large proportion of adults aged 65 years and over had inadequate intakes of vitamin D (48%), vitamin C (43%), folate (36%), zinc (35%), calcium (31%), vitamin B6 (29%), riboflavin (21%), vitamin A (13%) and iron (11%; up to 13% for females).

The proportion of adults with intakes exceeding the UL was negligible for retinol, vitamins D, E, C, B6, preformed niacin, folic acid, calcium and iron (19-64y: <0.3%; ≥65y: <0.7%) and for zinc (19-64y: 2%; ≥65y: 1%).

These findings indicate that based on current dietary patterns, significant numbers of adults in Ireland have inadequate intakes of key micronutrients and highlight the need to investigate targeted dietary strategies to address these low intakes among this population group.

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OC171. Associations among dietary intake, gene polymorphisms and adipose fatty acid in TwinsUK study. Xinyu Yan¹, Ricardo Costeira¹, Max Tomlinson¹, Jordana T. Bell¹ and Kerrin S. Small¹. Department of Twin Research and Genetic Epidemiology, King's College London, London SE1 7EH, UK.

Fatty acids are essential molecules, which function as structural components, energy sources, and signaling mediators⁽¹⁾. Subcutaneous adipose tissue (SAT) is the largest fat depot and plays a crucial role in maintaining health and homeostasis^(2,3). While regulation and health impacts of circulating fatty acid levels are well established, less is known about the regulation of fatty acid levels within adipose tissue itself. The aim of this study was to investigate the effect of dietary and genetic contribution to fatty acid contents in adipose tissue and identify the interaction between single nucleotide polymorphism (SNP) and diet on adipose fatty acids.

In 427 healthy female twins from TwinsUK, 18 types of fatty acids were measured in SAT biopsies alongside genotype, RNA-Seq and clinical phenotypes. Dietary intake was collected by food frequency questionnaire. The associations between dietary intake and adipose fatty acids were tested with linear mixed models, adjusting for age, smoking, physical activity, index of multiple deprivation, energy intake, and relatedness. Genome-wide association studies (GWAS) were performed adjusting for age.

The association between dietary scores, food intake, nutrient intake and fatty acid levels in adipose tissue were examined. Most dietary scores were positively correlated with polyunsaturated fatty acid (PUFA) but negatively correlated with trans-unsaturated fatty acid (TFA) ($P_{FDR} < 0.05$). We highlighted the positive association between polyunsaturated margarine and fish intake and PUFA levels, as well as butter and cream intake and saturated fatty acid (SFA) levels ($P_{FDR} < 0.05$). Negative associations between fresh red meat including lamb and beef, butter, and cream intake and PUFA levels in adipose tissue were observed ($P_{FDR} < 0.05$). Regarding nutrient intake, PUFA, SFA, TFA, cholesterol, vitamin D, and vitamin E were correlated with fatty acid levels in adipose tissue ($P_{FDR} < 0.05$). To reveal local genetic regulation of fatty acids in adipose tissue, we performed GWAS and identified 10 fatty acid-associated genetic *loci* across 13 fatty acids (i.e. palmitic acid/palmitoleic acid – at the *SCD locus*, dihomo- γ -linolenic acid/arachidonic acid at the *FADS1 locus*, $P < 5 \times 10^{-8}$). The integration of adipose gene expression data revealed the mediation effects of *SCD* and *FADS1* expressions in the associations between *FADS1* SNP and the conversion of unsaturated fatty acids. We took forward two GWAS lead SNPs (*SCD* SNP and *FADS1* SNP) to test the SNP-by-diet interaction on adipose fatty acids. Milk intake showed SNP-by-diet interaction with *FADS1* SNP for linoleic acid and docosapentaenoic acid levels ($P < 0.001$). The interactions between roasted potatoes/chips and *FADS1*

SNP were significant for dihomo- γ -linolenic acid/linoleic acid ($P < 0.001$).

Adipose fatty acid levels were regulated by both genetic variants and dietary intake. We found suggestive evidence for the interaction of genetic variant and diet.

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Student Competition

OC172. Liver circadian genes are modulated by high fat feeding in mice: Investigation of microRNA-mediated mechanisms. X. Tan¹, C.W. Cheng², J.L. Thorne¹, Y.Y. Gong¹, J.B. Moore¹ and L. Lichtenstein¹ 1. School of Food Science and Nutrition, University of Leeds, Leeds, UK and 2. School of Medicine, University of Leeds, Leeds, UK.

Metabolic dysfunction-associated steatotic liver disease (MASLD) is a major public health issue, with a recent estimated global prevalence of 30%⁽¹⁾. The pathogenesis of MASLD is complex, multifactorial, and incompletely understood⁽²⁾. MicroRNAs (miRNAs) are small non-coding RNAs that typically inhibit gene expression as post-transcriptional regulators⁽³⁾. MiRNAs are increasingly recognised for their potential as diagnostic biomarkers and therapeutic targets in liver diseases⁽³⁾. The aim of this research was to consider the role of miRNAs in MASLD pathogenesis and their regulation by diet.

Liver RNA samples were extracted from male C57BL/6J mice (n=6/group) fed for 8 weeks either a chow diet (CD) or 60% fat (high fat diet, HFD) and sent for RNA sequencing. The raw data obtained from next-generation sequencing (Novogene, Cambridge) were passed through a quality control pipeline. Differential expression analysis, Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) enrichment analyses, and target predictions were performed in the R environment. Enriched GO terms were summarised and clustered by online tool Revigo. Rich factor (RF) was used to describe the intensity of dysregulated pathways, calculated as the ratio of differentially expressed genes (DEGs) to the total genes included in each pathway. MicroRNAs that targeted the DEGs were identified using two validated miRNA-mRNA interaction databases, Tarbase and miRTarbase.

A total of 1087 DEGs were found in HFD fed mice relative to CD (adjusted P<0.05) and their biological functions were examined using GO and KEGG enrichment analyses. In aggregate, significantly enriched components and functions included: small molecule metabolic processes, collagen-containing extracellular matrix and lipoprotein particles, and oxidoreductase activity. Circadian rhythm was the most enriched pathway (RF=0.29) among 12 enriched KEGG pathways, which also included fatty acid degradation (RF=0.21), PPAR signalling (RF=0.16), retinol (RF=0.17) and cholesterol metabolism (RF=0.22) pathways. Indeed, out of the 34 genes that comprise the KEGG circadian rhythm pathway, 10 (29%) were found dysregulated by HFD, including the critical Period genes (*Per2*, *Per3*). Further exploration in human found hsa-miR-133a-3p targets *PER2* and *PER3* via examination of validated miRNA-mRNA interaction databases. In addition to circadian rhythm, hsa-miR-133a-3p was found to target genes that function in macroautophagy, cold-induced thermogenesis, and insulin response pathways.

Peripheral clocks of circadian rhythm (liver, pancreas, adipose tissue and muscle) are regulated by miRNAs that contribute to the pathogenesis of MASLD through disruption of lipid metabolism and the insulin response. Future work includes the confirmation of miR-133a-3p expression and the related pathways in mouse liver and human primary hepatocytes.

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Student Competition

OC173. Nitrosyl-heme and heme iron intake from processed meats and risk of colorectal cancer in the EPIC-Spain cohort. L. Rizzolo-Brime¹, L. Lujan-Barroso^{1,2}, A. Farran-Codina³, R. Bou⁴, C. Lasheras⁵, P. Amiano^{6,7,8}, A. Aizpurua^{7,8}, M.J. Sánchez^{6,9,10}, E. Molina-Montes^{6,10,11,12}, M. Guevara^{6,13,14}, C. Moreno-Iribas^{6,13,14}, A. Gasque¹³, M.D. Chirlaque-López^{6,15,16}, S.M. Colorado-Yohar^{6,15,17}, J.M. Huerta^{6,15}, R. Zamora-Ros^{1,18}, A. Agudo¹ and P. Jakszyn^{1,19} 1. Unit of Nutrition and Cancer, Epidemiology Research Programme, Catalan Institute of Oncology (ICO), Bellvitge Biomedical Research Institute (IDIBELL), 08908 L'Hospitalet de Llobregat, Spain and 2. Department of Public Health, Mental Health and Maternal and Child Health Nursing. Faculty of Nursing. University of Barcelona, Carrer de la Feixa Llarga s/n, 08907, L'Hospitalet de Llobregat, Barcelona, Spain and 3. Department of Nutrition, Food Science and Gastronomy, Faculty of Pharmacy, Institute of Nutrition and Food Safety (INSA-UB), University of Barcelona, Campus de l'Alimentació de Torribera, Av. Prat de la Riba 171, Santa Coloma de Gramenet, E-08921 Barcelona, Spain and 4. Food Safety and Functionality Program, Institute of Agrifood Research and Technology (IRTA), Finca Camps i Armet s/n, 17121- Monells, Girona, Spain and 5. Functional Biology Department, School of Medicine, University of Oviedo, Asturias, Spain and 6. Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Instituto de Salud Carlos III, Madrid, Spain and 7. Ministry of Health of the Basque Government, Sub Directorate for Public Health and Addictions of Gipuzkoa, San Sebastian, Spain and 8. BioGipuzkoa (BioDonostia) Health Research Institute, Epidemiology of Chronic and Communicable Diseases Group, San Sebastián, Spain and 9. Escuela Andaluza de Salud Pública (EASP), 18011 Granada, Spain and 10. Instituto de Investigación Biosanitaria IBS.GRANADA, 18012 Granada, Spain and 11. Department of Nutrition and Food Science, Campus of Cartuja, University of Granada, 18071 Granada, Spain and 12. Institute of Nutrition and Food Technology (INYTA) 'José Mataix', Biomedical Research Centre, University of Granada, 18071 Granada, Spain and 13. Instituto de Salud Pública y Laboral de Navarra, 31003 Pamplona, Spain and 14. Navarra Institute for Health Research (IdiSNA), 31008 Pamplona, Spain and 15. Department of Epidemiology, Murcia Regional Health Council-IMIB, Murcia, Spain and 16. Social-Health Department, Murcia University, 30008 Murcia, Spain and 17. Research Group on Demography and Health, National Faculty of Public Health, University of Antioquia, Medellín, Colombia and 18. Department of Nutrition, Food Sciences, and Gastronomy, Food Innovation Network (XIA), Institute for Research on Nutrition and Food Safety (INSA), Faculty of Pharmacy and Food Sciences University of Barcelona, Barcelona, Spain and 19. Blanquerna School of Health Sciences, Ramon Llull University, 08022 - Barcelona, Spain

The International Agency for Research on Cancer classified processed meats (PMs) as “carcinogenic” and red meat as “probably carcinogenic” for humans ⁽¹⁾. The possible relationship between colorectal cancer (CRC) risk and processed meats (PMs), along with the specific compound contributing to this association have not been established yet. Nitrosyl-heme and heme iron have been proposed as potential-related compounds. The aim of this study was to assess the association of nitrosyl-heme and heme iron intake with CRC risk among participants from the European Prospective Investigation into Cancer and Nutrition (EPIC) Spain study.

This prospective study included 38,262 subjects (61.5% females) from the EPIC-Spain study. Food consumption was assessed by a validated diet history questionnaire ⁽²⁾. Dietary intake of nitrosyl-heme and heme iron was estimated by matching PMs intake and composition data based on laboratory analyses conducted using a High Performance Liquid Chromatography method ⁽³⁾. In brief, the daily intake of nitrosyl-heme and heme iron was determined by multiplying the intake of each PM (in grams/day) by its corresponding content of nitrosyl-heme and heme iron, and then summing up the estimated intakes from all PMs. The proportional hazards models were used to examine the association between sex-specific tertiles of nitrosyl-heme and heme iron intake and CRC risk and 95% confidence intervals (CIs) were computed using Cox regression. Age served as the time scale, stratified by age and centre with adjustments for sex, energy intake, body mass

index (BMI), waist circumference, education, smoking, physical activity in MET-h/week, lifetime alcohol consumption, dietary fibre, calcium intake, and family CRC history. Homogeneity of location subtype risk was also assessed. Interactions with smoking, BMI, physical activity, and alcohol were examined and sensitivity analyses were also conducted excluding the first three years of follow-up.

During a mean follow-up of 16.7 years, 577 CRC were identified. We found no overall association between nitrosyl-heme (T3 vs T1; HR: 0.98 (95% CI: 0.79-1.21)) or heme iron intakes (T3 vs T1; HR: 0.88 (95% CI: 0.70-1.10)) with CRC risk, nor according to tumour subtypes. However, we found a non-statistically significant positive association between nitrosyl-heme intake and proximal colon, HR= 1.03; 95% CI, (0.65-1.61) and rectum cancer, HR=1.04; 95% CI, (0.70-1.56).

Our study found no evidence supporting a link between nitrosyl-heme or heme iron intake and CRC risk in Spanish subjects from the EPIC cohort. As these results are novel and preliminary, more heterogeneous studies are necessary to provide more convincing evidence on their role in colorectal carcinogenesis.

Acknowledgments

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Student Competition

OC174. Malnutrition and its Risk Factors in Renal Patients on Dialysis. J. AbiKharma¹, J. ElNakouzi¹, M. Abboud¹, N. Wehbe¹ and M. Bassil^{2*} 1. Nutrition Program, Department of Natural Sciences, School of Arts & Sciences, Lebanese American University, Beirut, Lebanon and 2. Human Nutrition Department, College of Health Sciences, QU Health, Qatar University, Doha, Qatar.

Patients with end stage kidney disease (ESKD) on hemodialysis (HD) should follow a strict diet during the inter-dialytic period⁽¹⁾. Compliance to treatment, including diet, is key for optimal disease management and health outcomes and to protect against malnutrition^(2,3). The objective of this study was to assess renal nutrition-related knowledge, compliance with dietary guidelines, adherence to treatment and risk of malnutrition among patients with ESKD in Lebanon.

A convenience sample of 119 patients with ESKD on HD was recruited from the dialysis units of the Lebanese American University Medical Center-Rizk Hospital (LAUMC-RH) and Hammoud Hospital University Medical Center (HHUMC) in Lebanon. Demographic characteristics, 24 hour-recall and a validated food frequency questionnaire⁽⁴⁾ were collected from participants, while anthropometrics including weight status in the past 3 months, as well as biochemical data were collected from medical charts. Bioelectrical impedance tests were conducted on the patients, 30 mins after HD hemodialysis session, to assess body composition. Nutrition knowledge was assessed using a validated questionnaire⁽⁵⁾, whereby “poor knowledge” corresponds to <70% correct answers. Compliance to treatment (HD sessions, medications, fluids, and diet) was collected from participants using the End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ)⁽⁶⁾ (Kim et al., 2010) and scored using the tool guide. Accordingly, adherence was classified as “poor” (scores <500), “moderate” (scores: 500-799), or “good” (scores: 800-1000).

100 of the 119 participants (85.5%) were found to have malnutrition according to the Global Leadership Initiative on Malnutrition (GLIM) criteria⁽⁷⁾. Malnourished patients were mostly found with lower education (57%), poor nutrition knowledge (68%), poor to moderate overall compliance (82%), and with no adequate caloric intake (67%). Weight loss was the most common phenotypic criterion among malnourished patients, whereby 22% of malnourished patients had weight loss of > 3Kg in the past 3 months. Malnourished patients with weight loss had a higher ($p=0.008$) prevalence of poor overall compliance (36%), compared to those with mild or no weight loss (14%). Additionally, malnourished people with poor compliance tended to be younger (<55 years of age) and with lower levels of income and education ($p<0.05$).

Malnutrition rates are alarmingly high among patients with ESKD in our sample and are linked with low nutrition knowledge and poor adherence to treatment, including dietary compliance. Future studies with a larger more representative cohort are required to confirm our results. Accordingly, intervention trials targeting knowledge and adherence among ESKD patients in Lebanon are warranted to prevent malnutrition and to achieve better clinical outcomes.

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OC175. Alcohol consumption and risk of rheumatoid arthritis: results from the UK Women's Cohort Study. Y Dong¹, D.C. Greenwood², L.J. Hardie³ and J.E. Cade¹ 1. *Nutritional Epidemiology Group, School of Food Science and Nutrition, University of Leeds, Leeds, UK* and 2. *School of Medicine, University of Leeds, Leeds, UK* and 3. *Leeds Institute of Cardiovascular and Metabolic Medicine, University of Leeds, Leeds, UK*.

While some studies have suggested that moderate alcohol consumption may be beneficial for rheumatoid arthritis (RA) prevention⁽¹⁾, the role of competing events have not been considered and may lead to misinterpretation of the magnitude of the risk between alcohol intake and RA incidence. We aimed to investigate the relationship between alcohol consumption and RA incidence when the competing risk of death is accounted for in the survival analysis.

Data from the UK Women's Cohort Study (UKWCS), a prospective cohort study of 35,372 middle-aged women established between 1995 and 1998, was used for the analyses⁽²⁾. Alcohol intake was assessed at baseline by asking for the number of specified units of each type of alcoholic beverage (beer, wine, sherry, and spirits) consumed per week. Cases who developed RA were identified through linkage with Hospital Episode Statistics (HES) up to March 2019 (International Classification of Diseases, ICD-10 code M05-M06). Data linkage with the Health and Social Care Information Centre (HSCIC) allowed cause of death to be identified using ICD codes (9th/10th version). We used directed acyclic graphs, competing risk regression modelling, and subgroup analyses to examine the effect of alcohol intake on RA incidence.

Among 29,830 women linked to the HES data (666,857 person-years), 255 cases of rheumatoid arthritis were identified, with a median follow-up of 22.5 years. After adjustment for confounders, in both competing risk regression and cox proportional hazards models, regular drinking was associated with a reduced risk of RA. In the competing risk model, with occasional drinkers (less than 1 serving of alcohol per week) as the reference, the subhazard ratios (SHRs) for non-drinkers were: SHR, 0.67, 95% CI: 0.43-1.07; regular drinkers: SHR, 0.70, 95% CI: 0.53-0.94. Every additional unit of alcohol per week was associated with a 3% lower risk of rheumatoid arthritis (SHR (95% CI): 0.97(0.96-0.99)). BMI modified the linear associations between alcohol intake and risk of RA ($P_{\text{interaction}} = 0.01$). The incidence of RA in participants with a BMI < 30 kg/m² (227 cases, 27,015 participants) was 2% lower for each additional serving of alcohol consumed per week (0.98(0.96-0.99)), no statistically significant effect was seen for alcohol in those with a BMI 30+kg/m², though numbers were smaller in this group.

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OC176. Associations between n-3 index and systemic lupus erythematosus disease activity.

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Higher consumption of n-3 polyunsaturated fatty acids (PUFAs) is associated with reduced severity of cardiovascular disease (CVD) and autoimmunity⁽¹⁾. The n-3 index (O3I), which correlates to n-3 PUFA habitual intake, is a useful clinical biomarker in determining cardiovascular risk⁽²⁾. Individuals with an O3I <4% are considered to have higher cardiovascular risk, with 4-8% characterised as medium risk. The desirable O3I is >8% and deemed low risk for a cardiovascular event⁽³⁾. Yet, little is known about O3I in systemic lupus erythematosus (SLE) patients who have a higher risk of CVD associated with their disease. This analysis aimed to determine the O3I of SLE patients, and its associations with disease activity.

A non-fasted blood sample was collected from SLE patients (n=15) and healthy participants (n=15). Isolated red blood cells were used to determine O3I and expressed as %. Habitual intake of fish, a rich source of n-3 PUFAs was assessed by questionnaire. Disease activity of SLE patients was assessed by a clinician using the British Isles Lupus Assessment Group (BILAG), Systemic Lupus Activity Measure-Revised (SLAM-R) and Systemic Lupus Erythematosus Disease Activity Index (SLEDAI). Mann-Whitney U was used to evaluate O3I differences between SLE patients and healthy participants. Spearman's rank coefficient assessed associations between O3I and SLE disease activity.

SLE patients had an O3I of 4.38% and categorised to have a medium risk of a cardiovascular event, which was significantly lower compared to healthy participants for cardiovascular risk (5.48%; $p < 0.01$). Some 67% SLE patients (n=10) reported to never/rarely consume fish (≤ 1 portion per month) whereas 53% healthy participants (n=8) reported that they consumer >2 portions of fish per month. Correlation analysis showed O3I was negatively associated with BILAG ($\rho = -0.061$), SLAM-R ($\rho = -0.215$) and SLEDAI ($\rho = -0.122$); albeit these associations were not significant ($p > 0.05$).

This is the first report of O3I in SLE patients and identified lower O3I compared to healthy participants, suggesting that SLE patients might benefit from increasing fish consumption to reduce their risk of CVD. Further research is required to fully elucidate associations between O3I and SLE disease activity.

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OC177. Associations between maternal fish intake, maternal and cord polyunsaturated fatty acid concentrations and offspring anthropometrics at birth and at 7 and 13 years of age. James E McMullan¹, Alison J. Yeates¹, Philip J. Allsopp¹, Maria S. Mulhern¹, J.J. Strain¹, Edwin van Wijngaarden², Gary J. Myers², Emelyn Shroff³, Conrad F. Shamlaye³ and Emeir M. McSorley¹ 1. Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine BT52 1SA, Ireland and 2. School of Medicine and Dentistry, University of Rochester, 601 Elmwood Avenue, Rochester, NY 14642, USA 3. The Ministry of Health, Mahé, Republic of Seychelles.

Findings from animal models suggest early exposure to polyunsaturated fatty acids (PUFAs) during pregnancy may influence developmental plasticity including adiposity⁽¹⁾. Birth cohort studies examining associations between offspring weight and maternal n-3 PUFA status or maternal fish intakes, the richest dietary source of n-3 PUFAs have been few and have yielded inconsistent findings. Some have reported lower weight at birth and throughout childhood with increasing maternal fish intakes and n-3 PUFA status⁽²⁾, whilst others have observed positive or null associations⁽³⁻⁴⁾. These have focused on the first few years of life and have been conducted within low fish-consuming populations. Our study provides novel data by examining associations between maternal fish consumption and prenatal PUFA (n-3 & n-6) status and offspring weight at birth and throughout childhood (7 & 13 years) in a high fish-eating population.

Pregnant women were enrolled in the Seychelles Child Development Study Nutrition Cohort 2 between 2008-2011. Serum PUFAs were quantified in maternal blood collected at 28-weeks' gestation and in cord blood collected at delivery using gas-chromatography tandem mass spectrometry. Maternal fish consumption was assessed at 28-weeks' gestation using a Fish Use Questionnaire. Childbirth weight (kg) was measured at delivery and classified according to WHO growth standards⁽⁵⁾ (n=1185). Child height (m), weight (kg), waist and hip circumference (cm) were recorded at 7 (n=1167) and 13 (n=878) years. Statistical analysis was conducted using logistic and multiple linear regression adjusting for child sex, gestational age, maternal age, BMI, alcohol use, socioeconomic status, and parity. Models at 7 & 13 years were additionally adjusted for child height and fish intakes.

Women were consuming on average 8.49±4.51 fish meals/week during pregnancy. No significant associations were found between maternal fish intakes and anthropometric outcomes at birth, 7 & 13 years. No significant associations were observed between maternal PUFAs and offspring weight at birth. At both 7 & 13 years, however, higher maternal total n-6 PUFAs were associated with increased child weight [7yr; $\beta=0.070$, $p=0.003$, 13yr; $\beta=0.097$, $p=0.004$], waist circumference [7yr; $\beta=0.086$, $p=0.003$, 13yr; $\beta=0.105$, $p=0.004$], and hip circumference [7yr; $\beta=0.062$, $p=0.027$, 13yr; $\beta=0.090$, $p=0.013$]. No significant associations were found between cord n-6 PUFAs and birth weight. In quartile analysis, cord docosahexaenoic acid (DHA; C22:6n-3) concentrations <0.071mg/ml were associated with a higher risk of large for gestational age (LGA; >90th percentile) when compared to cord DHA concentrations >0.129mg/ml [OR 4.17, $p=0.017$]. There were no significant associations between cord PUFAs and anthropometric outcomes at 7 & 13 years.

These findings suggest lower cord DHA, an n-3 PUFA, may be associated with higher risk of LGA at birth whilst higher n-6 PUFAs during pregnancy may be associated with adiposity development throughout childhood. Future work is needed to determine the potential long-term metabolic consequences of such associations.

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Student Competition

OC178. Characterisation of patients diagnosed with pernicious anaemia: A first step towards James Lind Alliance Priority Setting Partnership driven research. A. Thain¹, P. Visser², K. Hart¹ and KR. Ahmadi¹ 1. School of Biosciences and Medicine, University of Surrey, Guildford, UK and 2. The Pernicious Anaemia Society, Bridgend, UK.

Pernicious anaemia (PA) is characterised by vitamin B12 deficiency due to autoimmune-mediated loss of gastric parietal cells and intrinsic factor, a specific transporter for the intestinal uptake of vitamin B12. PA is typically managed with lifelong intramuscular hydroxocobalamin injections every 2-3 months. However, this regimen lacks robust scientific validation and fails to account for varied symptomatic responses among patients, with many requiring more frequent injections(1).

The Pernicious Anaemia Society (PAS) is a patient-driven charity that identified 10 research priorities for PA through a James-Lind Alliance Priority Setting Partnership(2). PAS members were surveyed to build a PA Research Repository, exploring diagnostics, treatment, family histories, and comorbidities. This project aims to better understand and manage the condition by addressing these priorities and characterising a cohort of patients.

An online survey was designed using SurveyMonkey comprising 21 questions to collect data on demographics, mode and timing of PA diagnosis, diagnosed comorbidities, family history of PA or other autoimmune conditions, and management (type, regime and patient satisfaction). All questions were compulsory. The survey was sent to 3,482 PAS members (April-September 2022) via the PAS newsletter, email, and website. Chi-square tests were used to investigate associations between gender and survey responses. The study protocol and procedures received a Favourable Ethical Opinion.

Completed surveys were received from 1,191 PAS members (34% response rate). Among these, 971 (81%) had a confirmed PA diagnoses, and the cohort was predominantly UK-based (92%) females (81%) aged 23-90 years, with a wide age of onset (10 to 80 years, mean 49 years). Diagnoses were typically based on low serum B12 (40%), positive intrinsic factor (31%), and/or parietal cell autoantibodies (13%), with 7% diagnosed via the now obsolete Schilling test. Diagnostic delays were common, 39% of participants reported waiting ≥ 3 years for a diagnosis. Over half (59%) reported other micronutrient deficiencies upon diagnosis. Half reported additional autoimmune diseases, with one-third having family with PA or other autoimmune conditions. Treatment primarily involved hydroxocobalamin intramuscular injections (77%), with 48% following the recommended guidelines and 52% injecting more frequently. Females had higher prevalence rates of Hashimoto's disease (27% vs 7%), asthma (33% vs 20%), and iron deficiency (49% vs 35%) (all $p < 0.05$).

This survey has established the first-ever PA research repository of over 1,000 participants offering initial insight into the complexities of PA, from varied age-of-onset and familial clustering to diagnostic challenges and treatment variability. These results support the need for improved diagnostic and treatment strategies, supporting the research recommendations made in the recent vitamin B12 deficiency NICE guidelines(3). It also highlights the potential of collaborative research with a patient-driven charity. Collaborative efforts aim to advance patient-centred PA research, improve treatment evaluation, and develop evidence-based approaches to managing this complex condition.

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Student Competition

OC179. What is the prevalence of vitamin B12 deficiency among healthy vegans and vegetarians of European ancestry residing in Western Europe or the USA? A. Niklewicz¹✉, L Hannibal², M. Warren³ and K. R Ahmad¹. 1. Department of Nutritional Sciences, Faculty of Health & Medical Sciences, University of Surrey, Guildford and 2. Laboratory of Clinical Biochemistry and Metabolism, Department of General Paediatrics, Adolescent Medicine and Neonatology, Faculty of Medicine, Medical Center, University of Freiburg, Freiburg, Germany and 3. Norwich Research Park, Quadram Institute Bioscience, Norwich, UK ✉ Ali Niklewicz is a PhD student supported by a Doctoral Training Program Studentship from the BBSRC.

Vegan and vegetarian diets, lacking animal-based foods, increase the risk of vitamin B12 deficiency⁽¹⁾. Yet, there is limited current data on its prevalence among European ancestry individuals in Western Europe or the USA. This study aimed to provide a consensus on the prevalence of B12 deficiency among vegans and vegetarians of European ancestry residing in Western Europe or the USA.

We identified studies from our systematic review of “Functional Vitamin B12 Status Among Adult Vegans” to develop a narrative review of the prevalence of B12 deficiency based on biomarkers of B12 status among vegan and vegetarians. We then used pooled data from National Diet and Nutrition Survey (NDNS)⁽²⁾ to calculate UK-specific prevalence information on B12 deficiency and insufficiency using the new NICE⁽³⁾ criteria among vegan/vegetarian women of child-bearing age (WCBA) (age 18-45) compared with older women.

A total of six studies (2013-2022) with data on the prevalence of B12 deficiency were identified. These studies were conducted on participants from UK, Norway, Spain, Czech Republic and US. Nearly all used different cut-offs to define B12 deficiency. Among vegans and vegetarians, the reported prevalence of deficiency ranged from 5-52% and 6-14%, respectively. Studies from Norway⁽⁴⁾ and Finland⁽⁵⁾ highlight low prevalence (5%) and no difference between dietary groups, possibly due to widespread supplement usage. The USA⁽⁶⁾, indicated a higher prevalence of inadequate B12 intake among vegans and vegetarians compared to omnivours, with 8% of vegans and 6% of vegetarians exhibiting serum B12 levels < 148pmol/l. Similarly, results from Spain⁽⁷⁾ noted subclinical deficiencies in 11% of participants, in both vegans and vegetarians. In the Czech Republic⁽⁸⁾, cobalamin deficiency was noted in 15% of vegans, with 17% exhibiting deficiency (Serum B12 < 100 ng/L). Notably, regular supplementation significantly reduced deficiency rates, emphasising its role in maintaining normal B12 levels. In the UK⁽⁹⁾, only one publication reported B12 deficiency rates (Serum B12 < 118pmol/L) among male vegans (52%) and vegetarians (7%). Using data from the NDNS and NICE guidelines, the prevalence of B12 deficiency was (defined as serum B12 < 133pmol/L and Holo-TC < 25pmol/L) at 5-8% among vegetarian WCBA (Age 18-45); appropriate data on vegans was not available. B12 insufficiency (potential deficiency), defined by NICE as serum B12 < 258 pmol/L and Holo-TC < 70 pmol/L, translated to 75% of vegetarians within the WCBA cohort being defined as insufficient compared to 39% among older vegetarian women. A similar but more pronounced trend emerges for Holo-TC insufficiency, with 90% of vegetarians exhibiting inadequate Holo-TC < 70 pmol/L, compared to 58% of older women vegetarians and 65% of omnivores.

Few studies report B12 deficiency among Western European vegans and vegetarians, particularly for vegan WCBA. Existing data suggest a high risk can be mitigated with appropriate supplementation or adequately fortified foods.

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Student Competition

OC180. Assessment of vitamin B12 status among women of childbearing age in the UK following vegan and vegetarian diets: results from the National Diet and Nutrition Survey (NDNS). A.

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Introduction: With the rising popularity of plant-based diets, assessing the nutritional status of individuals following these diets has become increasingly important, especially for vulnerable groups such as women of childbearing age (WCBA)¹. Vitamin B12, an essential nutrient primarily found in animal products, is of particular concern, as its deficiency can lead to serious health problems. Evaluating vitamin B12 status through multiple biomarkers provides a more comprehensive analysis, ensuring a thorough understanding of nutritional health in these populations.

Aims: To assess vitamin B12 status using a full battery of B12 biomarkers, including serum B12, Holotranscobalamin (Holo-TC) and total homocysteine (tHcy), among women of childbearing age adhering to vegan and vegetarian, compared to omnivorous diets, and to examine the association between vitamin B12 status and vitamin B12 dietary and supplement intake.

Methods: Repeated cross-sectional study based on data from four publicly available NDNS (2008-2012, 2012-2014, 2014-2015, 2016-2019) datasets (2,3). These were population-based surveys of randomly selected samples of adults which were conducted in their households.

Results

A total of 2,299 WCBA (6 vegans, 89 vegetarians & 2,204 omnivorous) across all the NDNS year groups, of which 521 had complete data for biochemical and dietary intake (participant number varies for each variable), were included in the study. Among WCBA group, the median dietary intake of B12 was 0.9mcg (IQR=0.5) in the vegan group, 1.7mcg (IQR= 2.0) in the vegetarian group, and 2.0mcg (IQR= 2.4) in the omnivore group. Median B12 intake from both diet and supplements was 1.2mcg (IQR=1.7) in vegans, 3.6mcg (IAR=2.6) in vegetarians and 5.2mcg (IQR= 2.6) among omnivores. No significant differences in B12 intake were observed between WCBA and older women (5 vegans and 48 vegetarians, age: 46-64) among vegan or vegetarian groups. We did observe significant differences in serum B12 ($p=0.02$) and Holo-TC concentrations ($p<0.001$) but not for tHcy ($p=0.760$) between these two age groups among vegetarians. Vitamin B12 biomarker data was available for only four vegans of which none were deficient, but half had insufficient B12 status based on serum B12 (<258 pmol/L) and Holo-TC (<70 pmol/L) levels. The proportion of B12 supplement users among vegans and vegetarians was 50% and 27%, respectively. Among all WCBA, of those with intake levels below 2.5mcg (current WHO/FAO recommended EAR for B12) (4) 41% had serum B12 levels below 200pmol/L compared with 23% when intake is above 2.5mcg. There were not enough data for vegans but 54% of vegetarians had serum B12 levels below 200pmol/L when not meeting the EU EAR.

Conclusion

There has been a considerable rise in the number of individuals taking up plant-based diets in Western society but data pertaining to this demographic remains notably scarce. Results presented here based on four combined releases of the NDNS program underscores a significant risk of B12 deficiency and insufficiency among individuals adhering to plant-based diets significantly exacerbated in WCBA and not adhering to an appropriate regimen of B12 supplement use.

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Student Competition

OC181. Diversity of plant-based food and beverages consumption in the UK adult population: a cross-sectional analysis of the National Diet and Nutrition Survey Year 9. *E. Dimidi¹, A. Creedon¹, M.G. Arulpragasam¹, N. McCall¹, L. Foyle¹ and R. Gibson¹* *1. Department of Nutritional Sciences, King's College London, London, UK.*

There is a considerable body of evidence supporting the effects of increasing quantity of plant-based food consumption on health. Recently, there has been interest in the importance of diversity of plant-based food consumption, however, this remains less well understood⁽¹⁾. This study aims to (1) characterize the quantity and diversity of plant-based foods consumed, and (2) determine the association between plant-based food diversity, nutrient intake and demographic characteristics, in a nationally representative UK adult population.

This is a cross-sectional study using the National Diet and Nutrition Survey Year 9 (2016/2017) adult cohort. Participants completed estimated food and drink diaries over four days, which were then analysed to determine the intake of 258 distinct plant-based items within 2,202 discrete and composite foods. Items in all plant food categories (fruits, vegetables, grains, herbs, spices, nuts, seeds, fats, oils and beverages) were included. The mean daily diversity count was calculated by dividing total diversity counts by the number of food-diary days completed. Diversity was categorised into terciles to estimate low, moderate and high plant-based food diversity. Multivariate regression analyses were conducted to identify predictors of diversity of plant-based food consumption.

Overall, 677 adults were included (58% female, 91% white, 29% with a degree). The median diversity of plant-based food intake was 8 counts/d (IQR 4). Diversity of plant-based food intake was categorised into the following terciles: low (median 5.5, IQR 1.8 counts/d), moderate (median 8.1, IQR 1.3 counts/d), and high diversity (median 11.0, IQR 2.3 counts/d). Vegetables were the largest contributors (22%) to diversity, followed by fats and oils (19%), and fruit (18%). The high diversity tercile had a higher fibre intake, compared to low diversity (median 11.5, IQR 4.9 g/d vs median 9.5 vs 4.0 g/d; $p < 0.001$), and a lower trans fat intake (median 0.5, IQR 0.3 g/d vs median 0.6, IQR 0.4 g/d; $p = 0.031$). Higher annual income (+0.2 diversity counts/d per £5,000 increments, 95% CI 0.1-0.3; $p < 0.001$), higher qualification levels ($p < 0.001$), and following a vegetarian dietary pattern ($p = 0.008$) were significantly associated with higher daily diversity.

This is the first study to characterise plant-food diversity intake in the UK, showing the UK population consumes on average eight different plant foods a day. Higher plant-food diversity is linked to improved nutritional intake, and may offer an alternative strategy to optimise healthy diets. However, this remains to be confirmed in high quality randomised controlled trials, and the potential socio-economic disparities in relation to such a nutritional public health intervention need to be explored.

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OC182. A survey to understand whether an evolution of the Eatwell Guide and use of icons would support protein diversification, particularly more plant-based and fungi-based (non-animal) proteins. *L.R. Durrant¹, S Slade², T Haffner² and H.E. Theobald¹*. 1. Marlow Foods Ltd, Stokesley, UK
2 MyNutriWeb, London, UK.

Dietary guidelines, such as the Eatwell Guide, play a crucial role in shaping public perceptions and behaviours regarding nutrition. In recent years, there has been a growing interest in diversifying protein sources, particularly towards more sustainable options such as plant-based and fungi-based proteins.⁽¹⁻²⁾ However, the effectiveness of current dietary guidance in promoting these alternatives remains uncertain.⁽³⁾ This study aims to seek views from healthcare and food professionals on whether an evolution of the Eatwell Guide to represent more protein-rich foods, and incorporate icons to denote origin of protein sources, could raise awareness of and support protein diversification.

Between 8th and 31st March 2024, an incentivised survey was distributed to members of the MyNutriWeb community, consisting primarily of healthcare and food professionals. The survey aimed to gauge respondents' perceptions of whether an evolution of the visual representation of the Eatwell Guide, to represent more protein sources pictorially or within the description, and the use of icons within the plate image, would support them when talking through the protein section and support protein diversification, particularly in the form of plant-based and fungi-based proteins.

Of the 865 respondents, the majority (65%) were dietitians and nutritionists, with 12% being students and the remaining respondents representing various other food and health professions. While 83% (of 719 respondents) reported finding plant-based and fungi-based foods and drinks easy to identify within the Eatwell Guide plate image and description, only 12% were confident that those they support can easily identify them. However, a significant proportion (92% of 712 respondents) believed that updating the proteins description and images within the Eatwell Guide to showcase a more diverse range of proteins, will support people to consider more plant-based and fungi-based proteins within their diet. Furthermore, 68% (of 688 respondents) think adding plant-based and fungi-based icons to help themselves and other people to more easily identify plant-based and fungi-based foods and drinks would be 'helpful' or 'very helpful'.

These findings underscore the potential for visual and descriptive enhancements of the Eatwell Guide, such as the inclusion of a more diverse range of protein foods and the use of icons, to improve the effectiveness of dietary guidelines in promoting protein diversification. By better representing plant-based and fungi-based options, the Eatwell Guide could facilitate informed decision-making and encourage the adoption of more sustainable dietary practices. Moreover, the high level of support expressed by respondents, including nutrition professionals, highlights the relevance and importance of incorporating visual aids to support the in-practice promotion of healthier and more sustainable dietary habits.

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OC183. Spaghetti Bolognese without the mince: analysis of meat in UK meal structures. B.J.J. McCormick¹, D. McBey¹, G.W. Horgan² and J.I. Macdiarmid¹ 1. The Rowett Institute, University of Aberdeen, Aberdeen, UK and 2. BioSS, Aberdeen, UK.

Climate change is strongly linked to production of livestock^(1,2) and national recommendations are to reduce meat consumption, especially ruminant meat⁽²⁾, as part of a more sustainable diet. However, this recommendation in isolation is no guarantee that diets would be healthy or have lower greenhouse gas emissions because foods are eaten within the context of meals and a wider diet. In this study the role of meat within the context of UK meals was examined to understand the potential knock-on consequences for meal structures.

Cross-sectional dietary intake data from UK National Diet and Nutrition Surveys⁽³⁾ (2008- 2019) were analysed to compare the composition of 287,719 eating occasions. Mixed-effects logistic and gamma regressions models were used to determine the likelihood of consumption and, when eaten, the quantity consumed of selected food groups based on the coincidence of other foods in the meal. Models adjusted for age ($1.5 \leq \text{years} \leq 96$), gender, and time of day in addition to a random intercept for participants.

Of the eating occasions examined, 30% contained meat, rising to 42% for evening meals (5pm to 8pm). Meats were a significant determinant of the type of starchy foods within a meal, for example the likelihood of pasta was higher with beef (OR 1.06 (95% CI 1.04, 1.07) per z-score change in beef in the meal) than poultry (OR 0.87 (0.85, 0.87)) whereas rice was more likely to be eaten with chicken (OR 1.44 (1.42, 1.46)) than beef (OR 1.06 (1.04, 1.08)). The likelihood of potatoes in a meal increased with all meats, but the likelihood of bread was lower in meals containing meat, except for bacon and ham (OR 1.30 (1.30, 1.33)). The presence of meat, of almost any type, in a meal was predictive of vegetables in the meal. On average the quantity of meat increased the quantity of vegetables in the meal by approximately 11.2% (95% CI 9.5, 12.8), 8.7% (6.0, 11.4), 8.1% (5.5, 10.8), and 3.9% (2.7, 5.2)% per 100g increase of beef, lamb, pork, and poultry respectively.

Recommendations to reduce meat consumption must consider the wider impact on the whole diet as meals are restructured. Observed meals indicate the combinations of foods currently consumed, and how people may change eating patterns if they reduce meat consumption. The consequence of reducing meat in meals may change the choice of starchy elements. Switching from beef to poultry would likely increase rice consumption and reduce use of potatoes and pasta, attenuating the net reduction in emissions. However, since meat was positively predictive of the presence and quantity of vegetable in meals, reducing meat content may, in the short term, have negative implications for public health as people restructure meals.

Acknowledgments

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OC184. Can in-store product placement encourage purchases of side salads? A quasi-experimental study in a UK supermarket setting. V.L. Jenneson¹, F.L. Pontin², A. Fildes³, W.C. Young⁴, M.A. Morris^{1,2} 1. School of Food Science and Nutrition, Faculty of Environment, University of Leeds, UK and 2. Consumer Data Research Centre, School of Geography, Faculty of Environment, University of Leeds, UK and 3. School of Psychology, Faculty of Medicine and Health, University of Leeds, UK and 4. School of Earth and Environment, Faculty of Environment, University of Leeds, UK.

Fruits and vegetables are rich in dietary fibre, vitamins and minerals making them beneficial for health. The UK's Eatwell Guide (EWG)⁽¹⁾ recommends fruits and vegetables make up 40% of the diet (by weight), but on average they contribute less than 29% to the UK diet⁽²⁾. Prominent product placement can boost sales. We explored the effect of placing salads next to ready meals in a retail setting, on salad and total fruit and vegetable sales.

In a 12-week intervention (July – October 2021), four bagged salad products were shelved above Italian ready meals in 23 stores. Salads displayed a 'healthy' on-pack symbol and shelf signposting encouraging customers to 'add salad to their baskets for a balanced meal'.

Two matched control store groups were identified, based on store area demographics (n=23 stores) and store-level pre-intervention bagged salad and Italian ready meal sales (n=21 stores), accounting for external sales influences, e.g. weather, supply chain shocks and Covid-19 lockdown behaviours. Transactions were shared by the retailer for 2 years before, 3 months during, and 9 months post-intervention.

Two years of pre-trial transactions (units and weight) were aggregated to the store level to produce an interrupted time series model quantifying changes in store-level daily sales of promoted salads, versus a predicted counterfactual. Analysis was repeated in control stores.

Within-group change in mean basket proportion (by weight) by EWG segment was examined via the Wilcoxon signed-rank test for difference, comparing the intervention period with two time-matched baseline (BL) periods (BL1 = July – October 2019, and BL2 = July – October 2020).

In the first three weeks of the intervention, unit sales of promoted salads increased by 35.74% (CI 25.91 - 45.72, $p < 0.001$) vs counterfactual in the intervention stores. However, over the whole 12-weeks, unit sales were down 18.34% (CI -26.17%, -10.35%, $p < 0.001$) vs counterfactual. A similar trend was observed across control groups, indicating changes were independent of the intervention.

In intervention stores, fruits and vegetables made up 38.75% of baskets at BL1, but declined significantly over time, down 4.12 ($p < 0.001$) percentage points in the intervention period vs BL1 and 1.43 ($p < 0.001$) vs BL2. The proportion of composite (multi-ingredient) dishes rose; up 0.74 ($p < 0.001$) percentage points vs BL1 and 1.35 ($p < 0.001$) vs BL2, as did discretionary items; up 0.91 ($p < 0.001$) percentage points vs BL1 and 0.45 ($p < 0.001$) vs BL2. Similar patterns were observed in control stores.

Salad sales increased at the start of the intervention relative to predicted sales, but the same change was observed in control stores meaning it cannot be attributed to the trial. Pre-intervention fruit and vegetable purchases with the retailer aligned with the EWG, indicating shoppers already had healthy purchase patterns which may have limited intervention effectiveness.

Acknowledgments

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programmes on healthy and sustainable diets. It is part of a broader suite of interventions at multiple retailers. Specific thanks to the Healthy and Sustainable Diets Team at IGD. We gratefully acknowledge support from staff at the retailer who provided data and insight for this work.

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OC185. Evaluating the prevalence of high fat sugar salt (HFSS) products and labelling characteristics of foods sold in-store Restricted Areas: A survey in three UK supermarkets following the 2022 implementation of The Food (Promotion and Placement) Regulations. E. Hurst¹, S. Moore¹ and L. Wallis¹. 1. School of Food Science and Nutrition, University of Leeds, Leeds, LS3 9JT, United Kingdom.

Regulations restricting promotion of some High Fat, Sugar, Salt (HFSS) products within “restricted areas” (RAs) (e.g. end of aisles) of eligible supermarket stores came into force in October 2022 in England.

To evaluate the prevalence of HFSS products, Front-of-Pack Nutrition Labelling (FOPNL) characteristics and categories of foods sold within RAs in a sample of supermarket stores, with respect to the Food (Promotion and Placement) Regulations 2021.

A cross-sectional survey of products in RAs in three supermarkets.

Following the manual identification of each supermarket’s RAs, from November 2022-January 2023, these were photographed and the display of products and their Front-of-Pack Nutrition Labelling (FOPNL) recorded. Products were identified using corresponding online supermarket webpages, from which data collected included product name, nutrition, and ingredients. This information was used to allocate each product to a category (e.g. ready meals) that was either in or out of scope of the Regulations. Evaluation of each product’s healthfulness was performed using the UK Nutrient Profiling Model (to determine HFSS status) and UK Multiple Traffic Light criteria to calculate number of inherent (i.e. possessed regardless of their display) Red Traffic Lights (iRTL). Prevalence of HFSS, FOPNL and iRTL were calculated as a proportion (%) of total products displayed in the included RAs. Associations between the prevalence of these characteristics were performed using chi-squared tests.

Across the three stores, 86 RAs were identified, with data collected from 32 RAs displaying 679 food products, most of which fell into product categories considered out-of-scope of the Regulations (64%, n=435). Across included RAs, the prevalence of HFSS products within all in and out-of-scope categories, was 42 % (n=282). Half of all products (53%, n=357) displayed FOPNL, and 16% possessed 1, 2 or 3 iRTL, including both HFSS and non-HFSS items. Across those product categories in-scope of the Regulations (n=245), prevalence of HFSS was 17% (n=42). These HFSS products were less likely to display FOPNL compared to non-HFSS products ($\chi^2 = 25.01, p < 0.001$).

Following the implementation of The Food (Promotion and Placement) Regulations, intended to create healthier food retail environments, products sold across Restricted Areas of three eligible supermarkets included those in categories in and out of scope of Regulations with varied prevalence of less-healthy (HFSS) products, display of FOPNL, and possession of iRTL across both. This study is a first researcher-led evaluation of the recently regulated consumer-facing in-store environment, with implications for future policy impact evaluation.

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OC186. Subjective feedback from the EatWellUK-2 study: Insights for personalised nutrition apps. Eka Bobokhidze¹, Michelle Weech¹, Rosalind Fallaize^{1,2}, Faustina Hwang³ and Julie Lovegrove¹. 1. Hugh Sinclair Unit of Human Nutrition, Department of Food and Nutritional Sciences, and Institute for Cardiovascular and Metabolic Research, University of Reading, Whiteknights, Reading, UK, RG6 6DZ, UK and 2. School of Life and Medical Sciences, University of Hertfordshire, Hatfield, UK, AL10 9AB, UK and 3. Biomedical Engineering Section, School of Biological Sciences, University of Reading, Whiteknights, Reading, RG6 6DH, UK.

Poor dietary habits are associated with the development of non-communicable diseases⁽¹⁾. Most strategies implemented to enhance population diet quality follow a “one-size-fits-all” standardised approach, often neglecting individual preferences and requirements. Evidence suggests that personalised nutrition (PN) advice, tailored to an individual, can improve dietary intakes⁽²⁾. This research investigates participants’ subjective feedback from the EatWellUK-2 randomised control trial that compared PN advice versus general dietary guidance, both delivered via eNutri, a web app, developed at the University of Reading. eNutri delivers automated food-based nutrition advice tailored to the user based on their dietary intake recorded by a food frequency questionnaire (FFQ)⁽³⁾.

Participants were disease-free UK adults (>18y) who were randomised to the PN or control group. Participants completed the eNutri FFQ, then automatically received via the app either advice tailored to their dietary intake (PN group) or general population advice based on the UK’s Eatwell Guide (control). Following a 12-week intervention, the FFQ was repeated and participants completed a feedback questionnaire containing open-text and Likert questions assessing agreement with statements (strongly disagree, disagree, neutral, agree and strongly agree). Mann-Whitney U tests compared the mean ranks between the PN and control groups for each question. Data are presented as percentages of participants who felt positively about each statement based on “agreed” plus “strongly agreed” responses. The study received ethical approval from the University of Reading Research Ethics Committee (08/19) and was registered at ClinicalTrials.gov (NCT03897972).

Participants (90% female) had a mean (SD) age of 46 (15) y and BMI of 25.8 (6.1) kg/m². When asked about the advice received, the responses of the PN group (n=54) were more positive that “it encouraged me to eat healthily, even if only for short time” (p=0.045, PN 55.6% vs control 41.8%) and “it was clear what changes I needed to make to improve my diet” (p=0.011, PN 73.6% vs C 51.8%). When asked to provide an “app review” of eNutri, the control group (n= 55) described their advice as “too general” and “readily available elsewhere”, while the PN group said it contained “varied and realistic examples”, and the advice was “very clear”, “helpful” in relation to choosing “better foods to eat” and allowed people to “assess your own goals”.

Participant feedback favoured PN over general population advice as it provided encouragement and clarity about which dietary changes would benefit each individual. Together with the quantitative results from the EatWellUK-2 study, which are still being analysed, these findings will help to assess eNutri’s potential as a useful tool to encourage UK adults to adopt healthier dietary behaviours.

Acknowledgments

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Student Competition

OC187. Using fruit and vegetable intakes to illustrate the impacts of personalised nutrition feedback: Results from the MyPlanetDiet RCT. *K.P Davies¹, E.R. Gibney¹ and A.M. O'Sullivan¹*. *Institute of Food and Health, School of Agriculture and Food Science, University College Dublin, Dublin, Ireland.*

Previous research has shown personalised nutrition feedback is more effective than generic one-size-fits-all nutrition advice ⁽¹⁾. Using fruit and vegetable intakes from the MyPlanetDiet randomized controlled trial, this analysis will determine if different severity of personalised nutrition feedback delivers greater dietary change.

Participants were recruited from the general public and randomised to receive personalised feedback based on a more sustainable diet (intervention) or Healthy Eating Guidelines (control). Intervention participants received feedback on total fruit, total vegetables, dark green vegetables, and/or red/orange vegetables. Control participants received feedback on total fruit and vegetables, total vegetables, citrus fruits, and/or fruit juice. Participants completed dietary assessments (3x 24-hour recalls) at baseline (Week 0) and endpoint (Week 12) using Foodbook24, a validated online dietary assessment tool ⁽²⁾. Mean food group intakes and Healthy Eating Index scores were calculated. Personalised feedback messaging was assessed to measure the severity of fruit and vegetable feedback, ranging from zero messages (least severe) to four messages (most severe). Data are presented as mean \pm standard error. Data were analysed via two-way mixed analysis of covariance and univariate general linear models using IBM SPSS Statistics (Version 29).

Participants (n=292) were 56% female and 42.3 \pm 0.7 years old. Mean fruit and vegetable intake at baseline was 325.4 \pm 183.3g. Almost all participants (97%) received feedback for at least one component of fruit and vegetable intake. Control participants were more likely to receive feedback on fruit (p<0.001) while intervention participants were more likely to receive vegetable feedback (p<0.001). There was a significant time*group interaction for fruit intake (p=0.005) with larger increases in the control (+102.3g) than the intervention group (+38.6g). The intervention group had higher vegetable intakes (200.6 \pm 7.9g) compared to control (164.2 \pm 7.5g) at endpoint (p<0.001). Those receiving more severe fruit and vegetable feedback had significantly lower intakes of fruit and vegetables at baseline (p<0.001) but not endpoint (p=0.80). There was a significant time*group interaction for fruit and vegetable intake (p<0.001) between severity groups. Those with least severe feedback decreased fruit and vegetable intake (-57.4g) while those in the most severe group increased intakes by 162.2g. However, mean fruit and vegetable intake in the least severe group was still higher (472.9 \pm 31.8g) at endpoint than in the most severe group (397.2 \pm 23.6g). There was a significant time (p<0.001) and time*group interaction (p=0.039) in HEI scores with the smallest increase in the least severe group (+3.7) and the largest increase in the most severe feedback group (+9.6).

More personalised nutrition feedback was associated with greater behaviour change when using fruit and vegetable intake as an example. Differences in messaging between control and intervention groups led to corresponding differences in dietary change. Different severity of personalised nutrition feedback resulted in participants having comparable fruit and vegetable intakes at endpoint.

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Student Competition

OC188. Development of an index to assess adherence to the Traditional Chinese Dietary pattern - a modified Delphi study. J. Niu¹, B. Li¹, and A. Papadaki¹. ¹Centre for Exercise, Nutrition and Health Sciences, School for Policy Studies, University of Bristol, Bristol, UK.

Adhering to traditional diets could significantly contribute to enhancing health and promoting environmental sustainability (1). China reports the highest incidence of non-communicable disease related fatalities globally (1). There has been no consistent definition of the traditional Chinese diet (TCD). Findings on the association between TCD and health outcomes are also inconsistent (2). Therefore, it is critical to establish a consensus on the definition of the TCD, including food groups that are characteristic of this diet and their quantities. The Delphi method is widely accepted as an effective tool for consensus-building among experts (3). Hence, this study aimed to 1) establish an index for assessing adherence to the overall TCD, involving inviting nutrition experts to achieve a consensus on which food groups, food quantities, and food-related habits define the TCD; and 2) develop five indices that characterise regional TCDs (for the eastern, western, southern, northern, and central Chinese regions).

From October 2023 to February 2024, a three-round modified Delphi study was conducted via an online platform. The eligible participants were nutrition experts, working in various fields, including academic professors, registered dietitians, and clinical nutrition physicians. Participants were invited to complete online questionnaires, to establish the food groups and food-related habits that characterise TCD by using a mix of Likert scales, a list of responses, and yes/no questions. Open-ended and free-text questions were also used to collect detailed comments/suggestions. Consensus was assessed by using percentages of agreement; median values and interquartile ranges were used to illustrate the recommended consumption ranges for each food group to be included in the index. Statistical analyses were performed using SPSS and NVivo 12.

Fifty-eight nutrition experts (a minimum of ten experts from each region) were involved in the first Delphi round. Response rates for the second and third rounds were 87.9% and 93.1%, respectively. The resulting overall TCD index comprises 15 food groups plus one dietary habit, with scores ranging from 0 to 23 (minimum to maximum), where higher scores reflect higher adherence to TCD. Rice, various vegetables, fruits, eggs/egg products, wheat/wheat products (excluding wheat with filling), and starchy roots and tubers scored two points when meeting the consumption range. Wheat with filling, pork/pork products, fermented foods, deep-fried wheat, corn/coarse grains, legume products, beef/beef products, poultry and cooking by steaming and/or boiling were scored one point each when meeting the consumption criteria. Five regional TCD indices, including food groups and the range of quantities for each food group, were also developed.

This modified Delphi study achieved consensus for developing TCD index and five regional TCD indices for the first time. These indices can be utilised as essential instruments for future research on exploring adherence to TCD and its impacts on health outcomes and environmental sustainability.

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Student Competition

OC189. Understanding current discourses on food poverty on the island of Ireland. C. Kerins¹, C. Kelly¹, S. Furey², P. Kerrigan³, A. McCartan⁴ and E. Vaughan¹ 1. Health Promotion Research Centre, School of Health Sciences, University of Galway, Galway, Ireland and 2. Department of Hospitality and Tourism Management, Ulster University Business School, Ulster University, Coleraine, Co. Londonderry, UK and 3. School of Information and Communication Studies, University College Dublin, Dublin 4, Ireland and 4. School of Communication and Media, Ulster University, Belfast, Co. Antrim, UK.

Food poverty is an acknowledged social determinant of health and is associated with significant adverse health outcomes^(1,2). It is a growing issue on the Island of Ireland, due to a number of factors, including, the COVID-19 pandemic, chain supply issues, inflation and external geo-political events. As news media play a key role in shaping policy discourse⁽³⁾ and public attitudes⁽⁴⁾ towards health and social issues, understanding how the issue of food poverty is framed on the island of Ireland may help health promoters develop alternate framings to better advocate for effective policy measures. The overall aim of this research was to investigate the discursive construction of food poverty in the news media, and to explore public, policy and key stakeholder perceptions of food poverty.

A series of interlinked studies were conducted, including analysis of policy documents, analysis of print and broadcast news media reporting on food poverty, and qualitative interviews with news media professionals, members of the public, third sector community organisations and policymakers. In analysing how the topic is framed, the research drew on Entman's Framing Theory. An integrated knowledge translation approach was adopted throughout the research process.

Findings from analysis of policy documents ($n=48$), print ($n=81$) and broadcast ($n=91$) news media, and qualitative interviews with key stakeholders ($n=44$) across the island of Ireland revealed four core inter-linked and over-lapping discursive frames, including: political dysfunction, economic dysfunction, social dysfunction, and individual dysfunction. A key finding included differing opinions between participants in the North and the Republic on whether lifestyle (individual dysfunction) or structural (political dysfunction) factors were salient drivers of food poverty. Those who leaned more towards understandings of food poverty that included individual dysfunction showed greater endorsement of individual and community level interventions, while those who leaned more towards understandings that included political dysfunction showed greater endorsement of policy-led interventions. This coherence was not evident in news media reporting, where media discourse more prominently highlighted community-led responses (e.g. charitable food aid), despite acknowledgement of its upstream drivers. Another key finding was the absence of the voices of those experiencing food poverty from news media reporting on the issue. While news media professionals expressed a need for case studies, third sector service providers raised questions about the ethical engagement with vulnerable populations.

The research findings highlight that the problem of food poverty is largely depicted through the lens of charity, which precludes obligations for state actors and says nothing of the right to food. Re-framing discussions of food poverty as a health and human rights issue may be a fruitful strategy in addressing the problem. Health promoters, researchers and other stakeholders interested in food poverty should move towards adopting rights-based messaging when translating knowledge, including to policymakers and the media.

Acknowledges

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OC190. Modified diet adherence to nutrition standards in long-term care facilities. *E Deasy*^{1*}, *H. Sheedy*^{1*} and *G. Kent*^{1,2} *equal contributions 1. School of Food and Nutritional Sciences, University College Cork, Cork, Ireland and 2. School of Population Health, Royal College of Surgeons in Ireland, Dublin, Ireland.

Dysphagia is more common in older age and is present in up to 70% in long-term care facilities (LTCFs)⁽¹⁾. Thus, the demand for texture-modified diets (TMDs), required to ensure safe nutrition for residents, is high. Individuals with dysphagia are at greater risk of malnutrition, poorer health outcomes and quality of life⁽²⁾. Moreover, TMDs are less energy- and nutrient-dense due to necessary processing⁽³⁾. Consequently, TMDs require additional planning and fortification to meet nutrient requirements for this cohort. The International Dysphagia Diet Standardisation Initiative (IDDSI) framework describes drink thickness (level 0-4) and food textures (level 3-7; liquidised-regular), to ensure standard textural characteristics of foods and drinks, however, there is little guidance for food providers in Ireland on how to prepare TMDs to meet nutritional requirements. Whether TMDs in LTCFs meet nutrition standards for food provision in Ireland is unknown. Our aim was to conduct a clinical audit, evaluating adherence of TMDs in a LTCF in Cork, Ireland, to the BDA Nutrition and Hydration Digest⁽⁴⁾.

Samples of the daily menu, i.e. all meals, snacks and drinks for IDDSI level 3,4,5 and 6 were weighed over a 2-day period, representing the maximum food and beverages available to residents. Recipes were confirmed with the catering department. Nutritional analysis was conducted using Nutritics©. Nutritional composition was compared to the nutrition standards of the BDA for food providers for nutritionally vulnerable individuals (total daily targets:1840-2772kcal, 79-92g protein; main courses: 800kcal, 27g protein).

The daily TMDs of the LTCF provided [mean (SD)] 1928 (334) kcal, 73 (0.0) g protein (level 3); 1646 (62) kcal, 52 (2.0) g protein (level 4); 1323 (91) kcal, 45 (3.0) g protein (level 5); 1506 (75) kcal, 53 (5.0) g protein (level 6). On analysis of main courses, lunch meals provided 534 (99) kcal, 20 (3.0) g protein (level 3); 436 (0.3) kcal, 16 (0.8) g protein (level 4); 399 (16) kcal, 12 (1.0) g protein (level 5); 353 (13) kcal, 14 (0.3) g protein (level 6), while evening meals provided 770 (58) kcal, 33 (7.0) g protein (level 3); 561 (33) kcal, 19 (0.4) g protein (level 4); 305 (39) kcal, 9 (0.4) g protein (level 5); 379 (52) kcal, 18 (6.0) g protein (level 6).

Across levels, there was poor adherence to energy and protein standards. Only level 3 provided sufficient daily energy and met protein targets for evening meal, potentially explained by the use of full fat milk as a dilutant to create the correct consistency. Guidance is needed for food providers of all LTCFs in Ireland on how to prepare TMDs for nutritionally vulnerable individuals. Future research should investigate actual food consumption, malnutrition risk, oral nutritional supplementation use and training of food providers in LTCFs.

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OC191. Culinary nutrition in the United Kingdom: nationwide survey of skills, experiences and education needs of students of nutrition and dietetics. M. Renard¹, A. Knight¹, K. Whelan¹, and F. Lavelle¹. *1. Department of Nutritional Sciences, Kings College London, London, UK.*

Culinary nutrition (encompassing culinary medicine) is an emerging field that is gaining traction as potential means to mitigate the global disease burden linked to unhealthy dietary patterns, by fostering practical culinary and nutrition literacy among health professionals. Culinary nutrition programmes have shown promise in improving dietary behaviour, cooking confidence, and nutrition counselling skills among students and professionals⁽¹⁾. There is a recognised need for the development and evaluation of standardised culinary nutrition training for nutrition and dietetics (N&D) professionals and there is limited understanding regarding the preparedness of the next generation of nutritionists and dietitians in delivering effective culinary nutrition programmes⁽²⁾. This study aimed to investigate the cooking and food practices of students of N&D in UK to assess their capabilities and to inform the requirements of future educational curricula.

Between May and June 2023, an online survey was circulated to all UK universities delivering AfN- or BDA-approved nutrition or dietetics programmes, for subsequent circulation to students. It contained validated questionnaires on cooking and food skills confidence, meal preparation frequency, food engagement, and completion of curriculum-based cooking sessions. King's College London provided ethical approval. Kruskal-Wallis H tests and hierarchical multiple regression modelling with adjustment of relevant covariates were conducted using SPSS Statistics v29.0.2, with a significance threshold of $p < 0.05$.

There were complete responses from 213 students of N&D from 27 UK universities. Respondents mean age was 28.1 ± 9.4 years, 194 (91.1%) were female, and 132 (62.1%) were white ethnicity. The cohort comprised 57 undergraduate and 95 postgraduate nutrition and 32 undergraduate and 29 postgraduate dietetic students. Students' average confidence scores were 84.3 ± 14.7 (out of 98) for cooking skills and 112.0 ± 20.7 (out of 133) for food skills, with an average food engagement score of 40.2 ± 4.7 (out of 50). 95 (44.6%) students reported cooking a main meal daily, and 141 (66.2%) had completed an average of 14.2 ± 16.4 practical cooking session hours as part of their degree program. Undergraduate dietitians completed the least time of cooking sessions at 3.00h, versus undergraduate nutritionists at 9.00h ($p = 0.044$) and postgraduate nutritionists at 10.00h ($p = 0.025$). Hierarchical regression models accounted for 18.8% of the variance in cooking skills confidence and 27.7% in food skills confidence. Notably, meal preparation frequency and food engagement significantly contributed to the explained variance in the respective models ($p < 0.001$), even after adjusting for demographic factors such as gender and ethnicity.

Students of N&D in the UK exhibit higher cooking and food skills confidence compared to the general population⁽³⁾. Coupled with their inherent knowledge of nutritional science, they are well-positioned to implement future culinary nutrition interventions that could enhance public dietary behaviour and health outcomes. However, to ensure the future workforce is ready, there is a need for curriculum consensus.

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OC192. Perceptions and attitudes of food frequency questionnaires and technology-based dietary assessment tools: a qualitative study with Turkish research-focused dietitians. *M. Guney-Coskun¹, I. Kalkan¹, M. Weech², R. Fallaize^{2,3}, F. Hwang⁴ and J. A. Lovegrove²* 1. Department of Nutrition and Dietetics, Institute of Health Sciences, Istanbul Medipol University, Istanbul 34810, Turkey and 2. Hugh Sinclair Unit of Human Nutrition, University of Reading, Whiteknights, Reading, RG6 6DZ, UK and 3. School of Life and Medical Sciences, University of Hertfordshire, AL10 9AB, UK and 4. Biomedical Engineering Section, School of Biological Sciences, University of Reading, Whiteknights, Reading, RG6 6DH, UK.

Dietary assessment methods play a crucial role in evaluating individuals' and communities' dietary intake (1). Among these methods, Food Frequency Questionnaires (FFQs) are common in epidemiological dietary surveys. However, with the rapid advancement of technology and increased internet usage globally, innovative digital tools to assess dietary intake have emerged (2). Collaborative efforts between tool developers and dietitians are vital for leveraging technology effectively and advancing evidence-based nutrition practice. Thus, the aim of this study was to explore the: 1) perceived advantages and disadvantages of FFQs, 2) challenges and benefits associated with transitioning from traditional paper-based to web-based FFQs, and 3) opportunities and challenges of integrating a range of new technologies, from established digital tools such as web-based or smartphone applications to more futuristic options such as artificial intelligence and biosensors, into dietary assessment practices and research among research-focused dietitians with PhD.

Seven dietitians from Turkey with extensive experience in using dietary assessment methods were selected using purposive sampling. One-to-one semi-structured interviews were conducted using a topic guide via Microsoft Teams and transcribed verbatim into text-based records. They examined advantages and challenges of paper-based and web-based FFQs, ranked a list of predefined features for FFQ development, and provided insights into technology integration, addressing both the benefits and challenges of incorporating new tools. Preliminary thematic analysis was conducted using NVivo12 software to identify common themes.

Participants had an average of 18 years (6-49 years) of experience in nutritional research. Common challenges identified by the group included the absence of validated FFQs in Turkish (n=5), necessitating the use of FFQs alongside other methods like 24-hour recall (n=4). General diet representation was commonly appreciated, while all participants deemed paper-based semi-quantitative FFQs time-consuming. The top priorities for FFQ enhancement included a semi-quantitative feature for nutrient intake calculation, inclusion of portion size photos, and evidence-based development using national diet survey data. None of the participants had employed any digital dietary assessment tools in their research endeavors. However, there was a consensus recognizing the potential benefits and drawbacks of using technology in dietary assessment. Participants highlighted the efficiency (n=7), increased flexibility in data collection (n=6), and heightened accuracy (n=5) associated with technology-based assessment methods as significant advantages. Common concerns included users' lack of proficiency with technology (n=6), potential challenges related to the cost of research and development (n=4), and considerations surrounding data privacy and ethical breaches (n=3), particularly the unauthorized recording of sensitive information by artificial intelligence in camera-based technology.

The insights from Turkish dietitians highlight the necessity for validated Turkish web-based FFQs. While technology-based dietary assessment tools offer research benefits, addressing integration barriers is crucial. These findings will contribute to the development of web-based FFQs and more futuristic dietary assessment tools, advancing evidence-based nutrition practice.

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Student Competition

OC193. The implementation and evaluation of a recipe box scheme to help ease the cost-of-living crisis in university students. *Bhakta D¹, Aghili A¹, Illingworth S¹, Marsh K¹, Mulrooney H¹, Shu J¹, Wood P¹, Kwan C. Y¹, Ranta R², Nancheva N³, Dawson R⁴ and Dawson N⁴* 1. School of Human Sciences, London Metropolitan University and 2. School of Law, Social and Behavioural Sciences, Faculty of Business and Social Science, Kingston University London and 3. School of Arts, Humanities and Social Sciences, Roehampton University and 4. Voices of Hope, Kingston, London.

The recent ONS survey reported that 92% of students had been affected by the cost-of-living crisis with 46% revealing their overall mental health and well-being had worsened ⁽¹⁾. London Metropolitan University has a unique diverse student population: in 2020-21, 82% of students were mature, 64% of students identified as female, 55% of students were from a minoritised background and 13% had a known disability ⁽²⁾. Furthermore, at least 50% of our students, many of whom have caring responsibilities, reside in the most deprived wards of Islington or other impoverished London boroughs. It has been documented that those students with families, who come from a low income and a minority background are more vulnerable ⁽³⁾ and are more likely to be disproportionately affected by the cost-of-living crisis and at risk of food insecurity. We sought to ease the burden of the cost-of-living crisis with a recipe box scheme, BRITE Box ⁽⁴⁾ and evaluate its acceptance.

BRITE Box provides a complete set of pre-weighed ingredients for a healthy nutritious meal with an easy-to-follow recipe guide. Each box typically contains two servings of vegetables, meat, bread and dairy, as well as spices, dried and tinned goods to feed a family of five people. We distributed 300 boxes over a period of five months to students primarily with families who had accessed the university hardship fund. Student volunteers and the academic staff pre-weighed the ingredients, prepared and distributed the boxes. The scheme was advertised through Student Services who administer the hardship fund, the Student Union and the intranet. The recipients of the boxes were provided with a QR code linking to a 20-item online survey on demographic characteristics, number of children, acceptability of the box and perceived advantages and disadvantages of the scheme. Ethics was approved by London Metropolitan University.

Thirty-three participants completed the survey, 42% of the recipients identified as female, 55% were from a minority background and 30% had children. The responses showed that students agreed and strongly agreed that the recipe box introduced them to new flavours (52%), and new foods (42%). The majority followed the recipe and will use again (67%). Most importantly, 73% students agreed and or strongly agreed that it helped with the food budget and helped foster a sense of belonging to the university (85%).

The scheme has proved to be popular among the students: “a really cool concept”, “it helped me cook”, “the box provided food for 3 days” and created a buzz around campus on distribution days. It has enhanced the feeling of community and belonging within the university, whilst also alleviating food insecurity and tackling the cost-of-living crisis.

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Student Competition

OC194. Community cafés as a response to food insecurity: what is their impact? N.

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Community cafés are non-profit setups seeking to address food insecurity (FI) locally and equitably usually using a pay-as-you-feel model and surplus foods⁽¹⁾. Concerns about rising levels of FI⁽²⁾ and food waste⁽³⁾ frequently drive this model. Started in 2023, the Kitchen Roots Café (KRC) aims to provide healthy, sustainable, affordable meals without proof of need or referral. Open once a week during lunch it offers hot meals, primarily using surplus foods. Clients can pay as much or little as they wish and can pay a meal forward. A mixed methods evaluation of KRC was carried out which aimed to identify who KRC clients were and their reasons for attending, in addition to its social and nutritional impact.

Qualitative and quantitative data were gathered using bespoke questionnaires and optional interviews. In all, 32 individuals completed questionnaires, the majority in-person at KRC (91%), the remainder online. Four client telephone interviews were also held. Thematic analysis of qualitative data was carried out to identify recurring themes, while descriptive statistics were generated for quantitative data.

KRC clients were largely vulnerable. The majority were at least middle-aged (28.1% aged ≥60; 25.0% aged 50-59 years) and out of full-time employment (62.5% worked <1 day a week while 9.3% worked part-time). Self-reported disability was common (43.8% overall; 50.0% of all men). Several lived in supported housing (e.g. YMCA, accommodation for women victims of domestic violence). One reported homelessness due to their immigration status. High levels of FI were evident: over half (54.8%) used other, often multiple, food support services, including food banks, community fridges and church lunches.

The majority made use of the KRC primarily in response to FI, indicating as their main reason for visiting *support with food cost and/or the cost of living* (46.9%). For this group using the service was tightly linked with their ability to access a healthy hot meal and to save money; 85.7% *agreed or strongly agreed* with this.

Many added the social aspect of the KRC experience as a second main reason for visiting (50.0% of those who gave multiple reason). Additionally, *support the local community* and *enjoy delicious food* were highlighted. Ninety-six % of participants *agreed or strongly agreed* that coming to the KRC had improved their wellbeing, while 65.6% *agreed or strongly agreed* that it had made them feel more valued, like they 'belonged' to the community.

While concern about food waste was not their primary reason for coming, 90.6% of participants thought that eating surplus food offered at KRC benefitted the environment.

For this vulnerable group, local community café provision offered a safe space with affordable healthy food. This, plus feeling welcomed and included, benefitted their feelings of wellbeing and belonging.

Acknowledgments

We thank the KRC clients who spent time talking to us.

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OC195. Exploring the impact of cost-of-living-crisis on the dietary practices and health impact among immigrant Nigerians in the UK. B. Johnson¹, M. Sharma¹ and B. Ellahi¹ 1. Faculty of Health, Medicine, and Society. University of Chester, UK.

Morbidity and mortality from preventable diseases among ethnic minority groups are higher when compared with white population group in the UK⁽¹⁾. Diet is a major modifiable disease risk factor and depends on several factors, including the affordability and availability of foods commonly consumed by these communities. With families now bearing the burden of inflation with an increase in the price of food, and with people adapting to this by adjusting their spending, the widening of health inequality is reported⁽²⁾.

Understanding of the impact of the cost-of-living crisis (COLC) on the dietary practice and health of ethnic minority populations is limited⁽²⁾. This study explored the impact of dietary choices in the immigrant Nigerian community living in the UK, within the context of a COLC.

Using hermeneutic phenomenological design and with the aid of purposive sampling, community networks, and snowballing were leveraged to assist in recruiting participants from the Nigerian population in Manchester and London based on age, gender, and socio-economic factors. Utilising an informed consent process, fifteen one-to-one telephone semi-structured interviews were undertaken, and detailed information about culture, dietary choices, and the cost-of-living crisis was collected.

The six-step guide Braun & Clark's Reflexive thematic analysis of verbatim transcribed data from the audio-recorded interviews revealed adaptive and coping strategies have been adopted⁽³⁾. Participants report what they now eat, and activities adopted to support eating. This includes purchasing cheap, low-quality, and reduced quantities of food, reducing wastage of food through preservation of any excess, bulk cooking, or preparation to minimise energy usage. Other cost savings are being made through, cutting down on social engagements (e.g. eating out and nightlife), A focus on food "needs" and not "wants", a reliance on social networks for support and assistance, the use of food banks, and skipping meals is also reported. One participant: *"This has affected our diet. So, it's been very challenging. I mean generally, everywhere the cost of things is high"*. (GregM61). Another said, *"I just cook enough for two days so that I can save some energy and reduce my energy bills"*. (KhadijatF45). Illustrating the impact on health one participant suggested: *"When you have a cheap cost of meat and a cheap cost of carbohydrates, then you are eating badly"*. (EkongM51).

These findings cause concern since cheap and low-quality diets eaten by ethnic minority communities are known to be unhealthy and are high-risk factors for chronic diseases⁽⁴⁾. The need for long-term support for individuals or groups most at risk of the COLC, and an ongoing need to develop culturally appropriate strategies to support healthy eating on a budget for this ethnic group are paramount to prevent poor health outcomes in this group.

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Student Competition

OC196. Food insecurity, food behaviours, mental wellbeing and diet quality: a nationally representative cross-sectional investigation during the UK cost of living crisis. *M. Renard^{1*}, Y. Standish¹, Z. Bell¹, C. Reynolds², C. A Martins^{3,4}, A. Flynn^{1,5}, and F. Lavelle¹* 1. Department of Nutritional Sciences, School of Life Course & Population Sciences, Kings College London, London, UK and 2. Centre for Food Policy, City University, London, UK and 3. Center for Epidemiological Research in Nutrition and Health, University of Sao Paulo, Sao Paulo, Brazil and 4. Institute of Food and Nutrition, Federal University of Rio de Janeiro, Macaé, RJ, Brazil and 5. School of Population Health, Royal College of Surgeons in Ireland, Dublin, Ireland. *Equal Contribution

In the 12-month period leading up to March 2023, inflation in the UK increased by 8.9%⁽¹⁾. Notably, the annual inflation rate for food and non-alcoholic beverages reached a peak of 19.2% in March 2023, marking a 45-year high⁽¹⁾. Concurrently, research conducted between October 2022 and January 2023, revealed that 25% of adult respondents were classified as food insecure⁽²⁾. Food insecurity disproportionately affects young families, ethnic minorities, and individuals with disabilities, and correlates with poorer mental health, higher rates of obesity, and lower dietary quality. However, improving skills in cooking, meal planning, and budget shopping may alleviate some of the adverse health consequences associated with food insecurity. This primary research aimed to investigate the relationships between food insecurity, mental wellbeing, dietary quality, and food behaviours among a nationally representative sample of UK adults and was pre-registered (<https://doi.org/10.17605/OSF.IO/ZFMHD>).

A nationally representative cross-sectional survey was conducted in April 2023. Participants were recruited using a market research company (Dynata, UK) and quota-controlled sampling ($\pm 5\%$) for age, gender, region and socioeconomic status. Data on food insecurity, mental wellbeing, diet quality and food behaviours, were collected, using validated measures where available. Ethical approval was received from King's College London (Ref: LRS/DP-22/23-35412). Data analysis consisted of chi-square tests of homogeneity, Kruskal-Wallis H tests and hierarchical multiple regression modelling with adjustment of relevant covariates, using SPSS Statistics v29.0.2. The significance threshold was set at $p < 0.05$.

1493 UK adults participated. Within the sample, 49.9% were male, mean age was 44.7 years (SD 16.3), 35.9% were classified into groups of either low (22.2%) or very low (13.7%) food security⁽³⁾. Analyses revealed significantly higher proportions of females, individuals with lower income, and those of non-white ethnicity in the low or very low food security groups compared to groups with higher levels of food security ($p < 0.05$). Participants in the low or very low food security groups exhibited lower mental wellbeing scores and consumed fewer fruits and vegetables per day compared to those with higher food security ($p < 0.05$). Hierarchical regression models explained 28.5% of the variance in mental wellbeing scores and 16.4% in daily fruit and vegetable intake. Notably, variables related to food behaviour, such as food engagement and cooking skills confidence, significantly added to the variance explained by the models ($p < 0.001$), even after controlling for factors such as food insecurity score and income, respectively.

This study reveals the substantial prevalence of food insecurity among UK adults, whilst also highlighting its associations with mental wellbeing and dietary quality, particularly among higher risk groups. The findings emphasise the urgent need for targeted interventions. Implementing programs focused on enhancing cooking skills and wider food behaviours could serve to mitigate some of the adverse health consequences associated with food insecurity, leading to improvements in overall wellbeing.

Acknowledgments

The authors would like to acknowledge and thank all the participants who completed the survey

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OC197. Building community and offering food support to university students: the KingsGate Student Pantry. S. Sumpter¹, S. Clay², P. Harper³, S. Schwikkard¹ and H. Mulrooney^{1,4}. 1. School of Life Sciences, Pharmacy & Chemistry, Kingston University London and 2. Voices of Hope, Kingston and 3. KingsGate Church, Kingston and 4. School of Human Sciences, London Metropolitan University.

University students have high risk of food insecurity (FI) ⁽¹⁾. Largely comprising young adults, they often have poor diets ⁽²⁾, important given the potential for this life stage to embed healthful eating behaviours ⁽³⁾. Having established high levels of concern about their food security among students at a post-92 university ⁽⁴⁾, the KingsGate Student Pantry was established in November 2023 as a partnership between university staff and student volunteers, a local food charity and a local church. It includes a weekly social space with free refreshments to encourage belonging, signposting to support, cookery demonstrations and access to a range of food, household and personal hygiene items, including bread, fresh fruit and vegetables. For a weekly payment of £5, customers receive £20-35 of items (estimated). An evaluation of the Pantry to understand its impact on customers and volunteers was carried out.

Bespoke questionnaires for each group collected qualitative & quantitative data about experiences of FI, reasons for coming (or volunteering) and impact of the Pantry on nutrition and belonging. These were administered at the Pantry using QR codes. Optional telephone interviews were held. Qualitative data were analysed using thematic analysis to identify key themes, while quantitative data were used to generate descriptive statistics. The impact of demographics on responses was explored using Kruskal Wallis tests.

This ongoing evaluation currently includes 112 customer and 14 volunteer questionnaires, as well as 3 customer and 5 volunteer interviews. Preliminary results suggest that finances and social reasons are major drivers for customer attendance. Key food items required at the Pantry are vegetables and fruit; cereals, pasta and rice; and milk and dairy products – basic staple foods now expensive largely due to cost-of-living pressures. High levels of satisfaction among both customers and volunteers are apparent, not limited to the goods on offer although levels of satisfaction with these are high. Goods are largely surplus, supplemented with additional items specifically purchased using the £5 weekly customer fee. This ensures a high quality offer in addition to contributing to sustainability of the Pantry. Satisfaction also extends to opportunities to build relationships, including between community and university volunteers and customers, groups otherwise unlikely to meet. The social space and welcome received are highly valued:

'Doesn't feel like support, feels like going out shopping with friends' [customer interview]

'Happy place to be' [volunteer interview]

The Pantry therefore represents a pathway to developing a shared understanding of the meaning of community between diverse groups, to their shared benefit. Built using existing relationships and partnerships, it exemplifies how universities can utilise the skills and expertise of their community stakeholders to mutual benefit.

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OC198. Exploring food insecurity and sustainable food in rural India: collaborative learning through student mobility programme. R.K. Vijayakumar¹, G. Gayathri², R. Lakshmi² and J. Shiney², Juliette Truman¹ and Carol Clark¹. 1. Department of Rehabilitation and Sport Sciences, Bournemouth University, Bournemouth, UK and 2. Department of Clinical Nutrition, Faculty of Allied Health Sciences, Sri Ramachandra Institute of Higher Education & Research.

Four main NCDs identified in India (cardiovascular diseases (CVDs), cancers, chronic respiratory diseases (CRDs) and diabetes) are closely related to behavioural risk factors - unhealthy diet, lack of physical activity, and use of tobacco and alcohol⁽¹⁾. South India (Tamil Nadu state) where the research was conducted faces challenges like the rich-poor gap in access to health, the persistence of high levels of malnutrition, anaemia, and the ever-increasing expectation and demands for public health services from the public⁽²⁾. Variation and inequality in nutrient intake showed a declining trend⁽³⁾ due to factors such as expenditure on food, household size, and literacy and poverty especially in rural area⁽⁴⁾. There is need to determine the food insecurity situation comprehensively in India and plan appropriate policy actions to address it effectively, to attain the key Sustainable Development Goals (SDGs)⁽⁵⁾. This pilot study investigated food insecurity and related health behaviours in a rural village in Tamil Nadu. Additionally, collaborative learning (peer learning) was implemented, as both UK and local Indian students conducted this research - UK students travelled to India using the Turing Funding Scheme.

This is qualitative research, whereby researchers from two universities (UK and India) obtained perspectives of the rural communities. Data was collected in two stages: observation of health behaviours (for each family on three different days in a week), where pictures were taken with permission, and followed by face-to-face interviews (with 6 heads of households). A total of three male and three female adults (aged between 28–68 years old, all married and living in an intergenerational family setting) were interviewed for approximately 30-40 minutes and analysed thematically using the Braun & Clarke approach⁽⁶⁾. Consensus coding was used to determine invariant constituents, while reliability and validity were achieved through intercoder agreement, audio recording, triangulation, and member checking.

A total of five themes were identified: *Accessibility to food, Influences of culture, Health behaviour and barriers, and Vision for a healthier community*. It was apparent that their food consumption was affected by their economic background, but it was thought-provoking to discover that they were focusing on more sustainable and traditional ways to address food insecurity, such as consuming different millets rather than rice (which were cheaper, sustainable, and nutrient-rich), vegetables and fruits sourced locally, milk, and eggs. Limited consumption of meat and fish, processed food, and snacking was rare. Deficiencies and malnutrition were self-reported during the interview (such as iron and calcium). Limited motorized vehicles were used, and they walked a lot, there was no exercise routine practiced. Social media plays a significant role in influencing their health behaviour.

There is a need for more awareness of nutrition and health through the right channels- social and digital media.

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OC199. Food growing: building community and food resilience. *N. Nancheva*¹ and *H. Mulrooney*^{2,3}
1. School of Arts, Humanities and Social Sciences, Roehampton University and 2. School of Life Sciences, Pharmacy & Chemistry, Kingston University London and 3. School of Human Sciences, London Metropolitan University.

The Covid-19 pandemic exposed the fragility of the UK food system⁽¹⁾. Currently, 46% of fruit and vegetables are imported⁽¹⁾, making the UK vulnerable. Recent events such as war in Ukraine, volatile fuel prices and crop failures attributed to climate change have exacerbated this⁽¹⁾, with global food prices reflected in the cost-of-living crisis⁽²⁾. Food is not just a source of nutrition, but of personal and cultural identity⁽³⁾, with potential to impact on the extent to which people feel that they belong to a place or community. Community food growing schemes such as allotments remain popular in the UK⁽⁴⁾. They could increase food resilience and security through growing produce, otherwise imported. The impact of a community growing scheme based in south London was explored. The scheme, a small farm allotment, was established by a Hong Kong farmer to grow produce including traditional Asian vegetables. It also aims to encourage collective efforts e.g. co-farming, through use of shared and private spaces. Focusing on traditional Asian vegetables, it offers bespoke advice, support and education via workshops, online mentoring and traineeships.

Evaluation of this scheme was undertaken with ethics approval from Kingston University London. Using participatory non-extractive methods, qualitative and quantitative data were obtained using questionnaires and optional interviews with attendees of workshops (n=52), online mentees (n=2), and trainees (n=3).

All participants described themselves as Asian, Chinese or Hongkongers. More than two thirds (69.1%) had been in the UK for a relatively short time (up to 24 months). Both experience of, and knowledge about, growing food were low amongst participants, although this varied by group. While none of the trainees had previous food growing experience, half of online mentees and more than quarter (26.9%) of workshop attendees had some. All of the online mentees and over half (53.8%) of workshop attendees described themselves as having some knowledge about growing food. The most common reasons given for their involvement were an interest in urban growing/agriculture and practical (rather than theoretical) skills acquisition. Asian vegetables had multiple meanings for participants. Most commonly, they related to aspects of home, demonstrating the importance of culturally specific foods in evoking memories of people, place and time. Asked whether taking part in growing could help them build a sense of belonging within the UK Hong Kong community, responses were almost entirely affirmative for a variety of reasons.

This highlights the multiple roles of food in people's lives, and the potential for food to be used as a bridge between different groups, and as a bridge between their original and current homes. It also emphasises the role that growing food could play in cultural identity and pride, potentially building belonging as well as food resilience.

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We thank all those who took part.

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OC200. Building belonging: the role of community cafés. S. Sumpter¹, N. Nancheva², R. Ranta³, D. Bhakta⁴, and H. Mulrooney^{1,4} 1. School of Life Sciences, Pharmacy & Chemistry, Kingston University London and 2. School of Arts, Humanities and Social Sciences, Roehampton University and 3. School of Law, Social and Behavioural Sciences, Faculty of Business and Social Science, Kingston University London and 4. School of Human Sciences, London Metropolitan University.

Community cafés are non-profit ventures tackling food insecurity (FI) locally and equitably, primarily using pay-as-you-feel models ⁽¹⁾. FI is most prevalent in low-income and other vulnerable groups ⁽²⁾, in whom poor diets and worse health also intersect ⁽³⁾. Despite recognition that FI is largely driven by poverty and inequity ⁽⁴⁾, FI individuals are often negatively judged ⁽⁵⁾, risking further marginalisation. Community approaches to tackling both food waste and FI include community cafés, which frequently utilise surplus foods ⁽¹⁾ to produce fresh meals and/or donate surplus food to those in need. Beyond a nutritional impact, community cafés have the potential to offer marginalised groups a safe space and a feeling of inclusion, benefitting their mental health and wellbeing. The aim of this study was to explore the social impact of community cafés.

Two linked community cafés in a London borough were evaluated to explore their social impact on clients. Both operated using pay-as-you-feel; neither required proof of need. Evaluations were undertaken using mixed methods on 9 site visits (November 2022 - April 2023). Bespoke questionnaires (n=72) and 4 interviews were completed by clients, and 40 interviews with volunteers. Thematic analysis of qualitative data and Kruskal Wallis analysis (posthoc Dunn's and Bonferroni correction) of quantitative data were carried out.

Both cafés relied on surplus food. Their primary priorities were tackling food waste and the environment followed by addressing FI. Qualitative and quantitative data from interviews and questionnaires revealed that for many clients, social and food provision were equally important. This was especially true for older clients; significantly more of those aged ≥65 compared with those aged 18-24 yr visited for social reasons (p=0.02). The most highly rated aspects of provision for clients were the friendliness of the people and the helpfulness of the staff (98.7 and 97.1% respectively). Being able to meet and talk was identified as important by 70.1% of clients. Anecdotally, this was especially important to marginalised groups like migrants and refugees. Since referral to the cafés was not needed, clients included individuals utilising them for environmental reasons as well as those affected by FI. This allowed mixing among groups who would not ordinarily meet. Volunteers also highlighted this as key to enable them to hear the stories of those they served. The mixed clientele not only helped build community but helped reduce stigma, since FI was not the sole reason for attending. For volunteers, the open and accepting nature of community provision which did not require referral or proof of need, was valued.

The data suggest that community cafés have important value beyond nutrition, enabling formation of community networks and increasing understanding of the lived experience of those with FI.

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OC201. Application of a New Definition of Sarcopenic Obesity in Middle-Aged and Older Adults and Association with Cognitive Function: Findings from the National Health and Nutrition Examination Survey 1999–2002. Uraiporn Booranasuksakul¹, Kostas Tsintzas¹, Ian Macdonald¹, Blossom CM Stephan^{2,3,4}, Mario Siervo^{4,5,6}. 1. MRC Versus Arthritis Centre for Musculoskeletal Ageing Research, School of Life Sciences, The University of Nottingham Medical School, Queen's Medical Centre, Nottingham, NG7 2UH, UK and 2. Institute of Mental Health, The University of Nottingham Medical School, Nottingham, UK and 3. Curtin enAble Institute, Faculty of Health Sciences, Curtin University, Kent Street, Bentley, WA, Australia and 4. Dementia Centre of Excellence, enAble Institute, Faculty of Health Sciences, Curtin University, Kent Street, Bentley, WA, Australia and 5. Curtin School of Population Health, Faculty of Health Sciences, Curtin University, Bentley WA, Australia and 6. Vascular and Metabolic Disorders Group, Curtin Health Innovation Research Institute (CHIRI).

The role of the sarcopenic obesity (SO) phenotype for disease risk prediction has been tested in several observational studies, but results have been contrasting due to the application of different diagnostic models^(1,2,3). This study applies the newly proposed the European Society for Clinical Nutrition and Metabolism (ESPEN)-European Association for the Study of Obesity (EASO) definition of SO⁽⁴⁾ to a representative population of adults aged 50 years and older to evaluate its performance in the identification of prevalent cases of SO and its association with measures of cognitive function.

Data from individuals aged 50-85 years was collected from the National Health and Nutrition Examination Survey 1999-2002 waves. At the screening phase of the SO definition following the definition of the European Society for Clinical Nutrition and Metabolism and the European Association for the Study of Obesity (ESPEN-EASO), body mass index and waist circumference were used to evaluate obesity, while sarcopenia cases were identified using the SARC-F questionnaire (a self-report questionnaire to screen sarcopenia). Sarcopenia was diagnosed based on knee extensor isometric strength per weight (KES/W) and a percentage of appendicular lean mass per weight, while fat mass percent measured by Dual-energy X-ray absorptiometry was used to determine obesity. Cognitive function in older participants was assessed using the Digit Symbol Substitution Test (DSST), while memory-related question was used for middle-aged individuals or older participants without DSST scores.

Participants aged 50–85 years were men (44.7%) with a mean age of 66.7 years, and most participants aged 60 years and over (87.4%). The prevalence of SO was 32.5%, 20.9% and 15.3% at screening, diagnosis phase I, and diagnosis phase II of the ESPEN-EASO definition, respectively. The prevalence of cognitive impairment was 14.8% in participants aged 50-59 years and 29.5% in participants aged 60-85 years. There were associations between SO and cognitive impairment at diagnosis phase I (Odds ratio (OR): 1.6, 95%CI (confidence interval) 1.1-2.4) and phase II (OR: 1.9, 95%CI 1.1-3.3). These associations were significant among participants aged 60-85 years (phase I, OR: 2.2, 95%CI 1.4-3.4; phase II, OR: 2.8, 95%CI 1.6-4.8), but not among those aged 50-59 years.

The new ESPEN-EASO definition of SO identified a high prevalence of SO cases. A significant association between SO and poor cognitive function in older individuals was observed.

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OC202. Tailoring UK food-based dietary guidelines to older adults' nutritional preferences and needs using diet optimisation modelling. *B Bray,¹ F.Vieux², R.Poinsot², M.Clegg^{3&4}, J.Lovegrove³, J.Woodside¹, V. O'Neill¹, A. Kaur⁵ and C. McEvoy¹* 1. Centre for Public Health/The Institute for Global Food Security, Queen's University Belfast, UK and 2. MS-Nutrition, Marseille, France and 3. Hugh Sinclair Unit of Human Nutrition, University of Reading, UK, UCC, School of Food and Nutritional Sciences and 4. University College Cork, Ireland and 5. Nuffield Department of Primary Care Health Sciences, University of Oxford, UK.

In the UK, men and women can expect to spend approximately half of their remaining years from the age of 65 in good health. Nutritional needs change with age, with diet offering the potential to prevent and/or lessen the impact of poor health. Furthermore, specific Food Based Dietary guidelines (FBDGs) are required as older adults have specific nutrient needs.

There are gaps in the evidence on the role of dietary habits and/or specific nutrients in healthy ageing⁽¹⁾. Much of the prior work focuses on those with chronic illness and disease. There is a limited evidence base addressing the issues of healthier older people living in the community⁽²⁾, and it is important to prevent and/or correct nutritional deficiencies before the consequences become too difficult to treat. The objective was to identify a diet that meets the nutritional requirements for adults aged over 64-years-old with smallest divergence to the current average diet.

This study applied diet optimisation modelling (a method of finding the optimum diet under certain conditions/constraints) using national food and nutrient intake data from the National Diet and Nutrition Survey (years 1-11). Linear models were prepared using the open-source software R. Two models were developed for observed and recommended energy intake.

Constraints were included for energy, carbohydrate, free sugars, protein, salt, fat, saturated fat, alcohol, calcium, and red and processed meat. Constraints were informed by the Eatwell Guide (the UK's Food Based Dietary guidelines), government age*gender specific recommendations, and proposed recommendations from a literature review⁽³⁾. The linear model method was developed and trialled using data for a sub-population (women aged over 74 years n= 469).

In the observed/baseline diets the average daily energy intake for women over 74 years was 1517kcal, fibre was 17g, vitamin b12 9µg, fruit and vegetables 308g, and red and processed meat 52g. As a percentage of total energy, fat comprised 28%, protein 14%, saturated fat 12%.

Attempts to optimise with fibre and folate target levels at 30g and 400 µg increased fruit and vegetable intake (>500g). Optimising the diets with energy constrained at current levels reduced intake fat (-4 percentage points [%pt]), and vitamin b12 (-3µg). Intake increased for protein (+3%pt), calcium (+95mg), and fruit and vegetable intake (+211g). Constraining energy at 1840kcal resulted in protein increasing (7%pt), and fruit and vegetable intake (+394g). Fibre and folate levels were 22g and 310µg, respectively.

Preliminary results indicate that protein intakes in women aged over 74 years are sufficient to meet current FBDGs, but not the proposed level of 1.2g/kg without an increase in energy intake. In optimised diets maintaining the same energy intake, desired fibre and folate levels could only be achieved with greater, and potentially less acceptable divergence from the existing diet.

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Student Competition

OC203. Provision of a daily high protein and high energy meal: effects on the physical and psychological wellbeing of community-dwelling, malnourished elderly adults. *L. Struszczyk¹, M. O'Leary¹, B. Metcalf¹, M. Hickson², I. McClelland³, L. Torquati¹, M. Barreto¹ and J. Bowtell¹*.
University of Exeter, Faculty of Health & Life Sciences, St Lukes Campus, Heavitree Road, Exeter, EX1 2LU, UK and 2. University of Plymouth, Faculty of Health, Drake Circus, Plymouth PL4 8AA, UK and 3. Department of Nutrition and Dietetics, Hengrave House, Torbay Hospital, Torquay, TQ2 7AA, UK.

Community-dwelling older adults experience a high prevalence of malnutrition⁽¹⁾, leading to frailty, loss of independence and poorer health including increased mortality and healthcare resource use (HRU)⁽²⁾. Consumption of a high-quality diet is associated with better health-related outcomes⁽³⁾. We previously found significantly improved mini nutritional assessment (MNA) and depression scores following 3-weeks of daily meal provisions to healthy community-dwelling elderly participants⁽⁴⁾. However, <30% of UK councils provide meal delivery services. This study aimed to determine the impact of longer term (12-weeks) daily provision of nutrient-dense meals (>40% daily energy requirements and >50% recommended daily protein intake) to under-nourished, independently living, community-dwelling elderly adults on physical and psychological outcomes. We hypothesised the meal intervention would significantly improve nutritional outcomes, physical wellbeing and function, and psychological wellbeing.

Participants (n=56) were randomised (stratified for baseline MNA score and cohabiting or living alone) to receive 12-weeks of meal provisions followed by 12-weeks control (meals first group, n=28) or, a 12-week control followed by 12-weeks of meal provisions (meals second group, n=28). Forty-nine participants completed the study (16 males, 33 females; 81.8 ± 7.4 years). MNA, body composition, physical function, self-esteem, and depression were evaluated before and after each 12-week period (baseline, 12-weeks, and 24-weeks). The effect of meal provision was assessed by testing pre-post meal intervention change in both groups via paired t-test. Group effects were combined via meta-analysis (STATA ver17). The retention of the meal provision effect was tested in the meals first group, by testing the change from the end of meal provision versus 12-weeks follow-up control via paired t-test.

Meal provisions significantly improved energy and protein intakes (mean effect 311kcal Cohen's D=0.52 (95% CI 0.22 to 0.82), p<0.001; 0.24 g.kg⁻¹ Cohen's D=0.52 (95% CI 0.19 to 0.81), p<0.001, respectively), MNA score (mean effect 2.6 points Cohen's D=1.14 (95% CI 0.78 to 1.50), p<0.001), and handgrip strength (mean effect 1.5kg Cohen's D=0.36 (95% CI 0.06 to 0.66), p=0.02), but did not change levels of depression or self-esteem. Energy and protein intake decreased by 85% and 94% respectively upon return to habitual diet for the 12-week follow up. Sixty-eight percent of the favourable effect of the meal intervention on MNA score remained after the 12-week follow-up period, whilst handgrip strength reverted to baseline.

Provision of nutrient-dense meals to community-dwelling elderly adults for 12-weeks improved nutritional status and handgrip strength, indicative of reduced frailty risk. Benefits were not retained on withdrawal of the intervention, suggesting a need for sustained interventions in this cohort to meet nutritional needs. Future research is needed to identify optimal meal delivery service designs to support expansion of home-delivered meals to all eligible older adults to improve health-related outcomes and consequently reduce HRU.

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OC204. Associations between preferred and misaligned eating behaviours with cognitive outcomes in 45-65-year-old adults living in Cyprus: the NUTRICO study. C. A. Demetriou¹, E. Onisiphorou², D. Hileti², C. Kazafanioti², M. Alogakos¹, D. Vardakastani², E. Christofidou², F. Varianos¹, M. Papaioannou², P. Philippou², E. Andreou², C. Giannaki², P. Stavrinou², F. Constantinidou^{3,4} and E. Philippou^{2,5} 1. Department of Primary Care and Population Health, University of Nicosia Medical School, Nicosia, Cyprus and 2. Department of Life Sciences, School of Life and Health Sciences, University of Nicosia, Cyprus and 3. Center for Applied Neuroscience, University of Cyprus, Nicosia, Cyprus and 4. Department of Psychology, University of Cyprus, Nicosia, Cyprus and 5. Department of Nutritional Sciences, King's College London, UK.

Healthy midlife cognitive function (CF) reduces the risk of cognitive decline in older age. Evidence suggests that chrononutrition behaviours, such as time-restricted eating (TRE), positively affect CF possibly through a bioenergetic switch towards ketone use by the brain, DNA repair, and anti-inflammatory action^(1,2). However, misalignment between preferred and actual food intake timing might disrupt the circadian rhythm, negatively affecting CF⁽³⁾. This study investigated associations between chrononutrition behaviours, including eating misalignment, and cognitive outcomes in adults aged 45-65 living in Cyprus.

The following behaviours were derived from the Chrononutrition Profile Questionnaire⁽⁴⁾, as a weighted aggregate score of working and non-working days: breakfast skipping, largest meal of the day, morning latency (time between waking and first eating event), evening eating (last eating event in the waking day), evening latency (time between last eating event and sleep onset), night eating (waking in the night to eat) and eating window (time between the first and last eating event)⁽⁴⁾. Misalignments were calculated by subtracting reported aggregate behaviour from preferred. Computerized neurocognitive remote testing was used to derive standard normalized age-matched scores for composite memory, psychomotor speed, cognitive flexibility, complex attention, and global neurocognitive index⁽⁵⁾. Education, marital status, smoking, body mass index, chronic disease diagnosis, Greek-Orthodox fasting, sleep, physical activity, and Mediterranean diet adherence were also assessed, the latter three using validated questionnaires.

Cognitive outcome scores were divided into tertiles and analyzed using ordinal logistic regression. Each chrononutrition variable, divided into categories⁽⁶⁻⁷⁾, was independently regressed against each cognitive outcome, with the significant pairs then examined in multivariable models, adjusting for sociodemographic variables that were independently significantly associated with each cognitive outcome.

Two-hundred-seven participants were analyzed (58% female, median age: 52 yrs, 75.6% University graduates). Morning latency misalignment was associated with higher neurocognitive index (Odds Ratio (OR) of eating later than preferred by 30-90min: 2.28; 95% confidence interval (CI): 1.10-4.71 & OR of eating later than preferred by > 90min: 1.95; 95% CI: 1.03-3.68) and with higher cognitive flexibility score (OR of eating later than preferred by 30-90 min: 2.21; 95% CI: 1.07-4.60). An eating window longer than preferred by >120 mins was associated with a lower psychomotor speed score (OR: 0.16; 95% CI: 0.04-0.06). Evening eating between 20:00-22:59 vs. before 20:00 was associated with a higher complex attention score (OR: 2.04; 95% CI: 1.06-3.93).

The study findings on delaying the first eating episode and having a shorter eating window support previous findings that TRE is associated with better CF⁽²⁻³⁾. The association of evening eating with better CF might be related to unexplored aspects of the overall diet quality and the evening meal or other residual confounders and needs further exploration.

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OC205. Associations of eating rate with postprandial glycaemic and insulin responses, gastric emptying, food and energy intake in older adults (aged ≥ 65 years). D. Zannidi¹, L. Methven¹, J.V. Woodside², G. McKenna², C. G. Forde³, A. Shafat⁴ and M. E. Clegg^{1,5} 1. Department of Food and Nutritional Sciences, University of Reading, Whiteknights, Reading, RG6 6DZ, UK and 2. Centre for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast and 3. Sensory Science and Eating Behaviour, Division of Human Nutrition and Health, Wageningen University and Research, Wageningen, the Netherlands and 4. Physiology, School of Medicine, University of Galway, Galway, H91 W5P7, Ireland and 5. School of Food and Nutritional Sciences, University College Cork, Cork, Ireland.

The population of older individuals worldwide is increasing and achieving a good quality of life in older age is vital ⁽¹⁾. However, anorexia of ageing, a phenomenon often associated with delayed gastric emptying and reduced oral processing abilities ⁽²⁾, can negatively affect older adults' health, quality of life and contribute to undernutrition ⁽²⁾. In younger populations, slower gastric emptying has been associated with greater satiation and satiety ⁽³⁾, and slower eating rates with reduced food intake and postprandial euglycemia ⁽⁴⁾; however, little is known about these associations in the older adult population. This study investigated individual variations in food oral processing and their influence on postprandial glycaemic and insulin responses, gastric emptying, food and energy intake, in healthy adults, aged ≥ 65 years.

Participants attended a single visit day, after an overnight fast. A fixed-portion breakfast meal was provided and consumption was video-recorded for behavioural-annotation to quantify specific oral processing behaviours. Postprandial glucose and insulin responses were assessed via mixed-capillary fingerprick samples, and gastric emptying was measured with the ¹³C-octanoic acid breath test ⁽⁵⁾. Three hours post breakfast, an *ad libitum* lunch was provided, where eating rate and food intake were measured. Food and drink intake for the rest of the day was assessed using a weighed food diary. Participants were classified as slower and faster eaters using a median of eating rate (g/min) of the breakfast meal, with an even number of males and females in each group. Repeated measures ANOVA and multiple regression analysis were used to explore the relationship between *ad libitum* intake and the parameters outlined above.

Eighty-eight older adults were recruited, 44 males and 44 females, with mean age 73.7 (± 5.3) years. For the three hours postprandially, both glucose and insulin changed significantly over time ($F_{\text{glucose}} = 150.779$, $p < 0.001$ and $F_{\text{insulin}} = 111.645$, $p < 0.001$), but no differences observed between faster and slower eaters ($p > 0.05$). Similarly, gastric emptying did not differ between faster and slower eaters ($p > 0.05$). At the *ad libitum* meal, eating rate of the meal was the only significant predictor of energy intake ($r = 0.685$, $p < 0.001$), after accounting for age, gender and the postprandial (post breakfast) metabolic responses, gastric emptying and subjective satiety.

This study found no effect of eating rate on postprandial glycemia or gastric emptying in older adults, but showed significant association of eating rate during the meal on food and energy intake. These findings could provide implications in the design of texture-appropriate foods for this age group for future meal interventions.

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Student Competition

OC206. Exploration of self-perceived masticatory ability and measured biting force on nutrient intakes in older Thai adults. S. Nitsuwat¹, L. Marshall¹, K. Sranacharoenpong², A. Sarkar¹ and J. Cade¹ 1. School of Food Science and Nutrition, University of Leeds, Leeds, UK and 2. ASEAN Institute for Health Development, Mahidol University, Nakhon Pathom, Thailand.

As the global population ages, understanding the factors influencing older adults' health and well-being becomes increasingly important. Aging can lead to various health complications, including reduced muscle strength, affecting daily activities such as food consumption⁽¹⁾. The decline in oromasticatory muscle function can cause chewing difficulties that limit food choices⁽²⁾. Given that adequate nutrition is essential for maintaining the quality of life, this study aims to examine the relationship between self-perceived chewing ability and objectively measured biting force to understand the extent of their effect on nutrient intake.

A total of 148 community-dwelling older adults aged 64 to 90 years old (median age 71 ± 8 years) from urban (Bangkok Metropolitan Region) and rural (Chonburi Province) areas of Thailand participated. Maximum biting force (Newtons, N) of the posterior teeth was instrumentally measured, and participants rated the chewing difficulty of 20 commonly consumed foods as easy, difficult, or cannot be chewed at all. Foods were grouped into five difficulty levels by principal component analysis of the ratings and masticatory ability scores (0 to 10) were calculated. Food intake was obtained from 24-hour dietary recalls through interviews and body mass index (BMI) data was obtained.

Participants were grouped into tertiles of low (median = 73 N; IQR = 37–127), moderate (median = 336 N; IQR = 241–387), and high (median = 512 N; IQR = 477–512) biting force. A Kruskal-Wallis test revealed that those with low biting force had significantly ($p < 0.01$) lower self-assessed masticatory ability scores (median = 7.69) compared to those with high biting force (median = 8.86). Significant differences in the daily intakes of dietary potassium, magnesium, and vitamins B1, B2, B6, and C were observed between the high and low biting force groups ($p < 0.01$).

However, multiple regression analyses adjusted for age, sex, education, and location did not show significant predictive power for any nutrient intake from either biting force or masticatory ability, except for positive associations with vitamins C and B2, and fruit intake. A unit increase in mastication ability was associated with an increase in daily intake of 0.21 milligrams of vitamin C (95% CI = 3.03, 33.64; $p = 0.02$) and 0.19 milligrams of vitamin B2 (95% CI = -0.01, 0.13; $p = 0.03$). Additionally, a unit increase in biting force was associated with an increase in daily fruit intake of 0.17 grams (95% CI = -0.02, 0.28; $p = 0.08$). No relationships with BMI were observed for either biting force or masticatory ability.

Higher biting force in older adults improves self-perceived masticatory ability, leading to a higher-quality diet with foods rich in vitamins B2 and C, such as meat and fruits. Targeted interventions to enhance biting force could help prevent malnutrition.

Acknowledgments

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Student Competition

OC207. Dietitians' involvement, confidence and perceptions around processed foods and health: Preliminary Survey Results. V. Moran¹, SG. Moore¹ and P. Ho¹ 1. School of Food Science and Nutrition, University of Leeds, Leeds, UK, LS2 9JT.

Food processing, defined as a range of processes which convert fresh food into safe products, is of interest to nutrition professionals including dietitians given associations between consumption of highly processed products and health⁽¹⁾. Given such products contribute between 51-68% to UK diets⁽²⁾, dietetic practice is now likely to encompass this topic. This study aimed to explore dietitians' involvement in professional practice around the topic of processed foods and health, and their perceptions of individual products displaying label information (nutrition and ingredients).

An online survey was developed using (5-point likert scale) items adapted from other surveys^(3,4) to evaluate levels of professional involvement (1=never, 5=daily) and confidence (1=not confident, 5=very high) around this topic. For three products displaying label information (tinned tomatoes, Quorn Mince, wholemeal bread), respondents' perceptions of; level of processing (i.e. ranging from "minimally processed" to "highly/ultra-processed") and recommended frequency of consumption (FoC) (1=should be avoided, 5=several times a day) were evaluated. Ethical approval was granted before survey invites were sent via email to over 10,000 members of the British Dietetic Association between November 2023 and January 2024. Data analysis quantified percentages of all responses (%) and Kruskal-Wallis and Wilcoxon Pairwise tests were performed to explore differences in respondents' overall responses across, and between pairs of products.

A total of 366 dietitians completed the survey. Most (96%) were female with an average of 13± 9.8 years in practice across specialisms including diabetes, paediatrics, and gastroenterology. In practice, around half of respondents were regularly (weekly or daily) engaged in discussion of processed foods and health (51%) and provided guidance on this topic (46%). Most reported high confidence in discussing (61%) and providing guidance (59%) on processed foods and health. Most strongly agreed/agreed that healthy balanced diets can include some processed (94%) and "highly/ultra" processed (71%) foods, and that nutritional content is more important than level of processing (61%). Most respondents reported high/very high confidence (range: 60%-62%) in their classifications of processing levels for each product. Respondents' most popular classification of products were: tomatoes "minimally processed" (54%), Quorn mince "highly/ultra-processed" (57%), and bread "processed" (46%), which were significantly different across products ($p < 0.01$). Perceptions of recommended FoC were also significantly different across products; tomatoes and bread "several times a week" (69%, 58%, respectively), and Mince "several times a month" (40%) ($p < 0.01$).

Surveyed dietitians reported high involvement and confidence in discussing and providing guidance around processed food and health. Perceptions of individual product's level of processing varied across three processed products which displayed label information. This is the first insight into dietitians and the topic of processed foods, and further work is warranted to support dietetic practice and training.

Acknowledgments

Survey dissemination to British Dietetic Association (BDA) members via email newsletter was supported by Quorn Foods - a BDA Corporate Partner. Design of the research questions and survey were undertaken independently by the researchers.

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Student Competition

OC208. Digital competency in nutrition education – an educator’s perspective. S. O’Donovan¹, S. Scully¹, A. Donnellan¹. and L. Ryan¹. *Department of Sport, Exercise and Nutrition, Atlantic Technological University, Galway, Ireland.*

Digital competency is defined as “the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society”⁽¹⁾. Digital competence is an essential skill required in today’s modern society and has become a highly desired skill in employment. The digitalisation of education has broadened the student skillset deemed necessary to being a well-rounded professional⁽²⁾. Yet little is known on how digital competency is currently taught or assessed in nutrition science education. The aim of this study was to assess the extent to which Irish nutrition science educators conceptualise digital competence and how digital competency education is integrated into nutrition science teaching and learning.

Two semi-structured focus groups with 15 nutrition science educators from three undergraduate nutrition science programmes in Ireland were conducted. Participants completed a baseline digital competency assessment using the MyDigiSkills⁽³⁾ tool, testing five areas of competence. Focus groups followed a semi-structured interview guide focusing on questions around digital competency, digital skill requirements, teaching and learning digitally, training and upskilling opportunities, and future digital competency education. Focus groups were transcribed and a content analysis conducted whereby the data were coded, categorised and discussed by all authors.

The digital competency assessment tool highlighted higher levels of competence for ‘Information and Data Literacy’ and ‘Communication and Collaboration’ and lower levels of competence for ‘Digital Content Creation’, ‘Safety’, and ‘Problem Solving’. A clear difference was seen between focus group discussions with one focused on a more traditional approach and the other a more modern innovative approach. Participants reported using multiple ways to teach digital competency through presentations, podcasts, development of professional social media accounts, e-portfolios, Twitter chats, blog sessions, media diaries, and recipe analysis tools. Internal and external training opportunities to learn about and develop digital literacy and skills were identified across both groups and barriers to embracing those opportunities highlighted – funding, protection of time, equipment.

This study highlights that digital competency is becoming an important aspect of nutrition science education and educators agreed digital skills are important to teach and ensure graduates can meet the expectation of today’s modern workforce. Educators’ opportunities to upskill and learn about digital competency should focus on improving competence in areas of ‘Content Creation’, ‘Safety’ and ‘Problem Solving’. Improving nutrition educators’ digital competency levels will enhance digital teaching and learning for future students. Funding was reported as a major barrier to improving digital skills causing delays with accessing innovative tools to enhance teaching and learning practices, limiting training days, updated software, and new equipment. These flexible courses help educators understand new technology and update their skills. Future research should focus on removing these barriers for educators upskilling and providing more support for embracing digital innovations in education.

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Student Competition

OC209. Assessing nutritional intake of Sensory Panellists during sensory evaluation sessions.

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Food manufacturers often employ highly trained Sensory Panellists to conduct sensory evaluations, such as profiling, discrimination and rating testing to understand the impact of any reformulation/process/pack changes and new product launches on consumer experiences. At Marlow Foods, 8-12 Panellists work four days/wk evaluating meat, mycoprotein, and plant-based alternatives for up to four hours/day, between 09:00 and 13:00. As part of Marlow Foods commitment to supporting the wellbeing of all employees, the energy, macronutrients and sodium consumed during evaluation sessions need to be considered within the context of habitual (three-daily) meal patterns. Consequently, these daily tasting sessions should be regarded as an interlude between meals, or as a 'snack period'. The UK government's recommended calorie guidelines, assuming an energy intake of 2000kcal and weight maintenance, suggests 400kcal for snacks and beverages.⁽¹⁾ This project aimed to determine the Panellists nutritional intake during these evaluation sessions, to compare against energy and nutrient recommendations, and to monitor consumption of nutrients of public health concern (e.g, salt and saturated fat).⁽²⁾

To assess average dietary intake during evaluation sessions, details of the foods consumed by the 11 panellists (7 female, 4 male, mean age 51yrs, range 41-63yrs) were collected over 5-weeks. Average daily intakes for energy, total fat, saturated fat, sugar, fibre and salt were calculated from declared back of pack nutrition information and theoretical nutritional values for products in development using FoodChain ID.⁽³⁾

Over the 5-week period, the Panellist average daily intake (range, \pm SDs, % of reference intake (RI)) during evaluation sessions were 192kcal energy (93-292, \pm 85, 9.6%), 7.3g total fat (2.7-14.5, \pm 4.5, 10.4%), 1.1g saturated fat (0.6-2.2, \pm 0.6, 5.7%), 1.5g sugar (0.4-2.3, \pm 0.9, 1.7%), 7.1g fibre (4.0-12.6, \pm 4.0, 23.6%) and 1.0g salt (0.4-1.9, \pm 0.6, 16.6%).

The average daily energy intakes recorded during the tasting period comfortably fell within the UK government's recommended allowance for snacks, thereby supporting the notion that Panellists can maintain a healthy, balanced diet whilst consuming this category of food. However, salt intakes in Panellists averaged 16.6% of the RI, reflective of the added salt content in many meat and meat alternative products. This signals the need for a panel nutrition policy, establishing specific nutritional guidelines to ensure responsible balance of projects and thus consumption of nutrients of public health concern (e.g., salt and saturated fat) during evaluation sessions. As next steps, Marlow Foods is developing such a policy and guidelines, to ensure the wellbeing of Panellists while maintaining delivery of robust sensory evaluations.

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OC210. Views from healthcare and food professionals on which proteins to include within the Eatwell Guide to support diversification. L.R. Durrant¹, S Slade², T Haffner² and H.E. Theobald¹.
Marlow Foods Ltd, Stokesley, UK and 2. MyNutriWeb, London, UK.

Shifting towards predominantly plant-based diets is an important tool in addressing population and planetary health, and diversifying protein intakes is part of this.⁽¹⁾ Whilst updating the Eatwell Guide to include a diverse range of protein sources can encourage individuals to adopt more varied and sustainable dietary patterns, understanding healthcare and food professionals' perspectives on which protein sources to include in dietary guidelines is essential for effective recommendations, which this research aimed to explore.

Between 8-31 March 2024, an incentivised survey was distributed to members of the MyNutriWeb community, made up primarily of healthcare and food professionals. A part of the survey aimed to gain insights about which protein sources respondents recommend when supporting people with their protein consumption, and which should be included if the visual representation of the Eatwell Guide was to be updated.

Of the 865 respondents, the majority (65%) were dietitians and nutritionists, with 12% being students and the remaining respondents representing various other healthcare and food professions. When supporting people with their protein consumption, 92% (of 748 respondents) regularly recommend legumes and pulses, 87% fish, 85% eggs, 72% poultry, 57% soy/tempeh/tofu, 47% unprocessed red meat (e.g. beef, pork, lamb), 34% mycoprotein (e.g. fungi meat alternatives like Quorn) and 2% processed meat (e.g. sausages, bacon, ham, salami, pies, burgers, pâtés, canned meat). When asked which protein sources should be included if the Eatwell Guide protein description was to be updated, 90% (of 643 respondents) selected soy/tempeh/tofu, 88% legumes and pulses, 79% eggs, 78% mycoprotein, 78% fish, 74% poultry, 63% unprocessed red meat and 6% processed meat. 10% also selected 'other' and 25 of the 64 additional comments provided mentioned nuts and seeds. In relation to the brief protein description included on the Eatwell Guide visual, 53% (of 635 respondents) responded yes to an update supporting people to consider more fungi and plant-based proteins within their diet, and only 6% responded no. The remaining 41% responded that it depends or other, and the most prominent additional comment was on the need to keep fish, eggs and meat in the description.

This survey reveals a consensus among healthcare and food professionals regarding the importance of including a variety of protein sources in dietary guidelines. Legumes, pulses, fish, and eggs were among the most recommended protein sources, emphasizing the significance of both non-animal and animal-based proteins in a balanced diet. While there was strong support for including more non-animal protein foods such as soy, legumes, and mycoprotein in the Eatwell Guide, respondents also emphasized the importance of retaining animal protein sources. This suggests that a balanced approach, incorporating non-animal (plant and fungi) and animal-based proteins, is widely supported among professionals for promoting healthier and more sustainable eating habits.

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OC211. UK Dietitians' and Nutritionists' Perceptions of Low-Calorie Sweeteners in Obesity and Type 2 Diabetes Management: A Cross-Sectional Survey. A. Gorbatenko¹ and G. Farhat¹. *1. Faculty of Health and Education, Manchester Metropolitan University, Manchester, UK*

Low-calorie sweeteners (LCS), also known as non-nutritive sweeteners, are suggested to reduce sugar and calorie intake, potentially serving as a useful strategy for weight loss and management of type 2 diabetes (T2D)⁽¹⁾. However, inconsistencies in scientific research and conflicting guidelines regarding the benefits and risks of LCS rendered professionals uncertain about their safety and effectiveness in the management of obesity and T2D⁽²⁾. Dietitians and nutritionists play a crucial role in preventing and managing obesity and T2D. Understanding their perceptions and knowledge of LCS is essential for developing strategies to keep them updated with the latest evidence. This survey aimed to assess the perceptions and knowledge of LCS among HCPC registered dietitians and nutritionists living and working in the UK.

An online cross-sectional survey was distributed to nutritionists and HCPC registered dietitians in the UK through social media and workplaces such as gyms, hospitals, and universities. Participants rated statements on their perceptions and knowledge of LCS use in obesity and T2D management, their risks, benefits, and government regulations. Ordinal logistic regression was used to investigate the impact of educational level and occupation (dietitians versus nutritionists) on the outcomes.

A total of 200 participants (136 dietitians and 54 nutritionists) responded to the survey. While 99% of respondents were familiar with LCS, only 62.5% were confident about advising clients/patients on their appropriate use. Additionally, 69.9% believed that LCS are helpful for weight loss and 67.8% stated that they can help manage T2D. Some respondents viewed LCS negatively: 15.5% considered it harmful, 39% deemed it unsafe, while 42.5% saw its benefits outweighing risks. Interestingly, 41.5% of respondents were not aware of the regulations surrounding the use of LCS. Open-ended questions revealed that some participants expressed concerns about the negative health effects of aspartame, with many considering stevia to be a healthier alternative due to its natural origin. Further analysis revealed that professionals with a doctorate degree in Nutrition/Dietetics were less likely to believe that LCS are bad for health when compared to those with an undergraduate degree (Wald $\chi^2(1) = 4.209$, $p = 0.04$). Compared to nutritionists, dietitians were more likely to express concerns regarding the impact of LCS on weight gain ($p = 0.029$), yet the latter outcome is limited by the unequal sample size between the 2 groups.

While the majority of respondents recognize LCS as a valuable tool in managing obesity and T2D, a research and educational knowledge gap remains. Perceptions and knowledge of LCS could be further explored in a larger survey. It is crucial for professional and regulatory bodies to disseminate accessible information, ensuring that healthcare professionals provide the public with evidence-based guidance on the use of LCS in addressing obesity and T2D.

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OC212. Dietetic attitudes and practice towards bolus feeding. L. Reynolds¹, G. Egan², J.L. O'Neill², J. Hovey², and S. Wilkinson² 1. School of Agriculture and Food Science, University College Dublin, Belfield, Dublin 4, Ireland and 2. Danone Nutricia Specialised Nutrition, Block 1 Deansgrange Business Park, Deansgrange, Co. Dublin, Ireland.

Bolus feeding is the administration of feed to a patient as a series of smaller volumes of enteral nutrition given at regular intervals via an enteral feeding tube.(1) It is currently estimated that approximately 2,000 people are receiving home enteral tube feeding (HETF) in Ireland.(2) However, there is limited evidence surrounding the use of bolus feeding in enterally fed patients.

The aim of this study is to investigate Irish dietitians' attitudes and usage of bolus feeding in their adult patients.

Survey Monkey was used to create an eighteen-question survey which was distributed by the 'Irish Nutrition and Dietetic Institute' in their online newsletter and the 'Irish Nutrition Jobs' Facebook page. Descriptive statistics were performed using IBM SPSS® v27 to determine percentages. Dietitians that worked with adult patients and recommended bolus feeding to patients were eligible to take part in the survey.

Out of 100 respondents, 74 dietitians fit the eligibility criteria for data analysis. Of the 74 participants recommending bolus feeding in adult patients, they primarily worked in hospitals (64%, n=47) and in the community (35%, n=26) with 20% (n=15) specialising in oncology. Just over half (58%, n=43) of dietitians agreed that the number of patients being bolus fed has increased over the last 5 years with 26% (n=19) reporting that more than half of their enterally fed patient case load receive bolus tube feeding. The majority of dietitians (99%, n=73), routinely use the syringing method when administering a bolus feed.

Dietitians commonly recommend bolus feeding in oncology patients (65%, n=48), those with neurodisability (46%, n=34) and in adults with gastrointestinal diseases (19%, n=14). When choosing to administer a bolus feed, 53% (n= 39) of dietitians aim for 400kcal per feed, with 200ml ONS being the most popular bolus feed format (62%, n=46). Almost all dietitians (96%, n=71), decide to use bolus feeding with their patients as it suits their lifestyles as well as 81% (n=60) reporting that it is favoured for its convenience.

Many of the dietitians (61%, n=45) are of the opinion that feeds designed in a format for bolus feeding would improve patient experience. To further improve their training, dietitians reported there is a need for additional practice guidelines (47%, n=35) and practical workshops (46%, n=34) on bolus feeding.

This study found that dietitians are recommending bolus feeding for patients more often in the last 5 years (2019-2024). Participants reported that bolus feeding suits patients' lifestyles as it's convenient and it suits their social circumstances. There is a need for a specific format for bolus feeding products as well as specific bolus feeds to improve patient experience. Dietitians agree that additional resources such as practical workshops and guidelines are needed to further support them with bolus feeding.

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Student Competition

OC213. Exploring dietetic attitudes and experience of recommending tube feeds containing real food ingredients to paediatric patients. E. Gallagher¹, G. Randles², J. Hovey², J.L. O'Neill² and S. Wilkinson² 1.School of Biological and Health Sciences, Technological University Dublin, Ireland and 2.Danone Nutricia, Dublin, Ireland.

Blended tube feeding for patients requiring enteral nutrition involves the provision of pureed food administered via a gastrostomy tube⁽¹⁾. It is relatively new in dietary practice, with several clinical and perceived benefits, which was partly driven by the large prevalence of enteral nutrition intolerance in paediatric patients⁽²⁾. In response to patient and dietitian preferences, as well as challenges of blended diets, medical nutrition manufacturers have developed commercial tube feed products containing real food ingredients (RFI). There is very limited published literature on these types of tube feeds.

The aim of this study was to understand the attitudes and awareness of dietitians towards recommending tube feeds containing RFI. This was done through investigating the indications behind recommending this type of product, what conditions they are recommended for, and the main barriers and benefits of recommending tube feeds containing RFI to paediatric patients.

A twelve-item online survey was distributed via Irish Nutrition and Dietetic Institute (INDI) and Irish Nutrition Jobs Facebook group to collect data from registered dietitians over six-weeks. Frequencies and Cross-tabulations were performed to analyse categorical variables using IBM SPSS V29.

From the total sample of 23 paediatric dietitians, those who currently recommend tube feeds containing RFI (n=14) reported that the two main disorders to use this product are, gastrointestinal disorders (n=13, 93%) or neurological disorders (n=12, 86%). A primary indication for recommending these products is to improve tolerance (n=12, 86%), with the main feeding method being bolus pump (n=13, 93%). Key benefits reported are improvements to GI symptoms (n=13, 93%) and improved weight gain (n=5, 36%). Of the total sample, prime barriers found to recommending this type of feed is the low energy dense profile (n=7, 30%) and insufficient amount of natural ingredients (n=3, 13%).

This study shows a positive response towards tube feeds containing RFI and gives an insight into the potential benefits that using these innovative tube feeds can have for patients and carers. More case studies using these products are required, for dietitians to fully understand the main benefits and drawbacks of recommending these feeds to their paediatric patients.

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Student Competition

OC214. Delivering and evaluating a behaviour change communication training programme for farm advisors. Laura Gribben^{1,3}, Alison Burrell², Aine Regan³, Moira Dean¹ 1. Institute for Global Food Security, School of Biological Sciences, Queen's University Belfast, Belfast, United Kingdom and 2. Animal Health Ireland, Carrick-on-Shannon, Co. Leitrim, Ireland and 3. Department of Agri-food Business & Spatial Analysis, Teagasc, Athenry, Co. Galway, Ireland

Farm advisors provide knowledge and support to farmers, to help them change their on-farm practices or behaviours, with a view to improving the farm's overall sustainability and competitiveness^(1,2). In this way, advisors can be viewed as agents of change⁽³⁾. In order to fulfil their role as agents of change, advisors must possess sufficient knowledge of human psychology and behavioural science, which is the discipline involved with understanding, predicting and changing behaviour^(4,5). Despite this, within advisory education and professional development, it is considered that greater emphasis is given to advisory technical knowledge acquisition, than how to work effectively with others to support learning and change⁽⁶⁾. Accordingly, this study aims to implement a behaviour change communication training programme for farm advisors and evaluate its efficacy. As much work within the health and social care field has been undertaken to support health related behaviour change, this study aims to adapt a behaviour change communication training programme originally developed for use within this field to the advisory setting^(7,8).

A mixed-methods case study under the pragmatic worldview was conducted. Ethical approval was obtained from the Faculty of Medicine, Health and Life Sciences Research Ethics Committee at Queen's University Belfast. The programme was adapted from the 'MAP of Health Behaviour Change Learning Programme' (MAP) created by NHS Education for Scotland⁽⁹⁾. Eight farm advisors completed the programme delivered by health psychologists, which involved the completion of a 40-minute online module and a one-day in-person workshop about the principles of person-centred communication and behaviour change techniques. The Brinkerhoff training evaluation model guided the evaluation⁽¹⁰⁾. Quantitative questionnaire data, including perceived knowledge and confidence, was descriptively analysed. Qualitative data including surveys, logs and focus group/interview data was thematically analysed.

Descriptive analysis found advisors scored highly in perceived knowledge (mean: 5.5) and confidence (mean: 5.5) post-training (measured on 6-point Likert scale). Thematic analysis determined three themes: valuable activities, takeaways, and programme evolution. Advisors valued open discussions and role-playing activities. A key takeaway was how to structure conversations about change; firstly, identifying a person's stage of change, then delivering behaviour change techniques tailored to that stage. Further training on how to support individuals to explore and build motivation towards change was deemed beneficial.

MAP was shown to be an effective training programme with applications in agriculture. This study offers insights for those involved in advisory education. Incorporating behaviour change communication courses into advisory programmes helps advisors develop knowledge surrounding the psychology behind behaviour change and additional competencies in supporting behaviour change at the farm level.

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Student Competition

OC215. Impact of food based intergeneration community intervention. F. Tsofliou¹, R. Vijayakumaran¹, A.T Wilson¹ and A.Mills¹. Department of Rehabilitation and Sport Sciences, Bournemouth University, Bournemouth, BH8 8GP

The current food system is not only unsustainable but also increasingly inequitable, resulting in food insecurity for many people in the United Kingdom and globally⁽¹⁾. The health impacts of the current food system on disadvantaged communities warrants examination to improve ecological public health nutrition strategies⁽²⁾. Community gardens and kitchens are frequently established by volunteers in the hope that they will serve as alternatives to the current food environment, building healthy food capacity in the community as well as outdoor physical and social activities for urban residents⁽³⁾. This remains to be explored in deprived communities in Dorset, UK.

This pilot research was conducted in fourteen adults living in disadvantaged areas in Dorset (Hamworthy-Poole). Inclusion criteria were individuals over 18 years old living in low-income households, who were users of community food garden and kitchen initiatives. The individuals usually attend with their family members in the food growing and cooking activities, including young children and older adults in the programmes. Three semi-structured interviews and three focus groups (total n=14) were undertaken to uncover views on the importance and roles of these community food initiatives in relation to healthy eating and access to locally grown fresh produce. All discussions were digitally recorded, and data were transcribed verbatim. Qualitative data analysis, using Clarke and Braun's⁽⁴⁾ six steps of thematic analysis, was performed via NVivo software.

Four main themes emerged: *Tackling food insecurity & sustainability, Utilization of climate friendly & organic Food, Bridging intergenerational gap and Promoting healthy lifestyle*. These food initiatives help in addressing food insecurity from the perspective of the participants. The role of community gardens together with cooking sessions can be further recognised as contributors to community development, access to healthy food such as fresh fruits and vegetables and nurturing skills related to nutritious food preparation.

In conclusion, this research provided insights into the perceptions on how we can design a health promotion initiative that is inclusive and sustainable to tackle food insecurity effectively.

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OC216. An online pilot study exploring the relationship between diet quality and psycho-behavioural characteristics in gamers and non-gamers. S. Kim¹, H. Ng¹, D. Micallef², S. Legrand¹, L. Brennan², T. Bin Abdur Rakib³, D. Abdulgalimov³, P. Olivier³, E. Foster³ and T.A. McCaffrey¹
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Engaging in sedentary activities and consuming energy-dense, nutrient-poor foods increases the risk of developing non-communicable diseases (1). Young adults are one of the largest users of video games in Australia (2). To engage young adults in lifelong healthy behaviours, we need to understand their attitudes and behaviours towards health and healthy eating by examining psycho-behavioural characteristics. This cross-sectional study explored the similarities and differences in diet quality of online gamers and non-gamers using a validated psycho-behavioural survey (3).

Online participants (n=53, 18-30 years) from Australia completed a validated self-administered survey (3) including demographics, self-reported weight and height, searching online, physical activity levels (4), strategic dieting behaviours (5,6), self-identification as gamers or non-gamers (7) and up to three online 24-hour dietary recalls over non-consecutive days using Intake24-Australia <https://intake24.com/>. Diet quality was assessed using the adapted Healthy Eating Index for Australian Adults (HEIFA)-2013 (8). Informed consent was obtained.

Gamers (n=18, 44%) were more likely to identify as male (14.3% for Non-gamers, p=0.05) but similar BMI (Median 23.4kg/m² (Percentiles=20.6,29.5) vs 20.76kg/m² (19.1,24.2), p=0.10) to Non-Gamers. Overall differences in Gamers and Non-gamers were not due to gender differences (P>0.05). Gamers were less likely to report significant weight change in the previous 12 months (77.8% vs 42.9% for Non-Gamers, p<0.05) and were more likely to consciously control their weight by dieting than non-gamers (p<0.01). There was no difference in sitting time (Gamers 540min/d (420,601) vs Non-gamers 420min/d (300,600), p=0.13). Despite being satisfied with the healthiness of their diet (score 9/15, p=0.99), both groups were somewhat likely to improve the healthiness of their diet (10/15, p=0.66). Non-gamers had higher intentions to search online for healthy eating and food-related information (p<0.05), healthy recipes, and meal plans (p<0.01). Diet quality was low across both groups (Gamers 50/100 vs Non-gamers 56/100, p=0.18). Non-gamers reported significantly higher water (398ml (0,981) vs 134ml (0, 326) p=0.031) and beverage (1264ml (761,1558) vs 690ml (505,977) p=0.010) consumption than gamers.

The findings suggest that online gamers and non-gamers share similar concerns and priorities regarding health. Diet quality was similar, with both groups likely to benefit from targeted interventions to improve dietary intake. Low water consumption is a concern, with campaigns highlighting the benefit of water for cognitive performance more likely to resonate with young adults, particularly gamers. Using a psycho-behavioural survey and co-design methods will provide insights to inform more tailored public health communication strategies for diverse groups such as young adults.

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OC217. UK university students' perceptions about the benefits and value of personalised nutrition advice delivered by the web-based eNutri app. E. Kelly¹, M. Weech¹, R. Fallaize^{1,2}, F. Hwang³ and J. A. Lovegrove¹ 1. Hugh Sinclair Unit of Human Nutrition, University of Reading, Whiteknights, Reading, RG6 6DZ, UK and 2. School of Life and Medical Science, University of Hertfordshire, College Lane, Hatfield, AL10 9AB, UK and 3. Biomedical Engineering Section, School of Biological Sciences, University of Reading, Whiteknights, Reading, RG6 6DH, UK.

University students often make less healthful dietary choices whilst at university however, do not typically receive advice and support to help them eat more healthily^(1,2). A tool which could be provided to students to promote more favourable dietary behaviours is the eNutri web-based app which includes a food frequency questionnaire (FFQ) and delivers automated personalised nutrition advice (PNA) and a diet quality score (DQS) consisting of 11 food/nutrient components⁽³⁾. The PNA includes scores and general advice for each component and, for the user's three lowest scoring components, recommends which foods to eat more/less frequently to improve their DQS. As part of a 4-week intervention study, we aimed to explore the perceptions of the eNutri PNA in UK university students.

As part of this intervention, 14 students from the Universities of Reading and Hertfordshire completed the eNutri FFQ and received their PNA. At the end of the study, they rated how much they agreed with statements about the perceived value and benefit (if any) of the eNutri PNA tool, on a 6-point scale ranging from strongly disagree to strongly agree. The percentage of respondents reported is the total number who responded "somewhat agree", "agree", or "strongly agree" to each statement.

Of the 14 students, 79% were female with a mean age of 25y (range=18-37y) and mean BMI of 24.7kg/m² (range=19.4-31.9kg/m²). At baseline, the average importance of a healthy diet to the participants (*n*=13) was rated at 7.2 out of 10 (with 0 being 'not important at all' and 10 being 'very important'). In total, 57% of respondents indicated that they felt they 'were eating a healthier diet because of the eNutri advice received' and only 14% reported that 'the advice did not motivate them to make changes to their diet'. Furthermore, 64% of respondents indicated that the 'eNutri PNA gave them confidence in their ability to make changes to their diet' and that it 'supported them to do so'. Half of the students agreed that 'they would want to use eNutri long term to track their progress and receive regular PNA'. In addition, 79% agreed that 'eNutri should be offered to all university students to help them make healthier food choices', and that if eNutri was offered to them for free by their university, 'it would be a valuable student benefit' and they 'would want to use it again'.

In general, university students indicated the eNutri PNA tool supported them to eat healthier and providing access to the wider student population would be beneficial to encourage healthy eating at university. These findings along with the quantitative data from the PNA intervention which is currently being analysed will support the development of larger, suitably-powered studies to confirm these findings.

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Student Competition

OC218. Gender differences in dietary behaviours, body mass index, and alcohol consumption patterns amongst first-year undergraduate students: preliminary findings from a multi-campus university in Ireland. K.-M. McCarthy¹, C. O'Neill¹, J. Walton², and A. Bickerdike¹. 1. Department of Sport, Leisure and Childhood Studies, Munster Technological University, Bishopstown, Cork, Ireland and 2. Department of Biological Sciences, Munster Technological University, Bishopstown, Cork, Ireland.

The transition to higher education (HE) constitutes a prime opportunity for intervention to address the sub-optimal dietary behaviours (low intake of fruit and vegetables (F&V), infrequent breakfast consumption [BC]), clinically-relevant gains in body mass, and hazardous alcohol consumption (HAC) patterns that have been reported amongst international HE student cohorts^(1,2). To inform such interventions, the current cross-sectional study aimed to explore gender differences in habitual F&V consumption, BC, body mass index (BMI), and HAC among first-year undergraduates at a multi-campus university in Ireland.

A 42-item web-based questionnaire was distributed by e-mail to first-year undergraduate students across the university's six campuses in semester 1 of 2022/23 (Wave 1) and was repeated in semester 1 of 2023/24 (Wave 2), supplemented by in-class recruitment. Participants met the inclusion criteria if they were a full-time first-year student, and were aged ≥ 18 years. Participants were asked to quantify their daily servings of F&V (serving defined as 1 piece of fruit, or 3 dessertspoons of vegetables). Habitual BC (days) were reported (weekdays: 0-5, weekend days: 0-2) and BMI [$\text{kg}/\text{height}(\text{m})^2$] was calculated from self-reported height and body mass. The AUDIT-C scale (range 0-12) was used to identify HAC on the basis of previously-reported sex-specific threshold scores⁽³⁾ (females ≥ 5 and males ≥ 6). Between-gender differences were examined using Chi-Squared Tests for Independence (categorical data) or Mann-Whitney U Tests (non-parametric continuous data). The level of significance was set at $p < 0.05$.

Overall response rate (W1/W2 combined) was 19.0%, ($n=1910$, 54.9% female, mean age 19.7 ± 4.0). Median number of F&V servings per day was 4.0 (IQR ± 3.0), with 35.7% reporting ≥ 5 servings. A significantly higher proportion of females reported consuming ≥ 5 daily servings of F&V, compared to males (38.6% vs. 32.2%, $p=0.007$). In total, 36.4% reported consuming breakfast on all weekdays, whilst 54.4% reported consuming breakfast on both weekend days. Males reported significantly more frequent BC than females on all weekdays (43.7% vs. 35.2%) and weekend days (64.4% vs. 53.4%, $p < 0.01$). In terms of BMI, 7.8% of students were classified with underweight (males: 6.6%, females: 8.8%), 61.0% with normal weight (males: 60.7%, females: 61.4%), 22.1% with overweight (males: 24.5%, females: 20.1%) and 9.1% with obesity (males: 8.3%, females 9.8%). The majority (89.9%) of students reported consuming alcohol, and 65.9% exceeded sex-specific HAC thresholds (males: 70.3% vs. females: 62.5%, $p < 0.01$).

The current study has served to highlight sub-optimal dietary behaviours amongst a cohort of first-year undergraduate students in Ireland. A concerning prevalence of overweight and obesity was also observed, and HAC was prevalent amongst 65.9%. Males appeared to exhibit less favourable behavioural patterns than females in terms of F&V intake and HAC. These findings will inform targeted 'life-course' interventions aimed at improving dietary and health related behaviours within the transformative setting of higher education.

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Student Competition

OC219. Whole Grain Intake in the United Kingdom Remains Unchanged from 2008/9 to 2018/19 and Well Below Recommended Levels. *Inga Kutepova, PhD¹, Colin D Rehm PhD², Samara Joy Friend PhD²* 1. Life Sciences, PepsiCo R&D, Reading, UK and 2. Life Sciences, PepsiCo R&D, Purchase, NY (USA).

Whole grain (WG) consumption has been associated with many health benefits⁽¹⁻⁴⁾. However, in the UK, there is a lack of WG intake data with the most recent analysis available spanning the years 2008-2011⁽⁵⁻⁷⁾. In this study, our aim is to assess the consumption of whole grains among the UK population using data from the National Diet and Nutrition Survey (NDNS) rolling programme covering the years 2008 to 2019.

WG intake trends and sociodemographic patterns from the UK NDNS Rolling Programme, 2008/09 to 2018/19, of 15,655 individuals aged ≥ 1.5 years who completed a four-day food diary were analysed. WG consumption was assessed by examining the WG content of foods in grams based on product ingredient information. Survey-weighted mean consumption of whole grains overall and by socio-demographic group and health status variables. Survey-weighted Wald tests (for categorical variables such as ethnicity) and trend tests (for ordered variables such as age group) will be used to determine whether intakes of whole grains differ within category.

No statistically significant trend was observed in total WG intake when comparing the intakes from 2008-2012 to 2016-2019, with mean intakes of 29.2g/day (95% CI: 27.8, 30.5) and 28.2g/day(95% CI: 26.8, 29.6), respectively. In 2016-2019 older adults (65y+) had the highest consumption (33.6 g/day [95% CI: 30.5, 36.8]), followed by 19-64y, with an intake of 29.1 g/day (95% CI: 27.1, 31.2). High-fibre cereals, bread, and other cereals including pasta and rice were the primary sources of WG. Between 2008-2012 and 2016-2019, the mean daily intake of high-fibre cereals and bread significantly declined from 11.1g (10.3, 11.9) to 9.3g (8.5, 10.1) and 12.4g (11.6, 13.1) to 10.0g (9.2, 10.8) respectively. Conversely, consumption of other cereals increased from 4.0g (3.3, 4.7) to 6.9g (6.1, 7.6) per day. Individuals with higher incomes, levels of education and healthy weights showed higher mean WG consumption.

Our study showed no statistically significant change in mean whole grain consumption in the UK from 2008/09 and 2018/19. Although, there is absence of dietary WG recommendations in the UK, whole grain intakes are below the recommended levels proposed by many countries.

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OC220. Nutrition and health claims on fibre; consumer perceptions, understanding and behaviour. E. Tann¹, L. Dye^{2,3}, N. Boyle³, and K. Adolphus⁴ 1. School of Food Science and Nutrition, University of Leeds, Leeds, UK and 2. Institute for Sustainable Food, University of Sheffield, Sheffield, UK and 3. Department of Psychology, University of Sheffield, Sheffield, UK and 4. School of Psychology, University of Leeds, Leeds, UK.

The importance of dietary fibre consumption for health is widely recognised. However, there is a clear 'fibre gap' between actual and recommended fibre consumption^(1,2). In the UK, average fibre intake is 18g⁽¹⁾. Fibre intake increases in relation to income, with fibre consumption particularly low in low-income households⁽³⁾. The absence of a UK reference intake value for dietary fibre means nutrition and health claims are a key route for food manufacturers to promote dietary fibre to consumers⁽⁴⁾. The aim of this study was to examine the relationship between perception of valence and understanding of approved fibre related nutrition and health claims, and marketing messages, and the intention to purchase products displaying these claims or messages.

An online survey was used to examine perception of valence and understanding of fibre-related nutrition and health claims, and any effects these claims, and other marketing messages related to fibre have on intention to purchase products, amongst the general population and individuals on a lower income in the UK. Data was collected from 560 respondents, with 84 classified as low-income, based on an annual household income of below £17,100⁽⁵⁾. Chi-squared tests were performed to examine associations, with post-hoc tests applied as appropriate.

Perception of valence was found to be significantly associated with intent to purchase for all the health and nutrition claims that were tested ($p < 0.001$), such that participants who perceived a claim or term to be positive, were more likely to report that they would purchase a product displaying the claim. Three of the eight nutrition claims that were tested demonstrated a significant association between understanding and perception of valence ($p < 0.01$), with only two demonstrating a significant association between understanding and intent to purchase ($p < 0.05$). All four of the health messages that were tested demonstrated a significant association between perception of valence and intent to purchase ($p < 0.001$), three demonstrated a significant association between understanding/interpretation and perception of valence ($p < 0.01$), and two demonstrated a significant association between understanding/interpretation and intent to purchase ($p < 0.05$). Thus, for many of the health claims and some health messages that were tested, there was no evidence to suggest that participants who understood the meaning of the claims would be more likely to perceive them positively or be more inclined to purchase a product displaying the claim or message.

Regardless of consumer understanding, claims must be perceived positively to significantly impact intent to purchase, so effort must be made to promote positive attitudes towards dietary fibre, and its associated health benefits. The wording of some claims may not be conducive to positive perceptions of dietary fibre.

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Student Competition

OC221. Double burden of malnutrition and the implementation of double duty actions in low- and middle-income countries: A scoping review of health systems policies. J. Johnsen^{1,2}, K. Martyn^{2,3}, A. Hill¹, C. Logue¹ and S. Ray^{1,2} 1. School of Biomedical Sciences, Ulster University, Coleraine UK and 2. NNEdPro Global Institute for Food, Nutrition and Health, Cambridge, UK and 3. School of Sport and Health Sciences, University of Brighton, Brighton, UK.

Low- and middle-income countries (LMICs) experience a shifting nutrition landscape marked by rising overweight and obesity alongside persistent undernutrition. This new nutrition reality results in a double burden of malnutrition (DBM) (1). DBM is classified as the coexistence of overweight and obesity alongside undernutrition and micronutrient deficiencies, at all levels of the population. To address DBM, a set of recommended nutrition actions called double duty action (DDA) was published by the World Health Organization (2) and Hawkes et al., (3). DDAs aim to lift the siloed view of malnutrition. For example, health services such as breastfeeding counselling is a DDA as breastfeeding prevents undernutrition and reduces the risk of overweight and obesity later in life. However, LMICs health programmes often prioritize undernutrition, hindering comprehensive DBM management (1). This scoping review aims to map existing LMICs' health systems policy on the narrative of DBM and the implementation of DDAs to identify gaps and opportunities to tackle the DBM.

Arksey and O'Malley's framework (4), with recommendations from Levac, Colquhoun, and O'Brien (5) was used. Countries were selected based on the 2022 World Bank criteria for LMICs (n = 102). Policy documents were extracted from WHO's Global database on Nutrition Action Implementation (6) between June 16th and September 2nd, 2023. Exclusion criteria included policies predating 2011, lacking English translations, and countries facing significant domestic challenges.

To identify relevant text key search terms were based on WHO DBM narrative (7) and DDAs characteristics were based on Hawkes et al., framework (3). When identified a full-text review of the relevant sections captured the narrative and extracted into an excel-sheet using a rubric format divided by country, policy title, and themes based on DBM narrative and DDAs characteristics.

This study included 51 countries (21 Southeast Asia, 19 Sub-Saharan Africa, 7 South Asia, and 4 Latin America and the Caribbean). Ninety-eight policy documents were identified and analysed. The majority focused on non-communicable disease prevention, national nutrition strategies, and health sector plans. Thirteen countries explicitly acknowledged DBM. Miscommunication or mistranslation were found as barriers to DBM narrative in six countries. Majority of the countries (54.9%) had a mismatch on the use of malnutrition definitions mainly focusing on undernutrition issues. If obesity was mentioned, the narrative was separated. Tanzania had incorporated the DDA framework into its policies. Regarding relevant DDA health system characteristics, 42 countries acknowledged breastfeeding, 29 nutrition in antenatal care, 28 complementary feeding, 21 growth monitoring, and 15 supplementation programmes.

Differential global efforts are needed to enhance advocacy, clarify definitions, and improve understanding of DBM and DDA narrative for health workers. Clearer terminology, DDA acknowledgment and consistent communication are crucial. Further research on health workers' knowledge, attitudes and practice is essential to build capacity for effective DDA implementation.

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Student Competition

OC222. A content and thematic analysis of Welsh school food menu design and healthiness compared to present government guidelines. A.S. Gilmour¹ and R.M. Fairchild¹. Cardiff School of Sciences and Health Sciences, Cardiff Metropolitan University, Llandaff Campus, Cardiff, UK, CF5 2YB.

All four United Kingdom (UK) nations have School Food Standards (SFS) which schools and local authorities must adhere to. Since the Welsh SFS were updated in 2013⁽¹⁾, the UK government has updated its healthy eating guidelines according to advice from the Scientific Advisory Committee on Nutrition (SACN)⁽²⁾. The Welsh government is committed to revising their SFS to reflect the most up-to-date scientific evidence for nutrients and food. This study aimed to quantitatively and qualitatively content analyse (CA) school food provision (i.e., menus and/or price lists) pan-Wales to determine the extent to which it meets the latest healthy eating government recommendations for school-aged children. Secondly, menu design was thematically analysed (TA) to ascertain the language used and design elements⁽³⁾.

Menus and/or price lists were collected cross-sectionally for the autumn 2023 term and 79% of the total population was sampled (n=82/104). Welsh language documentation was translated into English via an online translation website prior to CA. The study protocol received approval from the Cardiff Metropolitan University School of Sport and Health Sciences ethics committee. The researchers developed an assessment tool inclusive of healthiness criteria based on SACN guidelines as well as the Welsh SFS and used this tool to CA and TA all 82 menus.

Local authority organised primary school food provision was most likely to meet the predetermined healthiness criteria. Most secondary schools lacked fruit-based desserts (64%), red meat (95%) and milk (55%). Moreover, occasionally secondaries exceeded the allotted frequency for processed meat (11%), potatoes cooked in oil (22%) and high in fat, salt and sugar mid-morning snacks (18%). Instances were found where the healthiness criteria, identical to the current Welsh SFS, were not fulfilled. Regarding the TA of menu and/or price lists, four key themes were identified: (i) language, (ii) signalling, (iii) imagery and (iv) design. 12% menus featured the Welsh language. Descriptive language was apparent for cooking methods ('freshly filled,' 'oven-baked') or to popularise dishes ('veggie-dawgs,' 'meatball wrapstar'). An array of keys and icons were employed to signal non-meat items or nutritionally balanced dishes. Logos, photos and illustrations were evident across most menus, yet the imagery could be seemingly unrelated to the school food provision. In particular, primary school menus were bright and colour was utilised to emphasise different weeks of the menu cycle. Issues around clarity were observed on secondary school price lists which could be overly long and include complex pricing structures.

This study has established the current school food and drink provision pan-Wales and provides policymakers with a baseline from which the SFS may be updated and include a formal monitoring process. Improvement in the amount and clarity of information on menus could also be considered at this stage.

Acknowledgments

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OC223. School children's exposure to outdoor food marketing for ultra-processed foods. S. Spolander¹, I. Ioakeimidis¹ 1. Department of Biosciences and Nutrition, Karolinska Institutet, Stockholm, Sweden.

Childhood obesity presents a public health concern worldwide. In Sweden, the prevalence of school children living with overweight or obesity has doubled during the last 30 years ⁽¹⁾. In recent years, the food environment surrounding children has been given more attention regarding its role in the development of obesity. Environments dominated by marketing of ultra-processed foods (UPFs) pose a health risk, since food marketing has been linked to increased food intake, food choices and preferences as well as purchasing requests, especially in children ⁽²⁾.

The aims of the study were i) to identify areas in which children are exposed to food advertisements ii) to investigate the proportion of UPFs advertised in those areas and iii) to investigate the potential difference in food advertisement exposure based on differences in socioeconomic status (SES) and city size.

A cross-sectional pilot study was performed in two Swedish cities. The participants were recruited from secondary schools in areas with varying SES. The participants were instructed to take pictures of outdoor food advertisements that they encountered while living their normal lives for a period of two weeks. The pictures were taken using a research application (app) which allowed participants to take pictures of outdoor food advertisements and upload them to a secure server from which the pictures could be accessed by researchers. In addition to the picture itself, the app also recorded the GPS location of where the picture was taken.

After the two weeks of data collection was complete, areas where the adolescents encounter many food advertisements, so called "hotspot areas" could be identified using the GPS data from the pictures. Two researchers subsequently visited all the identified hotspot areas and systematically mapped all the food advertisements in the areas by taking a picture of each food advertisement. All pictures of food advertisements taken by the researchers were later annotated by two nutritionists based on their content of UPFs. Chi square test was used to compare the proportion of advertisements containing UPFs between the the areas based on SES and city size.

A total of 45 adolescents participated and took a total of 1310 pictures of food advertisements. From these pictures, 34 hotspot areas were identified and mapped by the researchers. The analysis of the food advertisement pictures taken by the researchers in all areas combined showed that 78 % of all food advertisements advertised ultra-processed food or drinks. No significant difference in the proportion of UPF advertisements was found depending on city size ($p = 0.575$) or the SES ($p=0.201$) of the area.

In conclusion, the vast majority of food advertisements in areas where children spend time in two swedish cities advertise UPFs. No significant difference in UPF advertising exposure was found between areas.

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Student Competition

OC224. Systematic review of school-based studies for the prevention and management of childhood obesity. L. Billy¹, I. Ioannis¹, G. Alkyoni¹, A. Tim¹. IMPACT research group, The Department of Biosciences and Nutrition, Karolinska Institutet.

Overweight and obesity rates have reached epidemic proportions and are still escalating. In the domain of childhood obesity prevention and management the school plays a vital role, due to its pedagogical position and exposure⁽¹⁾. The aim of this study was to conduct a systematic review examining the effectiveness, barriers and facilitators in school-based prevention and management interventions on childhood overweight and obesity.

The search criteria were, overweight and obese, 2-19 years old, school-based RCTs, no intervention, and change in overweight and obesity parameters (e.g., prevalence, BMI, waist circumference). Additional eligibility criteria were peer-reviewed articles published in the last 10 years, conducted in Europe, Canada, USA, or Oceania. The selection and data collection process were carried out by two reviewers and disagreements settled by a third. The clinical and statistical heterogeneity of studies lead to an analysis based on themes of recurring methods. The heterogeneity also resulted in that only the direction of the result could be analysed, with results reported as having a positive, negative, or inconclusive effect on the population based on the statistical tests performed. If a secondary obesity parameter showed a different effect direction it was noted as a contradicting result.

Of 8725 unique articles identified, 76 fulfilled the selection criteria. Two dimensions (nutrition and physical activity) with three intended mediators (knowledge, behaviour training, and environment) of interventions were identified.

Thirty-eight studies were conducted in Europe, 32 in North America, and 6 in Oceania. The median age of participants was 10.8 years. The median sex distribution of participants was 50.5%. Seventy-two percent of studies were cluster randomised at school level, and the rest on class or region. Only 22% of studies were blinded and the mean retention rate was 83.1%.

In nutrition, the most common interventions included a teaching component (n=29), or both a teaching and behaviour component (n=24). In physical activity, the most common intervention included a behavioural component (n=33), followed by knowledge only (n=22) and knowledge and behaviour (n=18). From the summative analyses performed on the main outcome variable of each intervention, 61% of all intervention arms had a positive effect, ranging from 54% to 70%. Five percent had a negative effect, ranging from 0% to 10%. Of the interventions that had a positive effect 50% displayed contradicting results from other obesity markers, ranging from 6% to 44%. Of single components, environment was most effective for nutrition and least effective for physical activity. Too few studies had negative findings to warrant an analysis. Contradicting results were most frequent for the environmental component of the nutrition dimension.

Interventions targeting physical activity and nutrition can be effective in preventing and managing overweight and obesity. Depending on the intended mediator and number of mediators results may vary.

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OC225. Hydration, mood, and cognition in primary aged school children in the United Kingdom. CA Roberts¹, K Boak¹, N McCulloch¹, C Haskell-Ramsay², LJ James³, BP Green⁴, GD Tempest¹, C Buce-Martin¹ and PLS Rumbold¹. 1. Department of Sport, Exercise and Rehabilitation at Northumbria University, Newcastle Upon-Tyne, UK and 2. Department of Psychology at Northumbria University, Newcastle Upon-Tyne, UK and 3. School of Sport, Exercise and Health Sciences, Loughborough University, Loughborough, UK and 4. Medical Nutrition Manager - Innovation R&D at Aymes, UK.

Children are at increased risk of dehydration⁽¹⁻³⁾, which can adversely impact cognition and mood⁽⁴⁻⁶⁾. Many children begin their school day dehydrated and fail to replenish fluids adequately throughout the day⁽⁷⁻¹¹⁾, however, these findings have not been confirmed using objective measures of hydration^(12,13). This study aimed to confirm hydration status of primary school-aged children across the school day using objective hydration assessments and to examine if changes in hydration are associated with cognition and mood.

Thirty children (mean age 9.4 ± 0.5 years old, stature 1.4 ± 0.5 m, body mass 36.5 ± 4.2 kg, and body mass index 18.9 ± 1.7 kg/m²) were recruited from a local primary school. Food and fluid intake were tracked via nutritional analysis of photographs. Urine osmolality (Uosm), serum osmolality (Sosm), urine specific gravity (USG) and self-reported urine colour (Ucol) were assessed at first void (Uosm only) or the start (9:00) and end (16:00) of the school day. Children's self-reported mood were obtained via Visual Analogue Scales(100mm) (9:00, 10:30, 13:30, 16:00). Children completed cognitive assessments using the Computerised Mental Performance Assessment System (15:30-16:00).

Mean total water intake was 759.9 ± 240.7 mL. Children consumed more fluid at mealtimes than from water bottle (Mean Difference (MD) 154.3mL, $t(29) = -5.763$, $p < 0.001$). From the start to the end of the day, significant increases in Sosm (MD 3.3mOsm/kg, $t(21) = 4.011$, $p = 0.002$), USG (MD 0.0066, $t(29) = 8.514$, $p = 0.005$) and Ucol (MD 1.2, $t(26) = 15.558$, $p < 0.001$), indicated reduced hydration. The prevalence of dehydration (Sosm > 290 mOsm/kg USG > 1.030) increased from the start (17%) to the end of school (40%). A series of ANOVAs from the start to the end of the day showed feelings of boredom, hunger, tiredness, and thirst increased, and focus, and happiness decreased (p 's < 0.05). Hydration measures were significantly associated with long term memory (LTM) (changes in Sosm, $r = 0.437$, $p = 0.042$) and working memory (WM) (changes in Sosm $r = 0.462$, $p = 0.031$, and USG, $r = 0.403$, $p = 0.033$).

Children were less hydrated at the end of the school day suggesting inadequate fluid replacement during the school hours. Changes in hydration status across the school day were associated with subjective mood states. Furthermore, a decrease in hydration resulted in decreased performance in the memory tasks which could potentially hold implications on school performance. Children in this study had access to water throughout the day, however, most fluids were consumed at breakfast and lunch, suggesting interventions promoting sustained drinking throughout the day are required. For example, measures could be taken to educate parents and school staff on the importance of adequate hydration, and the need to remind children to drink throughout the day. For this to be effective, action needs to be taken across lesson time, meals, and break times.

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Student Competition

OC226. Exploring the food and drink purchases of secondary school pupils in England across the school day. S. Spence¹ and J. Bradley¹ 1. *Human Nutrition and Exercise Research Centre, Population Health Sciences Institute, Newcastle University, UK.*

In the UK, 'The requirements for School Food Regulations, 2014' specify the 'type' and 'frequency' of food and drinks that can be provided across the school day.⁽¹⁾ For example, there should be one or more portions of fruit per day. However, there is no monitoring and pupils can choose from a daily selection. Most studies have focused on pupil's lunch intake^(2,3) and there are limited large-scale UK studies. Whilst interventions are needed in schools to improve pupil's dietary intake, identifying solutions is challenging. This study uses pupil-level purchase data to capture food and drink choices across the school day to identify potential opportunities for intervention development. One aim was to explore the food and drink purchases of UK secondary school pupils across the school day.

Ethics was obtained from Newcastle University (ref: 2482/26614). DPIA agreements were obtained from schools.

Secondary schools in Northeast England participated. Non-identifiable pupil-level purchase data from a four-week menu cycle were used that included: time, date, individual food and drink item, quantity, cost, and FSM status. Data were encrypted and transferred securely. Data were cleaned and manipulated in excel and Stata V18. Food and drink items were coded to 60 preliminary food and drink groups. Excel and Stata V18 were used for analyses; current analyses are descriptive.

Pupil-level purchase data ($n=3466$) from five secondary schools were included. FSM pupils accounted for 29% ($n=1015$), Year 7 pupils 25% ($n=848$) decreasing to Year 11 pupils 17% ($n=580$) of the total sample. The two meal types most pupils purchased were 'Break & Lunch' combined (58%, $n=2017$; FSM 26% $n=524$) and 'Lunch only' (20%, $n=659$; FSM 41%, $n=268$).

At break, the top five purchased items were: bacon/sausage bun ($n=7871$; 21%) pizza snack ($n=5714$; 15%), bagel/crumpet ($n=3697$; 10%), fizzy fruit juice ($n=3344$; 9%) and water ($n=3459$; 9%). At lunch, the top five purchased items were: meal deal ($n=12,527$; 16%), fizzy fruit juice ($n=7,895$; 10%), hot meal ($n=6,963$; 9%), biscuit ($n=5,803$; 8%), and water ($n=5001$; 6%). Food and drink purchases at break and lunch were similar by FSM status.

Preliminary findings show most pupils purchase at least one food and/or drink item at both break and lunch. Similar pupil purchasing was found regardless of FSM status. Future interventions need to consider the food and drink choices available at break and lunch. One school had a water only policy, therefore, school context and variation in the food and drink offer may impact findings. More detailed analyses will consider the effect of school, school year, meal type (breakfast, break, lunch) and Free School Meal Status (FSM) on pupil's food and drink purchases using multi-level logistic regressions.

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OC227. The effects of Project DAIRE, a school-based food intervention study, on diet diversity, diet quality and health attitudes of children in Northern Ireland. D. Olgacher¹, C. Wallace¹, S. F. Brennan^{1,2}, F. Lavelle², S. E. Moore^{1,2}, M. Dean², M. C. McKinley^{1,2}, P. McCole³, R. F. Hunter¹, L. Dunne⁴, N. E. O'Connell², C. R. Cardwell¹, C. T. Elliot², D. McCarthy², and J. V. Woodside^{1,2} 1. Centre for Public Health, Queen's University Belfast, Belfast, UK and 2. Institute for Global Food Security, Queen's University Belfast, Belfast, UK and 3. School of Business, Maynooth University, Maynooth, Co. Kildare, Ireland and 4. Centre for Evidence and Social Innovation, Queen's University Belfast, Belfast, UK.

The diets of children in the UK are suboptimal⁽¹⁾, which may influence their immediate and future health and well-being⁽²⁾. Schools offer convenient and prolonged access to children from diverse backgrounds, thus interventions within this setting have been suggested as a means to promote diet and health outcomes among this population⁽³⁾. This study explored the effects of Project Daire⁽⁴⁾, a school-based food intervention, on children's diet diversity and diet quality as well as their attitudes towards health behaviours.

A factorial design cluster randomized controlled trial was conducted. Fifteen primary schools in Northern Ireland were randomized into one of four 6-month intervention arms: Nourish, Engage, Nourish and Engage or Control (Delayed). The Nourish intervention modified the school food environment, provided food-related experiences and increased access to local foods. The Engage intervention included educational activities on nutrition, food and agriculture. Data on food consumption at home, school and/or in total over a 24-hour period were collected using age-appropriate food frequency questionnaires at baseline, with follow-up at 6-months. Diet diversity score (DDS) and diet quality score (DQS) were developed based on adherence to the Eatwell Guide. Additionally, a Health Attitudes and Behaviour measure assessed 10-11 year old children's attitudes towards importance of various health behaviours at both time points. Linear and logistic regression models were used to examine intervention effects and to account for school clustering.

A total of 445 children aged 6-7 and 458 aged 10-11 years old completed the trial. Results indicated that children aged 10-11 year old who received the Nourish intervention demonstrated higher school DDS (adjusted mean difference = 2.79, 95% CI 1.40 – 4.19; $p=0.001$) and total DDS (adjusted mean difference = 1.55, 95% CI 0.66 – 2.43, $p=0.002$) compared to their counterparts who did not. Subgroup analyses revealed that the increases in school DDS among 10-11 year old children in the Nourish group were apparent in both boys and girls (Boys: adjusted mean difference = 2.4 95% CI 0.1 – 4.7, $p=0.04$; Girls: adjusted mean difference = 3.1 95% CI 1.6 – 4.6, $p=0.001$). However, the increase in total DDS remained statistically significant only among girls, with an adjusted mean difference of 1.9 (95% CI 1.1-2.7, $p<0.001$). No statistically significant changes in DQS were detected in either age group. High levels of positive attitudes towards health behaviours were observed at baseline, with no clinically significant effects of either the Nourish or Engage interventions detected during the follow-up period.

The multi-component approach of the Nourish intervention, addressing both food provision and environment, showed promise in promoting diet diversity. Further research is warranted to develop sustainable implementation strategies for Daire, to explore additional intervention components to impact other outcomes, including diet quality, and to evaluate long-term effectiveness.

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Student Competition

OC228. Exploring the perception of whole grain foods in school meals: insights from Egyptian primary school. H. Hegazy¹, A. Shanab¹, A. Ahmed² and S. Salama¹ 1. EFB Labs Department, Egyptian Food Bank, Cairo, Egypt and 2. M&E Department, Egyptian Food Bank, Cairo, Egypt.

The integration of whole-grain foods into school meal programs represents a critical strategy in combating childhood malnutrition and obesity. Wheat is a vital part of Egypt's diet, contributing a substantial portion of daily calories and protein.⁽¹⁾ In Egypt, the prevalence of wasting in children under the age of 5 is 9.5% which is more than 1.5 times the average rate of wasting (6.0%) for the African region⁽²⁾. Therefore, the transition from refined to whole-grain foods could potentially offer significant health benefits. This study aims to assess the perception of whole grain foods within school meals among primary school students and their caregivers, using focus group discussions as a primary data collection methodology.

In collaboration with the Sawiris Foundation for Social Development (SFSD), the Egyptian Food Bank (EFB) made an awareness visit to a public primary school in Fayoum governorate. We as EFB conducted four focus group discussions (FGDs), approximately 25-30 each, in an Egyptian primary school as part of the Whole Wheat School Feeding initiative. These discussions involved different stakeholders, including mothers, cooks, and school children, with the intent to evaluate perceptions and acceptance of whole grain foods provided in the school. The sessions were structured to elicit feedback on specific whole grain meals (pizza, pasta, vermicelli with milk, cheese sandwich, Belila (Egypt's wholesome alternative to oatmeal) and kofta(meat) sandwich) and to understand general attitudes towards whole grain consumption.

The results indicate a mixed reaction to whole grain foods among the participants. Some meals like the pasta and kofta were well-liked, but others including the vermicelli with milk and Belila, were mostly disappointing. Taste, texture, and familiarity impacted acceptance. Notably, kids favored filling meals resembling their normal eats. Feedback from mothers and cooks also highlighted concerns regarding the nutritional content and the appeal of whole grain options.

The study reveals significant challenges and opportunities in the integration of whole-grain foods into school meal programs. While some whole grains are accepted, the findings show carefully thinking about local diets, tastes, and nutrition education matters in promoting whole grain eating. The study advocates a multi-pronged approach - varying menus sensory education, and stakeholder engagement - to make whole grains in school meals more agreeable and support general nutrition security and healthy growth in children.

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OC229. Exploring the school environment in relation to healthy eating and physical activity in female high schools in Saudi Arabia. Sarah Aldukair, Prof. Jayne V. Woodside, Dr. Laura McGowan¹ and Prof. Khalid Almutairi². 1. Centre for Public Health, School of Medicine, Dentistry and Biomedical Sciences, Queen's University Belfast, Belfast, UK and 2. Department of Community Health Sciences, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia.

In Saudi Arabia, adolescent health is suboptimal; among those aged 15-29 years, 79% have insufficient levels of physical activity levels, 30% are living with overweight or obesity, and 10% of them have pre-diabetes⁽¹⁾.

The Saudi Guidelines for the Prevention and Management of Obesity recommend implementing school-based interventions to prevent obesity among adolescents⁽²⁾. Understanding the school setting through a school-based environmental audit can provide insight into the barriers and enablers of obesity prevention strategies in schools (3), which can inform the design of school-based interventions. One such tool, the International Study of Childhood Obesity, Lifestyle and the Environment (ISCOLE) tool, assesses the school environment in relation to healthy eating (HE) and physical activity (PA). The reliability and feasibility of this tool has been tested across 256 schools in 12 different countries. Therefore, the ISCOLE tool can be used to conduct reliable environmental audits across international school settings⁽³⁾. The ISCOLE tool⁽³⁾ was used along with the Saudi Ministry of Education (MOE) canteen policy checklist to examine the school environment in relation to HE and PA.

The Saudi MOE canteen policy is a checklist of banned and recommended food and drink items sold to students. Three female high schools were selected from differing economic deprivation levels (high, medium, and low deprivation) in Riyadh, Saudi Arabia. The ISCOLE tool covers the domains of HE and PA provisions, school facilities and policies, and was completed by the researcher in conjunction with a senior school staff member. The researcher accessed the school canteens and examined the items present. Checklists were completed and pictures taken for documentation. Ethical approval was granted from the Saudi MOE, Princess Noura University's Institutional Review Board, and affirmed by Queen's University Belfast.

There were notable differences between the three high schools sampled. Middle and low deprivation schools had PA and HE policies under development, a specific time allocated for PA, HE promotion and a school shop; the high deprivation school did not have any of these. The results of the MOE canteen checklist illustrated that many 'banned' food items were available in the middle and low deprivation schools, including nectar juices, pre-packaged croissants, chocolates, and popcorn. Regarding 'recommended' food items, both schools offered sandwiches and bottled water. None of the schools offered healthy food at subsidized prices and only the low deprivation school had access to a small outdoor soccer area.

In Saudi Arabia, female high schools face significant challenges regarding a school environment that supports both HE and PA. These challenges include the absence of HE provision and lack of suitable PA facilities. Understanding the school context will help support the development of a future school-based obesity prevention intervention.

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Student Competition

OC230. Enhancing dietary assessment in Nigeria using myfood24: a pilot study of diets among Nigerian adults. C.A. Uzokwe^{1,2}, C.C. Nkwoala², B.E. Ebenso³, C.G. Opara² and J.E. Cade¹ 1. *Nutritional Epidemiology Group, School of Food Science and Nutrition, University of Leeds, UK and 2. Department of Human Nutrition and Dietetics, Michael Okpara University of Agriculture Umudike, Abia State, Nigeria and 3. Leeds Institute of Health Sciences, School of Medicine, University of Leeds, UK.*

With the rising rates of non-communicable diseases in Nigeria, there is need to understand the links between diet and health using an accurate and efficient dietary assessment method. The new online dietary assessment tool comprising a database of local Nigerian and West African diets, myfood24 West Africa (1), was piloted in a healthy adult population in Nigeria.

Participants were staff of Michael Okpara University of Agriculture Umudike, Abia State in southeast Nigeria, at least 18 years, not pregnant, not had childbirth in the last 3 months, and not diagnosed with diabetes. A pre-recorded video demonstration of food recording with myfood24 was sent to participants. One-day 24-hour recall was self-recorded by either participants or by the researcher on behalf of the participants. Participants who used myfood24 on their own completed the usability questionnaire to rate their agreement with system usability statements and provided feedback on the system.

179 adults were recruited for the study and a total of 1345 food/drink entries were made with a median number of 7 (IQR: 5, 9) food/drink entry per day per participant. Foods from our new West African food database contributed to 60-82% of the energy and nutrient intake. Mean energy intake was 1844 (SD 781) kcal; with energy coming from 28% fat, 63% CHO, and 9% protein. 53 (30%) participants used myfood24 on their own, with a mean age of 38.5 ± 8.7 years. There was no significant difference in the energy intake ($p=0.67$) and body mass index ($p=0.82$) of participants who used myfood24 on their own and those who did not. 39 out of 53 participants completed the user questionnaire. The mean system usability score was 74 (95% CI 65, 83), indicating a good usability. Participants found the tool easy to use and estimate portion sizes of local foods; it was educative showing levels of macronutrient consumed; and more efficient than manual recording of foods but some participants commented that a few local foods were missing.

myfood24 will support research investigation of relationships between diets and health in Nigeria. There is also now an offline function removing reliance on WiFi. Feedback from participants will inform future updates of the database.

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Student Competition

OC231. Collecting regional data for public health focusing on diet and sustainability measures using myfood24. Cade, J.E.^{1,2}, Rycroft, C.¹, Beer, S.², and Corrigan, N.³. 1. *Nutritional Epidemiology Group. School of Food Science and Nutrition, University of Leeds, UK* and 2. *Dietary Assessment Ltd, Nexus Building, Leeds, UK* and 3. *Office for Health Improvement and Disparities, Department of Health and Social Care Blenheim House, Leeds, LS1 4PL.*

There is no regular, routine measurement of food and nutrient intake undertaken regionally in the UK. This makes evaluation of local public health interventions challenging. Consumers want to be more sustainable in what they are eating. Social media penetration in the UK is 90%⁽¹⁾, with ~47m people using Facebook, a potential route to study recruitment. Nutritional analysis software with accurate underpinning food composition and sustainability data could enable quick and easy large scale data collection. This study aimed to collect diet and sustainability measures using online tools and to test the feasibility of using social media to obtain a large, regionally focused sample in a short time.

We undertook a rapid, time limited, regional (Yorkshire and Humber) food and nutrient tracking survey 'One day: Diet in Yorkshire and Humber' for use with policy makers⁽²⁾. A Facebook (FB) boost approach was used to recruit a regional sample of adults. Participants completed a brief online demographic survey and used myfood24[®] to give a detailed measure of their food intake for the previous day. myfood24[®] generic and branded databases were used⁽³⁾ which include sustainability metrics.

The FB posts were boosted for 21 days and reached 76.9k individuals. Just under £1,000 was spent on 3 FB boosts and 1,428 participants completed the questionnaire. 673 participants also completed the one-day diet diary. Hull, Barnsley and Doncaster had the highest rates of overweight and obesity in the region. Overall nutrient values recorded were similar to national survey data for older women. Intakes of fibre (mean 18g, SD 11) and iron (mean 9.6mg, SD 5.0) were low. For the first time, measures of sustainability from the diet were calculated from myfood24[®].

The mean greenhouse gas emissions (GHGE) were 5.9(kg CO₂ eq/day) (95% CI 5.6, 6.1); land use 9.0 (m²year/day) (95% CI 7.6, 10.3) and water use 582 (l/day) (95% CI 551, 611). Regression analysis showed that for each additional 100kcal consumed there was a significant increase in GHGE of 0.9 (kg CO₂ eq/day) (95% CI 0.8, 1.1). Land and water use were also significantly increased with increasing energy intake. Adjusting for total energy, protein intake was positively associated with all 3 metrics. Carbohydrate was inversely associated with GHGE and land use. However, fat intake was not associated with any of the sustainability measures. Portions of fruit and vegetables consumed were positively associated with water use only.

Diet is clearly linked to sustainability. The mean GHGE from diet is equivalent to driving an average car ~22km/day. We successfully recruited a large sample in a short timeframe using FB. Participants were able to use online tools to report food intakes. This data is relevant to local and national policy makers to monitor and evaluate public health programmes.

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OC232. Sustainability metrics of the UK diet using myfood24. G. Williams¹, A. Hasenböhler¹, A. Hamilton¹, M. Galazoula² and J.E. Cade^{1,2}. 1. Dietary Assessment Ltd, Nexus Building, Leeds, UK and 2. Nutritional Epidemiology Group. School of Food Science and Nutrition, University of Leeds, UK.

Promotion of sustainable healthy diets requires comprehensive metrics to assess environmental impact of foods consumed¹. Existing food systems are failing to meet the needs of current and future generations, by operating outside several planetary boundaries. Promoting healthy diets from sustainable food systems is central to realizing the 2030 Sustainable Development Goals. Standard food composition tables do not include sustainability metrics. The aim of this work was to add UK focussed sustainability metrics to the food composition table used in myfood24.

Greenhouse gas emissions (GHGE), land and water use were added to each food item in the myfood24 UK generic and branded databases. This is recorded as per 100g of product. The values for GHGE² takes account of factors including production method, land use management, feed used, soil and climate, processing and transport of both the product and aspects of its production e.g., fertiliser and feed. Values were weighted for UK trade statistics to reflect values for the UK food supply. Land use and freshwater withdrawals were also added.

Exploration of the sustainability metrics in the myfood24 database by food category show, as expected, that meat (1.5 kg CO₂eq, SD 1.4), fish (1.8 kg CO₂eq, SD 1.0) and dairy (1.3 kg CO₂eq, SD 0.8) plus dried herbs/spices (1.4 kg CO₂eq, SD 1.2) have the highest GHGE per 100g. In the meat category, beef and lamb had GHGE ~3.8 kg CO₂eq with pork and chicken having lower values ~1.0 kg CO₂eq. Plant based protein sources had much lower GHGE per 100g, with pulses at 0.3 CO₂eq (SD 0.2) and nuts at 0.2 CO₂eq (SD 0.2). Land use was by far the highest per 100g for lamb (63 m²year/day, SD 18) with beef next at 8 m²year/day (SD 4). Chocolate (5 m²year/day, SD 2) was the sixth highest food category for land use. Drinks, vegetables, fruit and potatoes had the lowest land use values. Regarding water use, seafood per 100g had high values at 484l/day (SD 167), followed by nuts (218l/day, SD 172), lamb (171l/day, SD 36) and rice (164l/day SD 42). Drinks, potatoes and breads had the lowest land use values per 100g.

Through addition of sustainability metrics to food and nutrient composition databases we can measure the impact of food intake in relation to both nutrients and sustainability. This linked data will help us to understand how to adapt our diets to be healthier and better for the planet.

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OC233. Method to develop globally relevant portion sizes for nutrient-dense and discretionary foods. A. L. Eldridge¹, C. Debras¹, E. Kotzakioulafi¹, L-T. Tsai¹, F. Salesse² and E. R. Gibney² 1. Nestlé Institute of Health Sciences, Lausanne, Switzerland and 2. Institute of Food and Health, University College Dublin, Ireland.

Portion sizes have increased substantially over the past several decades and are thought to contribute to rising rates of overweight and obesity.⁽¹⁾ People eat more when provided with larger portions, and over time, consider larger portions as normal.⁽²⁾ Providing descriptive labeling and visual cues can be helpful in guiding consumers to appropriate portion selection.⁽³⁾ Globally, few countries regulate servings sizes for packaged foods. Instead, Nutrition Facts are reported per 100g or 100mL, and/or per amount declared by the manufacturer. These variations lead to inconsistencies in on-pack portion sizes and may cause consumer confusion.⁽⁴⁾ Our objective was to develop a methodology to establish globally relevant portion size recommendations for both nutrient-dense and discretionary foods that could be implemented in countries where permitted.

A stepwise and systematic approach incorporated values from regulated serving sizes (n=10), portion recommendations from food-based dietary guidelines (FBDG; n=90, aggregated into 6 regions), and food consumption data from Europe (n=24 countries) and Australia for a total of 18 possible data inputs. These inputs were used to derive Global Portion Values (GPVs) as the median of all values for 50 food and beverage categories including both nutrient-dense and discretionary foods. To better understand the consistency of input values, 25th and 75th percentiles, and dispersion of input values, assessed as percent of median absolute deviations (MAD)/median, were calculated.

GPVs were calculated for milk and dairy (n=6 food groups), protein foods (n=5), mixed dishes (n=5), grains (n=7), fruits and vegetables (n=5), snacks and sweets (n=11), sauces and condiments (n=5), fats, oils and sugars (n=4) and beverages (n=2). The number of inputs for each portion value ranged from 6 (Appetizers/hors d'oeuvres) to 18 (juices). Only 5 of 50 food groups had fewer than 10 inputs; 21 had ≥15. Dispersion ranged from 0-33%; 88% of GPVs were considered "consistent" (dispersion <25%) and 8 categories had 0% variation, indicating high consistency across all inputs. Example GPVs for nutrient-dense foods include: 240mL for milk (16 inputs, 8% dispersion); 30g for cheese (17 inputs, 0% dispersion); 90g for main dishes (meat, poultry, fish) without sauce (16 inputs, 13% dispersion); 50g for bread and rolls (17 inputs, 20% dispersion); 130g for canned vegetables (10 inputs, 2% dispersion). Example GPVs for discretionary foods include: 30g for chocolate (15 inputs, 17% dispersion); 30g for potato chips and crisps (12 inputs, 17% dispersion); and 30mL for salad dressing (13 inputs, 0% dispersion).

This novel method incorporating regulated serving sizes, portions from FBDGs and actual intakes can be used to derive portion recommendations for commonly consumed foods and beverages. If adopted, these values could improve consistency in portion labeling in countries where they are permitted and therefore guide consumers to more appropriate portions.

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OC234. From Bytes to Bites; Advancing Data Collection Methodologies for Enhanced Branded Food Insights. L.B. Kirwan¹, E.O'Sullivan¹, S.Hogan¹, F. Douglas¹ and D'O Kelly¹ 1. *Nutritics Ltd, 22C Town centre mall, Main Street, Swords, Dublin, K67 FY88.*

Nutrition research relies on food databases which are extensively used in dietary surveys, clinical practice, research, and policy development [1]. Online data volume is expected to increase up to 180 zettabytes by 2025, due to a proliferation of internet-connected devices, the growth of social media platforms, and a digital transformation of industries [2]. Webscraping, a method to extract data from websites, has been previously used in Ireland to evaluate online retailer information as a potential source for monitoring food reformulation efforts in the Irish retail market [3]. This study aims to outline a process for, and evaluate the use of, webscraping on online supermarket websites to increase data availability to researchers.

An online supermarket website was selected to trial the new process. Octoparse software version 8 was downloaded. 12 data fields of interest were identified; cost, lifestyle, net weight, Directions for use, Storage instructions, Nutrition information, Front of pack information, legal name, brand name, manufacturer, ingredients, and allergy advice. A process was defined for data web scraping in four main steps; 1) collection of category level URL's, 2) collection of product level URL's, 3) collection of data at product level within defined fields and 4) data cleaning and re-structuring. A workflow was created in Octoparse for steps i - iii and step iv was completed using Excel version 16.69.1.

83 category level page links were generated and entered into Octoparse software. Webscraping was completed on 3,095 product level URLs. Data on 1,450 products (47%) were successfully scraped as they had data within the 12 defined data fields. A new dataset was created for the 1,450 products with data fields including information on nutrition (energy, fat, of which saturates, carbohydrate, of which sugars, fibre, protein and salt), costs per serving and per kg, lifestyle factors (e.g. whether a product was vegetarian or vegan), ingredient lists and allergy advice. 637 products (44%) were found to have vegetarian/vegan claims. Micronutrient level data was limited.

An increased availability of online data presents an opportunity for the development of new and more systematically updated datasets, and may increase the availability of information on branded products. Webscraping enables researchers to create new databases, and systematically update datasets, with less resources. This study enhances the availability of data and may enable researchers to explore new avenues for understanding food environments. Future research should test the process on additional websites to increase coverage of the Irish retail market and across different regions, identify sources with more in-depth nutritional data, and evaluate use case in mobile applications. Web scraping offers a promising tool for advancing research in food science and nutrition, and providing access to diverse datasets for research and innovation that change with the times.

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OC235. The relative validity of 24-hour dietary recalls conducted via telephone against a 4-day food record to estimate energy, macronutrient, dietary fibre and salt intakes in a convenience sample of adults in Ireland. *H. Al-Sehaim¹, L. Kehoe^{1,2}, B. McNulty³, J.M. Kearney⁴, A. Flynn² and J. Walton¹. 1. Department of Biological Sciences, Munster Technological University, Cork, Ireland and 2. School of Food and Nutritional Sciences, University College Cork, Ireland and 3. Institute of Food and Health, University College Dublin, Belfield, Dublin 4, Ireland and 4. School of Biological, Health & Sport Sciences, Technological University Dublin, Dublin, Ireland.*

The previous National Adult Nutrition Survey (NANS) (2008-10) in Ireland collected dietary data using a 4-day weighed food record⁽¹⁾, however, the more recent NANS II (2020-21) used 2x24-hour dietary recalls as per EU guidance⁽²⁾ (collected by telephone due to the Covid-19 pandemic social distancing guidelines). The aim of this study was to investigate the relative validity of two telephone 24-hour dietary recalls against a 4-day weighed food record to estimate energy, macronutrients, dietary fibre and salt intakes in a convenience sample of adults to ascertain comparability between the two methods.

A total of 40 participants (19-64 years; 55% female) visited Munster Technological University on four occasions as part of this study. Participants were equally randomised (to complete the food record first followed by the dietary recalls or to complete one dietary recall first, then the food record followed by the 2nd dietary recall (corresponding to the last food record day)). Participants were trained in completing the food record (with researcher visits on day 2/3 and upon completion to review the record/check for completeness). The researcher-led 24-hour dietary recalls were conducted via telephone (at least 7 days apart) (photographic food atlas provided to participants in advance). For both methods, a high level of researcher interaction was employed with detailed dietary data collected at brand level for updating of food composition tables. UK and Irish food composition tables were used to estimate energy and nutrient intakes (food sources only) and mean daily intakes of energy, macronutrients, total sugars, saturated fat, dietary fibre and salt (g, % total energy (%TE), g/10MJ) were estimated from both methods. Differences between methods were assessed using; mean percent difference (calculated as ((mean food record-mean 24-hour recall)/mean food record)*100), paired sample *t*-tests (to examine differences between mean intakes), Pearson coefficient analyses (to investigate the strength and direction of associations) and cross-classification tertile analysis (nutrient-specific; to quantify the level of agreement between the categorisation of estimates)⁽³⁾.

The mean percent difference between methods was acceptable (1-10% difference) for all nutrients except total sugars in both grams (13% difference) and %TE (11% difference). Paired-samples *t*-tests showed no significant difference between methods. Correlations ranged from 0.53-0.86 (good) for energy and nutrients, except dietary fibre (0.48: acceptable) ($p < 0.001$). Fifty to eighty percent of participants were classified in the 'exact agreement' category of intake by cross-classification with 90-100% of participants classified in the 'exact agreement/adjacent category'.

These findings suggest that two 24-hour telephone dietary recalls may be comparable with a 4-day weighed food record for the estimation of energy, macronutrients, dietary fibre and salt intakes in adults. The methodologies used for both methods (high researcher involvement, brand level data, matching food composition databases) are important for accuracy and their similarities may have improved comparability.

Acknowledgements

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Student Competition

OC236. Estimating the nutrient supply from agriculture in Scotland. *B.J.J. McCormick¹ and J.I. Macdiarmid¹*. *The Rowett Institute, University of Aberdeen, Aberdeen, UK.*

Responses to the Scottish Government commitment to Net Zero⁽¹⁾ will increase the demand for land from multiple sectors in Scotland and potentially take land out of food production. Choices about where and what foods are produced is important for nutritional security, but has rippling consequences for land use, rural populations and across the food system. To support choices about where and what might be produced, we present an estimate of the nutritional value of agricultural commodities produced in Scotland.

Building on a Scottish Government-built model, annual agricultural census data were used to identify commodities for human consumption, which were matched to the minimally processed foods from each commodity. We focused on the value of the least processed form of each commodity, before food processing and ingredients from elsewhere are incorporated. For example, wholewheat flour and hulled barley. Nutrient data for each food were drawn from the UK Composition of Foods Integrated Dataset⁽²⁾ and the energy and 27 macro and micronutrients were extracted for each food item. Using average yield and production data, the supply of nutrients was estimated.

Cereals could provide many nutrients, but are mostly used for non-food products (approximately 1% of barley and 12.5% of wheat are for human consumption⁽³⁾) so their realised contribution is attenuated. Vegetables are an important source of nutrients despite relatively little hectareage, however, their contribution to the nutrient supply is largely driven by large yields of potato and carrot (particularly for vitamin A). Given the quantity produced, milk is the largest source of nutrients, but livestock meat, which uses a significant proportion of agricultural land (including fodder crops, animal feed and grazing) has a disproportionately small contribution to nutrient supply. However, recognising nutrients vary between products which needs to be considered. Energy (71% of population needs), fibre (64.1%), iron (68.5%), selenium (59.7%), niacin (90.5%) and vitamins D (21.1%) and E (55.8%) all have a low supply from Scottish land.

These results are based on a nutrient supply from production of commodities on the land in Scotland, and the supply from primary production is not always what consumers have access to and the supply of nutrients often changes in food processing along the whole food chain. The supply of nutrients for human consumption is not only from domestic production and about half of the diet in Scotland is from imported foods (especially fruit and vegetables)⁽⁴⁾. However, the aim of this study was to estimate the potential of supply from current agricultural production. Understanding the potential and realised nutrient supply from domestic agricultural production helps to evidence a discussion about how agriculture is valued, the opportunities to reimagine food production to maximise the supply of nutrients across Scotland and consider uses of land.

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OC237. Operationalising dietary acceptability: A systematic review on how acceptability is applied in dietary optimisation models. C. Baungaard¹, M.A. Martins¹, G.W. Horgan¹, D.C. Little², J. Hillier³ and B. de Roos¹. 1. The Rowett Institute, University of Aberdeen, Aberdeen, UK and 2. Institute of Aquaculture, University of Stirling, Stirling, UK and 3. Global Academy of Agriculture and Food Systems, University of Edinburgh, Edinburgh, UK.

The current environmental, climate and health challenges require critical transitions to diets and food production systems that are more sustainable, in turn providing diets that are adequate nutrition, affordable and environmentally friendly. Recent studies have identified cultural acceptability as an important dimension in sustainable diets⁽¹⁾. Mathematical optimization models have been developed to deal with the complexities of all the dimensions, yet diet acceptability has had limited successful integration into these models⁽²⁾. This systematic review explored two research questions in the context of dietary optimisation studies; how is acceptability defined and operationalised?; how does including acceptability impact dietary optimisation solutions?

A hybrid search strategy was implemented. The first used the PRISMA guidelines to conduct a systematic search on two electronic databases (PubMed, Embase) for articles published between January 2013 and April 2024. Search terms were developed through preliminary readings and included: diet OR diets OR dietary AND modelling OR modeling OR optimisation OR optimization OR optimize OR optimize OR linear programming AND acceptabl*. Articles in English optimising acceptable diets for adults (18+) were included. The second used the snowball method for identifying relevant articles from previous searches⁽³⁾. Backward snowballing was conducted by identifying references from the initial set and forward snowballing was conducted through Web of Science in June 2023.

Fifty-one studies fulfilled the inclusion criteria. European countries had the largest representation ($n = 41$; 20 from France, 7 from The Netherlands); 43 studies took a population-based modelling approach, 7 on individual-based modelling and 1 study used both approaches. The review identified 12 modelling approaches, where linear programming was most frequently used ($n = 26$), followed by non-linear programming ($n = 7$) and quadratic ($n = 6$). The majority of studies that optimised for acceptability used the minimal deviation from observed diet as the objective function ($n = 32$). Baseline dietary data for observed diets were primarily from National surveys ($n = 36$), followed by local surveys ($n = 5$), however, 25 studies used data that was 8 – 16 years older than the publication date. Majority of studies included at least one acceptability constraint ($n = 45$), ranging from setting boundaries on certain foods ($n = 34$), removal of certain foods/food groups ($n = 12$), limiting deviation ($n = 15$).

The full analysis of the studies is ongoing; however the current results highlight the varying methods used to operationalising 'acceptable' diets in diet optimisation literature. A conceptual framework for integrating acceptability into diet optimisation studies is currently under development, aiming to highlight the various ways in which 'acceptability' is operationalised through the modelling process from data inputs, models chosen to validation of the solutions. It is anticipated that this work will highlight new opportunities for further modelling for acceptable diets.

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OC238. A global review of methodologies for establishing food intake recommendations in food-based dietary guidelines. *Fanny Salesses^{1,2}, Alison L. Eldridge³, Tsz Ning Mak⁴ and Eileen R. Gibney^{1,2}* 1. UCD Institute of Food and Health, University College Dublin, Ireland and 2. Insight Centre for Data Analytics, University College Dublin, Dublin, Ireland and 3. Nestle Institute of Health Sciences, Lausanne, Switzerland and 4. Nestle Institute of Health Sciences Singapore Hub, Nestle Research, Singapore.

Food-Based Dietary Guidelines (FBDGs) are valuable tools for providing dietary recommendations to different population groups across the globe⁽¹⁾. However, while the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) have issued guidelines to support the development of FBDGs⁽²⁾, a lack of consistency persists in how these are applied by individual countries in their derivation approach and monitoring efforts^(3,4). This review compares the methodologies used by public health bodies to develop FBDGs.

Documents describing FBDGs and their development were obtained via the FAO online repository of FBDGs, and information could be found directly from the FBDG or from their joint scientific report. A spreadsheet was created to report details on the approaches used to derive dietary guidance for the general adult population, with a focus on the type and specificities of the data used, when applicable (characteristics of the study population, food intake assessment methodology, analysed consumption patterns, and nutritional requirements inputted if diet modelling was applied). General information such as the year of issue and stakeholders involved in the elaboration of the guidelines was also retrieved.

A total of 96 FBDGs were accessed and translated into English for analysis: 11 in Africa, 16 in Asia, 34 in Europe, 29 in Latin America and the Caribbean, 4 in the Near East, and 2 in North America, published on average in 2014. Of these, 60 FBDGs (63%) were developed based on scientific consensus, 43 (45%) mentioned a review of current evidence on the associations between dietary patterns and health outcomes, 26 (27%) derived the recommendations according to energy and/or nutritional requirements, and 15 (16%) used a statistical/mathematical optimisation method to develop quantitative guidance. 10 FBDGs (10%) did not provide any information on the rationale used to derive the values.

The general lack of FBDG revision using up-to-date evidence as well as the low use of typical consumption resources and specifically of national intake data represents a limitation to the development of relevant guidelines for food consumption. Ultimately, although consideration of local cultural practices is necessary, this study highlights the need for harmonisation of strategies to enhance the accuracy and therefore the effectiveness of FBDGs in promoting healthier eating habits.

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Student Competition

OC239. Consumption of ultra-processed foods based on the NOVA classification system and association with diet's quality and clinical outcomes in Crohn's disease. A. Karachaliou¹, E. Chari¹, M. Bletsas², G. J. Mantzaris³, M. Tzouvala⁴, E. Zacharopoulou⁴, G. Bamias⁵ and M. D. Kontogianni¹ 1. Department of Nutrition and Dietetics, School of Health Science and Education, Harokopio University, Athens and 2. Department of Nutrition and Dietetics, "Sotiria" Hospital of Athens and 3. Department of Gastroenterology, "Evangelismos-Ophthalmiatreion Athinon-Polykliniki" General Hospital, Athens, Greece and 4. Department of Gastroenterology, General Hospital of Nikaia Piraeus "Agios Panteleimon"-General Hospital Dytikis Attikis "Agia Varvara", Nikaia, Greece and 5. GI-Unit, 3rd Academic Department of Internal Medicine, Sotiria Hospital, Medical School, National and Kapodistrian University of Athens, Athens, Greece.

Retrospective studies highlight the negative effect of increased consumption of ultra-processed foods on the Crohn's disease (CD) risk¹, however studies investigating their consumption during the disease course are lacking. The aim of the present study was to assess the consumption of ultra-processed foods and its association with diet's quality and clinical outcomes in CD.

Dietary intake and habits were assessed through two non-consecutive 24-hour recalls and a food frequency questionnaire, respectively. Diet's quality was assessed through the MedDietScore (range 0-55, higher values indicate higher adherence to the Mediterranean dietary pattern)^{2,3} and CVD score (range 0-11, higher values indicate higher adherence to dietary guidelines for the prevention of cardiovascular disease)⁴. NOVA classification was used to estimate the intake of ultra-processed (NOVA 4) foods⁵. Follow-up data were collected at 6, 12 and 24 months [need for intensification/change of biologic agent, start of biologic agent/corticosteroids, disease activity, overall adverse clinical outcome (need for surgery, change of medication, start of biologic agent, administration of corticosteroids, need for hospitalization, cancer)].

250 adults [54.8% males, aged 41.2±14.1 years, 26.9% obesity] were evaluated. The percentage of NOVA 4 in the daily energy intake was 25.7% (16.8, 41.8%). Higher consumption (4th quartile) of NOVA 4 was associated with higher energy (p=0.033), protein (p=0.023) and carbohydrates (p=0.028) intake; lower MUFA intake (p=0.001), fruit consumption (p=0.007) and CVD score (p=0.031); and higher consumption of red meat (p=0.001), sweets (p=0.009) and soft drinks (p<0.001), compared to the lowest consumption (1st-3rd quartile). No differences were observed between higher NOVA 4 consumption and disease outcomes, after adjustment for age, sex, disease location, disease activity and energy intake at 6, 12 and 24 months.

Consumption of ultra-processed foods had a median contribution to about ¼ of total daily energy intake in this sample of people with CD, which is almost half of that reported in young adults in Greece⁶ or the general population in UK, USA and various countries in Europe^{7,8}. Although higher consumption of ultra-processed foods was associated with lower diet's quality, it was not associated with adverse clinical outcomes at 6, 12 and 24 months of follow-up.

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OC240. Benchmarking the sugar and caffeine content of carbonated sugar-sweetened beverages and energy drinks on the Irish market in 2023. A. McCann¹, C. Dunne¹, G. O'Shaughnessy¹ and S. O'Mahony^{1,2} 1. Food Safety Authority of Ireland, Dublin 1, Republic of Ireland and 2. Institute of Food and Health, University College Dublin, Dublin 4, Republic of Ireland.

Over consumption of sugar-sweetened beverages (SSBs) is associated with an increased risk of weight gain and dietary related noncommunicable diseases.⁽¹⁾ Consumption of energy drinks (EDs) by children and adolescents is linked to poor health and social outcomes.⁽²⁾ To address high sugar content in beverages in Ireland, the Sugar Sweetened Drinks Tax (SSDT) was introduced in 2018 and applies to SSBs, including EDs, with a sugar content of 5 g/100 ml or more.⁽³⁾ SSBs and EDs are also prioritised for sugar reduction in the Irish reformulation strategy.⁽⁴⁾

The aim of this study was to examine the mean analysed sugar (g) content of carbonated SSBs and EDs on the Irish market in 2023 against the Irish SSDT differential rate thresholds. A secondary aim was to determine a 2023 benchmark for the mean labelled caffeine (mg) content of EDs.

A convenience sample of SSBs (n=67) and EDs (n=28) were collected from Dublin-based supermarkets in 2023. Samples were sent to the Public Analyst Laboratory, Galway for sugar analysis, using high-performance anion-exchange chromatography/pulsed amperometric detection. The mean, standard deviation (SD), minimum and maximum (min-max) analysed sugar (g) per 100 ml and per suggested serving size were determined and assessed against the SSDT lower rate of 5–7.99 g/100 ml and upper rate of >8 g/100 ml. The mean, SD and min-max labelled caffeine (mg) content per serving of EDs containing caffeine (n=18) was determined. Statistical analysis was completed using RStudio v4.3.0.

The mean analysed sugar (g) of SSBs (n=67) and EDs (n=28) was 4.48 g/100 ml (SD 1.53; min-max 1.6 g–10.7 g) and 6.56 g/100 ml (SD 3.31; min-max 1.5 g–14 g), respectively. In SSBs (n=54) and EDs (n=22) that provided a suggested serving size, the mean analysed sugar (g) was 11.17 g per serving (SD 3.75; min-max 4 g–26.75 g) and 25.93 g per serving (SD 18.17; min-max 9.75 g–70 g), respectively. In this sample 31% (n=21) of SSBs and 50% (n=14) of EDs had a sugar (g) content above the taxable rate. Of these, 10% (n=2) of SSBs and 64% (n=9) of EDs were above the SSDT upper taxable rate. Caffeine containing EDs (n=18) had a mean labelled caffeine (mg) content of 129.17 mg per serving (SD 39.38; min-max 70 mg–160 mg).

The majority of carbonated SSBs in this sample were below the SSDT lower differential threshold. However, the majority of EDs had a high sugar content and were liable for SSDT at the higher rate. These findings agree with a 2019 study and show EDs remain high in sugar and caffeine.⁽⁵⁾ Given their association with poor health outcomes in children and adolescents, EDs on the Irish market require additional reformulation to meet sugar reduction targets.⁽²⁾

Acknowledgments

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OC241. Under the microscope - A review of the testing of Foods for Specific Groups products available on the Irish market. *L. Farrell^{1,2}, N. Clarke¹, S. Nic Sheoin^{1,2}, M.G. Hogan^{1,3}, C. Grimes¹, S. Walsh¹ and C.B. O'Donovan¹* 1. The Food Safety Authority of Ireland, Dublin, Ireland and 2. School of Biological Health & Sports Sciences, Technological University Dublin, Dublin 7, Ireland and 3. School of Agriculture and Food Science, University College Dublin, Dublin 4, Ireland.

Foods for Specific Groups (FSGs) are a category of products for vulnerable groups including “processed cereal-based foods and baby foods” (PCFBF); “food for special medical purposes” (FSMPs); “infant formula” (IF) and “follow-on-formula” (FOF) as per Regulation (EU) No 609/2013 ⁽¹⁾. Specific labelling and compositional requirements are set out in the legislation for each of these categories of foods. The Food Safety Authority of Ireland (FSAI) ensures the enforcement of these regulations through service contracts with official agencies including the Health Service Executive (HSE) and the Department of Agriculture, Food and the Marine (DAFM) ⁽²⁾. The aims of this study were to: (1) Identify the categories and quantities of FSGs tested by official agencies in 2022 and (2) Investigate the compositional compliance of products tested.

FSG products were analysed by Official Laboratories (OLs) using accredited methods for potassium, selenium, iodine, zinc, manganese, magnesium, molybdenum, phosphorus, calcium, folic acid, sodium, iron, chromium, vitamin B2 and vitamin B1. Both the measure of uncertainty (MoU) and limit of quantification (LOQ) values were reported. Data was extracted from FSAI’s National Food Safety Surveillance database. Samples were categorised as IF, FOF, PCFBF or FSMPs as per the legislation. FSG products not available for sale in Ireland were excluded. Nutrient concentrations were assessed against the limits permitted in legislation.

Of the total FSG products tested (*n*92) in 2022, nearly two-thirds (*n*64) were produced for the Irish market, with the remainder (*n*28) produced for export. The majority (*n*51) of Irish products were sampled by the HSE including IF (*n*10), FOF (*n*8) PCFBF (*n*7) and FSMPs (*n*26). The remaining Irish products (*n*13) were sampled by DAFM - IF (*n*6), FOF (*n*6), and FSMPs (*n*1). The majority of PCFBF (*n*6), IF (*n*14), FOF (*n*13) tested were deemed compliant, while only 44% (*n*12) of FSMPs sampled were compliant with the legislation. Possible non-compliance of FSMPs was due to high levels of selenium, chromium, and molybdenum. Possible non-compliance of FOF and IF was due to high levels of selenium. PCFBF possible non-compliance was due to high levels of potassium. However, the analytical MoU values for the nutrients ranged from 0.04 % to 44% which makes judgement of compliance difficult in some instances.

This study gives an overview of FSG products tested by official agencies including their compliance with compositional regulations. Overall, compositional compliance across FSG products is high. However, possible non-compliances were identified due to the wide range of MoUs and their overlap with some permitted limits for certain nutrients. Another issue identified is that some LOQs were higher than the maximum permitted level in legislation. Future work for the FSAI will involve working with the OLs to accredit more sensitive methods, thus facilitating better official controls.

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OC242. Salivary redox biomarkers of overweight and obese adults in response to prebiotics intervention. Xiangyu Meng¹, Lijing Ke^{1,2*}, Li Li³ 1. Food Nutrition Sciences Centre, Zhejiang Gongshang University, Hangzhou, Zhejiang 310018, China and 2. School of Food Science and Nutrition, University of Leeds, Leeds, LS2 9JT, UK and 3. Clinical Medicine College, Hangzhou Normal University, Hangzhou, China.

Overweight and obesity are fast-growing risk to health. Its occurrence and prevalence are positively correlated to oxidative stress and inflammation. Saliva, as a crucial biological fluid, contains numerous redox biomarkers related to overweight and obesity ⁽¹⁾ and is consistent with the corresponding biomarkers in blood ⁽²⁾. The prebiotics have been found to regulate the energy metabolism and reduce the severity of obesity. Their influences on salivary redox homeostasis, however, remain unclear. This study set out to investigate the changes in salivary redox biomarkers of overweight/obese Chinese adults in response to prebiotic intervention.

In total 102 overweight and obese adults (BMI \geq 26.5, male: female = 48:54) were recruited and randomly assigned to intervention group and placebo control. The intervention group received a prebiotics cocktail (10 g per serving, containing 3.6 g of inulin, 3.6 g of resistant dextrin, 0.8 g of oat fiber, 0.8 g of psyllium husk), while the control group received a placebo, 3 times per day for three months. Their saliva samples before and after intervention were collected by natural flow method and quantified for the salivary flow rate, total protein content, and salivary redox biomarkers, namely ferric-reducing antioxidant power (FRAP), thiol, uric acid, malondialdehyde, glutathione (GSH) levels, and superoxide dismutase (SOD) enzyme activity. There are 32 participants has completed the intervention while the other 70 participants are still ongoing.

The data collected to date showed an average weight reduction of 5.37 kg in the intervention group and 0.72 kg in the placebo control, with a significantly different BMI ($p < 0.05$). The intervention group showed significant decreases in salivary uric acid and malondialdehyde ($p < 0.05$), and significant increases in FRAP, GSH levels, and SOD enzyme activity ($p < 0.05$), while no significant differences were found among other biomarkers. It is worth noting that the salivary flow rate increased slightly while gaining the weight loss, although not significantly. Upon completion of the study, the salivary attributes will be correlated with gut microbiome profile to interpret the link between redox homeostasis in body fluids and prebiotics-caused gut microbial alternation.

This study provides new insights in the redox biomarkers of overweight or obese adults, particularly in response to the prebiotic intervention and the subsequent weight loss. It may facilitate the establishment of noninvasive methods for determination of the redox biomarkers of obese patients and evaluation of dietary intervention.

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OC243. Multifunctional hydrogels for the delivery of drugs and nutraceuticals for the treatment of inflammatory bowel disease. A. Murtagh¹, C. Higginbotham and P. Heavey¹. SHE (Sport, Health, and Exercise) Nutrition Research Group, Department of Sport and Health Sciences, Technological University of the Shannon: Midlands, Ireland.

Inflammatory bowel disease (IBD) is chronic relapsing condition that affects 6.8 million people worldwide and unfortunately there is no cure ⁽¹⁾. Treatment, typically via anti-inflammatory medications, aims to induce remission and for many they are effective but for some they can lead to unpleasant side effects ^(2,3). Anti-inflammatory nutraceuticals such as curcumin have, in recent years, shown potential for the treatment of IBD, however, there are limitations for its use including poor solubility and inadequate concentrations at target tissues ^(4,5,6). Targeted delivery systems have the potential to reduce drug side effects and overcome some of the challenges for nutraceuticals. Hydrogels are a type of delivery system that can be easily tuned to target specific tissues, but there are challenges incorporating active ingredients such as curcumin. Therefore, microspheres can help overcome some challenges including solubility issues and act as a carrier for drugs and nutraceuticals within the hydrogel. Hence, the aim of the current study was to incorporate curcumin and dexamethasone loaded microspheres into a hydrogel that can target the specific features of IBD.

An emulsion solvent evaporation technique was utilised to entrap dexamethasone (0.4wt%) and curcumin (0.4wt%) in polylactic acid-polyethylene glycol microspheres. Subsequently, 100 mg (0.5wt%) of each (dexamethasone and curcumin microspheres) were incorporated into hydrogels which were synthesised using polyethylene glycol dimethacrylate (PEGDMA), acrylic acid, water and a photoinitiator, via UV photopolymerisation. Encapsulation of dexamethasone and curcumin and their release from microspheres were determined via UV spectroscopy. Characterisation tests including swelling studies in pH buffers 2.2 and 6.8 and ionic charge studies in positively methylene blue in both pH 2.2 and 6.8, were carried out to determine the hydrogels-co-microspheres ability to target specific features of IBD. Statistical analysis (paired T-Test) was carried out using OriginLab.

Encapsulation studies showed that on average 29% of the dexamethasone and 92% of the curcumin were successfully encapsulated into the microspheres, however the subsequent release measured over 4 weeks was low with higher release of dexamethasone (17.45%±0.09%) compared to curcumin (0.02%±0.0007%). Swelling studies demonstrated the equilibrium water content (EWC), the ability of the hydrogel-co-microsphere to uptake its surrounding solution, with differences observed in response to changes in pH. In pH 6.8 they had a higher EWC compared to pH 2.2 (EWC = 53%±0.06% and 43%±0.01%, respectively). The ionic charge of the hydrogel-co-microspheres was negative as indicated by uptake of positively charged methylene blue solution, with uptake in pH 6.8 greater than in pH 2.2 (4.7µl±0.14 V 3.5µl±0.09, respectively p<0.05).

Although further work is required, an advanced delivery system of microspheres encapsulating drugs and nutraceuticals embedded in a hydrogel that can target specific features of IBD has great potential for improving therapeutic efficacy.

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OC244. An investigation into the palatability of a new glycomacropeptide based protein substitute among a sample of phenylketonuria patients. E. Gallagher¹, G. Randles², J. Hovey², J.L. O'Neill² and S. Wilkinson² 1.School of Biological and Health Sciences, Technological University Dublin, Ireland and 2.Danone Nutricia, Dublin, Ireland.

Phenylketonuria (PKU) is an inherited rare metabolic disorder that is caused by a lack of the enzyme phenylalanine hydroxylase. One in every 4,545 infants born in Ireland have PKU⁽¹⁾. This condition is managed by a low protein diet and the consumption of nutritional supplements that provide all essential amino-acids. However, the palatability of these supplements is often unpleasant, as they are formulated with pure amino-acids⁽²⁾. Glycomacropeptide (GMP) is a by-product of cheese making that is naturally low in phenylalanine, while still being a rich source of amino-acids. As it is a natural protein source, it has improved palatability and texture, and is a suitable alternative to amino-acid based supplements⁽³⁾.

The aim of this study was to evaluate the palatability of a new GMP based protein substitute PKU GMPPro Ultra, Lemonade and Vanilla flavours, among a sample of PKU patients, and assess their expected compliance of using this product.

Samples of the study product were available for monadic taste testing at two patient events that took place in December 2023 and March 2024. All PKU patients attending were eligible to take part. The taste test was not blinded, as the patients were aware they were tasting either the lemonade or vanilla flavoured study product. Patients sampled ~20ml of the study product and then answered a short six-question survey. This included questions on age, gender, the rating of the product out of 5 (5 being the highest and 1 being the lowest) and expected compliance of one serving of the product (180ml). Compliance was measured using a Likert scale. Data was analysed using IBM SPSS v29 to calculate frequencies, mean and standard deviation.

A total of 21 PKU patients taste tested the study samples. The mean age of patients was 17.88 years (SD 12.9), with 67% of participants being aged 16 years or younger. With regards to taste, it was found that 62% (n=13) of patients rated the product either 4/5 or 5/5, therefore rating the product satisfactory⁽⁴⁾. The other 38% (n=8) rated the product between 1 to 3 out of 5. Patients were also asked how likely it was that they would finish a whole serving of the study product. 67% (n=14) reported that they were likely to complete one serving of the study product, while 33% (n=7) stated they were unlikely to finish a whole serving.

In this sample of PKU patients, the majority found the new GMP based protein substitute to be palatable. These substitutes have been shown to be highly palatable, safe and acceptable alternatives to amino-acid based protein substitutes, which may improve dietary compliance⁽⁵⁾. It is important that patients have a wide choice of protein substitutes, which are convenient, flexible and avoid taste-fatigue.

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Student Competition

OC245. Sensory appeal and acceptance of a novel food intervention programme for older adults living with dysphagia. J. Holmes¹, K. Light¹ and J. Andrews² 1. The Faculty of Health and Social Sciences, Bournemouth University, Bournemouth, UK and 2. Dorset County Hospital NHS Foundation Trust, Dorchester, UK.

Approximately 60% of older adults living in residential care live with dysphagia (difficulty chewing and swallowing) ⁽¹⁾ and require texture modified foods (TMF). Despite the International Dysphagia Diet Standardisation Initiative (IDDSI), foods are often prepared with variation in texture, flavour, and consistency leading to further swallowing difficulties and safety concerns ⁽²⁾. Nutritional quality of food is detrimentally impacted by modifying texture of food due to overcooking and addition of liquid to adhere to guidelines leading to malnutrition risk.

Specially prepared, sensory rich, nutrient enhanced TMF could positively impact nutritional status and wellbeing of those living with dysphagia (Balesteros-Pomar et al. 2020). A novel food intervention programme (NFIP) (Dysphameal™) has been developed using food technology solutions to thicken food using proteins. Zanini et al. ⁽³⁾ evaluated this novel food intervention and identified positive clinical outcomes in Italy, but to date no work has evaluated this product from a sensory and food experience perspective. This qualitative pilot study aimed to understand the sensory appeal, and acceptance of the novel food intervention programme (NFIP) for older adults living with dysphagia.

Carers (n = 9, aged 30-60 years) were recruited independently of the workplace; with the condition they had or were currently supporting older adults living with dysphagia. Additionally, healthy, independent, older adults (n = 9, aged 65 years and over) were recruited to represent comparable sensory aptitude to a similar age group living with dysphagia. Samples (n= 6 flavours) of selected NFIP were available for participants to taste during semi structured interviews. Interviews were recorded and transcribed. Data collection and analysis used Braun and Clark's ⁽⁴⁾ six stage thematic analysis until data saturation had been reached.

Three themes arose to understand sensory appeal, and acceptance of the NFIP:

- Negative sensory experience comprised of taste (bland, lack of seasoning, after-taste), texture (starchy, comparable to wallpaper paste, dependent on serving temperature), smell and visual appearance, primarily colour.
- Performance of the products included acceptability, meeting expectations, ingredient suggestions to improve sensory characteristic especially flavour.
- Acceptability of individual products varied.

The NFIP provides an opportunity to boost nutritional intake and be incorporated as part of a hybrid food delivery service to replace hard to puree, nutritionally dilute foods, especially bland products such as rice and pasta to serve alongside fresh counterparts and, reduce risk of malnutrition for those living with dysphagia. Opportunities exist to further develop this type of texture modified food product to improve palatability, enhance flavour, and appearance characteristics for those living with dysphagia, through advances in molecular gastronomy, controlling antioxidant activity and loss of volatiles.

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Student Competition

OC246. Chemical and biological study on the effect of yoghurt on most common consumed ready meat products. Amnah Mohammed Alsuhaibani¹. 1. Department of Physical Sports Sciences, College of Sports Sciences & Physical Activity, Princess Nourah bint Abdulrahman University, P.O. Box 84428, Riyadh 11671, Saudi Arabia.

Basterma is characterized as fresh non cooked and manufactured under the addition of salt, phosphate, nitrite, ascorbic acid, sugars, and different seasoning [1]. Sausages are very common and popular processed meat products manufactured from lower-value trimmed meat to produce a higher-value product [2]. Basterma is fermented during the partially drying process under climatic conditions [3,4]. Nitrates and nitrites are chemicals that can be found naturally in our food, water and in plant nutrients. Nitrites cause a color reaction in the meat and add an appealing pink color to cooked products [5]. Nitrite prevents the growth of a harmful bacterium called *Clostridium botulinum* and other spoilage bacteria [6]. This study was to estimate nitrite and nitrate in basterma and sausage and the effects of yoghurt in lowering the side effect of nitrite and nitrate at heavy consumption of some ready-made meat products.

The ready-made meat products and yoghurt were bought from different supermarkets in Riyadh/KSA. Thirty-five male albino rats, weighing 110 ± 6 g was provided from experimental animal's center in Medicine collage of KSU in Riyadh. The experimental diet formed from basal diet but basterma and sausage were added to basal diet instead of casein. The nitrite and nitrate contents were determined in experimental readymade-meat products immediately after purchase in triplicate by rapid method of improved accuracy according to Follett and Ratcliff method. Rats fed on basal diet for a week as adaptation period in wire cages under the normal laboratory conditions. Food intake was calculated daily, and the body weight gain was recorded weekly. Collected data are expressed as mean \pm SE. Statistical analysis was done by using analysis of variance (ANOVA) followed by student's t-test and P values of 5% and less were significant.

The results of ALT, AST, ALP and γ GT of the experimental rat groups noticed that a non-significant higher in values of AST, AST and γ GT and a non-significant lower in values ALT and ALP compared to rat group which fed on basterma. Rat groups which fed on basterma with yoghurt, sausage with yoghurt, and both basterma and sausage with yoghurt showed a significant decrease in liver enzymes concentration in comparison with rat groups which fed on either basterma or sausage but showed non-significant difference among these groups. Also, results presented a significant decrease in creatinine, urea, and uric acid concentration in comparison with rat groups which fed on either basterma or sausage. Likewise for the results of total protein, albumin, and globulin for the same rat groups.

It can be recommended from this study that heavy meat products consumer should consume yoghurt to lower side effects of meat preservative as nitrite and nitrate.

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OC247. Development of a novel food frequency questionnaire for the estimation of dietary (poly)phenol intake. Y. Li¹, Y. Xu¹, M. Le Sayec¹, N. N. Zaidani Kamarunzaman¹, R. Gibson¹, and A. Rodriguez-Mateos¹. *1. Department of Nutritional Sciences, School of Life Course and Population Sciences, Faculty of Life Sciences and Medicine, King's College London.*

(Poly)phenol intake has been associated with reduced risk of non-communicable diseases in epidemiological studies^{1,2}. However, there are no dietary assessment tools that have been developed to estimate (poly)phenol intake in the UK. This study aimed to develop a novel food frequency questionnaire (FFQ) to capture dietary (poly)phenol intake in the UK and assess its relative validity by comparison with 7-day diet diaries (7DD) and plasma and urine (poly)phenols metabolites.

The (poly)phenol FFQ was developed based on the EPIC-Norfolk FFQ validated for energy and nutrient intake estimation in the UK population^{3,4}. Food items added to the FFQ based on total (poly)phenols content (≥ 1 mg/serving) and UK consumption. Participants aged 18 ~ 29 years ($n = 255$) completed the EPIC-Norfolk FFQ and a (poly)phenol FFQ. In a subgroup ($n = 60$), 7DD, spot urine, and fasting plasma samples were collected. An in-house (poly)phenol database was used to estimate (poly)phenol intake from FFQs and 7DD. Plasma and urinary (poly)phenol metabolite levels were analysed using a validated LC-MS method⁵. The agreements between (poly)phenol intake estimated using the (poly)phenol and EPIC-Norfolk FFQ and 7DDs, as well as plasma and urinary biomarkers, were evaluated by intraclass correlation coefficients (ICC), weighted kappa, quartile classification, and Spearman correlations, and the associations were investigated using linear regression models adjusting for energy intake and multiple testing ($FDR < 0.05$).

Strong agreements were observed between hydroxycinnamic acids estimated from (poly)phenol FFQ and 7DDs ($\kappa = 0.75$), fair agreements were found between 9 (poly)phenol groups, including total (poly)phenol intake ($\kappa = 0.41$), while the agreements for the rest of 17 classes and subclasses of (poly)phenols were poor ($\kappa: 0.07 \sim 0.39$). Strong positive associations were found in 9 (poly)phenols estimated from 7DDs, including dihydroflavonols, flavones, ellagitannins, hydroxyphenylacetic acids, total stilbenes, resveratrol, total other (poly)phenols, tyrosols, and alkylphenols with stdBeta from 0.62 (95% CI: 0.42 ~ 0.82) to 0.95 (0.86 ~ 1.00) ($FDR p < 0.05$). (Poly)phenol FFQs estimated (poly)phenol intake exhibited positive associations with 99 urinary metabolites (stdBeta : 0.27 (0.06 ~ 0.48) to 0.88 (0.72 ~ 1.03)) and 25 plasma metabolites (stdBeta : 0.39 (0.17 ~ 0.62) to 0.83 (0.64 ~ 1.02)) ($FDR p < 0.05$). The agreement between (poly)phenol FFQs and the EPIC-Norfolk FFQs was moderate (ICC 0.51 ~ 0.69) for all (poly)phenol intake after adjusting for energy intake. Compared with the EPIC-Norfolk FFQs estimated (poly)phenol intake, stronger and more agreements and associations were found in (poly)phenol FFQs estimated (poly)phenol with 7DDs and biomarkers.

(Poly)phenols estimated from (poly)phenol FFQ exhibited fair agreements and moderate to strong associations with 7DDs and biomarkers in the target population, indicating the novel questionnaire may be a promising tool to assess (poly)phenol intake. A representative UK population group is warranted for to test the further usability.

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Student Competition