

and placebo treatments for Homeostatic Model Assessment-Insulin Resistance (HOMA-IR) or high sensitivity C-Reactive Protein (hsCRP). Prebiotic consumption was associated with an increase in gastrointestinal side effects such as borborygmi ($p = 0.01$), frequency of bowel actions ($p = 0.001$) and flatulence ($p = 0.002$).

Conclusions: Dietary prebiotic consumption was associated with improvements in HDL cholesterol and waist circumference in adults with prediabetes. Longer term intervention studies are required to determine whether this is sufficient to prevent or slow the development type 2 diabetes.

Funding source(s): NHMRC

EFFECT OF RED AND PROCESSED MEAT AND REFINED GRAINS ON INSULIN SENSITIVITY IN INSULIN RESISTANT SUBJECTS

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Background/Aims: Epidemiologic studies indicate an association between red and processed meat and refined grains and incident type 2 diabetes. Interventions are limited. The aim is to compare the effect on insulin sensitivity of two diets; a diet high in red and processed meat and refined grains (HMD) vs. a diet high in whole grains, nuts, dairy and legumes (HWD).

Methods: A randomized crossover study was undertaken in 49 subjects without diabetes (15 men and 34 women, age 35.6 ± 15.7 years, BMI 27 ± 5.9 kg/m²) consisting of two 4-week weight-stable dietary interventions. The insulin sensitivity index (ISI) was calculated from the last 30 minutes of a continuous low-dose insulin (25 mU/kg·h) and glucose (4 mg/kg·min) infusion test (LDIGIT_{120-150min}) at the end of each diet. Differences between groups were tested by T-tests and repeated measures ANOVA.

Results: Groups were categorized *a posteriori* on insulin levels during the LDIGIT HMD: group 1 < 56 pmol/L ($n = 24$) and group 2 > 56 pmol/L ($n = 25$). In group 2, median insulin (153, IQR 180 vs. 123, 149 pmol/L; $p = 0.019$) and mean \pm SD glucose (7.4 ± 1.3 vs. 6.7 ± 1.2 mmol/L; $p = 0.05$) were higher in HMD vs. HWD, leading to a decreased log ISI (21.1, 34.2 vs. 31.6, 39.4; $p = 0.014$). Log ISI HMD was correlated with BMI ($p = 0.009$) and fat mass ($p = 0.004$). In both groups, total cholesterol ($p = 0.01$) and triglyceride ($p = 0.05$) were higher after HMD than after HWD. Log ISI HWD was positively correlated with the amount of carbohydrates in HWD after adjustment for log ISI HMD ($t = 3.5$; $p = 0.001$).

Conclusions: HMD decreases insulin sensitivity compared with HWD but only in insulin-resistant individuals.

Funding source(s): NHMRC, UniSA

METABOLIC EFFECTS OF PHYCODIGEST EXTRACT IN OVERWEIGHT OR OBESE INDIVIDUALS

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Background/Aims: Few studies have investigated the health benefits of seaweed extracts in human clinical trials. This study investigated the metabolic effects of a sulphated polysaccharide extract, PhycoDigest, from an Australian chlorophycean seaweed, in an overweight and obese population.

Methods: The 64 overweight and obese participants were randomly assigned into 3 groups: 2 gram or 4 gram doses of extract or a placebo (rice flour) for 6 weeks. Fasting blood samples and an OGTT were conducted at baseline and post-intervention. Blood samples were used to measure plasma lipids, fasting and 2-hr glucose and insulin, C-peptide and C-reactive protein (CRP). ANOVA and Kruskal-Wallis tests were used to test for differences between groups.

Results: Overweight participants showed a 10% reduction in non-HDL cholesterol (-0.37 ± 0.3 mmol/L, 2 g dose; $p = 0.02$) and a 30% reduction in

CRP (-0.78 ± 1.0 mg/L, 4g dose). In addition, the Atherogenic Index (2 g dose) trended to improve by 50% ($p = 0.05$) and the 2-hr insulin levels (4 g dose) trended to decrease by 12% ($p = 0.05$). For the obese category, only inflammation (CRP) showed a strong but non-significant trend and decreased by 30% (2 g dose; $p = 0.058$).

Conclusions: The antilipidemic, anti-inflammatory and metabolic effects of this specific algal polysaccharide extract, PhycoDigest, are consistent with findings of animal and *in vitro* studies of similar molecules. However, to our knowledge, this is the first clinical study that demonstrates significant metabolic effects from this type of seaweed extract in humans.

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ORAL α -GALACTOSIDASE IMPROVES GASTROINTESTINAL TOLERANCE TO A DIET HIGH IN PREBIOTIC FIBRE (GALACTO-OLIGOSACCHARIDES)

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Background/Aims: Galacto-oligosaccharides (GOS) are indigestible short-chain carbohydrates (FODMAPs) associated with gastrointestinal symptoms in irritable bowel syndrome (IBS). This study aimed to assess whether oral α -galactosidase enzyme co-ingestion with high GOS foods would reduce symptoms and breath hydrogen production in a double-blind, placebo-controlled, cross-over trial.

Methods: Patients with IBS (using Rome III criteria) who produced ≥ 10 ppm hydrogen on two consecutive breath samples following 10 g fructan were recruited. Participants were randomly assigned to full-dose enzyme (300 mg α -galactosidase "Vitacost Gas Enzyme"), half-dose (150 mg) and placebo (glucose). Following a 3-day low FODMAP run-in, participants consumed high GOS diets for another 3-days. Gastrointestinal symptoms were measured daily using a 100 mm visual-analogue-scale, analysed using Wilcoxon signed-rank tests. Hourly breath samples taken on the second last day were analysed as area-under-the-curve using paired samples *t*-tests.

Results: Thirty-one participants with IBS (20 IBS-D, 4 IBS-C, 7 IBS-M) completed the study. Addition of high GOS foods increased overall symptoms (median 13.0, IQR 1.5-22.0 mm vs. 35.5, 12.8-54.0; $p < 0.001$) with 22 participants exhibiting GOS-sensitivity (> 20 mm increase for overall symptoms). Of those, compared to placebo, full-dose enzyme reduced overall symptoms (5.3, 1.0-14.0 vs. 24.5, 16.0-34.6; $p = 0.029$) and bloating (7.0, 1.5-15.4 vs. 20.5, 7.3-41.5; $p = 0.026$). Breath hydrogen was minimal with no difference between full-dose and placebo (mean \pm SD 2086 \pm 1856 vs. 2457 \pm 2324 ppm·12h; $p = 0.350$).

Conclusions: Oral α -galactosidase taken with high GOS foods provides a clinically significant reduction in symptoms in GOS-sensitive individuals with IBS. This strategy can easily be translated into practice as an adjunct therapy to the low FODMAP diet to improve fibre intake.

Funding source(s): NHMRC

Concurrent session 4: Public health nutrition HAS MANDATORY FORTIFICATION WITH IODINE MADE A DIFFERENCE? RESULTS FROM TWO COHORT STUDIES IN THE DARWIN AREA

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Background/Aims: The re-emergence of iodine deficiency in Australia led to the mandatory fortification with iodine of salt used in bread making in 2010. We assessed urinary iodine concentration in two cohorts of young adults living in the Darwin area before and after fortification.

Methods: Spot urine samples were collected from participants in the Aboriginal Birth Cohort (urban and remote Aboriginal) and the Top End Cohort (urban non-Indigenous) as part of planned longitudinal follow-up.

This occurred before and after fortification. We used the WHO criterion of median urinary iodine concentration (MUIC) >100 µg/L in spot urine samples to classify population groups as replete for iodine.

Results: There were 590 urine samples before and after fortification. MUIC improved for all groups: in men from 47, 78 and 93 µg/L to 98, 128 and 132 µg/L in remote Aboriginal, urban Aboriginal and urban non-Aboriginal participants respectively. Similarly, in women, median concentrations increased from 55, 58 and 63 µg/L to 89, 127 and 94 µg/L respectively. All groups were classified as deficient prior to fortification. Following fortification, urban men, both Aboriginal and non-Aboriginal, and urban Aboriginal women were classified as replete. However remote living Aboriginal people and urban non-Aboriginal women continued to be classified as deficient.

Conclusions: Although there was improvement across all the groups post fortification, some groups remain in the mild deficiency range. This is most concerning in women of childbearing age as iodine requirements increase in pregnancy and lactation.

Funding source(s): NHMRC

AWARENESS AND INFLUENCE OF HEALTH STAR RATINGS

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Background/Aims: The Health Star Ratings (HSR) scheme is a voluntary front-of-pack labelling system designed to encourage healthier choices. However, there is misalignment between HSR and Australian Dietary Guidelines (ADG) recommendations, with some discretionary choices scoring higher than five food group foods. The aim of this study was to investigate awareness of the HSR scheme amongst consumers and its influence on their purchasing decisions.

Methods: Two online quantitative surveys of Australian adults were conducted in March 2015 ($n = 1,635$) and April 2016 ($n = 1,621$). Weighting ensured gender and age representativeness. *T*-tests assessed significance.

Results: Awareness of HSR significantly increased between March 2015 and April 2016 (42% vs. 68%, $p < 0.05$) but use of HSR remained similar between years (46% vs. 49%). Of those who used the HSR in 2016: 61% of respondents reported that they had 'bought a similar product with more stars', 28% reported buying 'their preferred product irrespective of the stars' and 68% agreed that HSR are a 'trustworthy source of nutrition information'.

Conclusions: Awareness of HSR among consumers is wide and increasing and they are influencing the purchasing decisions of approximately one in three consumers. These Results highlight the need to re-align the scheme so that HSR more closely reinforce the messages of the ADG, particularly to enjoy a variety of nutritious five food group foods every day and to limit intake of discretionary choices.

Funding source(s): Dairy Australia

FIFTEEN YEAR TRENDS IN AFFORDABILITY OF THE ILLAWARRA HEALTHY FOOD BASKET SURVEY

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Background/Aims: The Illawarra Healthy Food Basket survey aims to monitor trends in affordability of a basket of 57 food items for a typical family of five. The survey has been conducted biannually since 2000 and this study aims to compare cost and affordability of the food basket over a 15-year period.

Methods: The reference family of five consists of a 39 years old male and female, a 65 years old female, children aged 5 years and 15 years. Five suburbs with differing socioeconomic status (SES) were used to record food prices at a large supermarket, a butcher and fruit markets. Cheapest products without discounts and excluding home brand items were recorded and average prices per basket were calculated for each suburb. Basket prices were compared against average weekly earnings and welfare

payments, obtained for each survey time point.

Results: The cost of a healthy food basket in the Illawarra region ranged between 28 - 32% of average weekly earnings and 29 - 39% of welfare payments in the 15-year period between 2000 and 2015. There was no clear time trend, with 2001 and 2013 being the least affordable years of the survey. Food basket prices did not differ according to SES of the suburb being surveyed.

Conclusions: The affordability of a healthy food basket for a family of five has remained fairly consistent over time. Standardisation of healthy food basket surveys conducted around the country is needed to allow comparisons across states.

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MISSED OPPORTUNITY IN CHARITABLE FOOD SECTOR?

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Background/Aims: Nutrition education and improving food literacy skills has been identified as a sustainable strategy for improving individual food security. This study identifies the nutrition education needs of organisations, staff, volunteers and consumers in the charitable organisations in metropolitan Perth.

Methods: A cross-sectional study design, used an online questionnaire to survey 179 charitable organisations of whom 18% ($n = 32$) responded.

Results: 'Welfare/homeless services' ($n = 13$, 41%) were the primary service provider of food relief; emergency food parcels were the most common food service offered ($n = 13$, 41%) followed by cooking classes 31% ($n = 10$). The main recipients of food relief were Aboriginal and Torres Strait Islander People ($n = 25$, 78%); low income adults ($n = 25$, 78%); homeless adults ($n = 21$, 66%); asylum seekers, migrants or refugees ($n = 20$, 63%). Over 46% ($n = 11-13$) of paid staff and 67% ($n = 14-18$) of volunteers had not received training in food safety and handling, cooking, nutrition and food budgeting. Challenges to implementation of food literacy programs included limited cooking skills ($n = 9$, 28%) and poor nutrition knowledge ($n = 15$, 47%) of clients, insufficient funds to buy food ($n = 9$, 28%) and the lack of functional kitchen and resources available within the organisation ($n = 7$, 22%).

Conclusions: Improved food literacy of staff and volunteers is needed if charitable organisations are to effectively provide basic nutrition, budgeting and cooking skills to clients and address food security levels.

Funding source(s): N/A

INTERNATIONAL STUDENTS IN AUSTRALIA: ARE THEY FOOD INSECURE?

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Background/Aims: International students are vulnerable to food insecurity, thus impacting upon their ability to study and their international experience. This study investigates the food security levels of international students enrolled at an Australian university and the factors which influence the students' food security status.

Methods: A convenience sample of 85 international students were invited to complete a questionnaire and participate in a one-on-one interview. The questionnaire contained pre-validated measures of food security status and hunger (Household Food Security Module), a demographic variable component and the single item instrument from the National Nutrition Survey. Basic statistical and chi-squared analysis was conducted on the survey data and the in-depth interviews thematically analysed.

Results: Seventy-five surveys and 11 interviews were completed. Thirty percent of the cohort had experienced food insecurity with half of students who had experienced food insecurity experiencing hunger. Four themes emerged from the interviews: Adaptation and resilience; Quality and availability of traditional food; Student hardship and overcoming obstacles; and Food, health and wellbeing. Cooking and grocery shopping was a new skill for some. Although traditional foods were available, they were