ACHIEVING ETHICAL AND ECOLOGICALLY SUSTAINABLE HUMAN DIETS THROUGH THE PLANETARY HEALTH PARADIGM

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Background/Aims: Delivering sufficient, safe, ethical and nutritious food in a sustainable manner to meet the requirements of future generations is one of the world’s greatest challenges. Over the past 10,000 years, the growing human and human-associated animal population has been sustained through the domestication of plant and animal species for use as food sources and the industrialisation of agricultural systems, without taking natural capital into account. In addition, despite increases in agricultural production over the past two decades, malnutrition has not diminished significantly, with undernutrition remaining a significant problem in many developing countries and overnutrition becoming a major issue globally. Consequently, the past focus on increasing the quantity of food production is giving way to a focus on producing quality food that is nutrient rich, bioavailable, affordable and that can sustainably meet the nutritional needs of individuals at every stage of life. We must focus on fixing our broken food systems in support of long-term food security and the health of people and the planet.

Key challenges and potential solutions:

Increasing the sustainable production of nutritious and safe food

The human population is set to reach 9 billion by 2050 and 11 billion by 2100. This increase will be accompanied by increasing urbanisation, an increasing middle class and aging population together with a smaller rural labour force and more feedstocks for a potentially huge bioenergy market. Challenges and possible solutions to increasing the sustainable production of nutritious and safe food include:

(i) Providing diets tailored to individuals according to the life stages and cuisines of sub-populations - future food production will need to specifically target the nutritional requirements of individuals according to their age, gender, health and reproductive status while also employing efficient technologies. Urban food production will need to complement that produced by farmers in agricultural areas.

(ii) Producing nutritionally rich foods – accessing sufficient calories is important, but calories alone are not enough to optimize epigenetic programming: the proper balance of micronutrients is also essential for both short- and long-term health. This has become clear, as obesity and related health concerns are becoming significant issues in individuals and communities adopting western diets. Therefore, instead of focussing solely on volume or weight, it is important for food producers to increasingly take the naturally nutrient-rich (NNR) score into account to produce whole foods that provide the highest nutrient-to-kilojoule ratio. Where animal-source food (ASF) is concerned, it should ideally mimic the naturally lean wild meat consumed by humans over thousands of years. A substantial increase in the amount of non-essential fats and a loss of essential fats derived from contemporary animal husbandry, including poultry meat has been reported and, if widespread, needs to be reversed.

Future food production programs will need to: explicitly incorporate nutrition objectives and indicators; collaborate and coordinate with other sectors (health, environment, social protection, labour, water, sanitation, education and energy); and maintain or improve the natural resource base (water, soil, air, climate, biodiversity).

(iii) Promoting dietary diversity – Neglected crops may contribute to improved food security and coping with weather variability. With respect to ASF, dietary diversity can be promoted through the consumption of all edible parts of the carcass, including offal (e.g. liver which provides an excellent source of bioavailable micronutrients such as haem iron).

(iv) Empowering women - ensuring access to targeted information. Improving women and children’s access to a balanced diet, especially during the crucial period from conception until children reach 2 years of age will reduce stunting and, therefore, improve life-long health and productivity.

Decreasing food wastage

The Food and Agriculture Organization of the United Nations estimates that each year, approximately one-third of all food produced for human consumption in the world is lost or wasted. This food wastage represents a missed opportunity to improve global food security and also to mitigate environmental impacts. Challenges and possible solutions associated with mitigating food wastage include:

(i) Decreasing post-harvest losses – improving access to and reliability of cold storage facilities will reduce losses of fresh foods globally. Use all edible, safe parts of a plant or carcass.

(ii) Increasing the purchase of appropriate quantities of nutritious food – increasing awareness of the importance of purchasing less but more nutritious food will significantly reduce food wastage.

(iii) Increasing food safety – disease emergence has paralleled the intensification of livestock production with diseases such as bovine spongiform encephalopathy and
highly pathogenic avian influenza, leading to the disposal of huge numbers of carcasses.

(iv) Decreasing nutrient loss - nutrients are essential to life and yet modern food production and processing systems are causing huge nutrient losses. Annual nutrient losses through soil erosion are thought to exceed all the nutrients applied as fertilizer across the globe. Producing fertiliser from heat-treated urban human waste has the potential to contribute to improved nutrient cycling.

(v) Integrating supply chain and consumer technologies - the possibility of the “wired home” and the “internet of things” means a product can potentially be ordered, tracked and monitored through its entire lifespan, from production to plate.

Conclusions: Adequately and sustainably nourishing 9 billion people by 2050 will involve direct action from all levels of production from the soil to the plate. A Planetary Health approach to the production of sustainable, nutritious and safe food delivered with minimal waste has the potential to promote human, animal and environmental health. As governments worldwide grapple with unsustainable health budgets, nutrition-sensitive agriculture and value chains, bolstered by more effective policy frameworks, can help to stop malnutrition and ensure that the food produced delivers maximum benefits.

It is essential that the agriculture, health, education and infrastructure sectors work together closely to ensure that food can be produced and utilised efficiently and effectively. An awareness of the importance of the nutrient density and bioavailability of foods will help people wanting to maintain a nutritionally sound diet and healthy body weight. Collectively, food producers and nutrition scientists can contribute to enhanced physical and mental health and in the process make the health of the planet more resilient.

Bibliography
The roles, priorities and responsibilities of food, nutrition and health scientists and practitioners are changing for multiple reasons, chief among them climate change (Wahlqvist 2014a). This was anticipated and articulated in the IUNS (International Union of Nutritional Sciences) initiative of 2005 which argued that nutritional science should develop more effectively in 3 dimensions, namely, biomedical, societal and environmental, to which economic was later added. This required shift in professional framework has been driven by planetary over-population and ecosystem loss and destruction whose increasingly asymptotic courses began with settlement and the development of agriculture, and were accentuated with travel, migration and colonisation accompanied by the industrial revolution of the 1700s. That that has had indelible planetary consequences is evidenced by its now recognised a humanised Anthropocene epoch, as successor to the Holocene, in which we now live (Steffen et al, 2015). It encourages a more ecological view of health as ecosystem health disorders (EHD) (Wahlqvist, 2014b). There are substantial gains to health outcomes through biodiverse diets, not only by way of survival, but the modulation of disease expression. Thus the limits to what we might achieve in managing our health are partly determined by how well we manage ecosystems. Each of the major threats to these systems, population, energy from fossil fuels, ecologically-insensitive urbanisation, less agricultural and potable water, and less food-orientated agriculture (versus textiles and biofuels) which is unsustainable are now precarious (Hansen et al 2016). More environmentally-conscious food and health system management, in concert with other sectors, can contribute to the risk reduction of our nutritionally-related health outlook.

References


8. Wahlqvist ML Ecosystem Dependence of Healthy Localities, Food and People Ann Nutr Metab 2016;69:75-78 (DOI:10.1159/000449143)
While phosphorus is an essential nutrient in fertilisers and feed for food production globally, the long-term security of the world’s phosphorus sources is becoming increasingly uncertain and risky. The use of phosphate fertilisers has contributed to feeding billions of people globally over the past half-century by boosting crop yields, however Australia and the world are currently dependent on phosphorus sourced from finite phosphate rock reserves that have taken tens of millions of years to form. All farmers need access to phosphorus to grow crops, yet just five countries control 88% of the world’s main source—phosphate rock. Morocco alone controls three-quarters of the world’s remaining phosphorus. So few producers of a globally critical resource in potentially politically unstable regions creates a serious risk of disruption to supply and price fluctuations. The 800% phosphate price spike in 2008 demonstrated the vulnerability of global and local food systems to even a short-term disruption in supply.

Further, these non-renewable phosphate reserves are becoming increasingly scarce and expensive. Despite the uncertainty of the peak phosphorus timeline, there is consensus that the remaining reserves are of lower quality, harder to physically access, require more energy to mine/process and are becoming more expensive. Already one in six farmers can’t access fertiliser markets. At the same time, a staggering 80% of phosphorus is lost or wasted in the supply chain between mine, farm and fork. Much of this ends up in rivers and lakes leading to widespread nutrient pollution from China to the Great Barrier Reef. Algal blooms can kill fish and pollute drinking water, costing fisheries, local communities and recreation industries heavily; estimated at US$2.2 billion in the U.S alone.

Achieving phosphorus security will require an integrated approach, that might range from shifting diets, to developing markets for renewable phosphorus fertilisers sourced from excreta, manure & food waste, to efficient strategies for ‘unlocking’ soil phosphorus that has accumulated in agricultural fields over past decades. Indeed, there is a whole ‘toolbox’ of technologies and options for phosphorus recovery and efficiency that together can meet future phosphorus demand. However phosphorus vulnerability is very context-specific: what works in one country may be inappropriate or ineffective in another. Identifying context-specific adaptive strategies can increase the resilience of a food system. Investing in phosphorus reuse for example can create locally available ‘renewable fertilisers’, which simultaneously reduces dependence on imports from geopolitically risky regions, therefore buffering against future price spikes and supply disruptions; reducing phosphorus waste in the food supply chain; and reducing the risk of nutrient pollution. Importantly, technologies and practices don’t implement themselves: effective policy instruments are required to stimulate and support innovative phosphorus strategies. Shifting to sustainable phosphorus pathways means all stakeholders will need to play a role—from the agricultural & livestock industry to the sanitation sectors—to ultimately ensure all farmers have access to phosphorus, agriculture is productive, over 9 billion people have access to healthy diets and our rivers, lakes and oceans are clean.

**Funding sources:** Rural Industry Research & Development Corporation, International Social Science Council & Swedish Government, UTS Chancellor’s Postdoctoral Fellowship, CSIRO Sustainable Agriculture Flagship, Ian Potter Foundation.
PLENARY 2: TRANSLATING NUTRITIONAL EVIDENCE

RETHINKING THE TRANSLATION OF NUTRITIONAL EVIDENCE INTO PUBLIC HEALTH PRACTICE

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Nutrition science has a proud history of generating evidence that has then been translated into effective and safe public health practice. It is almost 100 years since the original public health practice of adding iodine to salt was undertaken in Switzerland; a practice that has now expanded to universal salt iodisation in many countries and a powerful example of how nutrition evidence can combat certain nutrient deficiency diseases (1). However, nutrition science now faces new and complex challenges if it is to continue to generate evidence for, and then have that evidence translated into, public health practice relevant to contemporary nutrition problems.

Dietary factors are now the leading contributors to the global burden of disease (2). Although nutrient deficiency diseases remain prevalent around the world, the dominant nutrition problems are diet-related chronic diseases and obesity caused by dietary imbalances and overconsumption. In addition, overshadowing the future nutrition science agenda is the relationship between nutrition and environmental sustainability which already is presenting another dimension of nutrition problems (3). Conventional reductionist, nutrient-oriented approaches for generating and translating nutrition evidence into public health practice are no longer sufficient to tackle these contemporary nutrition problems.

A project to rethink the translation of nutrition evidence into public health practice has been conducted by drawing on an adaption of Lang et al’s typology of the ‘three main approaches to nutrition’ (4) to construct a typology of nutrition science paradigms. The typology consists of three paradigms of nutrition and health relationships: nutrient-; food-dietary pattern-; and food systems-oriented. The paradigms are characterised by different worldviews of the causes and solutions to nutrition problems; and evidence synthesis methods. Principles for operationalising the typology to translate nutrition evidence into public health practice are outlined.

The project findings challenge the conventional orthodoxy for nutrition evidence translation. They provide a conceptually coherent and robust approach for guiding the translation of nutrition evidence into effective and safe public health practice relevant to contemporary nutrition problems.

CHALLENGES TO ADOPTION OF NUTRITIONAL KNOWLEDGE IN THE ANIMAL INDUSTRIES

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Nutrient requirements of livestock are influenced by many factors including: species; genetic strain within species; gender; weight; physiological state of growth, pregnancy and lactation; climate; social environment; disease status and microbial challenge; type of diet; and morphology of the digestive tract influencing where, and to what extent, dietary ingredients are fermented by microbes. A great deal of scientific understanding is published on how each of these factors influence nutrient requirements, animal performance and body composition. However, the complexity of interactions between the factors makes it extremely difficult to assess accurately the nutrient requirements of a specific animal and the impact of a nutrient imbalance on its performance. Furthermore, productivity and profitability of most animal enterprises could be markedly improved if existing knowledge was applied correctly and consistently within an animal enterprise over time.

The challenge for animal scientists has been to devise processes that ensure the abundant available scientific information can be applied effectively by animal producers. I have spent much of my scientific career trying to achieve this goal. The first approach was to integrate relevant scientific knowledge into mechanistic computer simulation models (1). These models were extended beyond animal biology to include factors contributing to enterprise profit, such as: price received for the product; enterprise costs; predictions of cash flow; as well as inclusion of an 'expert system' to identify the order management changes should be made to maximise profit. The pig simulation model, AusPig, has been used widely in Australia to determine nutrient requirements for specific groups of pigs within enterprises and has replaced the need for published Tables of Nutrient Requirements. The model predictions have been the basis for many strategic management changes within piggeries, such as the introduction of spray cooling to alleviate heat stress. However, animal simulation models, like AusPig, are not often used to make day-to-day enterprise decisions. The models are complex, require time to understand the underlying concepts and need a wide array of inputs to run simulations. These inputs are frequently difficult and costly to obtain. Nevertheless, with further investment, there is a strong future for models to apply available scientific knowledge for day-to-day management of animal enterprises. Investment is required to enable models to run in real-time for individual animals or group of animals. Model inputs will be derived continuously from electronic measuring devices. The models will continually determine the factors limiting performance, calculate whether there is an economic advantage to remedy and, if so, automatically control the feed and/or the environment to optimise animal welfare and profit.

The second approach was to greatly reduce the number of decisions an enterprise manager needed to make, by putting in place a system to ensure management practices were conducted correctly and consistently over time. The efficiency of consumption of pasture grown on grazing beef enterprises in southern Australia is typically around 35%, but sufficient knowledge is available for pasture use to exceed 90% of that grown. Low pasture utilisation rates occur because enterprise managers are unsure which of the myriad of possible management processes should be changed, and their perceived increase in risk of changing to a more intensive production system. A system was developed called 'More Beef from Pastures', based on Hazard Analysis Critical Control Point (HACCP) principles. Scientific knowledge available for each sector of an enterprise – from planning the business function through pasture growth, stock numbers, genetics, health, reproduction to sale of product – was used to identify those few management practices which had the greatest impact on profitability. Only 25 practices were considered essential. All of the 25 practices needed to be carried out correctly over time to optimise profit. For each practice, a variable that must be measured was identified, with its upper and lower limits set to ensure the practice would not fail. Predetermined corrective actions were identified for each practice when measurement limits were breached to quickly return the measured value to the acceptable range. The HACCP system becomes a 'risk control' management process. Producers who adopted the system increased pasture utilisation and profitability dramatically. However,
improvements declined over several years because managers failed to maintain the discipline to continually make measurements and undertake actions. Humans are poor at maintaining repetitive tasks over time. Similar to application of simulation models, these human failings may be overcome in future by using electronic measuring, interpreting and action-controlling devices.

In both examples given, a small proportion of the relevant cohort of managers adopted the procedure. Considerable time was spent on one-to-one coaching, which makes wide penetration across an industry difficult. A great deal has been written on factors that influence adoption of agricultural practices (2,3). Common themes emerge including: awareness of an opportunity; compatibility with current practice; negative association with age; price incentive through commodity price or subsidies; availability of capital; land tenure-owners greater adopters than renters; importance of one-to-one information exchange; encouragement from other farmers, family or friends; and personal goals, for example profit or leisure.

Several experiences from animal science are relevant to translating nutritional knowledge for use by humans. Adoption will not occur without awareness. Adoption is stimulated by price advantage, but decreased by low finance availability. One-on-one information exchange from experts, family or peers greatly stimulates adoption. Complex knowledge must be integrated, but delivered in a simple form. There are examples of these principles being important for the purchase of healthier foods in the human nutrition literature. Vogel et al (4) showed awareness and purchase of healthier foods, from supermarkets with lower quality foods, was associated with higher educational attainment. Price of foods also influences choices. Supermarkets generally place discount prices on less healthy foods, which increases their purchase (4,5), whereas lowering prices of fruit and vegetables by 20% increased the purchase of fruit by 35% and vegetables by 15% (5). Complex nutritional information can be simplified and spread widely across peers, families, friends and the community via smartphone Apps to influence food choices.

References
TRANSLATING NUTRITION AND LIFESTYLE EVIDENCE INTO PRACTICE: LESSONS FROM CANCER PREVENTION AND MANAGEMENT

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It is estimated that around one third of the most common cancers are preventable through appropriate dietary intake, maintaining a healthy weight and regular physical activity. However, little action has been taken to promote and implement dietary (quantitative and qualitative) change for cancer prevention and management. This finding is in contrast to tobacco control where there is a clear understanding about cancer risk which has been widely communicated and acted upon at both individual practice level and in public health policy. Like smoking, randomised control trials of diet and obesity interventions with cancer end points are not feasible. However, unlike tobacco, observational data on diet and cancer is often viewed with doubt due to personal observations, scepticism, failure to understand practical considerations and lack of commitment for promoting behaviour change from health professionals working in cancer settings. Intervention research has demonstrated that cancer settings provide “teachable moments” for engaging with behaviour change programmes but this concept has still to be fully explored.

Drawing on the model of tobacco control it is clear that translating dietary evidence into practice requires consistent messages (from trusted sources) on agreed objectives. The complexity of diet (e.g. everyone must eat food), the dream of discovering miracle chemopreventive agents and persistent concerns over undernutrition in cancer care increase translational challenges. Major changes in eating habits and weight management can only be achieved through a blend of programmes with environmental change and strong leadership from multi stakeholder collaborations. Within the medical, healthcare and user community there is a need to move beyond academic dissemination to championing the benefits of diet and weight management within user communities.

Funding source(s): ASA is core funded by University of Dundee and receives no funding from the private sector
LACTOSE INTOXERANCE: PERCEPTIONS, SCIENTIFIC REALITIES AND MANAGEMENT

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Approximately 3/4 of the World population maldigests lactose, due to a genetically controlled loss of intestinal lactase activity post weaning. Among this population of maldigesters, dairy food consumption is often limited due to perceived and real symptoms resulting from intake. Multiple factors influence lactose digestion and tolerance including lactose load, gastric and intestinal transit, the use of lactose digestive aids, colon fermentation of lactose and the consumption of fermented dairy foods and lactic acid bacteria. Major findings related to dietary management of lactose maldigestion include: The identification of a microbial lactase in yogurts that assists lactose digestion in the intestinal tract following the consumption of yogurt (1). The characterization of the amount of lactose required to cause symptoms in lactose maldigesters, being 12g or more of lactose (one cup of milk) (2). The finding that lactose consumed with a meal is tolerated 3 times better than lactose consumed in a fasted state (3). Identifying the colonic flora as key in determining tolerance to lactose (4). The colonic flora readily adapts to lactose in the diet of maldigesters. Thus, maldigesters who routinely consume lactose have less symptoms due to more efficient metabolism of lactose by the colon microflora. The identification of a population of digesters and maldigesters who believe that they are extremely intolerant to lactose, but who tolerate lactose quite well in double-blinded clinical trials (5). The characterization of the ability of lactic acid bacteria including acidophilus and bifidus to improve lactose digestion in vivo in the gastro-intestinal system. The results of these studies indicate that almost all maldigesters can consume significant amounts of dairy foods without experiencing symptoms of intolerance. Yet, a substantial group of maldigesters continue to believe that dairy foods, consumed in even small amounts, will result in gastrointestinal distress. We are interested in methods of intervention that will allow “lactose intolerant” individuals to learn that they can consume dairy foods without experiencing gastrointestinal symptoms (6). Finally, we are working with the dairy and pharmaceutical industries to attempt to develop food products that are well tolerated by the lactose maldigester (7).

6. O’Connor L, Eaton TK, Savaiano DA. (2015) Milk Aversion can be reversed in both lactose digesters...

Traditionally, nutrition investigations have taken a reductionist approach, reducing a food down to its constituent nutrients, then investigating the effects of different levels and combinations of nutrients on growth, development and well-being. The effects of nutrients and other food components, however, are not always additive, and can be synergistic. It has been suggested that a more fundamental unit in nutrition is food. Traditionally food science and food engineering have been based on a ‘unit process’ approach, and have placed a greater emphasis on holistic food morphometry, molecular structures and their interactions, in addition to chemical properties and along with physical properties such as particle size, particle density, porosity, surface area, rheology, coaguability etc.

Recently, food scientists have taken a greater interest in the “unit processes” of digestion and nutrient uptake, and in this space nutrition and food science intersect. Case-studies will be discussed whereby the dual application of both philosophical approaches, can provide new insights.
The nutritional sciences have made substantial advances over the past century, with many of the initial advances in human nutrition being gained from studies conducted in farm and laboratory animals. While animal studies still underpin much of our progress in human nutrition, more recently there has been a flow of information from human studies to animal nutrition. Some of the examples of this cross-fertilization will be discussed in this paper.

For example, beriberi had been described as a condition of humans on restricted diets for the millennia but it was the landmark studies in chickens in the late 1800’s that replicated the disease in chickens consuming a diet of solely white rice that led to the discovery of Thiamine. This was then confirmed in humans consuming white but not brown rice. The discovery of many other vitamin deficiencies in animals and humans followed. It was the ruminant nutritionist Eric Underwood who first identified the trace elements such as selenium and since then many other mineral deficiencies and toxicities have been characterised in animals confirmed to occur in humans.

More recently, there have been some excellent learnings for animal nutritionists from research conducted in human nutrition. Epidemiological studies, such as the study of the Dutch Famine, clearly identified the effects of prenatal nutrition on lifetime health outcomes of the progeny of mothers undernourished for key periods during gestation leading to the concept of foetal programming and epigenetics. Later research clearly identified lifetime consequence of over-nutrition during pregnancy as well and these concepts are now being manipulated in animal nutrition to improve performance and carcass quality. Another very active area in human and animal nutrition research is in the area of carbohydrate digestion where the apparent disparate needs of domesticated monogastrics and humans have resulted in advances in both branches of nutrition. Further areas of complementary progress include pro- and pre-biotics to improve gut health in humans and reduce antibiotic usage in animal agriculture, understanding the effect of the microbiota on health and the effect of nutrition on insulin resistance.

In conclusion, there have been enormous advances in nutrition with many of these discoveries being applicable in both human and animal nutrition. It behoves all nutritionists to follow all of the literature if we are to make best use of all the information that exists.
Historically, there has been a fundamental problem with the reporting of clinical research findings. On the order of 90% of published papers report statistically significant findings, an unrealistically high percentage given that most scientists are just not that good at guessing “right” the vast majority of the time. The reporting of clinical nutrition research is no exempt from this issue and the problem is no trivial one. The predominance of perceived “positive” studies in clinical nutrition seriously skews the apparent preponderance of evidence that forms the basis for nutritional guidelines and recommendations. The underlying causes have been realized for some time and include a wide variety of significance-chasing biases, allegiance biases and other “investigator degrees of freedom” that lead to distortion of results as they are presented in the literature. These will be discussed. To rectify the problems, new requirements for transparency in research reporting have evolved and are gradually making their way into journal policies worldwide. Their use ensures that reports contain the essential elements crucial for proper interpretation. Moreover, the remedial efforts also include requirements for registration of all clinical studies, including observational ones, a priori declaration of explicit primary and secondary endpoints, detailed exposition of the planned analytical approach, open availability of the data for independent confirmation and alternative analysis and declaration of potential non-financial as well as financial conflicts of interest. Unfortunately, as will be discussed, these declarations do not eliminate a wide variety of remaining biases.
Neither the modern human diet nor the size and proportions of the human gut resemble those of any other primate. The human digestive system has both evolved and diverged as different food types and food preparation techniques have been introduced. For example, the persistence of lactase activity into adulthood occurred after herding of cattle and dairying began about 8000 years ago and is common in some human populations and rare in others. The presence of multiple copies of the amylase gene was also influenced by changed diet, in this case the presence of dietary starches through the development of methods to make these available by milling grain and cooking. Humans have prepared foods by cooking and other means for at least 300-400,000 years, and divergence in genes through dietary influences can be traced back about 30,000 years. Cooking and food preservation expands the range of food that can be eaten, extends seasonal availability and enhances digestibility. The modern human digestive system is suited to a cooked diet because of its smaller volume, notably smaller colonic volume, relative to the intestines of other species, and because of differences from other primates in dentition and masticatory muscles that results in lower bite strength. Adaptations in human digestive physiology that involve genetic selection have occurred over thousands of years. However, transmissible diet-induced epigenetic changes occur in a single generation. These have been best documented for epigenetic changes related to obesity, and are in some cases maladaptive. Modern diets have changed dramatically in the last 50 years, which is too short a time for evolutionary change in digestive physiology. Short-term adaptation to recent dramatic dietary changes has proven insufficient to avoid deleterious effects leading to obesity, diabetes, fatty liver disease and the metabolic syndrome. In fact, obesity and associated diseases may be enhanced by the inheritance of epigenetic changes.
EPIGENETICS AND DIETARY POLYUNSATURATED FATTY ACIDS

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Background: Dietary fatty acids can alter cell function through membrane fluidity, by providing substrates for synthesis of second messengers and by activation or repression of transcription factors. Recent studies show that fatty acids can also modify the epigenetic processes. This talk will review these findings by focussing on the interaction between polyunsaturated fatty acids (PUFA) and the epigenome.

Results: Feeding pregnant rats diets with graded fish oil content induced increased DNA methylation of specific loci in Fads2 in adult offspring liver leading to lower transcription and reduced PUFA biosynthesis. However, such effects were transient in adult rats. Feeding men and women n-3 PUFA ethyl esters (3.5g/day) for 8 weeks altered DNA methylation of specific loci in the FADS2 and ELOVL5 genes compared to olive oil (4g/day) in leukocytes, contingent on sex. Women have higher capacity for docosahexaenoic acid (DHA) synthesis than men, which may be important for supply of DHA from mother to offspring. Progesterone induced reduced methylation of specific loci in the FADS2 promoter leading to increased expression and higher PUFA synthesis in HepG2 cells and primarily human hepatocytes. Preliminary findings suggest that induction of higher DHA synthesis in girls occurs during puberty and that this involves demethylation of FADS2.

Conclusions: Together these findings show that fatty acids can modify PUFA biosynthesis via changes in DNA methylation. This has implications for the capacity of a mother to meet the demands of her offspring for PUFA and for personalised nutrition.

Funding source(s): British Heart Foundation; Nutricia Research Foundation.
ROLE OF NUTRITION IN TOLERANCE DEVELOPMENT

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‘Immune homeostasis’ refers to the critical balance between tolerance to commensal microbes or food antigens and vigilance against pathogens. Effective homeostasis is associated with a healthy inflammatory tone that allows a rapid and self-limiting response to harmful encounters while protecting against unwanted inflammatory responses. Disturbance of these regulatory circuits leads to dysregulation of immune tolerance and an altered inflammatory tone with inadequately restrained inflammation; which are in turn associated with development of a range of immune-mediated and metabolic diseases referred to collectively as non-communicable diseases.

The non-communicable diseases (NCD) include allergic diseases (eg asthma, eczema, food allergy), autoimmune diseases (eg IDDM, multiple sclerosis), metabolic disorders (eg obesity, cardiovascular disease, stroke), other immune mediated conditions (inflammatory bowel disease) and neurodevelopmental conditions. Prevalence of these conditions has increased dramatically in the second half of the 20th century. Studies suggest that the environment in early life strongly affects one’s subsequent risk of developing NCD and play a much stronger determining role than later environmental influences or genetic inheritance. In particular, nutrition and intestinal microbial composition in early life have been shown to play important roles. The period from conception to the second birthday (referred to as the ‘first 1000 days’) has been proposed as a critical time for determining long term disease risk trajectory.

Establishment of the intestinal microbiota in the early neonatal period is essential for establishment of healthy immune homeostasis or ‘immune fitness’. Absence of or inadequate early microbial stimuli has been shown to cause defects in intestinal barrier function, reduced inflammatory responses, defective IgA responses and deficient oral tolerance induction. Mice raised in a germ free environment fail to develop oral tolerance. This immune dysregulation can be corrected by reconstitution of intestinal microbiota, but only if this occurs during the neonatal period. Alterations in the intestinal microbiota composition (particularly Bifidobacteria species) and a reduced intestinal microbial diversity in early life have been associated with later development of various non-communicable diseases. The process of colonization and the types of organisms that become established are influenced by many factors including mode of delivery (vaginal or Caesarean section), mother’s diet including use of probiotics, whether the infant is formula or breast-fed and the subsequent infant diet.

Recent studies suggest that diet plays a central role in regulating immune homeostasis through shaping the intestinal microbiota, supporting the production of microbial metabolites (short chain fatty acids) and via direct effects on immune cells. Intestinal microbial composition is predominantly shaped by the long term diet while short term dietary changes induce modest transient shifts in composition. Certain bacterial genus groups can digest soluble dietary fiber to produce short chain fatty acids which have potent immune effects that support tolerance and immune homeostasis. Diets high in fiber are associated with increased production of tolerance promoting short chain fatty acids, particularly butyrate and acetate, increased numbers of peripheral T regulatory cells and a reduced risk of NCD. Dietary components can also
modulate immune responses directly by binding to the aryl hydrocarbon receptor.

Summary
Early life nutrition and intestinal microbial composition play important roles in determining risk of NCD in later life. The first 1000 days of life represents an important window of time when environmental exposures have greatest impact on disease risk and hence offer an opportunity for prevention of disease.
PLENARY 5: FOOD AND AGEING

COGNITIVE AND BRAIN AGEING – HOW DOES DIET MATTER?

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Background/Aims: There is increasing interest in how individual nutrients and dietary patterns impact on cognitive and brain health in ageing. In this talk I will provide an overview of the normal changes in cognition in later life and transitions to cognitive impairment and dementia. I will discuss how current evidence on nutrition fits in with what we know about risk factors for cognitive decline and dementia.

Methods: Findings from the literature as well as findings from two population-based studies in Australia will be discussed – PATH Through Life and AusDiab. I will emphasise methodological considerations for interpreting this literature.

Results: There has been support for the Mediterranean diet and the MIND diet as protective against incident dementia and brain aging. Studies have linked higher fruit, vegetable and fish intake with less cognitive decline. However, we still lack sufficient data to conduct systematic reviews and very few randomised controlled trials have been conducted on this topic to date. Our analysis of two large Australian cohorts did not find a protective effect of the Mediterranean diet on cognitive function. There is growing evidence in animal and human studies that a junk food diet leads to poorer brain health.

Conclusions: Current evidence is limited and inconclusive but general findings in the field of cognitive aging and dementia are largely consistent with those from cancer, heart disease and stroke.

Funding source(s): National Health and Medical Research Council and Australian Research Council
Like humans, horses are remaining more active later in life due to a variety of factors including more targeted and managed training regimens, improved health care and greatly improved nutritional management. In the 2012 London Olympics, the equestrian events were well represented by "older" equines. Of the 74 horses that started the eventing competition, 17 were >15 yrs of age with the oldest being a 20 yr old. 2 of 5 of Germany's Gold Medal winning team were 15 yrs of age or older. In the Rio Olympics the oldest dressage competitor was 19 years old and the oldest eventer was the Australian horse Pluto Mio at 18 years old. It is apparent that many horses are still at their competitive peak in their late teens despite substantial age related physiological changes such as a decline in insulin-like growth factor (IGF-I) that alters metabolic control, endocrine and immune functions, muscle fibre changes away from an aerobic profile and a commiserate decline in aerobic exercise capacity.

Other physiological changes associated with aging in a working horse are reduced respiratory function, reduction in cardiovascular capacity, reduction in VO$_{2}$max and an age-related decline in HRmax and maximal stroke volume. The older horses also show an increased heart rate and associated increase in sweat production compared to younger horses.

This paper considers how the physiological changes in aged horses inform their nutritional management while still competing and training.

References:

TWO NUTRIENTS ARE BETTER THAN ONE: B-VITAMINS AND OMEGA-3 FATTY ACIDS IN THE PREVENTION OF DEMENTIA

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Background/Aims: Dementia, including Alzheimer’s disease (AD), is partly caused by life-style factors including poor nutrition. Low B-vitamin status, as revealed by elevated plasma homocysteine, and low intake/status of omega-3 fatty acids are two factors that increase the risk of dementia.

Methods: A randomized, controlled trial (VITACOG) was done on 270 elderly people with Mild Cognitive Impairment (MCI), a prodromal stage of dementia, to see if lowering homocysteine by supplementation with high-dose B-vitamins (folic acid, B6 and B12) would influence the disease process. Baseline plasma omega-3 fatty acids were measured to see if the levels influenced the effects of the B-vitamins.

Results: In those with raised homocysteine, B-vitamin treatment over a two-year period slowed the rate of brain atrophy, especially in brain regions vulnerable to AD, and also slowed cognitive and clinical decline. The protective effects of B-vitamins on brain atrophy and on cognitive and clinical decline were enhanced in people with high levels of baseline omega-3 fatty acids and were absent in those with low levels of omega-3 fatty acids.

Conclusions: The disease process in MCI, and so probably in AD, can be modified by lowering homocysteine but only if the omega-3 fatty acid status is good. A trial is needed of a combination of B-vitamins and omega-3 fatty acids in people with MCI to see if this combination prevents conversion to dementia. This study draws attention to the importance of interactions between nutrients in disease prevention.

Funding source(s): Medical Research Council, Charles Wolfson Charitable Trust, Norwegian Research Council
EFFECT OF SHORT CHAIN FATTY ACIDS, PREBIOTICS AND SYNBIOТICS ON SYSTEMIC INFLAMMATION: A SYSTEMATIC LITERATURE REVIEW

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Background/Aims: Prebiotic soluble fibres are fermented by beneficial bacteria in the colon to produce short chain fatty acids (SCFAs), which are proposed to have systemic anti-inflammatory effects. This review examines the effect of SCFAs, prebiotics and pre/probiotic combinations (synbiotics) on systemic inflammation.

Methods: Relevant English language studies from 1947 to May 2016, were identified using Medline, CINAHL, EMBASE, PubMed, and Cochrane databases. Studies were considered eligible if they examined the effects of SCFAs, prebiotics or synbiotics delivered orally, intravenously or per rectum, on biomarkers of systemic inflammation in humans. Data extraction and appraisal of methodological quality was conducted by two independent researchers using standardised tools.

Results: Of 5702 articles identified, 143 full text articles were retrieved and reviewed, and 64 studies performed in healthy subjects and a variety of inflammatory conditions, were included. 13 of 29 prebiotic studies and 12 of 25 synbiotic studies reported a significant decrease in one or more markers of inflammation, such as C-reactive protein and IL-6. 7 studies used both pre- and synbiotics, 2 of which reported a decrease in inflammation with synbiotics only, with 1 reporting a greater anti-inflammatory effect with synbiotics compared to prebiotics alone.

Conclusions: There is significant heterogeneity of outcomes in studies examining the effect of prebiotics and/or synbiotics on systemic inflammation. Approximately 50% of included studies reported a decrease in at least one inflammatory biomarker. The inconsistency in reported outcomes may be due differences in study design, supplement formulation, dosage, duration, and subject population.

Funding source(s): N/A
SATURATED FATTY ACID CHAIN LENGTH HAS NO EFFECT ON ENERGY EXPENDITURE IN OVERWEIGHT AND OBESE MEN

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Background/Aims: Monounsaturated (MUFA) fatty acids have been shown to induce greater meal induced thermogenesis (MIT) than saturated fatty acids (SFA). However, the effect of SFA chain length has not been examined. The aim of this study was to compare the acute metabolic responses of high fat meals differing in saturation and SFA chain length.

Methods: A three way postprandial parallel randomised single blinded cross-over study with healthy overweight and obese men 18-40 years was undertaken. Participants consumed an isoenergetic (3780 ± 4.3 kJ), high fat (45%) meal rich in MUFA; short/medium chain SFA (SCMSFA) (2-12 carbons); and long chain SFA (LCSFA) (14-24 carbons). MIT, fat oxidation, triglycerides (TG) and subjective appetite were measured for six hours post-prandially. Data were analysed as AUC and compared using a one way repeated measures ANOVA.

Results: The mean BMI of participants was 29.3 ± 0.6 kg/m^2 and mean age 23.8±1.4 years (n=13). MIT was similar between the three high fat meals: MUFA (204.17 ± 20.45 kJ/6hr), SMCSFA (192.58 ± 21.75 kJ/6hr), LCSFA (198.06 ± 21.54 kJ/6hr) (p=0.888). Fat oxidation, plasma TG and hunger and fullness were also similar between the meals (p>0.05 all values).

Conclusions: High fat meals rich in SMCSFAs and LCSFAs did not differentially affect MIT, fat oxidation, TG or appetite. These responses were also not different between the MUFA and SFA meals. These results support further investigation of the implications of dietary SFA.

Funding source(s): L.E.W Carty Charitable Fund
REDUCTIONS IN BODY WEIGHT AND PERCENT FAT MASS INCREASE THE VITAMIN D STATUS OF OBESE SUBJECTS

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Background/Aims: It is unclear whether the inverse relationship between vitamin D status and body fatness reflects a sequestration or a volumetric dilution effect. We questioned whether weight loss improved vitamin D status and conducted a systematic review and meta-regression analysis of studies over the last 21 years.

Methods: The systematic review inclusion criteria were human trials on weight loss, measurement of change in weight or body composition and serum 25-hydroxyvitamin D (25OHD). Studies were excluded if vitamin D was supplemented, dietary intake exceeded 800 IU/day or extreme sun exposure was reported.

Results: Eighteen of 23 trials showed an increase in vitamin D status with weight loss. An unadjusted meta-regression analysis indicated a marginally significant effect of weight loss on weighted mean difference of 25OHD ($\beta=-0.60$ [95% CI: -1.24 to +0.04] nmol/L; $p=0.06$) and after adjustment for study quality (Jadad score $\geq 3$) ($\beta=-0.64$ [95% CI: -1.28 to +0.01] nmol/L, $p=0.05$). The effect of percent fat mass on weighted mean difference of 25OHD ($\beta=-0.91$ [95% CI: -1.96 to +0.15] nmol/L; $p=0.08$) and after adjustment of study quality ($\beta=-1.05$ [95% CI: -2.18 to +0.08] nmol/L; $p=0.06$) was of marginal significance.

Conclusions: Overall the data support a volumetric dilution of vitamin D. However, the sequestration of 25OHD and its conversion to inactive metabolites would also play a role.

Funding source(s): N/A
NITRATE INTAKE AND Atherosclerotic Vascular Disease Mortality: A Prospective Cohort Study

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Background/Aims: Nitrate-rich vegetables have been shown to lower blood pressure and improve endothelial function in humans. However, it is not known if increased consumption of nitrate-rich vegetables translates to lower risk of long-term cardiovascular-related outcomes. The aim of this study was to investigate the association of nitrate intake derived from vegetables with atherosclerotic vascular disease (ASVD) mortality.

Methods: 1,500 women aged 70-85 years were recruited in 1998 and were followed for 15 years. Dietary intake was assessed at baseline using a validated food frequency questionnaire. Nitrate intake from vegetables was then calculated using a newly developed comprehensive database. The primary outcome was any death attributed to ASVD ascertained using the Western Australian Data Linkage System. Women with a baseline history of ASVD and diabetes were excluded from analyses. Cox regression modelling was used to analyse data.

Results: Over a follow-up period of 15,947 person-years, 238/1,226 (19.4%) women died of an ASVD-related cause. Mean (SD) vegetable nitrate intake was 67.0 (29.2) mg/d. Higher vegetable nitrate intake (per SD) was associated with lower risk of ASVD mortality in both unadjusted (HR=0.80, 95%CI 0.70, 0.92, P=0.002) and multivariable adjusted (HR=0.79, 95%CI 0.68, 0.93, P=0.004) models. This relationship was attenuated after further adjustment for diet quality (HR=0.85, 95%CI 0.72, 1.01, P=0.072).

Conclusions: In this population of older women, nitrate intake from vegetables was inversely associated with ASVD mortality, independent of ASVD risk factors. These results support the concept that nitrate-rich vegetables may provide further benefit to ASVD risk.

Funding source(s): NHMRC and Healthway.
EMU OIL IMPROVES BODYWEIGHT IN A MOUSE MODEL OF COLITIS-ASSOCIATED COLORECTAL CANCER, WHILST NOT IMPACTING HEALTHY CONTROLS

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Background/Aims: Ulcerative colitis (UC) is an incurable inflammatory bowel disorder whereby patients suffer from severe abdominal pain, fatigue and weight loss. Furthermore, if poorly controlled, UC may progress to colorectal cancer (CRC). Previously, we demonstrated that Emu Oil (EO) protected the intestine and improved clinical indicators of disease in experimental models of gut damage. We aimed to determine whether orally-administered EO could improve bodyweight in a mouse model of colitis-associated CRC.

Methods: C57BL/6 mice (n=9/group) were injected with azoxymethane (AOM), followed by three DSS/water cycles (consisting of seven days water or dextran sulphate sodium [DSS; 2%] and 14 days water). Mice were orally-administered either water or EO (80μL or 160μL), thrice weekly for 63 days. Daily bodyweights were expressed as a percentage change from starting bodyweight. Data were statistically analysed using two-way ANOVA with LSD. P<0.05 was considered significant.

Results: In normal animals, EO reduced bodyweight (days 16-18, 30, 49) compared to controls (mean 6% decrease ± 0.17 SEM; P<0.05) with no significant impact on other days. AOM/DSS resulted in significantly decreased bodyweight compared to normal controls (mean 10% reduction ± 0.88 SEM; P<0.05). Importantly however, in AOM/DSS mice, both doses of EO significantly increased bodyweight compared to disease controls (low dose: mean 7% ± 0.105 SEM; high dose: mean 9% ± 0.6 SEM; P<0.05).

Conclusions: Improved bodyweight following Emu Oil administration suggests therapeutic potential in patients suffering from colitis-associated colorectal cancer. Moreover, results indicate that Emu Oil maintains bodyweight within the normal range.

Funding source(s): N/A
CYTOTOXIC EFFECT CAUSED BY THE COMBINATION OF VITAMIN E HOMOLOGS ON PROSTATE CANCER CELLS.

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Background/Aims: Vitamin E homolog is known as an anti-cancer ingredient with high safety. The epidemiological analysis of vitamin E intake has indicated prominent preventive effect against prostate cancer (PC). PC has strong resistance for conventional chemotherapy, so new effective treatment is required. However, a single vitamin E homolog cannot induce cytotoxicity on PC cells effectively. In this study, we show that the combination treatment of δ-Tocotrienol (T3) and γ-Tocopherol (Toc) could strongly suppress PC cell growth.

Methods: Cell viability was evaluated by WST-1 assay. Cell cycle and apoptosis population analysis was performed by the Cell analyzer. The amount of uptake of vitamin E into the cell was measured by HPLC. Statistical analysis were performed by the Tukey-Kramer test.

Results: The combination treatment (δ-T3 10µg/mL, γ-Toc 10µg/mL) significantly showed cytotoxic effect on PC cells (p<0.01). In cell cycles analysis, δ-T3 and γ-Toc induced arrest of G0/G1 phase and G2/M phase, which lead to apoptosis. With respect to the apoptosis induction, single δ-T3 and single γ-Toc induced apoptosis at 24h and 48h after each treatment, respectively. On the other hand, the apoptosis induction by the combination treatment was observed at 48h. The result on HPLC analysis showed that there were no changes in the amount of uptake of vitamin E into the cell due to combination treatment.

Conclusions: These results suggest that combination treatment of δ-T3 and γ-Toc effectively induces cytotoxicity on androgen-independent PC cells in comparison to the single treatment of δ-T3 or γ-Toc.

Funding source: Inoue Enryou Memorial Foundation
ANALYSIS OF ANTICANCER MECHANISM OF A VITAMIN E DERIVATIVE ON MALIGNANT MESOTHELIOMA CELLS

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Background/Aims: It is known that a one of vitamin E family, tocotrienol (T3) suppresses the level of HMG-CoA reductase (HMGCR) which is a rate-limiting enzyme of cholesterol synthesis pathway, and is also expected as an anticancer agent. Our group synthesized a redox-inactive derivative of T3, 6-O-carboxypropyl-α-T3 (T3E) to reinforce the anticancer activity. In this study, we showed the cytotoxic effect on malignant mesothelioma (MM) cells via the suppression of HMGCR as an effect of non-antioxidant activity of T3.

Methods: We used H2452 cells (a MM cell line) and Met5A cells (a non-tumorigenic mesothelial cell line). Cell viability was examined by a WST-1 assay. The global analysis of gene expression was performed using a DNA microarray. Furthermore, gene expression was confirmed by RT-real-time PCR, and protein level was analyzed by immunoblot analysis.

Results: T3E showed high cytotoxicity on H2452 cells in a dose-dependent manner (~20µM), without cytotoxicity for Met5A cells. Additionally, T3E mainly suppressed the expression of HMGCR (p<0.01), which led to attenuate some factors including RAS closely related to cancer malignancy.

Conclusions: According to the results, it seems that T3E has negative growth control against MM cells, mainly through the suppression of HMGCR. Finally, this result may lead to establishment of a new effective treatment for MM.

Funding source(s): JSPS;KAKENHI
KRILL OIL EXTRACT INDUCES APOPTOSIS OF HUMAN COLORECTAL CANCER CELLS

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Background/Aims: Colorectal cancer (CRC) is the third most common cancer. The currently available chemotherapy for CRC is associated with numerous adverse side effects. This study assessed the efficacy of free fatty acid (FFA) extract of krill oil on three human CRC cell lines.

Methods: The human CRC cell lines of HCT-15, SW-480 and Caco-2 were obtained from the American Tissue Culture Collection (ATCC). Free fatty acids (FFA) were extracted from the krill oil following the hydrolysis (saponification) method of Salimon et al (2011). Cells were treated with the krill oil extract, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) for 48 hrs. Effects on apoptosis and mitochondrial membrane potential were determined using commercial kits. Data were analysed using SPSS 22 software. Mixed model ANOVA was used to determine the significance between treatments. P < 0.05 was considered significant.

Results: A significant cell apoptosis was observed after the treatment with krill oil extract at the concentrations of 0.12µL/100µL well, and EPA treatment at 100 µM and 200 µM. The percentage of cell inhibition ranged from 94 to 96% (p<0.01). Mitochondrial membrane depolarisation in all three cell lines was significantly higher after the treatment with krill oil extract compared to the control (p<0.01). However, no significant change in mitochondrial membrane potential was observed after EPA treatment. DHA treatment did not result in significant changes in any of the three CRC cell lines.

Conclusions: These results indicate that krill oil maybe an effective chemotherapeutic agent for CRC due to its potential of inducing the apoptosis. Although the exact mechanism of the pro-apoptotic properties of krill oil extract is unclear, mitochondrial pathway seems to be implicated.

Funding source(s): N/A
INVESTIGATING IMMUNE EFFECTS OF SHORT CHAIN FATTY ACIDS IN HEALTHY HUMANS

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Background/Aims: SCFA promote gut health and also pass into the circulation, especially acetate. Murine studies have demonstrated that increasing circulating acetate via consumption of a high fibre diet and oral consumption of acetic acid has anti-inflammatory effects. This occurs through promotion of Foxp3+ T regulatory cells (Treg). Our aim in this study was to characterize systemic immune effects associated with altering circulating acetate in healthy humans.

Methods: We conducted a single blinded, randomized, controlled cross-over dietary intervention study in a small group of healthy volunteers (n=10). Each participant underwent a vinegar drink dietary period, followed by a high and/or low fibre diet in random order. Each dietary period was 5 days in duration. Blood samples were taken on the 5th day of each dietary period to assess changes to plasma acetate, T cells and cytokines. This was determined using GC-MS, flow cytometry and multiplex assays. Statistical significance between groups was determined using ANOVA and subsequent Bonferroni testing.

Results: Vinegar consumption, low fibre diet (LFD) and high fibre diet (HFD) did not significantly change plasma acetate level (p=0.69). Consumption of the LFD was associated with a significant decrease in the proportion of T regulatory cells compared to baseline levels (p<0.01). No significant changes to cytokines levels were observed after consumption of vinegar, HFD or LFD.

Conclusions: Taken together, these results highlight associations between consumption of dietary fibre and the peripheral immune system that could be investigated further in a larger study.

Funding source(s): N/A
CONTRIBUTION OF TRANS-FATTY ACID INTAKE TO CORONARY HEART DISEASE BURDEN IN AUSTRALIA: A MODELLING STUDY

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Background/Aims: Trans-fatty acids (TFA) are consistently associated with higher risk of coronary heart disease (CHD) mortality. To inform ongoing policy discussions, we provided an updated assessment of TFA intake in Australian adults, examined how TFA intake differed according to social-economic status (SES), and conducted modelling to estimate the CHD mortality attributable to TFA intake in 2010.

Methods: TFA intake was assessed using the nationally representative 2011-12 National Nutrition and Physical Activity Survey. TFA intake was calculated for age and sex groups. CHD burden attributable to TFA was calculated by comparing the current TFA intake to a counterfactual setting where consumption was lowered to a theoretical minimum distribution of 0.5% of energy, equivalent to removing all industrially manufactured TFA.

Results: Average TFA intake among adults was 0.59±0.38% of daily energy. Overall 10% of adults exceeded the World Health Organization recommended limit of 1% total energy. In multivariate regression, education and income were moderately and inversely associated with TFA (P-value trend ≤0.001 for each), with 14% of adults in the lowest income and education quintile having >1% of energy from TFA. In 2010, an estimated 487 CHD deaths (95% CI, 367-615 CHD deaths) were due to TFA exposure, equivalent to 1.52% (95% uncertainty limits: 1.15%-1.92%) of all CHD mortality.

Conclusions: The relative impact of TFA exposure on CHD mortality in Australia is limited, but in absolute terms still substantial. Policies aimed at reducing industrial TFA exposure may therefore be desirable, taking into account potential varying impact on groups of different SES.

Funding source(s): Heart Foundation
ASSOCIATION BETWEEN VITAMIN D STATUS AND CARDIO-METABOLIC RISK FACTORS AMONG SAUDI ADULTS WITH AND WITHOUT CORONARY HEART DISEASE

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Objective: Current literature has suggested an association between low vitamin D serum levels and the burden of cardio-metabolic risk factors. In the context of the high prevalence of vitamin D deficiency in Saudi Arabia, this study hypothesized that vitamin D deficiency is associated with increased risk of cardio-metabolic risk factors, such as obesity, diabetes, hypertension, and hypercholesterolemia among Saudi adults with coronary heart disease (CHD) compared with subjects without CHD.

Methods: A total of 130 CHD subjects and 195 subjects without CHD were recruited from three hospitals in the western region of the Kingdom. Fasting blood samples were taken to measure serum levels of vitamin D, glucose, and total cholesterol from each subject. Anthropometric and blood pressure measurements were also measured.

Results: The results revealed that vitamin D deficiency [serum 25(OH)D < 20 ng/mL] was found to be associated with increased risk of diabetes in CHD patients (OR: 3.1, 95% CI: 1.08-9.3, P=0.035). No significant associations were found between other cardio-metabolic risk factors and vitamin D deficiency in both groups.

Conclusion: Vitamin D deficiency is associated with diabetes in subjects with CHD when they are severely vitamin D deficient.

Key words: Vitamin D deficiency, diabetes, obesity, Saudi Arabia, hypertension, Middle East
LOW AMOUNTS OF FISH OIL CAN OVERCOME LIMITATIONS OF STEARIDONIC ACID (SDA; 18:4ω3) AS AN ALTERNATIVE SOURCE OF ω3 LC-PUFA

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Background/Aim: Marine sources of omega3 PUFAs eicosapentaenoic acid (EPA, 20:5ω3) and docosahexaenoic acid (DHA, 22:6ω3) improve tissue DHA levels and reduce cardiovascular risk, whereas the influence of plant oils rich in stearidonic acid (SDA) on increasing tissue DHA is limited. We aimed to evaluate whether EO promotes tissue uptake of DHA when long-chain (LC) ω3PUFA is present in the diet.

Methods: Rats were fed diets containing 5% fat (w/w) as lard (control), SDA-rich echium oil (EO), fish oil (FO), or EO:FO blends (EO at 2, 3 and 4% mixed with FO at 3, 2 and 1% w/w respectively). After 12 weeks plasma, liver, heart and kidney fatty acid composition was determined. Data was analysed by one-way ANOVA and a Tukey post-hoc test.

Results: Both EO and FO (5% w/w) supplementation increased EPA in all tissues (P<0.05). FO increased DHA levels, but EO only increased EPA and DPA (docosapentaenoic acid; 22:5ω3), not DHA. Blending FO with EO enhanced tissue DHA levels, with as little as 1% FO doubling the level of DHA in heart tissue (P<0.05).

Conclusions: Dietary SDA (as EO) did not increase tissue DHA levels, as its elongation/desaturation terminated at DPA. However, this limitation can be corrected by the co-provision of a small amount of FO.
Poster Session 2:  
Room M8: Dietary strategies for chronic disease

12:00 - 13:00

FRUIT INTAKE AND ABDOMINAL AORTIC CALCIFICATION IN ELDERLY WOMEN: A PROSPECTIVE COHORT STUDY


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Background/Aims: There is a consistent inverse relationship between fruit intake and CVD events and mortality in cross-sectional and prospective observational studies. The effects of fruit intake on abdominal aortic calcification (AAC), a marker for subclinical intimal and medial atherosclerotic vascular disease, have not been studied previously. The aim of this study was to examine the cross-sectional relationship of total and individual fruit (apple, pear, orange and other citrus, and banana) intake with AAC, scored between 0 and 24.

Methods: The current study assessed baseline data for a cohort of 1052 women over 70 years of age (mean age = 75.1 ± 2.7) who completed both a food frequency questionnaire assessing fruit intake, and underwent AAC measurement using dual energy X-ray absorptiometry. The average total fruit intake at baseline was 230.9 ± 205.5 g/day.

Results: AAC scores were significantly negatively correlated with total fruit and apple intakes (p< 0.05), but not with pear, orange or banana intakes (p >0.25). In multivariable-adjusted logistic regression, each SD (50g/day) increase in apple intake was associated with a 24% lower odds of having severe AAC (AAC score >5) [odd ratio (OR): 0.76 (0.62, 0.93), p = 0.009]. Total and other individual fruit intake were not associated with increased odds of having severe AAC.

Conclusions: Apple but not total or other fruit intake is independently negatively associated with AAC in older women.

Funding source(s): Kidney Health Australia; Healthway Health Promotion Foundation of Western Australia; NHMRC
DIETARY PATTERNS BY REDUCED RANK REGRESSION ARE ASSOCIATED WITH OBESITY AND HYPERTENSION IN AUSTRALIAN ADULTS

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Background/Aims: Evidence linking dietary patterns (DPs) and obesity and hypertension risk is inconsistent. This cross-sectional study aimed to derive DPs, using reduced rank regression, and investigate their associations with obesity and hypertension.

Methods: Adults (n=4908; aged ≥19 years) were included from the nationally representative Australian Health Survey 2011/13. Reduced rank regression derived DPs from two 24-hour recalls, with dietary energy density (DED), fibre density, and total sugars intake as response variables for obesity, and sodium : potassium, saturated fat (SFA): polyunsaturated fat (PUFA) and fibre density for hypertension. Poisson regression (RR) investigated relationships between DPs and obesity and hypertension.

Results: Individuals in the highest tertile of Obesity-DP1 (positively correlated with fibre density and sugars intake and inversely with DED) and Obesity-DP2 (positively correlated with sugars intake and inversely with fibre density) had lower (RR: 0.88, 95% CI: 0.81, 0.95) and higher (RR: 1.09, 95% CI: 1.01, 1.18) risk of obesity compared with the lowest tertile, respectively. Hypertension risk was higher in the highest tertile of Hypertension-DP1 (positively correlated with sodium : potassium and SFA : PUFA) compared with the lowest in men only (RR: 1.33, 95% CI: 1.04, 1.69). Hypertension-DP2 was not associated with hypertension.

Conclusions: Obesity risk was inversely associated with low-DED, high-fibre and sugars diet and positively associated with low-fibre, high-sugars diet. Hypertension risk was higher with high-sodium and SFA diet. These findings highlight the differential obesogenic effects between a diet high in natural sugars and fibre and high in added sugars.

Funding source(s): Deakin University, NHMRC
BREAKFAST CEREAL
CONSUMPTION AND INCIDENT
OBESITY: 12 YEARS ANALYSES OF
THE AUSTRALIAN LONGITUDINAL
STUDY ON WOMEN'S HEALTH

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Background/Aims: The obesity rate among Australian women is 27.5%.
Breakfast cereal consumption is thought to be protective against obesity. This study investigated the effect of breakfast cereal consumption on the risk of developing obesity (BMI ≥ 30 kg/m²) over 12 years among participants of the Australian Longitudinal Study of Women's Health (ALSWH).

Methods: Data from Survey 3 (S3) to Survey 7 (S7) inclusive, from the 1946-51 ALSWH cohort were analysed. Dietary data (DQESv2 FFQ) were available at S3 and S7, obesity at S4-S7. Women were excluded if: dietary data were incomplete; they reported existing overweight and obesity cases; or if total energy intake was <4500 or >20,000kJ. Logistic regression models investigated the association between breakfast cereal intake (yes or no) and incident obesity. Models were adjusted for: education, income, physical activity, smoking, hypertension and dietary intakes.

Results: There were 255 (7.8%) incident cases of obesity. Total breakfast cereal intake was not associated with incident obesity (OR: 0.79, p=0.284, CI: 0.52, 1.21). There were no significant associations with most individual breakfast cereal types. Muesli consumption was associated with a strong and significant reduction in the risk of developing obesity (OR: 0.68, p=0.014, CI: 0.50, 0.92).

Conclusions: Among mid-age Australian women muesli consumption, but no other breakfast cereals, was associated with a reduction in obesity. This effect may be due to a particular profile of muesli eaters that we have not be able to fully adjust for, but the relationship warrants further investigation.

Funding source(s): The University of Newcastle
Background/Aims: Diabetes Mellitus (DM) affects 9.8% of Australian women. Breakfast cereal consumption has been linked with better health outcomes, including for DM. This study investigated the effect of breakfast cereal consumption on the risk of developing DM among the Australian Longitudinal Study of Women's Health (ALSWH), over 12 years.

Methods: Data from Survey 3 (S3) to Survey 7 (S7) inclusive, from the 1946-51 ALSWH cohort were analysed. Dietary data (DQESv2 FFQ) were available at S3 and S7, DM at S4-S7. Women were excluded if: dietary data were incomplete; they reported existing diabetes or IGT at S3; or if total energy intake was <4500 or >20,000kJ. Logistic regression models investigated the association between breakfast cereal intake (yes or no) and incident DM. Models were adjusted for: BMI, smoking, marital status, income, physical activity, and dietary intakes.

Results: There were 538 (8.1%) incident cases of DM. Total breakfast cereal intake was not associated with incident DM (OR:1.08, p=0.655, CI:0.76, 1.55). There were no significant associations with most individual breakfast cereal types, however women who consumed muesli had a strong and significant decrease in the odds of developing DM (OR:0.73, p=0.003, CI:0.59, 0.90).

Conclusions: Among mid-age Australian women muesli consumption, but no other breakfast cereals, was associated with a reduction in DM. This effect may be due to a particular profile of muesli eaters that we have not be able to fully adjust for, but the relationship warrants further investigation.

Funding source(s): The University of Newcastle
THE EFFECTS OF BOYSENBERRIES ON CHOLESTEROL METABOLISM TO PREVENT ATHEROSCLEROSIS

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Background/Aims: Heart disease is the second leading cause of death in Japan, and is mainly caused by atherosclerosis. Antioxidants are known to reduce such risks. We previously reported that boysenberry contained polyphenols more than raspberries and had potential antioxidants. It's thought that oxidized LDL cholesterol is a risk factor to induce atherosclerosis. We think if the absolute amount of oxidized LDL cholesterol would be reduced, the risk of developing atherosclerosis might be decreased. In this study, we aim to investigate the effects of boysenberries on cholesterol metabolism.

Methods: As samples, we used commercial boysenberry juice in Japan and ellagic acid that is the main polyphenol of boysenberry. Human hepatoma cells HepG2 and, human colon cells Caco2 were cultured in a medium containing samples. At 24 h after treatment in samples, we analyzed the mRNA expression by RT-real-time PCR.

Results: In the Caco2 cell, the expression of ABCG5 and ABCG8 in the 0.001% boysenberry juice was increased by half compared to the control medium having nothing (p<0.05, n=8). In the HepG2 cell, the expression of ABCA1 in the 1µM ellagic acid was increased by half (p<0.05, n=7). ABCA1, ABCG5 and ABCG8 are factors in cholesterol excretion.

Conclusions: Our results suggest that cholesterol excretion in the small intestine is promoted by adding boysenberries and thus the amount of oxidized LDL cholesterol might be reduced. We deduce that boysenberries influences cholesterol metabolism and its bioactivity does not depend on antioxidants. Boysenberries might have the potential to prevent atherosclerosis.

Funding source(s): N/A
ANXIETY LEVELS MODERATE THE PROTECTIVE EFFECT OF DARK CHOCOLATE POLYPHENOL INTAKE AGAINST METABOLIC SYNDROME: THE ATTICA STUDY


Background/Aims: Consumption of dark chocolate has been associated with favourable reduction in several markers of cardio-metabolic risk. However, these associations have not been explored with respect to levels of anxiety, this is despite that chronic stress is also correlated with unfavourable metabolic profiles. Therefore, the aim of the present analysis is to examine the association of dark chocolate consumption with the presence of Metabolic Syndrome (MetS), under the prism of anxiety.

Methods: During 2001-2002, 1514 men and 1528 women (>18y) without any clinical evidence of CVD or any other chronic disease, at baseline, living in greater Athens area, Greece, were enrolled (ATTICA study). In 2011-2012, the 10-year follow-up was performed in 2583 participants (75% retention). MetS was defined by the National Cholesterol Education Program Adult Treatment panel III (revised NCEP ATP III) definition. Dark chocolate intake was calculated using validated FFQs and anxiety levels were assessed using the Spielberger Anxiety Questionnaire.

Results: Individuals with MetS reported significantly higher levels of anxiety than MetS-free participants (mean±standard deviation: 43±12 vs. 40±12, respectively, p=0.029). Among subjects with lower level of anxiety, every increase of 25mg in daily dark chocolate polyphenols intake was associated with 5% less odds of MetS presence ((OR)=0.951, 95% CI:0.915-0.988), after adjustment for gender, age and physical activity levels, but no significant association was revealed for participants with lower anxiety levels (p>0.05).

Conclusions: The findings suggest that the daily dark chocolate consumption could have an important favourable effect on the development of MetS in individuals with low levels of chronic stress and anxiety in this population sample. Furthermore, this moderating effect of stress in chocolate intake warrants further investigation.

Funding source(s): Coca-Cola SA, Hellenic Atherosclerosis Society.
DARK CHOCOLATE POLYPHENOL INTAKE IS AN EFFICIENT PREDICTOR OF METABOLIC SYNDROME: THE ATTICA STUDY.

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Background/Aims: There is increasing interest and evidence that there is a potential favourable association between the daily consumption of dark chocolate and cardio-metabolic risk. However, this association has not been evaluated for its predictive ability. The aim of this analysis is to assess the role of dark chocolate consumption in predicting the presence of Metabolic Syndrome (MetS).

Methods: During 2001-2002, 1514 men and 1528 women (>18y) without any clinical evidence chronic disease (including CVD), living in greater Athens area, Greece, were enrolled (ATTICA study). MetS was defined by the National Cholesterol Education Program Adult Treatment panel III (revised NCEP) Chocolate intake was assessed with a valid FFQ.

Results: Daily dark chocolate polyphenols intake was a significant diagnostic tool for the presence of MetS, (AUC)=0.420, p=0.001). Additionally, for every 25mg increase in the daily intake of dark chocolate polyphenols, the odds ratio of MetS presence decreased by 8% (Odds Ratio=0.992, 95% Confidence Interval: 0.988-0.996)

Conclusions: Daily dark chocolate polyphenols consumption appears to be associated with the presence of metabolic syndrome. Further studies are required to examine the mechanisms through which dark chocolate mitigates the risk of developing MetS.

Funding source(s): Coca-Cola SA, Hellenic Atherosclerosis Society.
ASSOCIATION BETWEEN NUTRIENT PATTERNS AND BONE MINERAL DENSITY AMONG AUSTRALIAN ADULTS AGED 50 YEARS AND ABOVE

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Background/Aims: We hypothesized that certain nutrients influence bone mass and assessed the association between nutrient patterns (NPs) and bone mineral density (BMD).

Methods: Data from the North West Adelaide Health Study, a community-based cohort study undertaken in Australia, were used. In this specific study, 1182 adults (545 males, 45.9%) aged 50-87 years had dietary data collected using a food frequency questionnaire and also had BMD measurements taken using dual energy X-ray absorptiometry (DXA). Factor analysis with principal component method was applied to construct the NPs based on the intake of 33 nutrients. Poisson regression was used to assess the association between NPs and BMD.

Results: Patterns of animal-sourced nutrients including Omega-6, palmitoleic acid, cholesterol, protein, and saturated fat; plant-sourced nutrients including alpha- and beta-carotene, Vitamin C, fibre and phosphorous; and mixed-source (combining plant and animal) nutrients, including calcium, fibre and protein, were identified. Compared to the study participants in the first tertile (those with lowest consumption) of the plant pattern, participants in the third tertile had 15.3 milligram/centimeter$^2$ lower BMD ($\beta=-15.3$; 95% CI: -29.28-0.43; p for trend 0.031), likely due to lower levels of important nutrients such as calcium and protein, after adjusting for socio-demographic, lifestyle and behavioural characteristics, chronic conditions and energy intake. A statistically non-significant increase in BMD was found across tertiles of the mixed pattern.

Conclusions: Intake of a plant-sourced nutrient pattern may contribute to reduced BMD in adults.

Funding sources: The University of Adelaide, The South Australian Department of Health and The Queen Elizabeth Hospital
Background/Aims: This study aimed to assess the effect of fat mass and obesity-associated (FTO) genotype on weight loss following dietary, exercise or drug-based intervention in randomized controlled trials (RCTs).

Methods: A systematic review and random effects meta-analysis of individual participant data from RCTs was conducted. Databases were searched between inception and November 2015. RCTs in overweight or obese adults reporting reduction in BMI, body weight, and/or waist circumference (WC) by FTO genotype (rs9939609 or a proxy) following dietary, physical activity or drug-based interventions were included. Gene by treatment interaction models were fit to individual participant data using allele dose coding for genetic effects and a common set of covariates. Study-level interactions were combined using random effect models.

Results: We identified 8 eligible RCTs (n=9563). Overall, differential changes in BMI, body weight and WC in response to weight loss intervention were not significantly different between FTO genotypes. Sensitivity analyses indicated that differential changes in BMI, body weight and WC by FTO genotype did not differ by intervention type, intervention length, ethnicity, sample size, sex and baseline BMI and age category.

Conclusions: We observed that carriage of the FTO minor allele was not associated with differential change in adiposity following weight loss interventions. These findings show that individuals carrying the minor allele respond equally well to dietary, physical activity or drug-based weight loss interventions and thus genetic predisposition to obesity associated with FTO minor allele can be at least partly counteracted through such interventions.

Funding source(s): Deakin University.
UNRAVELLING THE BIOLOGY OF ENTEROENDOCRINE CELLS IN COELIAC DISEASE

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Background/Aims: In coeliac disease (CD), ingestion of gluten is associated with a range of symptoms. It has been hypothesised that these symptoms are due to the release of serotonin. Our lab previously demonstrated that the classification of enteroendocrine cells (EEC) into discrete cells with a single hormone is flawed, as a proportion of serotonin is co-stored with cholecystokinin and/or secretin in the mouse intestine. The aims of this study were to examine if co-storage of serotonin with other hormones occurs in humans and if the numbers/proportions of EEC differed between CD+ and CD- individuals.

Methods: Immunohistochemistry was used to investigate serotonin, cholecystokinin and secretin in duodenal mucosal biopsies from newly diagnosed CD individuals (n=3) in comparison to biopsies from patients with suspected CD diagnosed as CD negative following biopsy (n=3).

Results: Co-storage of secretin with cholecystokinin in human duodenum was confirmed. Incidences of serotonin and secretin/cholecystokinin co-storage was rare in these samples. The number of serotonin, cholecystokinin and secretin single storage EEC/mm² in CD+ and CD- populations were 4.7±5.6, 12.4±4.8, 1.2±1.5 and 4.6±0.5, 17.4±13.6 and 1.4±1.7 respectively. In the CD+ samples 0.8±0.7 cells/mm² contained cholecystokinin(secretin) whereas in CD- samples 6.8±6.5 cell/mm² contained cholecystokinin/secretin.

Conclusions: With the current n’s there was no evidence of a change in serotonin EEC between these 2 populations however another underlying pathology resulting in changes to the serotonin population in the CD- sample cannot be ruled out as these patients were biopsied because CD was suspected.

Funding source(s): N/A
NO EFFECT OF GLUTEN ON ANXIETY AND DEPRESSION IN PATIENTS WITH NCGS, BUT COULD IT BE BRAIN FOG?

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Background: Short-term (3-day) exposure to gluten induced current feelings of depression in patients with non-coeliac gluten sensitivity (NCGS) and might explain why patients 'feel better' on a gluten-free diet (GFD) despite ongoing gastrointestinal symptoms. Aim: To conduct a lengthy examination of gluten on depression.

Methods: Sixteen NCGS participants (mean age 51, 6 male) undertook a double-blind, placebo-controlled, cross-over study. Participants on a GFD were randomly challenged with muesli bars for 14 days, followed by a 14-day washout before crossing over to the alternate challenge. Bars were supplemented with vital wheat gluten 12 g/day or not supplemented (placebo). End-points measured at baseline and day 14 included: (1) gastrointestinal symptoms; (2) State Trait Personality Inventory (STPI); (3) Depression, Anxiety and Stress Scale (DASS); (4) Subtle Cognitive Impairment Test (SCIT; N=6). Linear mixed model analysis was undertaken.

Results: No differences between challenges were found for state depression (mean change 0.69, 95%CI[-2.15-3.53], p=0.61) or anxiety (p=0.93) or, trait anxiety (p=0.47) or depression (p=0.90), nor were there significant changes for STPI outcomes compared with baseline. No differences were observed for DASS indices or gastrointestinal symptoms. Gluten ingestion was associated with slower SCIT response times compared to baseline (43±SEM 16ms, p=0.05) but no differences were seen between baseline and placebo (p=0.29). Response time for gluten was 80 ± 36ms slower than for placebo, but did not reach significance (p=0.14).

Conclusions: Gluten exposure did not induce state depression. Small sample size may have contributed to the lack of observed effect. Preliminary data suggest gluten-specific subtle changes in cognition.

Funding source(s): Andrea Joy Logan; Monash University
BODY WEIGHT AND COMPOSITION CHANGES IN MILITARY PERSONNEL CONSUMING COMBAT RATIONS: A SYSTEMATIC REVIEW

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Background/Aims: Combat rations (CRs) are designed to provide dismounted military personnel with appropriate nutrition. However, consumption of CRs is often sub-optimal, leading to changes in the body weight and body composition of personnel that may adversely affect their performance. This review investigated the effect of continual use of CRs for 3-40 days on the body weight and body composition of military personnel engaged in training or deployment.

Methods: The Preferred Reporting Items for Systematic Reviews and Meta Analyses guidelines were followed. Ten electronic databases were searched from their inception until December 2015. Inclusion criteria comprised military personnel engaged in training or deployment for 3-40 days who consumed solely CRs, or CRs in addition to supplemental or personal food items. The Academy of Nutrition and Dietetics Quality Checklist was used to assess quality and risk of bias. Outcome data was tabulated and described narratively.

Results: Twenty-nine studies undertaken over 3-34 days were included. Changes in body weight and body composition were consistently observed. The most substantial change reported was a mean decrease of ~8.3% body weight during a 12-day period in a US Army Ranger course. Studies were rated positive (n=4), neutral (n=24) or negative (n=1) in quality, with many at risk of bias.

Conclusions: Consuming CRs for periods of 3-34 days results in decreased body weight and alterations to body composition. The impact these changes may have on the health and performance of personnel highlights the importance of routine monitoring of body weight and composition during training and deployment.

Funding source(s): Eliza Tassone worked on the review during a Summer Vacation Placement at DST Group.
LEUCINE SUPPLEMENTATION AND WEIGHT LOSS: A DOUBLE-BLIND RANDOMISED CONTROLLED TRIAL

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Background/Aims: Leucine intake may underscore increased loss of fat mass associated with higher protein and branched chain amino acid intake.

Methods: 37 Australian adults with abdominal obesity plus an additional characteristic of the metabolic syndrome underwent a double-blind placebo controlled weight loss trial. Participants were randomized to receive leucine (LEU, 3 g/d) or placebo (PL, 3 g/d cellulose) capsules for 8 weeks. All participants received individualised diet plans providing 75% of their estimated energy requirements, with restrictions on foods rich in leucine content (~3 g/d). Each participant was measured for detailed body composition, and compliance every 2 weeks until the end of supplementation. Change (post minus pre) in variables of interest were tested by multivariate ANOVA with intervention as between-subject factor. Changes in regional body composition were further adjusted for changes in fat mass (FM) and fat free mass (FFM) from DEXA (Prodigy, Lunar Corp. USA).

Results: On an intention to treat analysis, changes in DEXA weight (mean ±SEM, kg) (LEU: -3.4±0.78 vs. PL: -4.3±0.75, p=0.404), FM (LEU: -2.65±0.59 vs. PL: -3.10±0.57, p=0.583) and FFM (LEU: -0.733±0.42 vs. PL: -1.19±0.41, p=0.443) were similar. Changes in waist circumference (cm) (LEU: -5.42±1.10 vs. PL: -4.71±1.07, p=0.644), appendicular lean mass (kg) (LEU: 0.41±0.35 vs. PL: -0.22±0.34, p=0.197) and android-gynoid (AG) ratio (LEU: -0.01±0.03 vs. PL: -0.03±0.03, p=0.585) were also not different. Analysis of completers and compliers did not change these outcomes.

Conclusion: Leucine intake (3 g/d) did not accentuate loss of body composition and its distribution over caloric restriction.

Funding Source: School of Public Health, Curtin University
FOOD SUPPLEMENTATION RESULTS IN GREATER WEIGHT LOSS IN RANDOMISED CONTROLLED DIEATARY TRIALS: A META-ANALYSIS

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Background/Aims: Dietary trials provide evidence for practice and policy guidelines but poor adherence may confound results. Food supplementation may improve adherence to dietary interventions yet the impact of food supplementation on study outcomes is not known. This study aimed to examine the impact of food supplementation on weight loss in dietary intervention trials.

Methods: Following a systematic literature search using Scopus, PubMed and the Cochrane Library databases (January 2004 - March 2015), dietary intervention trials which involved the provision of food to at least one study group and reported weight change were included. Eligible studies were classified into two groups: "food versus no food" (only intervention groups received food) and "food versus food" (all subjects received food). Random effects meta-analyses were performed by categorising the studies according to dietary intervention provided.

Results: A significant weight reduction was reported following food supplementation in the food versus no food studies (n=12) (WMD:-0.74kg [95% CI -1.40,-0.08] p=0.03). A non-significant weight increase was found in the food versus food studies (n=4) (WMD:+0.84kg [95%CI -0.60,2.27] p=0.25). Pooled results found non-significant weight loss overall (WMD:-0.57kg [95% CI -1.17,0.03] p=0.06). Significant substantial heterogeneity was noted between the two sets of studies (p=0.05, I²=73.9%)

Conclusions: Food supplementation appeared to result in greater weight loss in dietary intervention trials.

Funding source(s): N/A
DIETARY NITRATE SUPPLEMENTATION ON ENDURANCE EXERCISE PERFORMANCE IN HEALTHY ADULTS: SYSTEMATIC REVIEW AND META-ANALYSIS

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Background/Aims: The use of dietary nitrates has become more popular amongst athletes attempting to enhance performance. The objective of this systematic review and meta-analysis was to evaluate the effect of dietary nitrate (NO₃⁻) supplementation on endurance exercise performance.

Methods: Relevant databases, Cochrane Library, Embase, PubMed, Ovid, Scopus and Web of Science were searched from inception to October 2015. Studies were included if a placebo versus dietary nitrate-only supplementation protocol was able to be compared, and if quantifiable measures of exercise performance was ≥ 30 seconds (for a single bout of exercise or the combined total for multiple bouts).

Results: Data from the 76 trials was extracted for inclusion in the meta-analysis. A fixed-effects meta-analysis was conducted for time trial (TT) (n = 28), and time to exhaustion (TTE) (n = 22). Pooled analysis identified a trivial, but NS effect in favour of dietary NO₃⁻ supplementation for TT (effect size (ES) = -0.10, 95% CI = -0.27-0.06, p > 0.05). TTE trials had a small to moderate statistically significant effect in favour of dietary NO₃⁻ supplementation (ES = 0.33, 95% CI = 0.15-0.50, p < 0.01). No significant heterogeneity was detected in the meta-analysis.

Conclusions: Dietary NO₃⁻ supplementation is likely to elicit a positive outcome when testing endurance exercise capacity, but likely to be less effective for time-trial performance. Future research should assess optimal dosing strategies, which population is most likely to benefit, and under which conditions dietary nitrates are likely to be most effective for performance.

Funding source(s): N/A
POTENTIAL EFFECTS OF ANTI-NUTRITIONAL FACTORS IN FORTIFIED NUT- AND SEED-BASED BEVERAGES

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Background/Aims: Anti-nutritional factors (ANFs) are substances in food that may reduce intake, digestion, absorption, and utilization of nutrients. This study aims to determine which ANFs may be present in fortified nut- or seed-based beverages and whether they could bind to added micronutrients and prevent or reduce their absorption.

Methods: ANF content in nuts and seeds were determined from published literature sources. ANF intakes from nut- and seed-based beverages were estimated using the reported ANF content, the weight percentage of nuts or seeds in the beverage, and mean consumption of these beverages as reported in the 2011-13 Australian Health Survey. The potential impact on micronutrient status was considered for beverages containing the highest amounts of ANF as a worst-case scenario and comparing to ANF intake from other foods or calculating potential chelation of added minerals on a molar basis.

Results: Phytate and oxalate were identified to be the only ANFs that could interfere with micronutrient absorption (calcium) with highest amounts present in almond-based beverages. The estimated phytate intake from almond-based beverages was 36 mg/day which was small compared to the phytate intake from a serving of a high fibre breakfast cereal (515 mg/day). The estimated oxalate intake from an almond-based beverage was 15 mg/day. On a molar basis, this amount potentially binds to less than 2% of the total calcium contained in almond-based beverage.

Conclusions: This study showed that ANFs present in fortified nut- and seed-based beverages are unlikely to impact appreciably on the absorption of added micronutrients.

Funding source(s): N/A
Background/Aims: Encapsulated coffee (Pods) are increasingly popular, yet little information on their caffeine content exists. This study quantified the caffeine content of the Nespresso® coffee pod range.

Methods: Initially, three serve sizes (ristretto (S), espresso (M), lungo(L)) of two pod varieties (Livanto and Roma) were prepared on three different Nespresso® machines (2 x U-Delonghi (one old (old), one new (new)), 1 x new Lattissima Pro (alternate)) using pods derived from two different batches (sleeves). In addition, one pod variety was prepared 8 times (same machine and serve size). Average caffeine content was then determined via triplicate samples using high-performance liquid chromatography. The CV of caffeine within a single pod was established and differences in caffeine content associated with serve size, machine or sleeve were determined via ANOVA or paired sample t-tests. Subsequently, the caffeine content from two serve sizes (S and L) from the remaining Nespresso® range (prepared by one machine) was established.

Results: Coffee preparation via different machines or pods from different sleeves did not influence the caffeine content (old=63±13, new=60±8, alternate=60±10 mg·serve⁻¹; p=0.537, sleeveA=63±11, sleeveB=59±9 mg·serve⁻¹; p=0.134). Less caffeine was delivered in S (51±7 mg·serve⁻¹) compared to M & L (66±7 and 66±10 mg·serve⁻¹, respectively). Substantial variation in caffeine content within a single pod variety was observed (range 25-71 mg·serve⁻¹, CV 38%). Caffeine derived from all varieties ranged from 19-147 mg·serve⁻¹ (Mean L sizes = 75±29 mg·serve⁻¹).

Conclusions: Nespresso® consumers are exposed to variable amounts of caffeine and should not rely on pod “intensity” to forecast the caffeine dose.

Funding source(s): Griffith University Internal Funding.
CONSUMPTION OF SMOOTHIES OR TRADITIONAL BREAKFAST FOODS: IMPACT ON SUBSEQUENT DIETARY INTAKE - A PILOT STUDY

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Background/Aims: Smoothies are often promoted as healthy breakfast alternatives. However, smoothies can vary considerably in their energy density. This study examined satiety and subsequent energy intake following consumption of different smoothies (two energy densities) compared to a cereal breakfast.

Methods: Ten participants (n=5 female, 23.3±1.1kg·m⁻², mean±SEM) attended the laboratory on three consecutive mornings·week⁻¹, for three-weeks. Participants received one of three test-meals each week; cereal and milk, CM; smoothie, S; or high energy-density smoothie, HED-S. Initially, all breakfasts were energy-matched to participant’s usual breakfast intake (1675±283KJ). Maltodextrin was then covertly added to the HED-S to provide an additional 20% of the recipients’ daily energy requirements (1344±542KJ). Protein, fat, fibre, and water content were matched for all test meals. Following breakfast, participants were required to photograph and record all food and fluid items consumed for the subsequent 24-hours. All dietary intake data was analysed by three dietitians using Foodworks® dietary analysis software (CV=11%). Differences between trials were analysed using one-way ANOVA.

Results: Mean daily EI was similar (p>0.05) on CM (7894±547KJ) and S trials (7570±463KJ). Mean daily EI for HED-S (8861±726KJ) was higher than CM and S trials (p<0.05). Satiety ratings immediately post-breakfast were similar across trials (p>0.05).

Conclusion: Participants failed to offset the additional calories consumed over a three-day period when provided with an energy dense breakfast smoothie. While smoothies may offer an alternative approach to increasing dietary fruit and vegetable intake, consumers’ interested in weight management should be cautious of energy dense formulations.

Funding source(s): N/A.
PLASMA ZINC IS LOWER IN ATHLETES COMPARED TO NON-ATHLETES - A SYSTEMATIC REVIEW

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Background/Aims: Zinc is an essential micronutrient in humans, and has vital roles in physical exertion. While it is postulated that athletes have increased zinc requirements, the current evidence is limited. The aim of this systematic review is to determine the zinc status of athletes, compared to healthy non-athletes.

Methods: We conducted a systematic review of peer-reviewed papers published up to 28th January 2016 to identify cross-sectional studies that investigated the zinc status of athletes, compared to non-athlete controls, using one or more zinc biomarkers.

Results: Sixteen studies (n = 1374 athletes, 670 controls) were eligible for inclusion. Fifteen out of 19 athletic groups had lower mean plasma zinc concentrations compared to non-athletes. Twelve out of 15 athletic groups had higher mean dietary zinc intakes compared to non-athletes. Of the 13 athletic groups that assessed plasma zinc and dietary zinc simultaneously, higher dietary zinc intake and lower plasma zinc concentrations were observed in 12 comparisons.

Conclusions: Plasma zinc concentrations are lower in athletes and appear to be independent of dietary zinc intake, suggesting differences in dietary zinc requirements for athletes and/or exercise-induced alterations in zinc homeostasis.

Funding source(s): N/A
ZINC STATUS AND RISK OF CARDIOVASCULAR DISEASES AND TYPE 2 DIABETES MELLITUS - A SYSTEMATIC REVIEW OF COHORT STUDIES

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Background/Aims: Zinc is an essential trace element with proposed therapeutic effects in cardiovascular diseases (CVD) and Type 2 diabetes mellitus (T2DM). The current review aims to determine the relationship between zinc intake or plasma/serum zinc levels and prospective incidence of CVD and T2DM.

Methods: We conducted a systematic review of peer-reviewed papers published up to May 2015 to identify prospective cohort studies that investigated the relationships between zinc status and risks of CVD and T2DM.

Results: Twelve papers describing prospective cohort studies were included, reporting either CVD (n = 91,708) and/or T2DM (n = 328,207) outcomes. Overall analyses from 4 out of 5 studies reported no significant association between zinc intake and CVD events, when adjusted for multiple variables. Serum zinc level was inversely associated with risk of CVD in 3 of 5 studies (mean of 10-37% increased CVD risk in lowest quartile of serum zinc), with significant effects observed in populations with T2DM and patients referred to coronary angiography. Two studies reported protective effects of dietary zinc on T2DM incidences (mean of 8-50% decreased T2DM risk in the highest quintile of dietary zinc), while the two remaining studies reported no association.

Conclusions: Inconclusive evidence is available to determine the relationship between zinc status and T2DM risk; limited evidence suggests protective effects of zinc on CVD risk. Further investigations are required prior to the establishment of dietary zinc recommendations for the prevention of CVD and T2DM.

Funding source(s): N/A
DEVELOPMENT OF A REFERENCE DATABASE FOR ASSESSING DIETARY NITRATE IN VEGETABLES

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Background/Aims: Dietary nitrate found in green leafy vegetables and beetroot increases nitric oxide with concomitant improvements in markers of vascular health. Whether this translates into improved long term health outcomes has yet to be investigated in observational studies. To enable the reliable estimate of nitrate intake from food records a comprehensive nitrate content of vegetables database providing information on biological, environmental/ agricultural and processing factors as well as analytical methods is needed.

Methods: A literature search (1980-2016) was conducted according to the PRISMA 2009 statement using Medline, Agricola and CAB abstracts databases. Vegetable, sampling, measurement and publication information were collected. The influence of growing method, season and cultivar on the nitrate content of lettuce was assessed using appropriate regression analysis.

Results: The database contains 4254 records sourced from 256 publications and includes data on 178 vegetables as well as 22 herbs and spices. The median nitrate content (mg/kg fresh weight (FW)) of individual vegetables with ≥3 publications ranged from Chinese flat cabbage (median; range: 4240; 3004-6310 mg/kg FW) to corn (median; range: 12; 5-1091 mg/kg FW). The median nitrate content of lettuce differed significantly (P<0.001) between organically or conventionally grown; undercover or open air and across seasons.

Conclusions: This comprehensive nitrate database allows quantification of dietary nitrate from a large variety of vegetables. This will allow investigators for the first time to examine the association between nitrate intake and health outcomes in large epidemiological studies.

Funding source(s): NHMRC
Background/Aims: Many attempts have been made to improve the quality and stability of meat products such as beef burgers. Consumer demand for fast food has continued to increase in recent years. However, epidemiological research has demonstrated a relationship between this type of diet and a lack of dietary fibre and the increase of diseases related to the metabolic syndrome. Sugar cane fibre (sucrose removed) was used as a dietary fibre in beef burger formulations. The effects of sugar cane fibre (SCF) addition on cook yield, dimensional changes and sensory characteristics were evaluated.

Methods: SCF was included in burgers at 1, 2, 3, 4 and 5% with differing amounts of water (0, 5, 10 and 15%). Water and oil binding capacity of SCF was determined. Cook loss, diameter reduction, thickness increase and cook yield of the burgers was determine. Sensory analysis was conducted by 14 trained panellists recruited among staff from The University of Queensland and the Australian Catholic University and a balanced design was used.

Results: Control burgers lost 22.6 ± 0.4% of weight due to cooking. Replacing beef with 1 to 5% SCF in burgers without extra water significantly reduced cook losses from 19.5 ± 1.0, to 8.6 ± 0.3% respectively due to its high water-binding capacity of 5.89 ± 0.08 g/g and oil-binding capacity of 4.68 ± 0.03 g/g.

Conclusions: Burgers with 1% SCF had the highest overall acceptability. The inclusion of SCF improved cooking properties by increasing cook yield and decreasing shrinkage whilst improving sensory characteristics.

Funding source(s): KFSU Ltd
POSTPRANDIAL GLUCOSE, INSULIN AND GUT PEPTIDE RESPONSES TO SOLUBLE DIETARY FIBRES ARABINOXYLAN AND BETA-GLUCAN IN GROWER PIGS

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Background/Aims: Soluble dietary fibre (SDF) consumption is associated with improved glucose tolerance in humans and human animal models, however, the effects on glucose tolerance in pigs adapted to diets with combined SDF have rarely been studied. In this experiment, cereal SDF wheat arabinoxylan (AX) and oat β-glucan (BG) were fed individually and combined to determine the effect on glucose tolerance in jugular vein catheterized grower pigs.

Methods: Thirty Large White grower pigs were fed diets containing either 10% wheat arabinoxylan (AX), 10% oat beta-glucan (BG), 5% AX with 5% BG, a model cereal whole wheat flour (WWF) or a control wheat starch (WS) with no SDF. Jugular vein blood was collected via catheters over 240 minutes following a feed and an oral glucose tolerance test (OGTT) on two separate days. Blood samples were used to determine plasma glucose, insulin, glucose-dependent insulino tropic polypeptide (GIP), glucagon-like peptide-1 (GLP-1) and peptide tyrosine tyrosine (PYY) concentrations.

Results: Following the feed and OGTT, AXBG delayed peak plasma insulin (45min postprandial) compared with WS, AX, BG and WWF (30min postprandial). After the feed, BG lowered the insulin response (area under the curve (AUC)) compared with WS. Subsequent the OGTT, BG and AXBG induced a lower total insulin response (AUC). AXBG decreased total plasma GIP ($P=0.014$) and PYY ($P=0.044$) compared with WS (AUC).

Conclusions: Combining cereal SDF AX and BG may alter carbohydrate digestion and attenuate subsequent glycaemic responses, likely mediated by altered physico-chemical properties of the diet.

Funding source(s): ARC COE in Plant Cell Walls
EFFECTS OF ANTI-HYPERTENSIVE PEPTIDES RELEASED FROM YOGURT FERMENTED BY LACTOBACILLUS HELVETICUS AND FLAVOURZYMEE

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Background/Aims: Angiotensin-converting enzyme inhibitory (ACE-I) peptides produced from food proteins via bioprocesses are receiving special attention as these peptides play a significant role in preventing hypertension and cardiovascular diseases. The present study investigated the effects of fermentation conditions on the production of ACE-I peptide in yogurt by Lactobacillus helveticus (L. helveticus) in the presence or absence of Flavourzyme.

Methods: For the production of higher ACE-I peptide from the yogurt, the optimal inoculation rates and fermentation time were determined. Peptides extracted from yogurt with different supplements were profiled using a reversed-phase HPLC. Several fractions of ACE-I peptide were separated using the preparative RP-HPLC to evaluate their ACE-I activity.

Results: Optimal conditions for peptides with the highest ACE-I activity were 4% (v/w) inoculum size for 8 h without Flavourzyme, and 1% inoculum size for 12 h with Flavourzyme. The yogurt fermented by L. helveticus resulted in 1.47 ± 0.04 and 16.91 ± 0.25 mg/mL of IC50 values with and without Flavourzyme, respectively. Seven fractions of ACE-I peptide from the yogurt incorporated with L. helveticus and Flavourzyme were separated. Fraction (F3) showed the highest ACE-I activity with an IC50 of 35.75 ± 5.48 μg/mL.

Conclusions: This study indicates that yogurt may be a valuable source of ACE-I peptides, which may explain the outcomes observed in the experimental and clinical studies, and foresee the application of fermented milk proteins into functional foods or dietary supplements.

Funding source(s): N/A
CHARACTERISATION OF HONEYS AVAILABLE TO AUSTRALIAN CONSUMERS

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Background/Aims: Recent revisions to dietary guidelines with respect to sugar/s have resulted in increased scrutiny of Australian consumers’ intake of sugars. In the past the focus was largely centred on the per capita intake of sucrose, that later expanded to include corn and wheat syrups. Lately the emphasis has been on the fructose fractions of sugars in our diets. There is more to honey than fractions of fructose and glucose, reflected in its broad range of culinary, nutritional, and medicinal applications.

Gastronomic classifications of honey include: artisan, storied, regional, heritage, symbolic, totemic, ritual, whole, functional, medicinal, and wild food. Are there substantive differences between honey and sucrose?

Methods: Science Direct and Web of Science databases were interrogated to characterise some of the honeys available to Australian consumers.

Results: Hundreds of analytes were identified, and their functional implications elucidated, often using a concatenation of techniques.

Conclusions: Honey is probably the most complex food Australians consume. Functionalities continue to emerge, due to the large number of studies being undertaken domestically and globally. There are more than hedonic motivations for consumption of this important food.

Funding source(s):
RELATIVE DIFFERENCES IN GLYCEMIC INDEX AND INSULIN INDEX OF TWO POTATO CULTIVARS ARE MAINTAINED IN MIXED MEALS

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Background/Aims: A criticism of ranking the physiological impact of carbohydrate foods using the glycemic index (GI) is that differences in GI between individual foods may not be maintained in the context of mixed meals.

Methods: Ten healthy adults (age: 28.3 ± 9.9 y, BMI: 22.6 ± 2.0 kg/m²) consumed four test meals and three reference glucose solutions, containing 25 g available carbohydrate, in a randomised, crossover study following the standardised GI testing methodology (ISO 26642:2010). The four test meals were boiled Carisma or Desiree potatoes consumed with and without 20 g cheese. Capillary blood samples were analysed for glucose and insulin concentrations, and GI and insulin index (II) values were calculated.

Results: The Carisma potato produced significantly lower GI and II values than the Desiree potato (GI: 58 ± 3 vs 79 ± 5, II: 60 ± 4 vs 80 ± 5, both p<0.001). The relative difference in GI was maintained when the potatoes were consumed with cheese (Carisma + Cheese: 50 ± 3 vs Desiree + Cheese: 75 ± 5 vs Desiree + Cheese: 99 ± 6, p<0.001).

Conclusions: Irrespective of potato cultivar, the addition of cheese caused a similar decrease in GI (~14%) and similar increase in II (~20%). The relative GI and II rankings of two potato cultivars are maintained when consumed with additional protein and fat, in the form of cheese.

Funding source(s): Internally funded
FSANZ RISK ASSESSMENT OF PHYTOSANITARY FOOD IRRADIATION OF SELECTED FRUITS AND VEGETABLES

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**Background/Aims:** There is a technological (phytosanitary) need to irradiate certain fruits and vegetables as a quarantine measure for the control of fruit fly and other insect pests within the dose range of 0.15 kGy to 1kGy.

**Methods:** FSANZ takes a risk assessment based approach to assess potential toxicological hazard and nutritional adequacy of consumption of irradiated fruit and vegetables for Australian and New Zealand populations. Factors such as baseline nutrient composition, ripening changes, impact of processing and handling as well as dietary intake considerations need to be considered to assess potential effects of irradiation.

**Results:** FSANZ established that a relatively small number of nutrients are sensitive to irradiation with vitamins A, C, E and thiamine being the most sensitive. Review of the impact of irradiation showed no effect on carotene levels, no decrease in vitamin C in the majority of fruits and vegetables and little effect on other non-vitamin bioactive compounds.

**Conclusions:** FSANZ has undertaken risk assessments of irradiation of a range of tropical fruits, persimmons, tomatoes and capsicums and a number of additional fruits and vegetables including apples, apricots, cherries, melons, nectarines, peaches, plums, strawberries, table grapes, zucchini and squash. We are currently assessing raspberries and blueberries. The conclusion is that there are no health and safety concerns associated with the consumption of the specific foods when irradiated at the proposed maximum doses.

**Funding source(s):** N/A
THE ACUTE EFFECTS OF QUERCETIN-3-O-
GLUCOSIDE ON ENDOTHELIAL FUNCTION AND BLOOD PRESSURE: A RANDOMISED DOSE RESPONSE STUDY

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Background/Aims: Epidemiological studies suggest that a flavonoid-rich diet can reduce the risk of developing cardiovascular disease. The flavonoid quercetin in particular has been shown to ameliorate endothelial dysfunction and reduce blood pressure, possibly by increasing the bioavailability nitric oxide (NO). The aim of this study was to determine if acute administration of increasing doses quercetin-3-O-glucoside improved endothelial function and reduced blood pressure (BP) in a dose-dependent manner. We also explored whether any effects correlated with changes in plasma NO production.

Methods: A randomized controlled crossover study was performed in fifteen healthy volunteers who each completed five visits with a minimum washout period of 1 week in between. Participants received each of the interventions in a random order: (i) 0 mg, (ii) 50 mg, (iii) 100 mg, (iv) 200 mg or (v) 400 mg quercetin-3-O-glucoside. Endothelial function and blood pressure were assessed before and 60 min post-intervention. A blood sample was taken before and 90 min post-intervention for analysis of plasma nitrate, nitrite and quercetin metabolites.

Results: Although we observed a significant correlation between dose of quercetin-3-O-glucoside and plasma concentrations of total quercetin (R^2=0.52, p<0.001) and isorhamnetin (R^2=0.12, p=0.005), we found no improvements in endothelial function or BP and no changes in NO production after any dose.

Conclusions: From these results, we conclude that there were no acute changes in BP or NO-mediated endothelium-dependent relaxation of the brachial artery with doses of quercetin ranging from 50 mg to 400 mg in a group of healthy men and women.

Funding source(s): NHMRC
EQUIPPING EMERGING NUTRITION LEADERS WITH CAPACITY TO WORK TOWARDS FOOD AND NUTRITION SECURITY IN OCEANIA

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Background/Aims: Leadership and ability to communicate and collaborate are critical skills needed to build a strong nutrition workforce. The Oceanic Nutrition Leadership Program (ONLP) was developed with the vision and mission of "working together towards sustainable food and nutrition security for Oceania by developing, inspiring and connecting a new generation of visionary leaders in nutrition".

Methods: Applicants (19 female, 3 male) from five countries across Oceania were selected by an independent committee for the inaugural ONLP course. Participants represented academia/research (50%), industry (9%), hospital/health service (14%), Government (23%) and non-government (4%) sectors. The program focused on leadership, communication, team-building, networking, policy, social responsibility and trans-disciplinary approaches to solving "wicked" problems. Learning experiences were enhanced by experiential learning through team and committee activities, case-studies and real-life experiences shared by nutrition leaders. A post-program evaluation assessed participant satisfaction using a scale from 1 (dissatisfied) to 4 (completely satisfied).

Results: Of the 16 participants (73%) who completed the evaluation, the majority of participants reported they were completely satisfied (62%) with the course with no participants dissatisfied. Furthermore, the course met expectations for 75% of the cohort. A networking strategy, that employed social media, was established, and a declaration of intent was sanctioned.

Conclusions: The ONLP was successful in establishing a strong network that has the capacity to positively influence food systems in Oceania by empowering emerging nutrition leaders to collaborate and raise awareness of sustainable, evidence-based approaches to improving our food environment.

Funding source(s): NSA, Fonterra, International Union of Nutrition Scientists, Australian Nutrition Trust Fund, Simplot, Massey University, CSIRO
A NEW MEASUREMENT AID - THE INTERNATIONAL FOOD PORTION SIZE UNIT CAN IMPROVE PORTION SIZE ESTIMATION

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Background/Aims: Portion size interventions, aids and education can be effective in helping prevent weight gain, but consumers are unsure what appropriate portions are and express confusion about existing guidelines. A lack of clarity about suggested serving size recommendations is a major barrier to food portion size control. Visual cues are an important mediator of portion size estimation, but standardised measurement units and clear terminologies are required. The International Food Unit (IFU) is a 4x4x4 cm cube (64cm$^3$) which, was developed to address some of the limitations with existing aids. We tested the performance of this new measurement aid.

Methods: Randomized between-subjects experiment; n=128 adults (66 men) estimated 17 food portions using 1) 'no aid' (control), 2) the 'IFU', 3) a 'play dough IFU' or 4) a 'measuring cup'. Estimation errors were compared between groups using Kruskall-Wallis tests and post-hoc comparisons.

Results: Overall, the estimation errors differed between groups (H(3)=22.62, p<.001) and were smallest in the group using the IFU as estimation aid (Mdn=18.9%, IQR=50.2). Compared with the measuring cup, the estimation errors using the IFU were significantly smaller for 12 and similar for five foods.

Conclusions: The IFU has the potential to improve estimation of food volumes. Further studies are needed to investigate whether portion size estimations made using the IFU are effective and sustainable in the absence of the aid. A 3-dimensional IFU could serve as a reference object for automatic food volume estimation with smartphones in the future.

Funding source(s): Priority Research Centre for Physical Activity and Nutrition
WHAT ARE THE EXPERIENCES AND BARRIERS NUTRITION EDUCATORS FACE IN COMMUNICATING SERVING SIZE RECOMMENDATIONS?

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Background/Aims: The high prevalence of obesity and related chronic diseases has been associated with the consumption of large portion sizes of food that exceed government serving size (SS) recommendations. This qualitative study explored nutrition educator's experiences when communicating SS recommendations and use of portion size estimation aids (PSEAs).

Methods: One-on-one semi-structured interviews were conducted with nutrition educators (n=11) experienced in educating clients about SS, including dietitians and health promotion practitioners from a range of settings. Interview questions explored client backgrounds, experiences of nutrition educators communicating SS concepts, education strategies utilised and educators' opinions on PSEAs. Interviews were professionally transcribed and inductive thematic analysis was employed.

Results: Three themes emerged: perceived barriers for clients following SS guidance, educational techniques utilised and overall experiences using PSEAs. Perceived barriers included client motivation, English not as the first language, literacy and resistance to altering portion sizes. Strategies such as individualised education that considered client interests and literacy, using PSEAs and focussing on SS for a limited number of foods were believed to be effective. Overall educators preferred visual PSEAs (e.g. photographs and pamphlets) as they were considered to be easy to understand, particularly for low literacy and culturally diverse clients, and something clients could refer to outside of their sessions.

Conclusions: Education strategies were not consistently used by nutrition educators from particular settings. Future research should investigate client preferences and strategies which overcome barriers in consuming recommended SS.

Funding source(s): N/A
INFANT FEEDING, GROWTH TRAJECTORIES IN CHILDHOOD AND BODY COMPOSITION IN ADULTHOOD

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Background/Aims: Growth patterns of breast-fed and formula-fed infants may differ, with formula-fed growing more rapidly than breast-fed. Our objectives were to identify growth trajectories and determine the effect of infant feeding on these trajectories to six years and body composition in adulthood.

Methods: The West Australian Pregnancy Cohort (RAINE) Study and three European cohort studies (European Childhood Obesity Trial Study), HUMIS (Norwegian Human Milk Study), Prevent CD (Coeliac Disease) collaborating in the European-Union funded Early Nutrition project collected data on full breastfeeding, anthropology, body composition and other characteristics. Latent growth mixture modelling identified trajectory classes from 6708 participating children. Full breastfeeding <3 months compared to 3+ months was assessed on the trajectory classes by logistic regression, and alterations in body composition at six and 20 years were tested by ANOVA.

Results: Three BMI-trajectories were identified and labelled: Class 1: Persistent, accelerating rapid growth (5%); Class 2: Early, non-persistent rapid growth (40%); and Class 3: Normative growth (55%). Following adjustment for predictors, a shorter duration of full breastfeeding (<3 months) was significantly associated with rapid growth trajectory class 1 (OR: 2.75 95% CI 1.53-4.95) and 2 (OR: 1.97 95% CI 1.52-2.55). Both classes continued to show significant associations with greater body composition at six and 20 years.

Conclusions: Full breastfeeding of <3 months compared to 3+ months increases the risk of rapid growth to six years impacting body composition into adulthood. Rapid growth in childhood may link infant feeding type to long-term obesity risk.

Funding source(s): Acknowledgments are extended to NHMRC funded participation (EU-NHMRC collaborative project ID#1037966) in the European Union project 'Long-term effects of early nutrition on later health' FP7-289346- EarlyNutrition, Project Coordinator: Ludwig- Maximilian's-University Munich, Germany, Project Director: Prof Dr B Koletzko. The research leading to these results has received funding from project Early Nutrition.
A COMPARISON OF SUGAR COMPOSITION IN POPULAR SOFT DRINKS IN AUSTRALIA, EUROPE AND THE USA

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Background/Aims: Soft drink sweetening agents around the world (fructose, glucose and sucrose), activate distinct metabolic pathways that impact on glycaemic control. We compared the composition of sugars in four popular soft drinks currently sold in Australia, Europe and the USA.

Methods: Soft drinks marketed under the same trade name (Fanta®, Pepsi®, Coca-Cola® and Sprite®) in Australia, Europe and the USA were analysed by an independent, certified laboratory (National Measurement Institute, Australia) for sugar content using high-performance liquid chromatography. Total fructose and glucose concentrations (final monosaccharide) were calculated accounting for these sugars within sucrose.

Results: On average, Australian formulations contained 20.4% more glucose and 10.6% less fructose per 100mL than USA formulations. European formulations were generally similar in total glucose and fructose concentration to those of Australia.

Conclusions: Australian soft drink formulations contain higher concentrations of total glucose (predominantly within sucrose) whereas those in the USA have greater amounts of total fructose. These findings have implications for glycaemic responses to soft drink consumption.

Funding source(s): NHMRC
BREAKS IN SITTING MAY AUGMENT REDUCTIONS IN POSTPRANDIAL GLUCOSE AND INSULIN RESPONSES VIA ELEVATIONS IN ENERGY EXPENDITURE

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Background/Aims: Frequent interruptions (or breaks) in sitting are beneficially associated with cardio-metabolic risk markers. However, the impact of different break modalities on metabolic parameters are unknown. We explored whether there is a dose-dependent lowering of postprandial blood glucose and insulin responses with increasing energy cost of different sitting break modalities.

Methods: Original data was pooled from three randomised crossover laboratory-based trials comparing the acute effects of prolonged sitting with sitting interrupted every 20 minutes with 2-minute bouts of either standing, light-, or moderate-intensity walking. As cohort characteristics (overweight/obese, sedentary), meal, and break frequency and duration were replicated across trials, we explored the relationship between postprandial glucose incremental area under the curve (iAUC) and formula-derived estimations (using Metabolic Equivalent of Task values) of energy expenditure (EE) with the different break modalities for nine individuals who participated in more than one trial. Random effects mixed models were used to explore within-individual correlation patterns, adjusting for age, sex and body mass index.

Results: Postprandial glucose iAUC was greatest for the sitting condition [7.14±1.26 mmol.hr.l⁻¹ (Mean±SEM)] and decreased across the standing, light-intensity walking and moderate-intensity walking conditions (6.72 ± 1.86, 5.13 ± 1.25, and 3.49 ± 0.47 mmol.hr.l⁻¹, respectively). Glucose iAUC and insulin iAUC were negatively associated with estimated EE [unstandardised coefficient (glucose) = -7.84mmol.hr.l⁻¹MJ⁻¹, P=0.02; unstandardised coefficient (insulin) = -1.24pmol.hr.l⁻¹.kJ⁻¹, P=0.03].

Conclusions: Among overweight/obese individuals, frequent brief interruptions to sitting of different intensities may lower postprandial glucose and insulin concentrations in a dose-dependent manner, via increased energy expenditure.

Funding source(s): NHMRC funding
UTILISATION OF A NEW COMPREHENSIVE DATABASE TO INVESTIGATE ANTI-INFLAMMATORY EFFECTS OF OLIVE PHENOLICS

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Background/Aims: Extracts from *Olea Europaea* possess potent anti-inflammatory effects however, the molecular mechanisms remain controversial. Our aims were to: 1) develop a database, with chemical and biological details for ~700 compounds detected in *Olea*, 2) utilise this new resource for *in silico* modelling to identify potential bioactive compounds, and 3) perform *in vitro* validation experiments to further clarify molecular mechanisms of action.

Methods: Having developed the *Olea* database, we investigated potential interactions of olive phenolics with the key inflammation-modulating cyclooxygenase enzymes, COX-1 and COX-2 using *in silico* docking and dynamic simulations. Further, findings for selected compounds were validated for COX inhibitory activity using *in vitro* biochemical assays and for enzymatic activity in cell culture systems.

Results: On the basis of an *in silico* docking screen, using a series of controls, including the non-steroidal anti-inflammatory compounds aspirin and ibuprofen, to create standard curves, we have ranked over 200 olive phenolics for binding affinity to COX-1 and -2 enzymes. Dynamic simulations (20-100 ns) indicated that top ranking bioactive compounds including oleocanthal (42.4 and 30.4kcal/mol for COX-1 and -2, respectively) and novel 1-oleetyrosol (~50.9 and ~49.7 kcal/mol) and ligostride derivative 2 (~48.2 and ~43.7kcal/mol) bind in the active site of COX-1 and -2 in a manner analogous to that for aspirin and ibuprofen.

Conclusions: We have identified novel *Olea*-derived phenolic compounds with potential anti-inflammatory activity and more generally, our overall findings provide new molecular insights highlighting the complexities associated with the anti-inflammatory effects of olive phenolics.

Funding source(s): McCord Research, Coralville, Iowa, USA
BINDING OF EXOGENOUS POLYPHENOLS TO INTACT POTATO CELLS AND INDIVIDUAL CELL COMPONENTS

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Background/Aims: The bioavailability of polyphenols largely depends on their interaction with food components including entrapment in food matrices. In the present work, we investigated the mechanism and extent of binding of three major dietary phenolic compounds (catechin, ferulic acid and rutin) to model food systems, viz. intact isolated cells, cell walls (dietary fibre) and starch granules from potato tubers, to gain understanding of the interactions taking place when polyphenols are consumed within plant-based foods.

Methods: Potato cells were isolated using mild acid (0.05N HCl) and alkali (0.025N NaOH) solutions. Potato cell walls (dietary fibre) and starch granules were isolated by mechanical disruption of cells followed by selective sieving. The binding capacity of polyphenols was assessed spectrophotometrically by solution depletion after incubation in the presence of each substrate at different concentrations and time intervals. Confocal laser scanning microscopy was further used to confirm the presence and location of binding.

Results: Significant, concentration and time-dependent amounts of polyphenols bound to both potato cells and individual cell components (cell walls and starch granules) in comparable amounts, with catechin exhibiting the greatest binding affinity (>20 µmol/g). Interestingly, the polyphenols were capable of penetrating the cell wall barrier and binding to the starch granules inside intact potato cells, showing the potential of intact plant cells to encapsulate bio-active polyphenols.

Conclusions: The current results define the role of plant cell components as carriers for polyphenols, which could have potential health implications as well as industrial applications.

Funding source(s): The Spanish Ministry of Economy and Competitiveness, and ARC Centre of Excellence in Plant Cell Walls.
THE EFFECT OF A LOW-FAT, PLANT-BASED LIFESTYLE INTERVENTION (CHIP) ON SERUM HDL SUBFRACTION LEVELS - A COHORT STUDY.

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Background/Aims: Low levels of HDL are considered an important risk factor for CVD. Lifestyle interventions promoting a low-fat, plant-based eating pattern appear to reduce cardiovascular risk while paradoxically also reducing HDL levels. Recent studies have shown HDL to comprise a range of subfractions, but the role these play in ameliorating the risk of CVD is unclear. The purpose of this study was to characterize potential differences in changes in HDL subfractions in individuals participating in the Complete Health Improvement Program (CHIP) lifestyle intervention.

Methods: Individuals participating in a CHIP intervention were assessed at baseline and 30 days for changes in BMI, BP, lipid profile, including large-, intermediate- and small-HDL subfractions, and fasting plasma glucose. Only individuals (n = 22; mean age = 55.4±16.3 years; 45.5% men, 54.5% women) where HDL decreased were included in the analyses. The extent of change in each measure was assessed using paired t-tests.

Results: In 30 days, all biometrics, including HDL subfractions significantly decreased, except for triglycerides which did not change. The decrease in small HDL was at least two-times greater than large or intermediate-HDL (22.7%, 10.0%, 8.3%, respectively). Intermediate-HDL was the most abundant subfraction at baseline and 30-days.

Conclusions: Levels of all HDL subfractions decreased in response to the adoption of a whole-foods, plant-based diet, along with other indicators of cardiovascular risk. Additional research is required to elucidate the reasons through which lifestyle therapies remodel the HDL particle and how this impacts the functional properties of HDL and vascular disease risk.

Funding source(s): none
AUSTRALIANS CAN ADHERE TO A MEDITERRANEAN DIET RESULTING IN REDUCED CVD RISK AND MAINTAINED COGNITION; THE MEDLEY TRIAL

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Background/Aims: The MedLey study investigated whether adhering to a Mediterranean Diet (MedDiet) for 6 months would improve cardiometabolic health and cognition.

Methods: 152 Australians aged 71±5yrs were randomly allocated to a habitual control diet (n=72) or a MedDiet (n=80). Adherence was assessed using a 15-point score based on weighed food records. Outcomes measured at 0, 3 and 6 months included lipids, C-Reactive Protein, F2-isoprostanes, glucose, insulin, blood pressure, endothelial function and cognition. Linear mixed models (intention to treat) were used to compare groups over time.

Results: The MedDiet adherence score significantly increased from low to high adherence at 6 months relative to the control which did not change (P<0.001). Plasma triglycerides were significantly lower at 3 (-0.149 (0.04)mmol/L, P<0.001) and 6 months (-0.094 (0.04)mmol/L, P<0.05). F2-isoprostanate concentrations were significantly lower at 3 (-107.6 (21.5) pmol/L, P<0.001) and 6 months (-70.1 (22.1), pmol/L, P=0.013) compared to the control. Compared to control, MedDiet had a greater reduction in systolic blood pressure (P=0.02, for diet*time interaction): -1.3 (95%CI -2.2, -0.3) mmHg, P=0.008 at 3 months, and -1.1 (95%CI -2.0, -0.1) mmHg, P=0.03 at 6 months. Endothelial function improved after 6 months (+1.27%) in the MedDiet relative to the control which did not change (P=0.03). There was no difference between groups in cognitive performance.

Conclusions: We've shown older Australians can follow the MedDiet for 6 months resulting in improvements in cardiovascular health whilst maintaining cognitive function. This dietary pattern could be a feasible dietary approach for improving heart health of Australians.

Funding source: NHMRC
THE MERGED REFLECT/COMPLETE HEALTH IMPROVEMENT PROGRAM (CHIP) IN THE SOUTH PACIFIC - A PILOT STUDY

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Background/Aims: Chronic diseases (CDs) have reached epidemic proportions in Pacific Island countries. Unhealthy lifestyle is one of the major risk factors and lifestyle interventions have been shown to be efficacious for primary, secondary and early tertiary prevention. However, there is a paucity of evidence regarding effective community-based lifestyle interventions in the South Pacific (SP). This study examined the effectiveness of a contextualised version of the evidence-based CHIP intervention, utilising the low-literacy REFLECT approach.

Methods: 30-day cluster-RCT of 48 adults with elevated risk (waist circumference ≥92 cm for men and ≥80 cm for women), in two rural Fijian villages. Intervention participants (n=24) met three times a week to receive the program. Control participants (n=24) received only country-specific Ministry of Health literature. Outcome assessments at baseline and 30 days included BMI, WC, blood pressure, lipids and glucose. The extent of the change in each measures between intervention and control villages was assessed using mixed between-within ANOVA.

Results: In 30 days, significant reductions were recorded for intervention participant's BMI (2%), SBP (10%), DBP (8%), T-cholesterol (6%), LDL (12%), HDL (15%) and blood glucose (10%), while triglycerides increased 35%. Only DBP (7%) and T-cholesterol (8%) decreased in the control group.

Conclusions: This is the first lifestyle intervention using the REFLECT approach to target CDs in the SP. Significant reductions in selected CD risk factors were observed in 30 days, being comparable to cohorts in first world countries. Larger scale research is warranted to assess broader delivery of this lifestyle intervention across the SP.

Funding source(s): N/A
THE EFFECT OF PLANT EXTRACTS ON S100B LEVELS IN ANIMAL PRE-CLINICAL TRIALS: A SYSTEMATIC REVIEW

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Background/Aims: The calcium binding protein S100B has been associated with significant health effects in humans. Elevated circulating levels in later life cause neuronal apoptosis and brain inflammation, and has been associated with severe and chronic pathology including Alzheimer's disease. The potential benefits of plant extracts on health have become more widely recognised and investigated. However to date, their impact on S100B levels are not well defined. The aim of this systematic review was to identify candidate plant extracts and determine their effect on S100B levels in animal pre-clinical trials.

Methods: The search strategy followed PRISMA 2009 guidelines, with four electronic databases interrogated (PubMed, The Cochrane Library, Scopus and CINAHL). Search terms were limited to "S100B" AND "Flavonoid", "Polyphenol", "Plant Extract". Only animal pre-clinical trials published in English between 2000 and 2016 were included.

Results: In total, 12 journal articles were identified and 11 different plant extracts were investigated: Green tea (EGCG), Resveratrol, Curcumin, Bitter melon, Quercetin, Silymarin, Rutin, Saffron, Natto, Siberian Ginseng and Cat's claw. Several plant extracts indicated potential to reduce S100B levels in in vivo animal models showing positive effects in brain neuro-inflammation, epilepsy and restoration of blood-brain barrier dysfunction.

Conclusions: Plant extracts high in secondary plant metabolites have shown significant beneficial effects in animal pre-clinical trials and as such pose a stepping stone for development of potential nutraceuticals for use in human trials.

Funding source: University of Canberra Health Research Institute (UCHRI) project grant.
HYDROXYTYROSOL ACETATE INCREASES OXIDATIVE STRESS AND PROINFLAMMATION IN YOUNG BUT NOT AGED MICE

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Background/Aims: The physiology of the organism, such as age, sex and disease status may influence biologic effects of an antioxidant. The effects of chronic consumption of a moderate dose of HT-AC on oxidative stress and inflammation in male healthy mice at different ages were investigated.

Methods: C57BL/6 male mice (4 groups: young = 2 months age, old groups = 17 months age, n=13 per group) were administered water solution orally with or without HT-AC for 19 weeks. The dose of HT-AC supplementation was 50 mg/kg body weight \( \cdot \) d \(^{-1} \), given 5 times a week. Proinflammatory cytokines (IL-6, TNF-\( \alpha \) and CRP) were assessed by ELISA. ROS was detected by fluorescence. Formation of hepatic inflammatory foci was examined. This study was approved by Experimental Animal Ethics Committee of Northwestern Polytechnical University. Data were analysed using 2 factor ANOVA.

Results: Young mice supplied with HT-AC had higher ROS (194.92±36.83 v.s 137.64±36.56; \( P=0.0013 \)), CRP (4.60±0.91 v.s 3.09±0.56; \( P=0.0005 \)), IL-6 (43.73±13.40 v.s 24.24±5.55; \( P=0.0001 \)) and TNF-\( \alpha \) (60.67±18.68 v.s 33.85±11.95; \( P=0.0006 \)) in serum compared with HT-AC-fed old mice. No significant changes of ROS, CRP, IL-6 and TNF-\( \alpha \) between old control and treatment groups were found, and the same between young and old control groups. There was significant interaction effect between age and HT-AC. Inflammatory foci was observed in HT-AC-fed young mice but not in HT-AC-fed old mice.

Conclusions: These data indicate an interaction between age and HT-AC supplement and suggest a need for caution among young individuals consuming HT-AC for long time.

Funding source(s): No.
THE EFFECT OF DRYING METHODS ON BIOACTIVE PROPERTIES IN THREE VARIETIES OF PRICKLY PEAR (OPUNTIA FICUS INDICA)

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Background/Aims: The prickly pear (PP) cacti (Opuntia ficus indica) are commonly utilised as a source of nutraceuticals due to its substantial bioactive composition. However, preservation of bioactivity can present a challenge with considerable losses of these compounds, depending on the type of drying technique used. Therefore, the aim of this study was to determine the optimum drying method to preserve the bioactive content of the commercially grown Australian PP's.

Methods: Three PP varieties (White, Orange, Purple) were dried using four different methods (freeze dryer, draft oven, microwave and dehydrator). Total Phenolic (Folin-Ciocalteu; Gallic acid equivalent (GAE)); Flavonoid (AlCl3; Catechin equivalent (CE)) and Betalain (Betaxanthin and Bethanin equivalent (BBE)) content along with antioxidant characteristics (Trolox equivalent (TE)), free radical scavenging activity (DPPH), reducing capacity (CUPRAC) and antioxidant capacity (FRAP) were determined spectrophotometrically. Kendall's tau test was used to determine the best drying method in comparison to freeze drying.

Results: Microwave drying produced the maximum levels (Mean±SE) for total phenolic content in White (145.0±15.5µg GAEE), Purple (129±17.8µg GAEE) and Orange (138.7±25.9µg GAEE) variety. In addition, in White and Purple variety, flavonoid (74.1±8µg CE and 66.2±9.2µg CE), CUPRAC (3261±172.9µM TE and 2743±272.8µM TE) and FRAP (1458.5±32.3µM TE and 1328±146.3µM TE) were also the highest. Total betalains, were highest in White PP (3.1±0.5mg BBE/100g) following microwave drying, whereas Orange PP maximum was achieved using oven drying (3.2±0.6mg BBE/100g) and Purple PP using dehydrator (2.9±0.4 mg BBE /100g). (All p<0.05).

Conclusions: The method that preserved the highest amounts and activity of bioactives, during the drying process, in comparison to freeze-drying, was the microwave drying.

Funding source(s): N/A
Oral Session 1:

Room M1&M2: Nutrition in children & adolescents

14:00 - 15:24

SALT PREFERENCE OF COMMERCIAL AVAILABLE PRODUCTS AMONG SCHOOLCHILDREN AGED 8-10 YEARS

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Background/Aims: Australian children are consuming too much salt, with the majority coming from processed foods. Taste is a major driver of food choice, with salt often used to enhance flavour profile of processed foods. Little is known regarding children's taste preferences for salt in commercially available foods. The aim of this study was to assess salt preference of commercially available foods of varying salt concentration in a primary schoolchildren.

Methods: Salt ranking and preference was assessed in a sample of primary school children enrolled in grades 2-4, prior to delivery of a salt education program. Children tasted potato chips and cornflakes at 3 different levels of sodium concentration and were asked to rank the samples based on perceived saltiness and preference. Chi-square goodness-of-fit test was used to assess the proportion of children across each of the 3 categorical responses.

Results: 52 children, mean age 9.06 (0.76) (SD) years, 54% (n=28) female participated. 54% (n=28) of children reported the highest level of sodium in chips as tasting the saltiest (p<0.01), and 52% (n=27) preferred the high salt chip compared to lower salt samples (p<0.01). 60% (n=31) of children reported the highest sodium concentration in cornflakes as tasting the saltiest (p<0.001), and 54% (n=28) preferred the high salt cornflake compared to lower salt samples (p<0.01).

Conclusions: Schoolchildren can distinguish between high and low salt varieties of commercially available food products and about half prefer the taste of higher salt products.

Funding source(s): NHF
Background/Aims: Skipping breakfast has been linked with poor diet quality, higher BMI and poorer educational outcomes among children and adolescents. The prevalence of breakfast skipping in Australia is not known. This study aimed to determine the prevalence and correlates of breakfast skipping among Australian children and adolescents.

Methods: 1,621 2-17 year-olds completed two 24-hour recalls, collected via face-to-face and telephone interview, in the 2011-12 National Nutrition and Physical Activity Survey. Breakfast was defined as an eating occasion named as 'breakfast' by the participant, which included at least 210kJ. Participants were classified as skipping breakfast on 0, 1 or 2 days. Survey weights were applied to give national estimates for skipping breakfast. Child, household and adult correlates were reported in the face-to-face interview. BMI (kg/m²) was calculated from measured weight and height. Ordinal regression was used to calculate odds ratios adjusted for sex, age and socioeconomic position.

Results: Most (86.8% of boys, 81.4% of girls) ate breakfast on both days, 11.8% of boys and 14.8% girls skipped on only one day and 1.4% boys and 3.8% girls skipped on both days. The characteristics associated with skipping breakfast were being female, older age, not having a healthy BMI, lower physical activity, inadequate sleep, lower household income, greater socioeconomic disadvantage, and being from a single parent home.

Conclusions: Breakfast skipping was common among Australian adolescents but few were consistent skippers.

Funding source(s): National Heart Foundation. NHMRC
DIETARY INTAKE AND SOURCES OF POTASSIUM AND THE RELATIONSHIP TO DIETARY SODIUM IN A SAMPLE OF AUSTRALIAN PRE-SCHOOL CHILDREN

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Background: Excessive dietary sodium has a detrimental effect on blood pressure whereas a higher potassium intake has a protective effect. For good health the World Health Organisation recommends an optimal sodium:potassium (Na:K) ratio ~ one.

Aims: To determine the intake and food sources of potassium and the molar Na:K ratio in a sample of Australian pre-school children.

Methods: Participants included children with dietary data at 3.5 years of age. Average daily potassium intake, contribution of food groups to daily potassium intake, Na:K ratio and daily serves of fruit, dairy and vegetables were assessed via 3 unscheduled 24 h dietary recalls.

Results: Diet recalls were completed for 251 Australian children (125 male); mean age 3.5 (0.19) (SD) years. Mean potassium intake was 1618 (267) mg/d; Na:K ratio: 1.47 (0.5) and 54% of children did not meet the Australian recommended Adequate Intake (AI) of 2000 mg/d for potassium. Main food sources of potassium: milk (27%), fruit (19%) and vegetable (14%) products/dishes. Food groups with the highest Na:K ratio: processed meats (7.8), white bread/rolls (6.0) and savoury sauces/condiments (5.4). Children had a daily mean intake of 1.4 (0.72) serves of dairy and 0.52 (0.32) serves of vegetables.

Conclusions: Most children had potassium intakes below the recommended AI. The Na:K ratio exceeded the recommended level. The average intake of vegetables was 2 serves/d below the recommended 2.5 serves/d. An increase in pre-school children's vegetable consumption is recommended to increase dietary potassium and decrease the Na:K ratio.

Funding source(s): (N/A)
WHICH EATING OCCASIONS CAN IMPROVE THE DIETS OF 14-18 YEAR OLDS IN AUSTRALIA?

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Background/Aims: More than 60% of adolescents have inadequate calcium and magnesium intakes and exceed the WHO free sugars recommendations. Identifying eating occasions lacking in shortfall nutrients and eating occasions high in free sugars may provide insights for more targeted strategies to improve dietary intakes among adolescents.

Methods: Dietary intakes from the first 24-h recall of 14-18 year olds in the 2011-12 National Nutrition and Physical Activity Survey were analysed (n=772). Participant-defined eating occasions were classified as breakfast, lunch, dinner or snacking. The percentage contribution to the top shortfall nutrients (Ca; Mg; vitamin A; Fe), free sugars, sodium; and nutrient density (nutrient/KJ) of eating occasions were calculated.

Results: Snacking contributed 30% to total energy and the most calcium (35%), magnesium (32%) and free sugars (48%). Snacking was the most dense for free sugars (14g/1000KJ), but the least dense for iron (0.85mg/1000KJ) and sodium (229mg/1000KJ). In contrast, lunch contributed the least calcium (18%). Lunch was the least dense for magnesium (28mg/1000KJ) and vitamin A (60retinol equivalents/1000KJ), and the most dense for sodium (393mg/1000KJ).

Conclusions: Recommendations on eating occasions need to consider that snacking is a top source of some essential nutrients, but also free sugars. Improving the quality of lunch is an opportunity to help adolescents meet intakes of shortfall nutrients and lower daily sodium intakes. These findings identify opportunities to develop strategies specific to each meal and snacking occasion that encourage adolescents to consume more nutrient-dense foods and beverages and limit less healthful choices.

Funding source(s): Nestlé Research Center, (NESTEC Ltd.)
TUMOR NECROSIS FACTOR-α IS ASSOCIATED WITH CARDIOVASCULAR DISEASE RISK FACTORS AMONG OVERWEIGHT AND OBESE ADOLESCENTS

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Background/Aims: Overweight and obesity is associated with chronic inflammation, which in turn could lead to cardiovascular disease (CVD). Several studies have looked at the association between pro-inflammatory markers and CVD risk factors. This study aims to investigate the association between plasma tumor necrosis factor-α (TNF-α) and blood pressures and lipid profiles among overweight and obese adolescents.

Methods: This study is an observational analysis with a cross-sectional design of high school students in City of Yogyakarta, Indonesia. One hundred and five overweight and obese adolescents were involved in the study. Their anthropometric measures, blood pressures and lipid profiles were measured. Plasma TNF-α were quantified using ELISA. Statistical analysis was performed using SPSS version 24.

Results: Plasma TNF-α was significantly associated with cholesterol among overweight and obese adolescents (p=0.004), but there were no significant associations with other markers of lipid profiles (p>0.05). There were also no significant association between plasma TNF-α and percentile blood pressures.

Conclusions: The study showed that pro-inflammatory marker, represented as plasma TNF-α, is associated with cholesterol in overweight and obese adolescents. This indicates that inflammation in overweight and obesity may play a role in increasing risk of CVD.

Funding source(s): Indonesia's Ministry of Health Risbin Iptekdok
Background/Aims: We examined whether a culturally-safe intervention developed with Indigenous communities to reduce early childhood caries improved children's diets.

Methods: The intervention included motivational interviewing, anticipatory guidance, oral health care and fluoride varnish from Aboriginal Health Workers and dentists, during pregnancy and at 6, 12, 18 months of age. The control group received standard care. Diet data was collected by three 24-hour multi-pass recalls at 24-months. The primary outcome was %energy intake from sugar in discretionary food. Secondary analyses included intakes of macronutrients, and grams, serves and consumers/non-consumers of major food groups. Analyses were adjusted for randomisation strata, day of recall and interviewer, as well as clustering within individuals' multiple recalls and missing data.

Results: During enrolment (2011-2012), over 60% of all women pregnant with an Indigenous baby across the state of South Australia were enrolled in the trial (n=223 intervention; n=225 control). Despite challenges of disadvantage and geography, we achieved 2-year diet follow-up of 65%. Intervention group children had 1.6% lower energy intake from sugars in discretionary foods (95% CI -0.2, 3.4) than controls. Between-group differences in major macronutrients, or major food group intakes were negligible, however consumption of discretionary foods intakes were lower in the intervention group (mean difference -9 g (95%CI -2, -16)).

Conclusions: A culturally-safe intervention from birth to 18 months had negligible effects on children's diets at 2 years.

Funding source(s): National Health and Medical Research Council of Australia.
Oral Session 2:

Room P1: Nutrition education and communication

14:00 - 15:24

WHO, WHAT, WHY & HOW? A STUDY OF NUTRITIONAL SUPPLEMENT USE BY AUSTRALIAN ADULTS.

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Background/Aims: Many Australians seek to improve their nutritional intakes with nutritional supplements (NS) that are readily available and often taken without medical advice. NS use is associated with gender (females), age, health conditions and exercise levels. The aim of this study was to examine NS use in Australians to identify needs for education programs that promote safe use of NS.

Methods: An online survey of adults aged 35+ years was conducted. Questions included: socio-demographic and health behaviours and related to NS: types of; reasons for use; perceptions/knowledge; and sources of information. Descriptive statistics and logistic regression analyses were used to examine NS use.

Results: 765 adults (54% female; Mean age 55.4 ± 11.4 yrs) responded. Users (68%) reported use of 26 different NS (most common: magnesium (53%); Omega-3 (42%); multivitamins (41%); Probiotics (30%); Vitamins C, D and B complex (29% each); calcium (28%); caffeine and glucosamine (25% each)). Common reasons for use were: general health (75%); illness prevention (41%); sports performance (15%). Most common sources of NS information were: Internet (46%); friends/family (30%); fellow athletes (25%); scientific journals (24%); dietitians (23%) and medical practitioners (21%). 72% believed there was no risk associated with use of their NS. NS use was associated with being female (p=0.04) or married (p=0.03; OR: 2.38), and self-rated knowledge of NS (p<0.0001; OR 8.71).

Conclusions: Education campaigns need to be developed to promote greater understanding of NS including the risks of NS in health and sport, and from whom/where we should obtain advice.

Funding source(s): Nil
EFFECT OF AUSTRALIAN SCHOOL VEGETABLE EDUCATION PROGRAM ON FACTORS ASSOCIATED WITH VEGETABLE CONSUMPTION IN CHILDREN

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Background/Aims: Children's consumption of vegetables is too low. This research aimed to develop a Vegetable Education Resource (VER) for use by teachers in Australian Primary schools to positively predispose children towards vegetable consumption.

Methods: A VER of 5 lessons each, aligned to the Australian curriculum, was developed for each of three stages of Primary school. The theoretical framework was based on sensory education programs, and had a large emphasis on exposure, involvement, experiential learning and vegetable tastings. The effectiveness of the VER was measured by comparing the results of students of two schools before and after this education program was taught, with those of students from two matched control schools that continued to follow their regular curriculum (total n=320). Measures consisted of factors positively associated with vegetable consumption. Data were analysed using REPMEAS ANOVA using school as between-subject factor.

Results: The VER significantly increased students' knowledge of vegetables and the senses (P<0.0001), increased ability to objectively verbalise sensations when eating vegetables (P=0.002), and willingness to try vegetables (P=0.05). It tended to increase vegetable acceptance (P=0.06) and intentions to increase consumption of vegetables (P=0.06). The VER also received positive feedback from teachers, however preparation was found challenging.

Conclusions: The Vegetable Education Resource was effective in achieving behavioural change amongst students in factors known to be positively associated with vegetable consumption. Results support further development and roll out of the resource.

Funding source(s): Horticulture Innovation Australia Limited using the Vegetable Industry levy with co-investment from CSIRO and funds from the Australian Government.
THE ACCURACY OF LIFESTYLE MANAGEMENT INFORMATION ON WEBSITES FOR THE MANAGEMENT OF PCOS

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Background/Aims: Lifestyle interventions (nutrition, physical activity and/or behavioural) are crucial in Polycystic Ovary Syndrome (PCOS) management. Despite the internet being a popular health information resource, the accuracy of lifestyle information on PCOS websites is unknown. This study aimed to assess the accuracy of lifestyle recommendations on PCOS websites.

Methods: The internet search was conducted through three search engines across different web-browsers. Websites providing lifestyle information in less than 10 sentences were excluded. Accuracy was assessed by two independent reviewers through a checklist of 29 questions developed from National and International guidelines for diet, physical activity or weight management for the general population and PCOS with higher scores indicating greater accuracy.

Results: Fifteen websites were eligible from 72 websites (20%). The total accuracy score was 56±13 (potential range -29 to 87): 23±6 for diet (potential range -9 to 27) and 14±3 for weight management (potential range -8 to 24). 40-80% of websites provided general information on diet and 47-60% provided weight management but only 10-40% provided information on aspects such as core food, discretionary foods, specific energy deficits, exercise quantity/intensity or behavioural strategies.

Conclusions: A limited number of websites for PCOS contain lifestyle management information. Of these, the majority provided information on general diet, physical activity and weight recommendations but less information on a healthy lifestyle implementation. PCOS-related websites need to be improved to provide more detailed and practical information for consumers.

Funding: N/A
EXPLORING AUSTRALIAN'S ATTITUDES TOWARDS FIVE FOOD GROUP FOODS AND DISCRETIONARY CHOICES

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Background: The 2011-12 Australian Health Survey (AHS) revealed that 96, 90, 86, 70 and 69% of the population under-consumed the Vegetable, Dairy, Meat, Grains and Fruit food groups, respectively. Discretionary foods supplied 35% of total energy intake.

Aim: To explore attitudes and beliefs around the consumption of food groups.

Methods: Five annual on-line surveys of the general adult population (n=1,621-3,286) designed to assess attitudes, perceptions, influences and behaviour. Weighting ensured gender and age representativeness.

Results: In 2011, the Vegetable food group was judged to be extremely important by 78% of adults. Corresponding figures for other food groups were: Dairy: 46%, Meat 52%, Grains 52% and Fruit 72%. By 2016 importance of consumption had declined to: 67%, 32%, 39%, 34% and 56% respectively. In 2016, 61% of adults reported limiting some foods and drinks because they did not consider them part of a healthy diet. The most mentioned foods to limit were: soft drinks, confectionary and alcoholic drinks. Only 7, 1 and 7% reported limiting consumption of cakes, pastries and biscuits.

Conclusions: Australians have a low awareness of the importance of some of the five food groups and fail to recognise that cakes, pastries and biscuits are major sources of discretionary energy.

Funding source(s): Dairy Australia.
KNOWLEDGE, ATTITUDES AND BEHAVIOURS RELATED TO SALT INTAKE AMONG VICTORIAN PARENTS

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Background/Aims: Salt intake among Victorian children and adults remains in excess of recommendations. Knowledge, attitudes and behaviours (KABs) may be potential factors influencing the amount of salt consumed. Parents KABs are likely to influence their children's salt intake. The aim of this study was to assess KABs related to salt intake in a sample of Victorian parents.

Methods: Participants were recruited from; an intercept survey conducted in 4 shopping centres across Victoria, Facebook and a consumer research panel. Participants completed an online questionnaire consisting of 7 questions relating to KABs.

Results: A total of 837 parents/caretakers, 58% female (mean age 41.0 (10.0) (SD) years), provided valid responses to the survey. 73% of parents agreed that Australian children consume far too much or too much salt and 70% either strongly agreed or agreed that reducing the amount of salt in their child's diet was important. Most parents believed that the excessive consumption of salt during childhood had negative long-term health consequences (77%). 46% and 32% of parents reported adding salt during cooking and at the table, respectively.

Conclusions: The majority of parents reported that they were aware of the long-term adverse effects of consuming a diet high in salt. However, over one third of parents continued to add salt during cooking and at the table. Educational messages that target discretionary salt use in the family environment should be included in population salt reduction strategies.

Funding source(s): Victorian Health Promotion Foundation (VicHealth).
WHAT IS A STANDARD SERVE? A COMPARISON OF HOW LEAN AND OVERWEIGHT ADULTS DEFINE SERVING SIZES

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Background/Aims: The AGHE specifies the serving sizes of core foods in well-defined units such as household measures. Comparatively, discretionary foods are more frequently defined by weight or energy (600kJ/serve), which is more difficult to visually assess and hence may pose a challenge for serving estimation. This study aimed to compare the accuracy of serving estimation for eight core vs. three discretionary foods in lean vs. overweight adults.

Methods: This was a cross-sectional study that included 20 lean (BMI 19-24.9kgm⁻²) and 20 overweight (BMI>25kgm⁻²) healthy adults. Participants completed eating behaviour questionnaires and estimated the number of servings of commonly consumed core (mashed potato, penne, baked beans, corn flakes, nuts, milk, yoghurt) and discretionary (lollies, crisps, M&Ms) foods presented to them. Based on the actual servings, participant responses were also classified as "underestimate", "accurate", and "overestimate".

Results: In the entire sample (n=40), the proportion of participants who accurately estimated the serving sizes of any food ranged from 13-40%; there was a tendency to overestimate core and to underestimate discretionary servings. More lean than overweight adults overestimated the number of servings for milk only (p=0.017). The estimated number of servings of each test food did not differ between lean and overweight individuals, except for M&Ms (overweight: 2.5±1.1, lean: 1.8±1.1 servings, p=0.034). Body weight, food liking, and familiarity with foods did not correlate with serving estimations.

Conclusions: The overall accuracy of serving estimation was low and did not differ between lean and overweight adults.

Funding source(s): School of Pharmacy and Medical Sciences.
DON'T TRUST YOUR TASTE BUDS - AN EVIDENCE-BASED SOCIAL MEDIA CAMPAIGN TO RAISE AWARENESS OF HIGH SALT CONSUMPTION

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**Background/Aims:** Victorians consume approximately 50% more salt than recommended. A diet high in salt increases the risk of hypertension which is a powerful predictor of stroke and heart disease.

Consumer research commissioned by VicHealth demonstrated that while Victorian's believe that Australians consume too much salt, less than a third believed their own salt intake exceeds recommendations.

Don't Trust Your Taste Buds is a social media campaign aimed at raising awareness among Victorians of current salt consumption, and the potential negative health impacts high salt consumption can have.

**Methods:** A quasi-experimental design was used to promote key salt messaging via digital and social media channels.

**Results:** The campaign achieved over 35.5 million digital impressions with almost 74,000 viewers clicking through for further information. Overall, the campaign performed strongly and above planned levels for a social media campaign, with display activity at a Cost Per Thousand of $4.57 which exceeded planned levels of between $7.50 and $10 (depending on the targeting parameters). Content amplification (Outbrain & Taboola) achieved an average Cost Per Click of 53 cents, which is an excellent result versus industry benchmarks. Post campaign evaluation to track any changes in awareness is currently underway and findings will be available in early September.

**Conclusions:** Social media campaigns are a low cost option for targeted health promotion messaging with the potential to reach a wide audience. Consideration of messaging and complementary promotion should be applied to extend reach and impact.

**Funding source(s):** VicHealth
THE PREVIEW STUDY: METABOLIC OUTCOMES IN OVERWEIGHT, PRE-DIABETIC INDIVIDUALS AFTER AN 8-WEEK LOW CALORIE DIET


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Background/Aims: The PREVIEW intervention study (www.previewstudy.com) is the largest study aiming to prevent T2D among prediabetic individuals with a combination of diet, exercise and behaviour modification. Prior to weight maintenance, participants follow a low-calorie diet (LCD).

Methods: Participants received LCD (810 kcal daily) for 8 weeks (Cambridge Weight Plan®). Those who achieved 8% WL were analysed. Two-sided t-tests and linear regression.

Results: The weight loss phase was successfully completed by 1,842 (79%) participants. At baseline, mean (± SD) age was 51.6 ± 11.6 y, BMI 35.3 ± 6.5 kg/m², fasting plasma glucose (FPG) 6.2 ± 0.7 mmol/L, and fasting serum insulin (FSI) 13.4 ± 7.8 mU/L. Average WL was 10.6 ± 4.0 kg, with men losing 12.7 ± 4.2 kg and women 9.6±3.4 kg (gender difference, P<0.001). FPG decreased by 0.57 ± 0.7 mmol/L in men, and by 0.37 ± 0.6 mmol/L in women (P<0.001). FSI decreased by 5.8 ± 7.4 mU/L in men and by 3.8 ± 5.4 mU/L in women (P<0.001). The linear model showed an association of the % weight loss as well as gender on FPG and FSI changes.

Conclusions: LCD intervention resulted in marked decreases in body weight, FPG and FSI among prediabetic subjects.

Funding sources: European Union 7th Framework Programme; NHMRC-EU Collaborative Grant; The NZ Health Research Council.
THE EFFECT OF MEAL TIMING ON POSTPRANDIAL GLUCOSE AND INSULIN RESPONSE: A CROSSOVER TRIAL IN HEALTHY VOLUNTEERS

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Background/Aims: Shift workers have a higher risk of T2DM and CVD compared to non-shift workers. Dietary factors, particularly at night, may be important factors in helping to reduce disease risk. This study examined the postprandial response to an OGTT and a low GI meal eaten at night compared with the morning.

Methods: Participants fasted for 10 hours before each meal in each trial. Trial 1 participants (n=10) consumed a glucose solution (75 g in 400 mL) at 8am and 8pm. Trial 2 participants (n=9) consumed a low GI meal at 8am, 8pm and midnight. Blood was collected for 2 hours (finger prick) and 3 hours (intravenous) for Trial 1 and Trial 2, respectively. Changes in postprandial blood glucose and insulin were examined using iAUC and compared using the Wilcoxon-signed rank test for Trial 1 and the Friedman Test for Trial 2. A p-value <0.05 was taken as significant.

Results: Trial 1, median (IQR) glucose iAUC (331.88(166.22) mmol/l.2h vs. 181.17(160.32) mmol/l.2h) was significantly greater at 8pm compared to 8am (p = 0.007). Trial 2, glucose iAUC at midnight (252.75 (84.80) mmol/l.3h) and 8pm (176.25 (331.21) mmol/l.3h) were both greater than 8am (27.90 (40.98) mmol/l.3h) (p = 0.021, p = 0.008) but not between the 8pm and midnight (p = 0.594). The same findings were observed for postprandial insulin.

Conclusions: Night time eating is associated with reduced glucose tolerance and insulin sensitivity. This study demonstrates timing of food intake may be a new risk factor for CVD and diabetes in shift workers.
RESISTANT STARCH AMELIORATES HEAT TREATED DIET-INDUCED GUT PERMEABILITY AND RENAL DYSFUNCTION IN EXPERIMENTAL DIABETES

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Background/Aims: Heat treating foods leads to the formation of advanced glycation endproducts (AGEs) which contribute to chronic renal injury. Recent research implicates gut dysbiosis in the progression of diabetic nephropathy. This study investigates whether excess consumption of dietary AGEs causes gut dysbiosis, exacerbating renal injury in a type 2 diabetes mouse model.

Methods: Six week old diabetic (db/db) and non-diabetic (db/h) mice were randomised (n=12/group) to receive a low AGE (LAGE, unbaked rodent chow) or a high AGE diet (HAGE, baked at 160°C for 1 hour), with or without resistant starch (RS) for 10 weeks. 24-hour urine was collected and albuminuria was measured. Intestinal permeability was assessed in vivo by the clearance of FITC-labelled dextran (500mg/kg body weight). Statistical differences were assessed by one-way ANOVA.

Results: The high AGE diet exacerbated albuminuria in db/db mice (874.4±154.8 vs 536.2±96.5µg/24h, P<0.05, db/db HAGE vs db/db LAGE), and RS attenuated this AGE-induced increase (874.4±154.8 vs 515.5±71.9µg/24h, P<0.05, db/db HAGE vs db/db HAGE+RS). Db/db mice had greater gut permeability compared to db/h mice (2.38±0.32 vs 1.05±0.11µg/ml, P<0.01, db/db LAGE vs db/h LAGE). Db/db-HAGE-fed mice trended towards increased gut permeability (3.43±0.43 vs 2.38±0.32µg/ml, P=0.06, db/db HAGE vs db/db LAGE), an effect not observed in RS-fed db/db mice.

Conclusions: Heat-treated diets led to increased intestinal permeability and worsening albuminuria in db/db mice. RS was protective against high AGE-induced albuminuria in db/db mice. These preliminary studies support the notion that dietary AGEs contribute to renal disease via alterations in gut homeostasis.

Funding source(s): N/A
EFFECT OF DIETARY PREBIOTIC SUPPLEMENTATION ON METABOLIC BIOMARKERS IN ADULTS WITH PRE-DIABETES. A RANDOMISED CONTROLLED CROSSOVER TRIAL

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Background/Aims: Modulation of the human colonic microbiota by the dietary consumption of prebiotics has been shown to confer a number of metabolic health benefits to the host, and may reduce risk factors for type 2 diabetes in susceptible individuals. A double-blind randomised placebo-controlled trial was designed to determine the effect of 12 week consumption of a prebiotic dietary supplement on serum lipids, insulin sensitivity and chronic low-grade inflammation in adults with pre-diabetes.

Methods: Twenty-seven adults with pre-diabetes (Impaired Glucose Tolerance or Impaired Fasting Glucose) aged between 40-60 years were randomly assigned to receive either 10 grams of prebiotic supplement (inulin-enriched oligofructose) or 10 grams placebo (maltodextrin) daily for 12 weeks. After a 2-week washout period, study subjects crossed over to receive the alternative dietary treatment for 12 weeks.

Results: Intention-to-treat analyses using paired samples t-tests indicated a statistically significant difference in serum HDL cholesterol (+0.07 mmol/L, P<0.05) and waist circumference (-1.1 cm, P<0.05) following prebiotic supplementation. There were no significant differences between prebiotic 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: 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 y, 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 (25mU/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: group1<56 pmol/L (n=24) and group2>56 pmol/L (n=25). In group2, insulin [(median and interquartile range) 153, 180 vs. 123, 149 pmol/L; P=0.019] and glucose [(mean±SD) 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
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) (2g dose) (p=0.02) and a 30% reduction in CRP (-0.78 ± 1.0 mg/L) (4g dose). In addition, the Atherogenic Index (2g dose) trended to improve by 50% (p=0.05) and the 2-hr insulin levels (4g 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% (2g dose) (p=0.058).

Conclusions: The antilipemic, 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.

Funding source(s): Australian Post Graduate Award and Venus Shell Systems Pty. Ltd.
ORAL ALPHA-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, crossover trial.

Methods: Patients with IBS (using Rome III criteria) who produced ≥10ppm hydrogen on two consecutive breath samples following 10g fructan were recruited. Participants were randomly assigned to full-dose enzyme (300mg α-galactosidase "Vitacost Gas Enzyme"), half-dose (150mg) 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 100mm 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: 31 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=0.000) with 22 participants exhibiting GOS-sensitivity (>20mm 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 (mean 2086 ± SD 1856 ppm.12h) and placebo (2457±2324; 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
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 mcg/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% versus 68%, P<0.05) but use of HSR remained similar between years (46% versus 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
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 39y old male and female, a 65y old female, children aged 5y and 15y. 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 29.4 - 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.
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): nil
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: 75 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 found to be expensive resulting in a change of diet.

Conclusions: This study highlights the challenges for international students to be food secure. Food insecurity impedes wellbeing and as a result impacts academic success. Further research to understand the impact of food security on the international student experience is recommended, coupled with educational interventions and reinforcing university support services to redress food insecurity amongst international students.

Funding source(s): N/A
PROSPECTIVE ASSOCIATIONS BETWEEN DIET QUALITY AND BMI IN DISADVANTAGED WOMEN: THE READI STUDY

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Background/Aims: Favourable dietary patterns appear to minimize long-term weight gain in the general population, however relationships between diet quality and weight change in disadvantaged groups have not been examined. This study examined associations between change in diet quality and change in body mass index (BMI) over 5 years amongst disadvantaged women.

Methods: Dietary intake and BMI were self-reported amongst 1242 women living in disadvantaged areas in Melbourne, Australia at three time points from 2007/08 - 2012/13. Diet quality was evaluated using the Australian Dietary Guideline Index (DGI). Associations between concurrent change in diet quality and change in BMI were assessed over the three time points using fixed effects and mixed models. Models adjusted for age, smoking, menopausal status, education, marital status, number of births, urban/rural location, and physical activity.

Results: Average BMI increased by 0.14 kg/m² per year increase in age in the fixed effects model, and by 0.13 kg/m² in the mixed model (p<0.0001). BMI decreased by 0.014 kg/m² with each unit increase in DGI score in the fixed effects model, and by 0.012 kg/m² in the mixed model (p<0.0001). There was a non-significant trend for the rate of change in BMI with age to be greater for those with a lower DGI score than for those with a higher score (p=0.07).

Conclusions: Positive change in diet quality consistent with the recommendations in the Dietary Guidelines for Australians is associated with reduced BMI among disadvantaged women. Greater adherence to population-level dietary recommendations may assist disadvantaged women with long-term weight management.

Funding source(s): NHMRC
Oral Session 5:

Room M1&M2: Dietary behaviours and assessment

15:54 - 18:08

WEIGHT MANAGEMENT PRACTICES ASSOCIATED WITH POLYCYSTIC OVARY SYNDROME AND THEIR RELATIONSHIPS WITH DIET AND PHYSICAL ACTIVITY

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Background/Aims: Polycystic ovary syndrome (PCOS) affects up to 18% of reproductive-aged women and is associated with obesity-related complications. Weight management is crucial in PCOS, however it is unknown what weight management strategies women with PCOS practice and their effect on diet and physical activity.

Methods: Weight management practices, diet and physical activity were assessed in n=7767 women (n=556 PCOS, n=7211 non-PCOS) from the Australian Longitudinal Study on Women's Health. The association between weight management practices and PCOS status and weight management practices and diet and physical activity in PCOS were assessed through multiple regression analyses.

Results: Women with PCOS were more likely to be following both healthy [reducing meal/snack size (OR 1.50, 95% CI 1.14, 1.96, p=0.003), reducing fat/sugar intake (OR 1.32, 95% CI 1.03, 1.69, p=0.027) or low glycaemic index diet (OR 2.88, 95% CI 2.30, 3.59, p<0.001)] and potentially unhealthy weight management practices (smoking, laxative, diet pills, fasting or diuretics (OR 1.45, 95% CI 1.07, 1.97, p=0.017)) than women without PCOS. In PCOS, use of healthy weight management practices were associated with increased physical activity and improved diet and use of unhealthy weight management practices were associated with decreased diet quality.

Conclusions: Women with PCOS are more likely to follow both healthy and potentially unhealthy weight management practices than women without PCOS with impacts on diet and physical activity. In PCOS, we should focus on improving healthy weight practices across both diet quality and quantity and on addressing unhealthy weight practices and their potential adverse effect on diet.
PREDICTORS OF CHANGE IN DIETARY PATTERNS DETERMINED BY PRINCIPAL COMPONENT ANALYSIS IN AUSTRALIANS > 55 YEARS

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Background/Aims: Many epidemiological studies assess dietary patterns at one time, however little is known about change over time. This study examined the predictors of change in dietary patterns determined by Principal Component Analysis (PCA).

Methods: Participants living in Victoria (n=2,111; 48% male) completed a questionnaire in 2010 and 2014, including an 111-item food frequency questionnaire and questions on socio-demographics and health-related behaviours. PCA determined dietary patterns using the 2010 dietary data and factor scores were calculated (sum of the key food factor loadings multiplied by daily serves). Factor loadings from 2010 were used to calculate factor scores in 2014. Multiple linear regression adjusted for covariates was used to identify predictors of change.

Results: Two dietary patterns were identified that were similar in men and women. Factor 1 was characterised by vegetables, fruit and fish and factor 2 was characterised by processed meats and refined grains. Having obtained a university degree compared to achieving a level of education no higher than year 10 predicted an increase in factor 1 in men (β=0.14, 0.06, 0.22). Meeting physical activity recommendations and avoiding weight gain compared to not trying anything also predicted an increase in factor 1 in men (β=0.09, 0.02, 0.16; β=0.08: 0.01, 0.15, respectively) and smoking predicted an increase in factor 2 (β=0.12: 0.04, 0.20, P=0.004). There were no significant results in women.

Conclusions: Higher education and positive health-related behaviours predicted a move to a healthier diet in men over 4 years.

Funding source(s): ARC; Diabetes Australia Research Trust, NHMRC; Australian Postgraduate Award
DEVELOPMENT AND RELATIVE VALIDATION OF A FOOD FREQUENCY QUESTIONNAIRE TO MEASURE FLAVONOID INTAKE IN OLDER ADULTS

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Background/Aims: Retrospective analysis of flavonoid intake in older adults informed the development of a FFQ to measure flavonoid intake, and flavonoid subclasses. The validity and reproducibility of the FFQ was assessed against a 4-day FR.

Methods: Older adults aged 60+y (n=42) attended two interviews one month apart. Anthropometrics, blood pressure, demographic data and the 93-item self-administered FFQ were collected. A 4-day FR was randomly administered between the two interview dates and cross-referenced with the USDA flavonoid database to estimate flavonoid intake. Validity and reproducibility of the FFQ was assessed using the Wilcoxon signed-rank sum test, Spearman's correlation coefficient, Bland-Altman Plots, and Cohen's kappa.

Results: Mean flavonoid intake was determined (FFQ=1048.7mg/day, FR=874.5mg/day). Tests of validity indicated the FFQ consistently overestimated flavonoid intake compared with the 4-day FR. There was a significant difference in estimates between the FFQ and the 4-day FR (Wilcoxon signed-rank sum p<0.001; Bland-Altman plots indicated large bias and wide limits of agreement), but they were well correlated (Spearman's correlation coefficient 0.93, p<0.001; Cohen's kappa κ=0.619, p<0.001). The FFQ showed high reproducibility (FFQ1 vs FFQ2). There was a small mean percentage difference (6.74%). The Wilcoxon signed-rank sum test showed no significant difference,

Conclusions: A FFQ developed to measure flavonoid intake in older adults demonstrates fair validity against a 4-day FR and excellent reproducibility.

Funding source(s): University of Wollongong Food and Health SRI
PATTERNS OF ADDED SUGARS INTAKE BY EATING OCCASION AMONG A NATIONALLY REPRESENTATIVE SAMPLE OF AUSTRALIANS
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Background/Aims: To examine the eating occasion (EO) where most added sugars (AS) were consumed using a nationally representative dataset.

Methods: Plausible dietary data from the Australian Health Survey respondents (n = 8202), collected by a multiple-pass 24h recall, were analysed. EO was self-reported during the recall. AS content of the foods reported was estimated using a previously published method. Proportion of daily AS consumed (%AS\textsubscript{daily}) and the main food sources, at each EO, were calculated. Differences between children/adolescents and adults were tested by one-way ANOVA. Further stratification by age group and sex was performed.

Results: The majority of the %AS\textsubscript{daily} came from non-main meal occasions (NMMOs; 48%), followed by breakfast/brunch (21%). Children and adolescents consumed more %AS\textsubscript{daily} during NMMOs compared with adults (52% vs. 47%; p < 0.001), while girls/women consumed more %AS\textsubscript{daily} during NMMO compared with boys (54% vs. 49%; p = 0.002) and men (50% vs. 45%; p < 0.001). Sugar-sweetened beverages were the top contributors to AS at lunch, dinner and NMMOs, while sugar and sweet spreads was the top contributor at breakfast/brunch. Other top contributors at NMMOs included ‘other foods’, ice cream, and cakes and biscuits, pastries and batter-based products.

Conclusions: Australians consumed nearly half of %AS\textsubscript{daily} during NMMOs, most of which came from high sugar EDNP foods. While the common perception that most AS come from snacks holds true, our results suggest that main meals are also important intervention targets.

Funding source(s): N/A
DOES DIET QUALITY VARY BETWEEN URBAN AND RURAL DWELLING WOMEN OF REPRODUCTIVE AGE?

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Background/Aims: Health disparities, including weight gain and obesity, exist between urban and rural dwelling women. Diet quality contributes to weight gain and may be poorer in rural areas where access and cost of healthy foods is higher. The present study aimed to assess diet quality and the predictors of a higher diet quality in urban and rural women of reproductive age.

Methods: Urban (n= 149) and rural (n=394) dwelling women aged 18-50 years completed the Dietary Questionnaire for Epidemiological Studies food frequency questionnaire. Outcomes include dietary quality, derived using the Dietary Guideline Index (DGI) and macronutrient and micronutrient intake.

Results: The DGI was not significantly different (mean ±SD, 84.8 ± 15.9 vs 83.9 ± 16.5 p=0.57) between urban and rural women. Rural women reported higher intakes of lean meat and poultry, fish, eggs, tofu, nuts, and legumes/beans compared to urban dwelling women. Overall, a higher diet quality was associated with higher annual household income (>80,000 vs <$80,000AUD p=0.02) and working status (working fulltime/part-time vs unemployed p=0.02) after adjustment for education, income, working status, BMI, age, and marital status.

Conclusions: While diet quality did not differ between urban and rural women variations were found in the intake of protein based foods. Women who are on a lower income and are unemployed are an important target group for future dietary interventions aiming to improve diet quality.

Funding source(s): The trial was funded by a project grant from the NHMRC.
THE SUCCESSFUL STRATEGIES THAT AUSTRALIANS USE TO CHANGE THEIR TAKEAWAY FOOD CONSUMPTION.

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Background/Aims: The aim was to explore issues surrounding takeaway food eating habits and how change in this behavior occurs, in order to inform the design of future health promotion programs targeting this dietary behaviour.

Methods: Young adults (18 to 35 years) were recruited to participate in semi-structured interviews. A socio-demographic questionnaire was also completed. Interviews were facilitated by two interviewers, using a discussion guide. Focus groups were conducted until no new themes emerged. Qualitative data underwent iterative thematic analysis.

Results: Nine focus groups (average duration = 67 minutes) were conducted. Groups ranged in size from three to eight participants in each (a total of 51 participants). Strategies used by participants who perceived they had successfully reduced their takeaway food consumption included: (1) Recasting consumption and/or reduction of takeaway foods; (2) Practical changes to behavioural practices shaping food choices; (3) External instrumental support; (4) Reconfiguring social events and takeaway food.

Conclusions: Individual level strategies should include goal-setting, self-monitoring, nutrition education, cooking classes, and education to improve time management skills and self-control. These strategies should incorporate time- and cost-efficient solutions that do not require excessive effort. Recommendations for environmental level change include increasing the availability of healthy alternatives, reducing the cost of healthy choices in line with or below the price of unhealthy options, and introducing labelling to help the quick identification of healthy choices.

Funding source(s): N/A
PERCEIVED HEALTH BENEFITS OF SMOOTHIE CONSUMPTION: INVESTIGATING CONSUMERS’ ATTITUDES, BELIEFS AND BEHAVIOURS
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Background/Aims: Consumption of smoothies has increased in popularity in recent years. This study explored consumers’ and non-consumers’ attitudes, beliefs and behaviours to smoothies and perceptions of these beverages as healthy dietary alternatives.

Methods: A cross-sectional study involving an online survey of the general public was conducted. The survey contained 44 questions classified into demographics, smoothie consumption behaviours, attitudes and beliefs, nutrition knowledge. Cross-tabulation and chi-square tests for association were used to compare survey responses.

Results: 833 adults completed the survey (79% female, 78% aged 18-34 years). One-third of survey respondents drank smoothies ≥2 times·wk\(^{-1}\), most commonly consumed as a snack (61%) or for breakfast (36%). Common energy-yielding ingredients included in smoothies were: fruit (90%), yoghurt (48%), milk (42%), fruit-juice (30%), honey (29%), nuts & seeds (26%) and nutritional supplements (26%). Respondents who consumed smoothies >1 times·wk\(^{-1}\) were more likely to cite to be healthy (p<0.01) and to increase fruit/vegetable intake (p<0.01) as reasons for drinking smoothies than those who consumed smoothies ≤1 times·wk\(^{-1}\). Over half (55%) of the respondents agreed with the statement that smoothies are indulgent.

Conclusion: Smoothies are frequently consumed beverages, often made using a combination of energy providing ingredients. Many consumers, particularly those that consume smoothies regularly, do so for the perceived health benefits. Regular consumption of energy dense smoothies may pre-dispose individuals to excess energy intakes, which may offset potential benefits from the drinks.

Funding source(s): N/A.
DIFFERENT PREFERENCES TOWARDS COFFEE TYPE AND ADDITIVE USAGES REFLECT VARIATIONS IN DIETARY PATTERN

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Background/Aims: Preferences towards different coffee types and additives use may reflect variations in dietary pattern. This study aimed at examining the differences in food intake of coffee consumers with different preferences towards coffee types and additives.

Methods: Intake data of food, coffee and additive usage from the adult respondents of the 2011-12 Australian Health Survey were used. Participants were grouped according to the type of coffee (espresso and ground coffee, E&G; coffee made from coffee mix and instant coffee, M&I; non-consumers, NC) and additives (milk, sugar and intense sweetener) which they consumed the most. Food intake was compared between consumption groups using general linear model.

Results: After adjusted for energy intake, mean dairy food intake of E&G drinkers was 23.2% higher than M&I drinkers (355.9 ± 357.8g vs 288.8 ± 353.3g, p<0.001) and 33.5% higher than NC (355.9 ± 357.8g vs 266.6 ± 383.2g, p<0.001). Mean discretionary food intake of E&G drinkers was 28.2% lower than M&I (196.2 ± 489.3g vs 273.2 ± 542.2g, p<0.001) and 33.7% lower than NC (196.2 ± 489.3g vs 296.1 ± 631.9g, p < 0.001). Among both E&G and M&I consumers, those who did not use additives had the lowest dairy food intake in their coffee groups: 52.0-59.2% lower than the others in the E&G group and 27.3-43.0% lower than the others in the M&I group.

Conclusions: Coffee consumers' different preferences towards coffee types and additive usages reflected significant variations in their dietary pattern.

Funding source(s): N/A
Background/Aims: Dietary biomarkers which are noninvasive, rapid and accurate may be useful to objectively assess dietary behaviours. The bases within fruits and vegetables (F&V) largely modulate net acid excretion (NAE); a laboratory intensive biomarker related to urine pH. As spot-testing pH is simple, we aimed to assess if spot-tests could index NAE while also exploring the influence of a F&V concentrate on these variables.

Methods: In a double blind cross over trial, healthy adults (n=13) randomly received a F&V concentrate (emulating the base within 3.5 F&V serves/meal) or placebo at breakfast, lunch and dinner for three days each, with diet standardised throughout. Measurements of 24 hour (24-hr) pH, NAE, and spot-tests were taken throughout. Regression analysis determined relationships between pH and NAE while T-tests and ANOVAs elucidated the concentrate's influence on these variables.

Results: 24-hr pH indexed 24-hr NAE ($r^2=82.5\%$) yet first morning, second morning and last evening spot-tests poorly indexed 24-hr NAE ($r^2=10.9\%, 3.5\%$ and $30.8\%$ respectively). Following supplementation, 24-hr NAE and 24-hr pH changed by -25.8 mEq (95%CI: -44.3, -7.4, $P=0.01$, $d=0.94$) and +0.51 (95%CI: 0.25, 0.79, $P=0.002$, $d=1.3$) respectively. Conversely, no significant changes occurred in the first or second morning spot-tests yet, a treatment effect occurred in the last evening spot-test by +0.31 (95%CI: 0.06, 0.56, $P=0.02$, partial $\eta^2=0.55$).

Conclusions: Urine pH spot-tests do not index NAE and inconsistently detected the F&V concentrate which clearly modulated 24-hr pH and NAE. This inconsistency would likely increase if participants consumed a non-standardised diet. Spot-tests are not recommended.

Funding source(s): N/A
INACCURACY OF PATIENT-REPORTED DESCRIPTIONS OF AND SATISFACTION WITH BOWEL ACTIONS IN IBS

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Background/Aims: Perception of diarrhoea and constipation differ greatly between and within physicians and patients. This study aimed to correlate subjective and objective assessment of faecal characteristics in IBS patients.

Methods: Data from two interventional dietary trials were interrogated. All subjects reported their stool form respectively on enrolment. IBS subjects were classified into Rome III IBS subtypes. Subjects rated their dissatisfaction with stool consistency daily using a 0-100 mm visual analogue scale during the interventions (0 = no symptoms). Subjects collected stools at the end of each dietary period. Each stool was scored according to the King's Stool Chart (KSC) as 'hard and formed', 'soft and formed', 'loose and unformed' and 'liquid'. Samples were pooled and freeze-dried to determine faecal water content (FWC); diarrhoea defined as ≥78%.

Results: 70 IBS and 8 healthy subjects were studied. The biggest change in dissatisfaction of stool consistency from enrolment to intervention was mean[95%CI]27.2[22.3-36.7]mm; repeated measures ANOVA P<0.001. Changes in FWC and KSC correlated poorly with degree of dissatisfaction. For example, of 25 IBS-D subjects, only 15 had diarrhoea according to FWC and KSC, and 3 had diarrhoea on FWC and of 8 healthy subjects, 1 had diarrhoea on FWC and KSC and 6 had hard and formed stools.

Conclusions: There are major disparities between patients' stool description and objective features of constipation and diarrhoea. Patient-reported bowel habits require more interrogation for accurate IBS subtyping.

Funding source(s): NHMRC, Eva and Les Erdi Foundation, George Weston Foods ARC Linkage Project.
Background/Aims: Dietary patterns and their associations with characteristics of elderly people are not well understood. This study aims to identify dietary patterns and their associations with socio-demographic characteristics in older adults.

Methods: 1098 participants aged ≥50 years were followed for 5 years. Dietary intake was measured using a validated food frequency questionnaire. Dietary patterns were identified using exploratory factor analysis and scores for each pattern calculated using the weighted sum score method. Associations with participants’ characteristics were investigated using linear mixed models.

Results: Three dietary patterns were identified: a healthy pattern composed of vegetables, fruits, nuts, and whole grains, a western pattern of pizza, hamburgers, chips, and potatoes and an Australian traditional pattern of cruciferous and dark-yellow vegetables, legumes, red meats, and poultry. Being female and having higher education were associated with higher healthy pattern scores but this difference lessened over time. Being unemployed was associated with lower healthy pattern score (β=-96.2(95%CI -148;-44.5)) but this effect reduced over time. For the Australian traditional pattern, being female was associated with higher (β=24.9(95%CI 4.9;44.9)) and being a smoker with lower (β=-66.8(95%CI -98.3;-35.3)) scores.

Conclusions: These results suggest that future nutrition interventions should target males and those of lower socio-economic status. The effects of these patterns on health outcomes require further research.

Funding sources: NHMRC, Tasmanian Community Fund, Royal Hobart Hospital, and Arthritis Foundation
Oral Session 6:

Room P1: Maternal and Childhood Nutrition

15:54 - 18:08

**ZINC INTAKES OF AUSTRALIAN INFANTS AND TODDLERS: MELBOURNE INFANT FEEDING, ACTIVITY AND NUTRITION TRIAL (InFANT) PROGRAM**

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**Background/Aims:** Limited information exists on zinc intakes for Australian children <2 years old. This study aimed to determine dietary zinc intake, food sources of zinc and the prevalence of inadequate and excessive zinc intakes in Australian children at 9 and 18 months.

**Methods:** Dietary data were collected using 3x24-hour recalls from 494 infants at 9 months and 428 toddlers at 18 months in the InFANT. Zinc intakes were determined using AUSNUT2007. The population proportion was used to determine the contribution of foods and beverages to zinc intakes for each age group. The prevalence of inadequate (<EAR of 2.5 mg/d for all) and excessive (>UL of 5 mg/d for infants and 7 mg/d for toddlers) dietary zinc intakes were estimated for each age group after first adjusting the distribution of observed zinc intakes for the day-to-day variability in intakes within individuals and then calculating the distribution of usual intakes for each age group with the software PC-SIDE (version 1.0, 2003).

**Results:** Mean (SD) zinc intakes were 6.6 (2.5) and 6.5 (1.8) mg/d for infants and toddlers, respectively. Main sources of dietary zinc were infant formulae for infants and dairy milk for toddlers (50% and 19% of total dietary zinc intake, respectively). Intakes <EAR were observed in 5.8% (95% CI 3.8, 8.1%) of infants and 0% (95% CI 0.0, 0.9%) of toddlers. Intakes >UL were observed in 65.8% (95% CI 61.4, 70.0%) of infants and 34.5% (95% CI 29.9, 39.1%) of toddlers.

**Conclusions:** The prevalence of inadequate dietary zinc intakes was low in Australian infants and toddlers, however this needs to be confirmed by biochemical data. The high proportion of children exceeding the UL for zinc is of concern and the role of zinc fortification in children's foods may need to be evaluated.

**Funding source(s):** NHMRC and Deakin University.
Background/Aims: Food literacy is the knowledge, skills, attitudes, and behaviours needed to have a diet that is environmentally sustainable and conducive to good health. This research aimed to measure food literacy in Year 6 New Zealand (NZ) schoolchildren.

Methods: Schools in the three largest NZ cities - Auckland, Wellington and Christchurch - were randomly selected and children invited to complete a 37-item online food literacy questionnaire. The questionnaire comprised three sections: food origins, nutrition knowledge, and food skills and was validated for this age group. Schools were visited from February-April 2016 and children had their height and weight measured. Data was analysed using linear regression.

Results: 858 school children from 44 schools completed the questionnaire. The majority of participants were 10 years old (87%), female (55%), and of normal weight (75%). The mean (SD) overall food literacy score was 68% (12), with girls scoring 3% (95%CI, 1 to 3; P=0.005) higher than boys. Mean food literacy score was 10% (95%CI, 5 to 15; P<0.001) lower in children from schools in low compared with high socioeconomic communities. Children scored highest in the food origins section, with a mean (SD) score of 74% (13), compared to 71% (15) in the food skills section, and 61% (13) in the nutrition knowledge section.

Conclusions: Socioeconomic status appears to be an important determinant of food literacy in NZ schoolchildren.
A HEALTHY PREGNANCY: BELIEFS AND ADVICE-SEEKING BEHAVIOURS FROM AN INTERNATIONAL SAMPLE

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Background/Aims: This research aimed to assess whether adults from an international sample considered diet to be an important lifestyle factor for a healthy pregnancy, and to test the hypothesis that pregnancy advice-seeking behaviours have changed because of the Internet and social media.

Methods: A three-week, Massive Open Online Course entitled 'Food as Medicine', covered topics relating to food, nutrients and health. Female and male participants (n=1695) from 84 countries completed a questionnaire that explored their beliefs about what was important for a healthy pregnancy and where they sought advice. Comparisons of categorical data were performed with Chi-square (p = 0.05).

Results: Eating a variety of fruit and vegetables and not smoking were ranked in the top five behaviours for a healthy pregnancy by 94% of participants, compared with maintaining a good fitness level (47%), seeking emotional support from friends and family (33%), and getting enough sleep (27%). Doctors (49%) were the most common source of lifestyle advice. Larger proportions of those aged <40 years reported using the Internet (<40 years 44.8%, >40 years 19.0% $\chi^2 = 129.79, p < .01$) and social media (<40 years 18.2%, >40 years 4.2%; $\chi^2 = 86.09, p < .01$) for pregnancy advice.

Conclusions: A healthy diet is considered to be an important lifestyle factor for pregnancy and health professionals, doctors in particular, are a trusted source of advice. The Internet and social media influence younger women. Therefore, this media needs to be incorporated into communication strategies aimed at this vulnerable population.

Funding source(s): Monash University
AMR PREGNANT WOMEN MEETING THE AUSTRALIAN DIETARY GUIDELINES? A COMPARISON OF WOMEN WITH AND WITHOUT TYPE 1 DIABETES

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Background/Aims: Studies suggest that women are not achieving the ADG. The aim was to evaluate the diets of pregnant women against recommendations from the 2013 ADG and NRV, and to compare the diets of pregnant women with and without type 1 diabetes.

Methods: Diet was assessed during the third trimester using the Dietary Questionnaire for Epidemiological Studies Version 2 food frequency questionnaire in a cohort of women from the Environmental Determinants of Islet Autoimmunity (ENDIA) study. The macro and micronutrient intakes and serves per day of women with type 1 diabetes (T1D) and without (controls) were compared using t-tests and the proportion achieving recommendations were compared using chi-square.

Results: 219 pregnant women completed the dietary questionnaire (T1D=122, control=97). No one achieved the recommended serves of grains (median serves, 3.3) and discretionary items (2.9) and only one T1D achieved vegetables (1.8). 42% achieved fruit recommendations (1.8), 43% achieved dairy recommendations (1.9) and more T1D achieved lean meat and alternatives recommendations (15% v 6%; P=0.03).

T1D consumed more vegetables serves (2.0 v 1.7; P=0.03), less fruit serves (1.7 v 1.9; P=0.02), and more serves of lean meat and alternatives (2.4 v 1.9, P=0.01). T1D consumed less carbohydrate and sugar (P≤0.02), and both groups were consuming above the adequate intake for sodium (2,248±908mg), and less than half the RDI for iron (238±77ug) and folate (11.5±4.3mg).

Conclusions: The majority of pregnant women with and without type 1 diabetes are not meeting the ADG.

Funding source(s): JDRF Australia, The Helmsley Charitable Trust, JDRF International, NHMRC.
MATERNAL DOCOSAHEXAENOIC ACID IS VITAL FOR CLOSURE OF THE NEURAL TUBE: A PROSPECTIVE, OBSERVATIONAL STUDY OF HUMAN PREGNANCY

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Background/Aim: The importance of DHA required during fetal neurological organogenesis is unknown. The aim of this study is to assess plasma fatty acid changes in early pregnancy in women undergoing natural cycle-frozen embryo transfer as a means of achieving accurately-timed periconceptual sampling.

Methods: Women were recruited from the Assisted Conception Unit, Glasgow Royal Infirmary, and serial fasting blood samples were taken pre-pregnancy, and at days 18, 29 and 45 of gestation and fatty acids analysed using gas chromatography. Differences in concentrations of fatty acids over time were assessed by one way ANOVA for repeated measures, with between group comparison using post hoc Tukey-Kramer HSD.

Results: There was a rapid, early initiation of maternal DHA mobilisation observed by 29 days of gestation (mean±SD, from 0.1±1.3 to 1.6±2.9nmol DHA per mL plasma per day). This early pressure to mobilise DHA was further emphasised in twin pregnancies where the increase in DHA concentration was two-fold higher than in singleton pregnancies (mean±SD increase, 74±39nmol/mL versus 35±40nmol/mL). An index of delta-6 desaturase activity increased 30% and positively correlated with DHA concentration between days 18 and 29 (R-squared adjusted = 41%, P=0.0002). DHA was the only fatty acid with continual accelerated mobilisation and a positive incremental area under the curve (632±911nmol/mL plasma) over the first 45 days of gestation.

Conclusions: Very rapid mobilisation of DHA is initiated in human pregnancy prior to neural tube closure (28 days’ gestation) suggesting that periconceptual DHA mobilisation has the potential to be as important as that of folate.
DIET QUALITY, SLEEP AND METABOLIC BIOMARKERS IN CHILDREN WITH AND WITHOUT ASTHMA

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Background/Aims: Overweight and obesity are more prevalent in children with asthma versus those without. Whether asthmatic children are at increased risk of weight gain due to modifiable lifestyle factors is unknown. The aim of this study was to compare weight-gain risk factors (sleep, appetite, diet, activity) in children with and without asthma, referred for polysomnography.

Methods: In a cross-sectional design, non-obese children with (n=17; age 10.7(2.4) years) and without asthma (n=17; age 10.8(2.3) years) underwent overnight polysomnography and measurement of lung function, plasma appetite hormones, insulin, glucose and lipids, dietary intake, food cravings, activity and daytime sleepiness. Between-group comparisons were made using Student's t-test or Wilcoxon rank-sum test. Categorical data were assessed using Fischer's exact test. Associations were assessed using Spearman-rank correlation coefficients.

Results: Sleep latency was longer (56.6(25.5) vs. 40.9(16.9) minutes, p=0.042) and plasma triglycerides marginally higher (1.0[0.8, 1.2] vs. 0.7[0.7, 0.8] mmol/L, p=0.013) in asthmatic versus non-asthmatic children. Appetite hormones, dietary intake and activity levels were similar between groups (p>0.05). Sleep duration was associated with better overall diet quality (r=0.36, p=0.04). Daytime sleepiness was associated with plasma lipids (r=0.61, p=0.001) and sedentary time (r=0.39, p=0.02).

Conclusions: Disturbances in sleep quality and plasma triglycerides were evident in asthmatic children referred for polysomnography compared with non-asthmatic children. Associations between sedentary behaviour, dietary intake, metabolic and sleep-related outcomes in children with asthma require further investigation, particularly the long-term health implications.

Funding source(s): Hunter Medical Research Institute Greaves Family Donor Grant
POOR METABOLIC HEALTH, IN THE ABSENCE OF OBESITY, INCREASES RISK FOR GESTATIONAL DIABETES AND PREECLAMPSIA IN PREGNANT WOMEN

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Background/Aims: Maternal obesity is a risk factor for pregnancy complications. Obesity associates with metabolic disturbances but the obese phenotype may exist in their absence. We aimed to determine whether metabolic phenotype, with or without obesity, associates with adverse pregnancy outcomes: small- and large for gestational age (SGA, LGA), intrauterine growth restriction (IUGR), preeclampsia (PE) and GDM.

Methods: Multi-centre, prospective cohort of nulliparous women recruited to the SCOPE study (n=5,488). Metabolic phenotype determined according to modified metabolic syndrome criteria (<4 abnormalities vs ≥4 abnormalities including glucose, mean arterial pressure, lipids, waist circumference, C-reactive protein at 15 ± 1 weeks’ gestation), and categorized for obesity (BMI ≥30 kg/m² vs <30 kg/m²). Adjusted multivariable models assessed relationships between pregnancy outcomes and metabolic phenotype.

Results: Compared to metabolically healthy, not obese (<4 abnormal criteria, BMI <30 kg/m²), being metabolically unhealthy, not obese increased risk for GDM (OR 8.60; 95% CI 3.41, 21.76, P<0.001) and PE (OR 2.94; 95% CI: 1.30, 6.64, P<0.001), while metabolically unhealthy and obese increased risk for GDM (OR 17.88; 95% CI: 7.84, 40.76, P<0.001) and PE (OR 3.60; 95% CI: 1.65, 7.85, P<0.001).

Conclusions: Poor metabolic health, in the absence of obesity, significantly increased risk for GDM and PE. Assessment of metabolic profile is warranted early in pregnancy for all women, so that targeted interventions to improve maternal metabolic health and pregnancy outcomes can be achieved.

Funding source(s): NHMRC
INFANTS CAN FERMENT RESISTANT STARCH SHORTLY AFTER WEANING WHICH CHANGES FAECAL METABOLITE AND MICROBIAL PROFILES

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Background/Aims: Resistant starch (RS) has a prebiotic effect in adults. It can increase short chain fatty acid (SCFA) production, diversity and change composition of the gut microbiota. Little is known of the capacity of young infants to ferment RS, particularly during early weaning when the microbiota differs in composition to that of adults. Here we assessed the fermentation capacity of infants on RS and changes in metabolite and microbial profiles.

Methods: Faecal samples were collected from 16 healthy infants within 12 weeks of giving the first non-milk food. RS (high amylose maize starch) was used as the test substrate in an in-vitro batch fermentation system. Fermentation of RS was established by measuring change in pH and production of SCFA over 24 hours. The negative control comprised faecal inoculum incubated without the RS. DNA was extracted from all ferments followed by Illumina MiSeq sequencing. Multivariate statistical analysis were used (PRIMER7).

Results: Young infants (7.16±.18 months) can ferment RS. Compared to negative controls, pH was reduced after 24 hours of fermentation by 1.22 units (p<0.05) and total SCFA concentrations were increased by 73% (14.74 mmol/l, p<0.01) Fermentation of RS also increased diversity (Shannon, p<0.05) and positively changed the microbial profile (p<0.05) compared to the negative control.

Conclusions: Production of SCFAs, lower pH, increased diversity and beneficial shifts in the microbial profiles has major health benefits. Our results suggest that infants could access the benefits of RS at a much younger age than previously considered.

Funding source(s): N/A
LONGITUDINAL STUDY OF PESTICIDE RESIDUES IN HUMAN MILK FROM WESTERN AUSTRALIAN WOMEN DURING THE FIRST YEAR OF LACTATION

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Background/Aims: Pesticides are synthetic chemicals that are released into the environment and during milk synthesis, are secreted into the milk. This study identified and quantified pesticides in human milk (HM) over 12 months of lactation. Methods: HM samples were collected from 16 Western Australian mothers at 2, 5, 9 and 12 months postpartum. HM analysis was carried out with GC-MS/MS for 88 pesticides.

Results: p, p′-DDE, p, p′-DDT and β-HCH were detected with a mean concentration (± SD) of 52.3 ± 49.9 ng/g fat, 27.7 ± 21.0 ng/g fat and 48.0 ± 22.5 ng/g fat respectively. p, p′-DDE decreased significantly from 2 to 12 months postpartum (P = 0.02). An overall decrease of 68%, 45% and 73% was observed for p, p′-DDE, p′-DDT and β-HCH, respectively over the 12 month period. No associations between the detected pesticides and maternal characteristics (age, parity, percentage fat mass) or infant growth outcomes (infant weight, body length, head circumference, percentage fat mass) were detected. The actual calculated daily intake of the detected pesticides was far below the tolerable levels regulated by the WHO, and decreased significantly throughout the first year of breastfeeding (P < 0.001).

Conclusions: Only trace amounts of pesticides were detected in HM from Western Australian women, and the concentrations appear to pose no risk to the infant.

Funding source(s): This study was funded by an unrestricted grant from Medela AG administered by The University of Western Australia.
INFORMING INTERVENTIONS TO REDUCE AUSTRALIAN CHILDREN'S DISCRETIONARY CHOICES INTAKE: A DIETARY SCENARIO MODELLING STUDY

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Background/Aims: Approximately 37% of Australian children's energy intake is derived from discretionary choices (DC). This contributes to excess intakes of added sugar, SFA and sodium, and displaces core food intake. The study aim was, to compare the theoretical effectiveness of three strategies to reducing children's DC intake.

Methods: Single day, dietary intake data from 2718 2-18 year olds participating in the National Nutrition and Physical Activity Survey 2011-12 were population weighted and aggregated at the food identity level. Scenarios simulating changes in the top 5 DC contributing to total energy intake were modelled in Excel. Strategies compared were: moderation, a 50% reduction in portion size of the top 5 DC subgroups; substitution, swapping 1 serve (600kJ/101g) of top 5 DC subgroups for equal grams (101g) of fruit and vegetables; reformulation, reducing added sugar by 50%, sodium by 50% and swapping 75% SFA for unsaturated fats in the top 5 DC subgroups.

Results: Base case (reported intake) was 8031kJ, 29g SFA, 58g added sugar and 2312mg sodium per day. All scenarios achieved similar reductions in SFA intake (9-14%), added sugars intake (21%) and sodium intake (4-5%). Change in energy intake varied from 1-7%.

Conclusions: Modelling of strategies to moderate, substitute or reformulate DC show similar reductions in intakes of SFA, added sugar, and sodium. Moderation showed greatest reduction in energy intake. Moderation via decreases in portion size or frequency of consumption would in theory be most effective for obesity prevention. Impact on overall diet quality needs evaluation.

Funding source(s): NHMRC
VITAMIN E IN INFANT FORMULA CONTAINING POLY-UNSATURATED FATTY ACIDS

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Background/Aims: Vitamin E prevents PUFA peroxidation in infant formula (IF) by reacting with oxidising compounds and is consumed in the process. Therefore, IF regulations specify vitamin E content in relation to PUFA content to cover oxidative losses and infant requirements. The specifications of the Australia New Zealand FSC and Codex Alimentarius express/calculate this differently. This study examines the vitamin E content of IF in Australia and New Zealand to determine whether the FSC specifications are appropriate, particularly when additional DHA is included.

Methods: Theoretical vitamin E amounts were derived using prescribed equivalencies which relate the vitamin E content to the number of PUFA double bonds. Calculations for PUFA content were based on these equivalencies and (1) IF fat content; (2) the PUFA content of plant oils typically used for IF; and (3) added DHA to the maximal permitted amount (0.5% of fatty acids).

Results: Using FSC specifications, the calculated vitamin E amount to compensate for PUFA double bond content ranged from 0.003 to 0.53 mg/100 kJ in theoretical infant formulas of different PUFA content. Vitamin E equivalents using Codex specifications were only slightly higher. DHA content at the maximum permitted amount also had a minimal impact on the calculated vitamin E amount.

Conclusions: This study showed that the calculated vitamin E amount to compensate for PUFA peroxidation can be substantial compared to the prescribed IF vitamin E content (0.11-1.2 mg/100kJ). However, the differences in calculating vitamin E equivalents by the FSC or Codex specifications were minimal.

Funding source(s): N/A
Background/Aims: Higher vegetable intake is consistently associated with lower risk of atherosclerotic vascular disease (ASVD). However, few studies have explored the associations between type and diversity of vegetable intakes and long-term ASVD outcomes. This study aimed to investigate the associations of quantity, type and diversity of vegetable intakes with ASVD mortality.

Methods: 1,500 women aged 70-85 years were recruited in 1998 and were followed for 15 years. Vegetable intake was assessed at baseline using a validated food frequency questionnaire. Vegetable types included cruciferous, allium, yellow/orange/red, leafy green and legume. Vegetable diversity was assessed by the number of different vegetables consumed (p/d). The primary outcome was an ASVD-related death ascertained using the Western Australian Data Linkage System. Women with a baseline history of ASVD and diabetes were excluded from analyses. Cox regression modelling was used to analyse data.

Results: Over 15,947 person-years of follow-up, 238/1,226 (19.4%) women died of an ASVD-related cause. Higher vegetable intake and diversity were both associated with a lower risk of ASVD mortality (P<0.01). For vegetable types, cruciferous (per 10g/d HR=0.87, 95%CI 0.81, 0.94, P<0.001) and allium (per 5g/d HR=0.82, 95%CI 0.73, 0.94, P=0.003) vegetables were inversely associated with ASVD mortality, independent of other vegetables. Associations for yellow/orange/red (P=0.443), leafy green (P=0.063) and legume (P=0.379) vegetables were not significant.

Conclusions: Including a diverse range of vegetables in the diet, with a focus on consuming cruciferous, allium and possibly leafy green vegetables, may contribute to reducing risk of ASVD in older women.

Funding source(s): NHMRC and Healthway.
A MEDITERRANEAN DIET IMPROVES ENDOTHELIAL FUNCTION IN MEN AND WOMEN OVER 65 YEARS: RESULTS FROM THE MEDLEY STUDY.

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Background/Aims: Endothelial function measured by flow mediated dilatation (FMD) has been linked to CVD risk. We aimed to determine if following a Mediterranean diet (MedDiet) could improve endothelial function in men and women aged over 65 years.

Methods: In a randomised controlled intervention trial, volunteers aged ≥65 years were randomly allocated to follow either a MedDiet or maintain their habitual diet (HabDiet) for 6 months. The MedDiet consisted of olive oil, vegetables, fruits, legumes, nuts, whole grains and fish. All volunteers saw a dietitian fortnightly. FMD of the brachial artery was assessed at baseline and 6 months. Linear mixed effects models with a diet*visit interaction term were used to determine between group differences.

Results: Complete FMD data for baseline and 6 months was collected for 78 volunteers (Med=45, Hab=33). Adherence to the MedDiet increased significantly in the intervention but not control group (P<0.001). Baseline %FMD was not different between groups (mean±SD 2.24±2.24 for HabDiet and 2.22±2.52 for MedDiet). At 6 months the adjusted marginal mean difference between groups was 1.50% (95% CI 0.19, 2.81, P=0.026), the intervention group increasing their %FMD by 1.49% compared to a 0.02% decrease in the Hab group.

Conclusions: Adhering to the MedDiet for 6 months compared to the HabDiet improved endothelial function in older healthy Australians.

Funding source(s): National Health and Medical Research Council
Background/Aims: The frequency of spicy food intake has recently been associated with a reduced risk of mortality in the Chinese population. This study aimed to prospectively examine the association between chilli intake and the incident of overweight/obesity in a Chinese adult population.

Methods: 12,970 adults aged 20 years and older in the China Health and Nutrition Survey were followed between 1991 and 2011. Dietary data were collected during home visits using a 3-day food record in 1991, 1993, 1997, 2000, 2004, 2006, 2009 and 2011. Cox regression was used to in the analysis. Overweight/obesity was defined as BMI ≥25 kg/m^2.

Results: 12,970 adults were followed for a median of 9 years. During 126,884 person years of follow-up, 3,203 participants developed overweight/obesity. The absolute incident rate of overweight/obesity was 26.4, 22.3, 24.4, and 20.5 per 1000 person years among those who consumed no chilli or 1-20, 20-50, >50 g/day respectively. Chilli consumption was inversely associated with the incident of overweight/obesity. In the whole cohort, after adjusting for age, gender, energy and fat intake, smoking, alcohol drinking and physical activity, those that ate chilli 0, 1-20, 20-50 and >50 g/day had a hazard ratio (HR) for overweight/obesity of 1.00, 0.85(0.73-0.98), 0.92(0.81-1.04), and 0.76(0.66-0.86) respectively. There was no interaction between chilli intake and gender, income, education and residence (urban/rural) in relation to the risk of overweight/obesity.

Conclusions: Chilli intake is inversely associated with the risk of being overweight/obese in Chinese adults.

Funding source(s): None.
FLAVONOID-RICH APPLE IMPROVES ENDOTHELIAL FUNCTION IN INDIVIDUALS AT RISK FOR CARDIOVASCULAR DISEASE

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Background/Aims: Studies show an inverse association between apple intake and coronary mortality. Endothelial dysfunction occurs before vascular disease is detected and is an independent predictor of cardiovascular risk. To determine if the benefits of apples comes from their flavonoid-rich skin, we gave volunteers apples with skin or apple flesh only as a control. We wished to determine if acute and chronic (4 weeks) ingestion of flavonoid-rich apple would improve endothelial function and BP in human volunteers with at least one risk factor for CVD.

Methods: We conducted a randomized, controlled, cross-over trial with 30 men and women with one or more of the following: 120< systolic BP <160, 5.6< blood glucose <6.5, 5< total cholesterol <8 or central obesity (men >94cm; women >80cm). We assessed acute and chronic changes in BP, endothelial function, arterial stiffness, and levels of plasma flavonoid metabolites, cholesterol, glucose, nitrate and nitrite. Differences between interventions were assessed by mixed models ANOVA with adjustments for baseline.

Results: We observed significant improvements in endothelial function 2hrs after acute ingestion (0.7%, p<0.0001) and after 4 weeks chronic ingestion (0.58%, p<0.0001) of the apple with skin intervention compared to the control. We saw a significant increase in plasma quercetin metabolites after the acute and chronic apple with skin intervention. We saw no significant changes in other measurements.

Conclusions: Our results support the theory that flavonoid-rich foods protect against cardiovascular disease by improving endothelial function, both acutely and chronically. The mechanism behind this is yet to be elucidated.

Funding source(s): NHMRC
DIETARY PECTIN’S EFFECT ON DIGESTIVE PANCREATIC ENZYMES AND RESIDUAL MACRONUTRIENTS IN GROWER PIGS

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Background/Aims: Consumption of dietary fibres has been inversely related to metabolic disorders through epidemiological studies. This study focused on soluble dietary fibres (SDF) in the form of mango pulp and purified pectin (apple). Although pectin has been shown to influence pancreatic enzyme activity (PEA) and residual macronutrients, the physiological mechanisms behind these changes are not completely understood. It was hypothesised that pectin would decrease PEA and increase small intestinal (SI) residual macronutrients.

Methods: Thirty Large White grower pigs were assigned to one of three diets. The control diet contained wheat starch (WS), which was partially replaced by SDF in the mango and pectin diets (1.6 & 6.9% inclusion respectively). Pigs were fed these diets for 21 days prior to slaughter after which the gastrointestinal tract was removed and SI contents collected. PEA and residual starch, fat and protein were determined.

Results: α-amylase activity from pectin pigs (5936 U/g DM) was significantly higher (P<0.001) when compared with control pigs (2468 U/g DM). Lipase and trypsin activity from pectin pigs was significantly lower (P<0.001) when compared with control pigs. α-amylase, lipase and trypsin activity from mango pigs was intermediate. Pectin pigs had decreased residual starch and protein and increased residual fat when compared with control or mango pigs (P=0.028, <0.001 & 0.048 respectively).

Conclusions: Negatively charged pectin most likely excluded α-amylase from the thickened pectin phase increasing α-amylase activity. Due to size, proteins potentially diffused into the pectin 'gel' resulting in more efficient digestion.

Funding source(s): ARC COE in Plant Cell Walls
ASSOCIATION OF VEGETABLE NITRATE INTAKE WITH CAROTID ATHEROSCLEROSIS AND ISCHEMIC CEREBROVASCULAR DISEASE IN OLDER WOMEN

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Background/Aims: A short-term increase in dietary nitrate intake can improve markers of vascular health via effects on nitric oxide. Whether this translates into long term vascular disease risk reduction remains unknown. We investigated the association of vegetable nitrate intake with common carotid artery intima-media thickness (CCA-IMT), plaque severity and ischemic cerebrovascular disease events in a population-based cohort of elderly women (n=1226).

Methods: Vegetable nitrate intake, assessed with a validated food frequency questionnaire, lifestyle factors and cardiovascular disease risk factors were determined at baseline (1998). CCA-IMT and carotid plaque severity was measured using B-mode carotid ultrasound (2001). Ischemic cerebrovascular disease hospitalization and death (event) over 14.5 y (15,032 person-years of follow-up) were obtained from the West Australian Data Linkage System.

Results: Higher vegetable nitrate intake was associated with a lower maximum CCA-IMT (β = -0.015, P = 0.002) and lower mean CCA-IMT (β = -0.012, P = 0.006). This relationship remained significant after adjustment for lifestyle and cardiovascular risk factors (P ≤ 0.01). Vegetable nitrate intake was not a predictor of plaque severity. Every 1 SD (29 mg/d) higher intake of vegetable nitrate was associated 17% lower risk of 14.5-y ischemic cerebrovascular disease events in both unadjusted and fully adjusted models (P =0.02).

Conclusions: Independent of other risk factors, increased vegetable nitrate intake was associated with a lower CCA-IMT and risk of an ischemic cerebrovascular disease event. These results are consistent with the growing body of evidence for the vascular health benefits of nitrate-rich vegetables.

Funding source(s): NHMRC and Healthway.
OAT β-GLUCAN LOWERS BLOOD CHOLESTEROL BY RESTRICTING ITS INTESTINAL ABSORPTION AND DECREASING BILE ACIDS LEVELS

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Background/Aims: Although oat (1,3:1,4)-β-glucan (BG) has been shown to decrease blood cholesterol in intervention trials, the detailed mechanism is not yet defined, but restricted re-absorption of bile acids (BAs) has been hypothesised.

Methods: Pigs used as a model for humans were fed a control (n=6) or a diet containing 10% oat BG (n=6) for 26 d. Blood and both intestinal contents and tissue from the proximal, mid-jejunum and terminal ileum were collected.

Results: Compared to the control, the BG diet caused decreases of 24% in blood total BA (TBA), 34% total cholesterol (TC) and 57% LDL cholesterol (LDL-C) (P<0.01); decreases of 20% mid-jejunal and terminal ileal TBA (P<0.01); increases of 80% caecal total neutral sterols (NS) including cholesterol (P<0.01); 50% BA diffusion rate reduction across ex vivo terminal ileum (P<0.001); and 32% jejunal microvilli heights reduction with increased goblet cell activity. Colonic sterols fermentation enhanced production of therapeutic ursodeoxycholic acid, suppressed toxic lithocholic acid, and decreased further cholesterol absorption by transformation into a non-absorbable NS, coprostanol.

Conclusions: BG physically hinders the active re-absorption of BAs and uptake of cholesterol; and changes BAs profile with lower circulating levels, without excess faecal excretion, resulting in reduced blood TC and LDL-C. BG also resulted in beneficial re-profiling of secondary BAs.

Funding source(s): ARC CoE in Plant Cell Walls
LOW DOSE DIETARY NITRATE IMPROVES ENDOTHELIAL DYSFUNCTION & PLAQUE STABILITY IN THE APOE<sup>−/−</sup> MOUSE FED A HIGH FAT DIET


Background/Aims: Nitric oxide (NO) is an important vascular signalling molecule. NO is synthesised endogenously by endothelial NO synthase (eNOS). An alternate pathway is dietary nitrate, which can be converted to nitrite and stored or further converted to NO and used. Atherosclerosis is associated with endothelial dysfunction and subsequent lesion formation, thought to arise due to a reduction in the bioavailability and/or bioactivity of endogenous NO. The aim was to determine if dietary nitrate can protect against endothelial dysfunction and lesion formation in the ApoE<sup>−/−</sup> mouse fed a HFD.

Methods: ApoE<sup>−/−</sup> fed a HFD were randomized to (i) high nitrate (10mmol/kg/day, n=12), (ii) moderate nitrate (1mmol/kg/day, n=8), (iii) low nitrate (0.1mmol/kg/day, n=8), or (iv) sodium chloride supplemented drinking water (control, n=10) for 10 weeks. A group of C57BL6 mice (n=6) received regular water. Aortic rings were isolated and assessed for their relaxation to increasing doses of acetylcholine. Plaque lipid and collagen content was assessed via staining.

Results: At 10 weeks, ACh-induced vessel relaxation was significantly impaired in ApoE<sup>−/−</sup> mice versus C57BL6 (P<0.05). Mice supplemented with low or moderate nitrate showed significant improvements in ACh-induced vessel relaxation compared to ApoE<sup>−/−</sup> mice given high nitrate or sodium chloride (P<0.05). Plaque collagen expression was increased and lipid deposition reduced following low or moderate nitrate compared to sodium chloride, reflecting increased plaque stability with nitrate supplementation (P<0.05).

Conclusions: Low and moderate dose nitrate significantly improved endothelial function and atherosclerotic plaque composition in ApoE<sup>−/−</sup> mice fed a HFD.

Funding source(s): N/A
ASSOCIATIONS BETWEEN EATING PATTERNS AND ADIPOSITY MEASURES IN AUSTRALIAN ADULTS

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Background/Aims: Research examining associations between eating occasion (EO) frequency and adiposity is inconclusive, with studies examining meal and snacks as separate EOs, and the impact of energy misreporting, rare.

Methods: This cross-sectional study examined associations between eating patterns (frequency of all EOs, meals and snacks) and adiposity in Australian men (n=2050) and women (n=2269) aged ≥19 years. Dietary intake was assessed via two 24-hour recalls collected during the 2011-12 National Nutrition and Physical Activity Survey. Frequencies of all EOs, meals and snacks were calculated. Height, weight and waist circumference (WC) were measured. Energy misreporting was assessed as the ratio of energy intake to predicted energy expenditure (EI:EE). Energy misreporters were identified by EI:EE ratios, <0.68 or >1.32. Multivariate regression models assessed associations between eating patterns and BMI scores and WC.

Results: After adjustment for covariates and EI:EE, EO and snack frequency, but not meal frequency was positively associated with WC and BMI in both men and women (P<0.05). Multivariate analysis that excluded energy misreporters and adjusted for total EI yielded different results. In men only, inverse associations with WC, but not BMI, were found for EO frequency (β=-0.8, 95% CI:-3.1, -0.2) and snack frequency (β=-0.5; 95% CI:-1.0, -0.0).

Conclusions: These findings suggest that the associations between eating patterns and adiposity are complicated by the role of EI and energy misreporting as different analytic approaches produced different results. Longitudinal research that considers the impact of EI and energy misreporting is needed to better understand the relationship between eating patterns and obesity.

Funding source(s): Australian Postgraduate Award (APA) Stipend, NHF, NHMRC
Background/Aims: Poor lung function is a characteristic of chronic respiratory disease and is associated with mortality. The relationship between high-fat dairy intake and lung function is unknown.

Methods: A subsample of the 1961-born Tasmanian Longitudinal Health Study cohort (n=836) underwent spirometry to measure lung function and completed a questionnaire. Regression was used to measure associations between fat content of milk consumed, frequency of high-fat dairy intake (ice cream, cream and full-fat cheese) and Forced Expired Volume in 1 second (FEV$_1$), Forced Vital Capacity (FVC) and FEV$_1$/FVC. All measures of association were adjusted for age, sex, height, education, occupation, asthma, BMI and fruit and vegetable intake. Smoking was examined as an effect modifier.

Results: Associations between fat content of milk and FEV$_1$ and FVC differed by smoking status (p=0.016 and 0.003 respectively). Current smokers consuming high-fat dairy foods once daily had a mean FEV$_1$ 276ml lower (82ml-470ml) and mean FEV$_1$/FVC 4.4% lower (3.1%-5.7%) than those who never consume high-fat dairy foods. There were no associations observed between milk/dairy fat and lung function in never or former smokers.

Conclusions: Consumption of high-fat dairy products was associated with poorer lung function in smokers. This was consistent across measures of dairy fat intake.

Funding source(s): NHMRC, Clifford Craig Medical Research Trust
HIGHER TINNED FISH INTAKE ASSOCIATES WITH A LOWER RISK OF A FIRST CLINICAL DIAGNOSIS OF CENTRAL NERVOUS SYSTEM DEMYELINATION

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Background/Aims: The evidence for a role of fish intake in reducing the risk of multiple sclerosis (MS) is inconclusive. We examined the associations between fish intake and risk of a first clinical diagnosis of central nervous system demyelination (FCD), a common precursor to diagnosis of MS.

Methods: The 2003-2006 Ausimmune Study is a matched case-control study examining environmental risk factors for a FCD. Dietary data were collected using the Cancer Council Victoria food frequency questionnaire. We used conditional logistic regression models to test associations between intakes of grilled, fried and tinned fish and risk of a FCD (256 cases, 430 controls), adjusting for smoking, physical activity, BMI and education.

Results: Higher intake (per 30 g/day, equivalent to two serves/week) of tinned fish was associated with a decreased risk of a FCD (OR=0.66; 95%CI 0.45,0.96; p=0.029). There were no significant associations between grilled or fried fish and risk of a FCD.

Conclusions: Tinned fish is primarily oily (e.g. tuna, salmon, sardines) and high in vitamin D and omega-3, both of which may be beneficial in relation to MS, although the current evidence for omega-3 is equivocal. Grilled and fried fish are likely to include white fish - low in vitamin D and omega-3 - which may explain the lack of association with a FCD. Future studies should elucidate whether components of oily fish and/or the replacement of other foods are factors in reducing the risk of a FCD.

Funding source(s): Multiple Sclerosis Western Australia
EFFECTS OF AN ENCAPSULATED FRUIT AND VEGETABLE JUICE CONCENTRATE ON OBESITY-INDUCED SYSTEMIC INFLAMMATION

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Background/Aims: Phytochemicals from fruits and vegetables have been shown to reduce systemic inflammation. This study examined the effects of an encapsulated fruit and vegetable juice concentrate on risk factors for chronic disease in overweight and obese adults.

Methods: A double-blinded, parallel, randomised placebo-controlled trial was conducted in 56 adults aged ≥40 years, with BMI ≥28 kg/m². Before and after 8 weeks daily treatment with 6 capsules of fruit and vegetable juice concentrate or placebo, peripheral blood gene expression (microarray and qPCR), plasma TNFα (ELISA), plasma carotenoids (HPLC), body composition (DEXA), HbA1c, cholesterol and triglycerides were assessed.

Results: Total carotenoids (0.73mg/L (week 0) versus 0.85mg/L (week 8), p=0.017) and β-carotene (0.11mg/L versus 0.16mg/L, p<0.001) significantly increased in plasma following consumption of the juice concentrate. Correspondingly, total cholesterol (5.70mmol/L versus 5.50mmol/L, p=0.015) and LDL cholesterol (3.63mmol/L versus 3.50mmol/L, p=0.032), plasma TNF-α (1.04pg/mL versus 1.02pg/mL, p=0.037) and systolic blood pressure (131.7mmHg versus 125.9mmHg, p=0.005) were decreased and total lean mass (49.3kg versus 50.0kg, p=0.018) increased following the juice concentrate. Between group differences were observed for plasma total carotenoids, lycopene and β-carotene. Gene expression of various signalling pathways was altered, including 3 genes involved in lipogenesis, 10 NF-kB associated genes and 2 AMPK associated genes.

Conclusions: Systemic inflammation, blood lipids and body composition were improved in obese individuals following an 8 week intervention with an encapsulated fruit and vegetable juice concentrate, which may be useful in reducing the risk of obesity-induced chronic disease.

Funding source(s): Financially supported by research grant from NSA, LLC (Collierville, TN).
MOLASSES EXTRACT IMPROVES BODY COMPOSITION AND GLUCOSE METABOLISM OF MICE ON A HIGH-FAT DIET

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Background/Aims: Plant polyphenols in health and disease have gained significant attention in recent years. In particular, some polyphenols have been shown to have weight-reducing properties with numerous studies reporting their ability to have positive effects on metabolism. We assessed the effect of a polyphenol rich extract from sugarcane molasses (ME) in an animal model of obesity on body composition, glucose tolerance and insulin sensitivity.

Methods: C67BL/6J mice were randomised to one of three dietary groups for 18 weeks (n=12): high-fat diet (HFD), HFD+16%ME (ME16), and HFD+32%ME (ME32) and body composition and metabolism assessed.

Results: ME16 and ME32 attenuated body weight gain (-4.75±0.99 and -10.14±0.41 g, respectively), reduced fat mass (-5.82±1.20 and -12.63±0.22 g), epididymal fat (-0.67±0.16 and -1.35±0.03 g) and liver weights (-0.19±0.16 and -0.74±0.05 g), increased energy expenditure (+9.40±2.49 and +11.27±2.99 kJ/d) and suppressed the level of absorption and digestion (-2.19±0.32 and -3.88±0.28 g) of the HFD (all p < 0.001). ME32 also improved glucose tolerance (+2.29±0.34; p<0.001) and insulin sensitivity (+3.01±1.12; p<0.01). In the liver, ME produced changes associated with thermogenesis and fat oxidation, including increased proliferator-activated receptor-gamma coactivator 1α (ME16: +1.35±0.46; ME32: +2.03±0.17; both p<0.001) and peroxisome proliferator-activated receptor α (ME16: +0.68±0.30, p<0.05; ME32: +1.13±0.09, p<0.001), while ME32 reduced inflammatory marker, monocyte chemoattractant protein (-0.73±0.03, p<0.05) and increased uncoupling protein 2 (+0.88±0.06; p<0.01), an adaptive response to oxidative stress.

Conclusion: Long-term administration of ME improves HFD-induced aspects of body composition by increasing energy expenditure and fat oxidation.
ACUTE EFFECT OF QUEEN GARNET PLUM JUICE ON BLOOD PRESSURE, COGNITION AND URINARY METABOLITE EXCRETION

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Background/Aims: Consumption of anthocyanins from fruit sources may exert protection against hypertension and cognitive decline. The aim of this study was to investigate the acute impact of plum juice, produced from the novel high anthocyanin Queen Garnet Plum (QGP), on cognition, blood pressure and urinary anthocyanin excretion profiles.

Methods: 12 older (65y+) and 12 younger (18-45y) adults participated in an acute crossover study. Participants randomly received either 300ml single dose or 3x100ml QGP juice over 3 hours (0, 1, 3h) on two different occasions with a 2-week washout period. Cognitive tasks were administered at 0h and 6h on each study day, BP and urinary anthocyanin/metabolite excretion profiles measured over 24h. AUC for BP was calculated (0-6h).

Results: No significant dose-effect was observed for BP, therefore, groups were analysed together. The greatest BP reduction was observed at 2h for both age groups. This was more obvious for systolic BP of the older group with a mean difference of 12.83mmHg (sd; 16.51) from baseline. No acute effect of QGP juice was observed on cognition. Native Queen Garnet plum anthocyanins as well as five methylated and glucuronidated metabolites were excreted in the urine of study participants (0.19-0.24% of the ingested dose) with no significant differences between age groups or dosage.

Conclusions: The notable acute reduction in BP following consumption of the QGP holds promise for non-pharmacological strategies to prevent and manage hypertension. Further studies are needed to elucidate the metabolic fate of fruit-delivered anthocyanins.

Funding source(s): SMAH Partnership Grant, University of Wollongong.
THE IMPACT OF STORAGE CONDITIONS AND GROWING SEASON ON THE ANTHOCYANIN CONTENT OF SWEET CHERRY VARIETIES

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Background/Aims: Cherries are known to be a rich source of anthocyanins, however the consumption of fresh cherries is limited by a short growing season. This study aimed to determine the anthocyanin profile and concentration of sweet cherry varieties produced in Tasmania, and to investigate the impact of storage at -20°C on these water-soluble pigments. The effect of seasonal variation on total anthocyanin content (TAC) was also investigated.

Methods: Cherries were harvested at commercial maturity stage in 2015 and 2016. Immediately and following storage at -20°C for 3 or 12 months, anthocyanins were extracted utilising an optimised extraction protocol. The anthocyanin profile and the TAC of the extract were determined via UPLC.

Results: Significant differences in total anthocyanin content were identified between varieties. Kordia was the richest source of anthocyanins, with a TAC of 873mg/100g, followed by Vans, Sweet Georgia, Simone and Lapins. TAC decreased by 54.6% following storage at -20°C for 3 months (p-value<0.005), with a further decrease to 22.5% of original TAC following 12 months storage (p-value<0.005). Seasonal variation was found to have a significant effect on TAC, with the average TAC of the 2015/2016 harvest being 1.9-fold greater than the TAC of cherries harvested in the 2014/2015 season (543.77mg/100g and 284.81mg/100g, respectively; p-value<0.005).

Conclusions: Kordia contained the highest levels of anthocyanin of all varieties tested in both the 2015 and 2016 growing seasons. Storage at -20°C for 3 months resulted in a significant reduction in anthocyanin content (54.6%) however due to their high initial TAC there is still sufficient bioactive compound to warrant this method of storage.

Funding source(s): Reid Fruits, Essential Oils of Tasmania, Research Connections
A SYSTEMATIC APPROACH TO ESTIMATE LEGUME CONTENT OF AUSTRALIAN FOODS

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Background/Aims: National food composition databases contribute to nutrition research practice by providing nutrient profiles of foods in the Australian food supply. Globally databases are yet to include legume content data. This study aimed to expand the most recent food composition database, AUSNUT 2011-13, with legume data to delineate legume contents of all foods and food products.

Methods: Foods and food products containing legumes from three subgroups (non-oil seed legumes, soy foods and beverages, and peanuts) were systematically identified. Legume content (g) per 100 g was calculated using a recipe-based approach using information from product labels, the Grains and Legumes Nutrition Council, and input from industry stakeholders.

Results: Legume ingredients were identified in 367 out of 5740 products. Soy foods and beverages formed the majority (51 %) of the database, 26 % contained non-oil seed legumes, 14 % contained peanuts, and 10 % were comprised of legume subgroup combinations. Core foods accounted for 83 % of the database. Cereal based products and dishes formed the largest proportion (23 %) of the database. Foods with legume content 100.0 g/100 g were canned and cooked legumes, baked beans, chickpea flour, soy flour, tofu as purchased, unflavoured soy beverages, and unroasted and unsalted peanuts.

Conclusions: The expanded AUSNUT 2011-13 legume database provides a tool for use in a range of research and practice settings to progress knowledge around nutrition and public health issues. Database application will allow investigation of legume intake and associations with anthropometric markers within the Australian population.

Funding source(s): N/A
INADEQUATE VITAMIN D STATUS IS ASSOCIATED WITH ALTERED CELLULAR BIOENERGETICS OF PERIPHERAL BLOOD MONONUCLEAR CELLS

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Background: Vitamin D plays an important role in immunity. Circulating peripheral blood mononuclear cells (PBMCs) are exposed to metabolic stimuli that influence their functionality. Few studies have examined the link between vitamin D status (25OHD) and the bioenergetics of PBMCs.

Methods: 38 participants (16 males, 22 females) ranging in body fat percentage were recruited. PBMCs were isolated from whole blood, counted and freshly seeded for bioenergetic analysis using the Seahorse XF96 flux analyser (Seahorse Bioscience, USA). Body composition by dual-energy x-ray absorptiometry (Prodigy, USA), McAuley's index of insulin sensitivity (McA), serum 25OHD level (Architect 25OHD immunoassay, Abbott Diagnostics) and other relevant clinical chemistry were also measured. Participants were grouped based on 25OHD cut-offs of <50 nmol/L (Group 1, n=12), 50-75 nmol/L (Group 2, n=15) and ≥ 75 nmol/L (Group 3, n=11). A multivariate general linear model was used to arrive at a parsimonious model which retained fat mass, fat-free mass, parathyroid hormone and McA as covariates.

Results: The participants were aged 41.9±18.2 years, with percent fat 32.8±8.0 Overall, there were significant differences between groups in basal respiration (BR) (p=0.001), non-mitochondrial respiration (NM) (p=0.021), ATP production (p=0.002) and proton leak (PL) (p=0.045). Group 1 had significantly higher BR, NM and ATP production, relative to both Group 2 and Group 3, while PL was significantly greater compared to Group 2 alone.

Conclusions: Inadequate vitamin D status adversely influenced bioenergetics of PBMCs obtained from adults, in a pattern consistent with increased oxidative stress and activation of these cells.

Funding sources: Curtin University.
BACKGROUND/AIMS: The involvement of zinc in multiple physiological systems requires tight control of cellular zinc concentration. The current study aims to explore relationships among cellular zinc transporters (ZnT and ZIP) and metallothioneins (MT) in a healthy population and a cohort with Type 2 diabetes mellitus (T2DM).

METHODS: Baseline data from three trials forming two cohorts, healthy (n=70) and T2DM (n=42), were used for combined statistical analyses. Cluster analysis and principal component analysis were used to identify groupings within 10 zinc transporter and MT gene expressions measured in peripheral blood mononuclear cells, stratified by health status. Multiple regression models were used to explore relationships among zinc transporter/MT groupings, dietary zinc and plasma zinc.

RESULTS: Gene expression of most cellular zinc transporters and MT were lower in the T2DM cohort (P<0.01). Similar groupings of zinc transporters and MT were identified between the cohorts, with the exception of the placement of 2 transporters: ZnT1 and ZIP7. In the T2DM group, ZnT1 was associated with ZnT6 and ZIP3, while ZIP7 was associated with ZnT5, ZnT7, ZIP1 and ZIP10. When grouped by the components identified, zinc transporters and MT were significant determinants of plasma zinc ($r^2=0.48$, P=0.001) in the healthy cohort, but not in T2DM.

CONCLUSIONS: The current study suggests altered cellular zinc homeostasis in T2DM; the dissociation of ZnT1 and ZIP7 from their groupings as identified in the healthy cohort, highlights potential defects in zinc transport system associated with T2DM.

FUNDING SOURCE(S): N/A
LIPIDOMIC PROFILES AFTER A 30-DAY KRILL OIL SUPPLEMENTATION COMPARED WITH FISH OIL IN HEALTHY WOMEN

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Background: Krill Oil (KO) and Fish Oil (FO) are used to formulate LC n-3 PUFA supplements. There is controversy over whether KO is more bioavailable compared with FO. This study aimed to compare plasma lipidomic profiles after 30-days of KO or FO supplementation.

Method: In a randomised cross-over study, 11 healthy women (18-45 years) consumed capsules to provide a daily supplementation of 1.3g of total LC n-3 PUFA from KO and 1.4g from FO. Plasma lipidomic profiles, conducted using electrospray-ionisation tandem mass spectrometry, as changes(%) from baseline, were assessed using repeated-measures ANOVA. The differences between supplementations were assessed using paired t-test for area under the curve.

Results: A total of 11 EPA and 40 DHA containing molecular species were significantly increased in both KO and FO supplementations. There were no significant differences between groups, apart from phosphatidylethanolamine (16:0-22:6, p=0.02). In a total of 51 arachidonic acid (AA) molecular species, at day-30, KO significantly increased two and decreased two of these AA species, whereas FO significantly increased one and decreased seven of the AA species. Particularly, phosphatidylcholine (O_16:0-20:4) was significantly increased by KO, whereas it was significantly decreased by FO.

Conclusion: There was a significant increase in EPA and DHA containing molecular species following KO and FO supplementation. The trends of lipidomic changes were similar, however some LC n-3 and n-6 PUFA species responded differently to supplementations, thus indicating that KO and FO do not have equivalent effects on all molecular species of phospholipids.

Funding sources: Victoria University, Melbourne, Australia.
Background/Aims: Protein-rich supplements are used widely to manage undernutrition in older people. Their use could, however, be counter-productive by reducing overall energy intake, if protein has the same satiating effects in older as in young people. Previously, we showed that a 30g-protein drink, 3hrs before a subsequent meal, suppressed energy intake in younger (25±2yrs, 17±3% decrease in energy intake by protein vs. control $P<0.05$), but not in older (73±1yrs, 2±5% decrease $P>0.05$), men. The aim of this study was to determine in older men the effect of timing of protein ingestion on appetite and subsequent ad libitum energy intake.

Methods: Whey-protein (30g/120kcal, 130ml) at 3, 2, 1, or 0hrs before a buffet-style meal, with iso-palatable non-caloric drinks (~0kcal) at the remaining time-points, was administered in randomised order on individual study-days to eleven older men (75±2yrs, 27±1kg/m²). Non-caloric drinks were ingested at all time-points on the control day. Statistical analyses: repeated-measures-ANOVA.

Results: There was no suppression of energy intake by protein 3hrs before the meal compared to control (0±7% decrease, $P=0.785$). There was no effect of timing of protein ingestion on hunger ($P=0.205$), fullness ($P=0.284$), or energy intake (3hrs:880±62kcal, 2hrs:845±76kcal, 1hr:855±56kcal, 0hr:892±27kcal, control:894±66kcal, $P=0.905$). Total energy intake (protein+meal) was higher during the protein days (94±46kcal increase, $P=0.07$) compared to control.

Conclusions: In older men 30g-protein ingestion does not suppress energy intake at 0, 1, 2 or 3hrs thereafter, supporting the use of 'pure' protein to increase protein and energy intake in older men at risk of undernutrition.

Funding source(s): RAH Gum-Bequest
A TAS2R38 GENOTYPE DEPENDENT RESPONSE TO MANDATORY FOLIC ACID FORTIFICATION: A COMPARISON OF TWO ELDERLY COHORTS


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Background/Aims: Variants in the TAS2R38 gene influence bitter taste. The polymorphic TAS2R38-49P variant is associated with increased sensitivity to bitter compounds. This can influence diet; tasters consume less energy and alcohol, but may also avoid healthy bitter foods, including cruciferous vegetables. This potentially results in lower intake of micronutrients, including folate. Therefore, we assessed the effect of TAS2R38-A49P genotype on red cell folate levels in response to mandatory folic acid fortification.

Methods: Blood was taken from two elderly (≥65 years) cohorts on the NSW Central Coast (n=115 pre-fortification, n=475 post-fortification). Red cell folate was assessed by accredited pathology laboratories. TAS2R38-A49P genotype was assessed by RFLP-PCR. Red cell folate LS-means (adjusted for age, sex, smoking and supplement use) were compared by Tukeys HSD test. Regression analyses with interaction terms were used to calculate pinteraction for fortification status and genotype.

Results: Pre-fortification, PP genotype participants had lower mean red cell folate (855.5±112.35 vs. 1211.6±50.6 nmol/L, p=0.02). Post-fortification, there was no difference in red cell levels between genotype groups (1422.7±60.2 vs.1354.9±35.6 nmol/L; p=0.6). The increase in folate levels following fortification was significant in both cohorts, but was larger in the PP genotype group (Δ567.2nmol/L, p<0.0001 vs. Δ143.3nmol/L, p=0.05). A significant interaction was found between genotype and fortification status in predicting folate levels (pinteraction=0.001).

Conclusions: Folic acid fortification appears to have enhanced benefit in those with a TAS2R38-A49P genotype, potentially related to sensitivity to bitterness. Fortification may therefore circumvent the impact of taste.

Funding source: Australian Research Council.
ANTI-GLYICATION POTENTIAL OF CYANIDIN-3-RUTINOSIDE (C3R): A NATURALLY OCCURRING ANTHOCYANIN

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Background/Aim: Advanced Glycation End Products (AGEs) play a significant role in the development and progression of vascular complications associated with diabetes. However, the damaging effects of AGEs may be prevented by anthocyanins, the colourful pigment from fruits and vegetables. This study aimed to determine whether an anthocyanin, cyaniding-3-rutinoside (C3R), inhibited protein glycation and oxidation, and improved vascular function.

Methods: The effect of C3R (0.125-1mM) on AGE formation was assessed by co-incubation with BSA and methylglyoxal, subsequent effects on DNA damage was assessed in a glycation model that included Cu2+. A cytochrome c reduction assay was used to quantify impairment of superoxide anion and hydroxyl radical formation. The acute vascular effects of C3R were assessed in rats by measuring the blood pressure response to intravenous administration of C3R, and changes in aortic ring contractility was assessed ex-vivo. Data was analysed by one-way and two-way repeated measures ANOVA.

Results: C3R reduced the formation of methylglyoxal-induced fluorescent AGEs, superoxide and hydroxyl radicals (p<0.05). Intravenous infusion of C3R (3-5 mg/kg) to rats reduced blood pressure by 10-22% (P<0.05). C3R (1-100nM) caused vasorelaxation in noradrenaline pre-contracted aortic rings by endothelium-dependant mechanisms.

Conclusions: C3R possess multiple attributes which makes it a potential natural anti-glycation agent. Further studies are warranted to ensure these actions are maintained during chronic hyperglycaemia.
FIBRE UTILISATION IS NOT DEFECTIVE BUT COLONIC EPITHELIAL FUNCTION MAY BE ABNORMAL IN QUIESCENT ULCERATIVE COLITIS

Background/Aims: Defective carbohydrate fermentation has previously been described in individuals with ulcerative colitis (UC). Additionally, low fibre but high protein intakes have been reported in UC patients and may contribute to its pathogenesis. We aimed to compare the (1) habitual dietary fibre and protein intake and (2) carbohydrate fermentation ability in UC patients and of healthy controls (HC).

Methods: Patients with UC in remission and HC without recent fibre supplementation were included. Seven-day food records were used to compare mean (SEM) dietary intake for fibre, resistant starch, oligosaccharides and protein between cohorts and against Nutrient Reference Values using Foodworks. 48-h faecal samples were assessed for daily faecal and starch output, pH and water content. Starch utilisation, a marker of carbohydrate fermentation, was also compared between groups. Data were analysed using unpaired t-tests, Fisher’s exact or Mann-Whitney tests.

Results: 8 UC patients and 9 HCs were studied. Consumption of protein (88(10) vs 99(11)g/d; p=0.50), fibre (24(2) vs 28(4) g/d; p=0.45) and its components was similar between UC vs HC respectively. Only 44% HC and 25% UC patients met fibre recommendations (p=0.62). None of the faecal indices differed except for faecal water content (25% higher in UC patients). Starch utilisation was similar in UC patients (median 96[range:85-99]%) and HCs (95[86-100]%; p=0.49).

Conclusions: Habitual protein and fibre intake did not differ in this UC cohort compared to those of HCs. Fibre utilisation was similar not supporting a carbohydrate fermentative defect. Instead, UC patients had a greater faecal water content, indicating functional impairment of the colonic epithelium.

Funding source(s): Ferring Pharmaceuticals.
PLASMA CYSTEINE PREDICTS WEIGHT REGAIN AFTER BARIATRIC SURGERY

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Background/Aims: Plasma concentrations of amino acids, in particular total cysteine (tCys) and branched-chained and aromatic amino acids (BCAAs, AAAs) are associated with obesity. Recent data suggest a causal association between tCys and obesity. In this study, we examined the association of selected plasma amino acids with changes in BMI from 2 to 4 y (ΔBMI₂₄y) after Roux-en-Y gastric bypass (RYGB).

Methods: Patients (n=165, 74.5% women) were investigated 2 and 4 y after RYGB. The associations of plasma AAAs, BCAAs and tCys at 2 y with BMI₂ y and with ΔBMI₂₄y were studied by linear and logistic regression, adjusted for age and sex.

Results: AAAs, BCAAs and tCys at 2 y were positively associated with BMI₂ y (r = 0.23-0.27, P≤0.003 for all), but only plasma tCys₂ y was associated with ΔBMI₂₄y (r = 0.21, P= 0.015). The risk of gaining ≥2 BMI units from 2 to 4 y was higher for those with tCys₂ y in quartile 4 vs. those in quartile 1 (OR: 2.96; 95%CI: 1.06-8.23).

The mean (SE) ΔBMI₂₄y was 2.3 (0.4) kg/m² in quartile 4 compared to 1.0 (0.4) kg/m² in quartile 1 (P=0.025).

Conclusions: High plasma tCys at 2 y after RYGB is associated with later weight regain. If tCys is causally associated with obesity, it may provide a treatment strategy against weight regain after bariatric surgery.

Funding source: The Norwegian Extra Foundation for Health and Rehabilitation through EXTRA funds, Norway.
THE IMPACT OF SODIUM ON INFLAMMATION RELATED TO MULTIPLE SCLEROSIS

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Background/Aims: The aetiology of Multiple Sclerosis is still unknown; however certain environmental factors paired with a genetic predisposition have been implicated in the onset of the disease. Recent studies have suggested dietary sodium as a contributing factor to Multiple Sclerosis exacerbation, which includes increased rate of relapse, severity of symptoms and increased number of T2-MRI lesions, which are indicative of disease progression. This review aimed to determine the impact of sodium on inflammation and autoimmunity related to Multiple Sclerosis.

Methods: A systematic literature review was conducted using the databases Scopus, Medline and PubMed to locate appropriate studies. Articles were restricted to those published in the past 15 years (2001-2016), and being an emerging area of research the search was open to all populations and study designs.

Results: Nine peer-reviewed articles were located for inclusion. Results showed in-vitro augmentation of the immune response when cells were exposed to high-salt media. Similarly, disease was exacerbated and associated inflammation was increased in-vivo in mice that were fed a high-salt diet. Human subjects who consumed a high-salt diet also had an increased number of T2-MRI lesions and a higher relapse rate.

Conclusions: High-salt conditions and intakes of high amounts of dietary salt contribute to a heightened autoimmune response and increased neuroinflammation in mice and in human subjects. Results are suggestive of a relationship between high dietary salt intake and Multiple Sclerosis pathophysiology and therefore higher-level evidence studies on this relationship are indicated.

Funding source(s): N/A
Background/Aims: Telomere length is a biomarker of cellular ageing, with longer telomeres associated with longevity and reduced risk of chronic disease in older age. Consumption of a healthy diet may contribute to longevity via its impact on cellular ageing but studies on diet and telomere length to date have been limited and their findings equivocal. The aim of this study is to examine associations between three indices of diet quality and telomere length in older men and women.

Methods: Adults aged 57-68 years participating in the Wellbeing, Eating and Exercise for a Long Life (WELL) study in Victoria, Australia (n = 679, 49% men) completed a postal survey including a 111-item food frequency questionnaire in 2012. Diet quality was assessed via three indices, the Dietary Guideline Index, the Recommended Food Score and the Mediterranean Diet Score. Relative telomere length was measured by quantitative polymerase chain reaction. Associations between diet quality and telomere length were assessed using linear regression adjusted for covariates.

Results: After adjustment for age, sex, education, smoking, physical activity and body mass index (BMI), there were no significant associations between any measure of diet quality and relative telomere length.

Conclusions: While diet quality was not associated with telomere length in the current study, future research should consider repeated measures of telomere length, to examine the impact of diet on rate of telomere shortening in longitudinal studies.

Funding source(s): ARC; Diabetes Australia Research Trust; NHMRC
ROLE OF THE HEPATOPORTAL SYSTEM IN THE REVERSAL OF INSULIN RESISTANCE IN RATS

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Background/Aims: Insulin resistance is the primary characteristic underlying the development of T2DM. We have previously shown that high-fat diet-induced insulin resistance in rats can be ameliorated by a single glucose meal, but the mechanism has yet to be elucidated. Our aim was to determine if this effect is mediated by gut or portal factors.

Methods: Male Wistar rats were fed a lard-based high-fat diet for three weeks. Two jugular vein cannula and a portal vein cannula were placed surgically in week two. Insulin sensitivity was assessed at week three using a hyperinsulinemic-euglycemic clamp. The evening prior to the clamp, rats were divided into four groups and received either isocaloric meals of high-fat (HF) or high-glucose (OG) diet, or an intravenous glucose infusion via the jugular (IVG) or portal vein (PG). Differences between groups were determined by ANOVA.

Results: Body weight, clamped plasma glucose and insulin levels were not different between groups. HF and IVG rats had low glucose infusion rates (GIRs) (16.5 ± 0.7, 16.5 ± 0.6 mg/kg/min respectively) indicative of insulin resistance. OG rats had a significantly higher GIR than both HF and IVG rats (GIR 19.8 ± 0.6, p<0.05 for both) indicating improved insulin sensitivity. PG rats had a significantly higher GIR (23.2 ± 1.0) than HF, IVG (both p<0.0001) and OG rats (p<0.05) indicating a marked improvement in insulin sensitivity.

Conclusions: These results demonstrate that the glucose-dependent reversal of insulin resistance in high-fat fed rats is mediated by factors relating to the hepatoportal system.

Funding source(s): N/A
SOLUBLE FIBRE INTERVENTION IMPROVES ASTHMA CONTROL, AIRWAY INFLAMMATION AND ALTERS GUT MICROBIOME IN STABLE ASTHMA

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Background/Aims: In asthma low fibre intake is associated with worse airway inflammation and lung function. Dietary fibre has been shown to modulate the gut microbiome and airway inflammation in animal models. This study investigated the effects of inulin supplementation in asthmatic adults.

Methods: A randomised, placebo controlled 3-way crossover study in 17 stable asthmatics of 7 days inulin (12g/day), inulin+probiotic (multi-strain >25 billion CFU) and placebo supplementation was performed, with clinical assessment and faecal collection before and after each treatment. Faecal bacteria were determined by fluorescent in situ hybridisation and faecal SCFA by HPLC-MS. Changes in asthma control (ACQ), lung function (FEV1), gut microbiota, SCFAs and induced sputum cell counts were analysed using Wilcoxon signed - rank and Spearman's correlations.

Results: ACQ improved (Δ-0.35(-0.50,-0.13) med(IQR) p=0.006), sputum eosinophil% decreased (Δ-1.0(-2.5,0.0) p=0.006) and a trend for improved FEV1 (p=0.131) was observed following the inulin intervention only. Significant changes in bacterial taxon relative abundance were seen; Bifidobacterium increased following inulin+probiotic with a trend following inulin. Anaerostipes increased following inulin and inulin+probiotic. An unidentified Erysipelotrichaceae taxon and Roseburia decreased following inulin only. Total faecal SCFA and acetate showed a trend to increase following inulin, and changes were correlated with changes in FEV1 (Rs=0.53, p<0.001; Rs=0.51, p<0.001), sputum eosinophils (Rs=-0.39, p=0.019; Rs=-0.34, p=0.048) and Erysipelotrichaceae (Rs=-0.40, p=0.013; Rs=-0.35, p=0.030).

Conclusions: Short term inulin supplementation beneficially alters gut microbiome, improves asthma control, airway inflammation and lung function in asthma. Soluble fibre supplementation warrants further investigation as a potential non-pharmacological addition to current asthma management strategies.

Funding source(s): John Hunter Hospital Charitable Trust
EFFECT OF 8-WEEKS PROBIOTICS SUPPLEMENTATION ON ALCOHOL METABOLISM - A PILOT STUDY

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Background/Aims: Improving gut flora via regular probiotics/prebiotics consumption may improve alcohol metabolism. This study investigated the impact of an 8wk pre/pro-biotics supplementation intervention on microbiome changes and responses to acute alcohol consumption.

Methods: 38 participants (21♀, 23.6±3.4kg·m⁻², mean±SD) attended the laboratory on two occasions. Each visit, participants provided a stool sample, which was analysed to determine presence of L.acidophilus and B.lactis. A dose of alcohol (0.40±0.04g·kg⁻¹, Vodka+SodaWater) was then consumed over 10min. Breath alcohol concentration was sampled over 5hrs and analysed using WinNonlin non-compartmental pharmacokinetic modelling (cₚₑₚₚ max, tₚₑₚₚ max, AUC last). For 8wks between visits, participants consumed supplements (1capsule and ½tsp powder·day⁻¹) as one-of-four double-blinded groups: Placebo+Placebo (PP), Placebo+Prebiotics (PA), Probiotics+Placebo (IP), Probiotics+Prebiotics (IA). Probiotics were InnerHealthPlus, Prebiotics were ArabinoGuard, and Placebo was Microcrystalline-Cellulose. Differences between trials were analysed using paired samples t-tests for both treatment intention and microbiome outcome.

Results: Increased counts for at least one bacterial strain were observed for all participants on IP (n=10) and IA (n=10) trials, and for some participants on PP (n=4) and PA (n=3) trials. No difference in cₚₑₚₚ max or tₚₑₚₚ max was observed between trials when analysed by treatment condition or microbiome outcome (p>0.05). A significant decrease in AUC last was observed between trials for PP (p=0.039) and PA (p=0.030) treatments, when increases in at least one bacterial strain (p=0.003) and no microbiome changes (p=0.016) were observed.

Conclusion: Consumption of probiotics appears to promote positive microbiome changes. Translation to beneficial impact on alcohol metabolism is less clear.

Funding source(s): Griffith University, HealthWorld Limited.
THE POSTPRANDIAL TRANSCRIPTOMIC RESPONSE OF PERIPHERAL BLOOD MONONUCLEAR CELLS IN 40-60 YR OLD MEN WITH METABOLIC SYNDROME

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Background/Aims: Identification and recommendation of appropriate dietary strategies that modulate the postprandial transcriptomic response in people with metabolic syndrome (MetS) may decrease future risk of chronic disease.

Methods: Twenty men (10 control; 10 MetS) were recruited to participate in a controlled randomised, crossover single meal study. Participants consumed isocaloric soy-based and dairy-based breakfast meals that were matched on % macronutrient contribution but differed in nutrient profile. PBMC's were collected at baseline (0 h), and 4 h following each test meal. Global gene expression profiling was performed using Illumina Human WG-6 v3 microarray chips. Genes that were differentially expressed were input into MetaCore software for pathway analysis. Pathways were considered significant with p-value < 0.05 and a false discovery rate (FDR) value < 0.05.

Results: One gene was differentially expressed in PBMC's of MetS compared with control men at baseline (GYPC, increased 506-fold, p=0.02). Four pathways; IGF family signalling (p<0.001), oxidative phosphorylation (p<0.001), autophagy (p<0.001) and LRRK2 in neurons (p<0.001); were enriched at 4 h following the soy-based meal in PBMC's of the control participants only, but not MetS. No postprandial differences in gene expression levels were observed in PBMC's after the dairy meal at 4 h in either control or MetS.

Conclusions: Isocaloric meals that differ in nutrient profile differentially impact the transcriptome in PBMC's in healthy men but not in men with MetS at 4 h postprandial.

Funding source(s): Dairy Health & Nutrition Consortium (DHNC)
EMUSIFIED FAT PARTICLE SIZE ON POSTPRANDIAL BLOOD GLUCOSE, INSULIN, TRIGLYCERIDES AND APPETITE

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Background/Aims: This study aimed to investigate if lipid droplet size manipulation via emulsification modulates blood glucose, insulin, triglycerides (TG), and appetite after a meal.

Methods: This was a randomised, crossover acute feeding study that consisted of three test meals: 1) bread + olive oil-water beverage (control), 2) bread + finely emulsified beverage (FE, droplet size diameter ~0.8μm), 3) bread + coarsely emulsified beverage (CE, diameter ~10.2μm). Fifteen healthy adult males completed the study (age=26±6 years, BMI=22.2±1.2kgm⁻²). Participants consumed a standardised lead-in dinner, attended test sessions after 10h overnight fast, and a blood catheter was inserted. Fasting capillary glucose (HemoCue), gastric antral areas (ultrasonography), insulin & TG (plasma), and appetite (VAS) were assessed before test meal, at every 15mins for 60mins, and then every 30 mins for 180 mins after test meals (240mins total).

Results: All variables, except for appetite ratings, changed significantly over 240mins (interaction effects, p≤0.002). Gastric antral area was significantly higher (delayed gastric emptying) after FE only. The iAUC of glucose and insulin did not differ between all test meals, but the peaks of these indices were delayed in FE and CE (90mins) than control (30mins). Postprandial TG excursions followed the following order FE>CE>control, but the iAUC was significantly higher in FE only. All appetitive measures did not differ significantly between all test meals.

Conclusions: Reducing lipid particle size via emulsification reduced gastric emptying rate and increased TG in the blood more rapidly.

Funding source(s): Agency for Science, Technology and Research (A*STAR)
GLYCAEMIC RESPONSE TO BUTYRYLATED HIGH AMYLOSE MAIZE STARCH

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Background/Aims: Dietary high amylose maize starch butyrylated (HAMSB) delivers butyrate and resistant starch to the colon. The potential of HAMSB to improve large bowel health is being investigated but the effects on glycaemic response are unknown. The aim of this study was to determine the postprandial glycaemic response (PGR) to HAMSB in healthy volunteers.

Methods: Oral carbohydrate tolerance tests were undertaken in 9 fasted healthy individuals by comparing their PGR to ingestion of 40g each of HAMSB, a low amylose placebo starch (LAMS) and glucose in water. Blood glucose and serum insulin concentrations were measured over 5-hours. Results were analysed and compared using general linear ANOVAs and two-sample t-tests with Bonferroni correction applied.

Results: PGR was reduced in response to HAMSB compared to LAMS and glucose ingestion. HAMSB had a 29.41% lower (P=0.014) incremental area under the curve for blood glucose concentration versus time and produced approximately 18.83% lower peak blood glucose concentration (P=0.002). Maximum change in blood glucose maximum change in plasma insulin and peak plasma insulin were significantly lower (P<0.0005) for HAMSB (31.5%; 81.44%; 73.54%, respectively) and LAMS (15.62%; 41.97%; 53.74%, respectively) compared to glucose.

Conclusions: This study demonstrates that the short-term glycaemic response to HAMSB is lower than that induced by ingestion of rapidly digested carbohydrates. The results warrant further investigation into the long term effects of resistant starch and butyrate on glycaemic control and insulin sensitivity.

Funding source(s): RMH Department of Colorectal Medicine and Genetics; assistance from CSIRO Food and Nutrition respectively.
MUTUAL INTERACTIONS BETWEEN FOOD MACRONUTRIENTS AND DIGESTIVE ENZYMES CONTROLS RATE OF ENZYMIC DIGESTION

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Background/Aims: Interactions among macronutrients affecting enzymic susceptibility could play crucial roles in modulation of metabolic responses. We report the effect of selective inhibition of amylase, protease and lipase in pancreatin, individually and in combination, on hydrolysis of starch, protein and lipid using wheat flour as a model food system.

Methods: Acarbose (4M/mL), protease inhibitor cocktail (10L/mL) and orlistat (10µg/mL) were added to pancreatin and incubated for 25-30 min to selectively inhibit amylase, protease and lipase respectively. After each treatment, the rate and extent of starch, protein and lipid hydrolysis in wheat flour was monitored.

Results: The selective inhibition of each pancreatic enzyme hindered the digestibility of the other two non-substrate macronutrients. For example, on inhibition of protease, the starch hydrolysis rate in wheat flour was reduced from 33×10⁻⁴ to 21×10⁻⁴, and lipid hydrolysis rate was decreased to 4×10⁻⁴ from 5×10⁻⁴. Similarly, when lipase was inhibited, the starch hydrolysis rate was reduced by 24.24%, and protein hydrolysis rate decreased by 21.42%. Similar trends were observed when amylase was inhibited, with protein and lipid hydrolysis rates decreased by 35.71% and 40.00% respectively.

Conclusions: Macronutrient hydrolysis rates in wheat flour depend upon synergy among the enzymes. Hindrance of hydrolysis of protein, lipid or starch affects the hydrolysis of the other two macronutrients.

Funding source(s): Australian Research Council Centre of Excellence in Plant Cell Walls
ASSOCIATION BETWEEN IN VITRO ENZYME DIFFUSION RATE IN MILLED CEREAL GRAINS AND DIGESTION IN THE SMALL INTESTINE OF PIGS

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Background/Aims: Milled grain digestion rate depends on enzyme diffusion rate (EDR), as influenced by the grain structure. We compare ileal digestibility in pigs with the EDR of milled grains.

Methods: Ten grain samples - 4 wheat, 3 barley and 3 sorghum cultivars were studied. Sieve fractions (1.0, 0.85, 0.71, 0.5, 0.25 and 0.075mm) of each hammer-milled grain were digested using in vitro conditions mimicking digestion in the mouth, stomach and small intestine. Rate coefficients (RC) (h⁻¹) were determined from first order kinetic plots of starch digestion. Apparent diffusion coefficients (ADC) (mm²/hr) were determined from the inverse square dependence of particle size on RC. ADC values were plotted against Ileal Digestible Energy:Faecal Digestible Energy (IDE:FDE) values obtained from earlier metabolism trials in pigs.

Results: RC showed an inverse square dependence with increasing particle size for each grain type. Seven grains had similar IDE:FDE of 0.77-0.91 and ADC of 0.017-0.026mm²/hr. A sprouted wheat sample had higher, IDE:FDE (0.9) and ADC (0.079), whilst a heat-stressed barley and an immature wheat both had high NSP levels and IDE:FDE values of 0.55 and 0.74, and ADC values of 0.092 and 0.049mm²/hr respectively.

Conclusions: Higher ADC can lead to a higher IDE:FDE when this is associated with a disrupted endosperm structure (e.g. sprouting), but a lower IDE:FDE when associated with high NSP levels (e.g. immature or shrunken grains). This suggests an important interaction between intrinsic digestibility and fibre content in determining ileal digestibility of starch.

Funding source(s): Pork CRC, ARC Centre of Excellence in Plant Cell Walls
**LC-MS/MS QUANTIFICATION OF NEU5AC, NEU5GC AND KDN LEVELS IN DIFFERENT ORGANS AND AGES OF PIG: IMPACT NEU5GC INTAKE AND HEALTH**

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**Background/Aim:** Many studies have shown the relationship between exposure to the sialic acid (Sia) N-glycolylneuraminic acid (Neu5Gc) in red meat and its risk in cancer and inflammatory diseases. Our aim was to quantify the Neu5Gc, N-acetyleneuraminic acid (Neu5Ac) & 2-keto-3-deoxy-D-glycero-D-galactonononic acid (KDN) in different organs of pigs and the impact of Sia intake from pork meat on health.

**Methods:** The fresh and cooked spleen, kidney, lung, heart, liver, and skeletal muscle from 3-days-old (n=4-8), 38-days-old (n=10) and adult piglets (n=4) were analyzed using LC-MS/MS method.

**Results:** (1) Lung tissue from 3 days-old piglets contained the highest level of total Sia (14.6 µmol/g protein) compared with other organs or age groups; (2) Unexpectedly, Neu5Gc was the major Sia in spleen (67-79%) and adult lung (36-49%) while free KDN was the major Sia in skeletal muscle. Conjugated Neu5Ac was the highest Sia in other organs (61-84%); (3) Skeletal muscle contained the lowest concentration of Neu5Gc in fresh and cooked meat; (4) KDN accounted for <5% of the total Sia in most organs; (5) During development, the total Sia concentration showed a 44-79% decrease in all organs.

**Conclusion:** the high level of Neu5Gc in all organs compared to skeletal muscle is a potential risk factor suggesting that dietary consumption of organ meats should be discouraged in favor of muscle to protect against cancer, cardiovascular and other inflammatory diseases.

**Funding sources:** Xiamen Univ
EFFECT OF MEAL GLYCAEMIC LOAD AND CAFFEINE CONSUMPTION ON PROLONGED MONOTONOUS DRIVING PERFORMANCE

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Background/Aims: Monotonous driving is often unstimulating and highly repetitive. This study examined the effect of consuming meals with different glycaemic loads on prolonged monotonous driving performance. The effect of consuming caffeine with a high glycaemic load meal was also examined.

Methods: Ten non-diabetic participants (7 male, age=51±7yrs, Mean±SD) completed a repeated measures investigation involving 3 separate trials. Participants were provided one of three treatments prior to undertaking a 90min computer-based simulated drive. Treatments included: a low glycaemic load breakfast + placebo capsules (LGL), a high glycaemic load breakfast + placebo capsules (HGL) and a high glycaemic load breakfast + caffeine capsules (3mg·kg⁻¹ BW) (CAF). Driving performance measures included standard deviation of lane position (SDLP), average lane position (AVLP), number of lane crossings (LC), average speed (AVSP) and standard deviation of speed (SDSP). Analysis was conducted using repeated measures ANOVA based on a-priori planned comparisons (HGL-LGL; HGL-CAF). Pairwise comparisons (least significant difference) were performed on significant main effects.

Results: No difference in driving parameters were observed between HGL and LGL treatments. A significant reduction in SDLP (0.36±0.20 v 0.41±0.19cm, p=0.004) and LC (34.4±31.4 v 56.7±31.5, p=0.018) was observed in the CAF trial compared to the HGL trial. However, no differences in AVLP, AVSP and SDSP were detected.

Conclusions: Altering the glycaemic load of breakfast had no effect on simulated monotonous driving performance in non-diabetic adults. Drivers may consider consuming caffeine as a means of improving vehicle control during repetitious drives.

Funding source(s): Griffith University Internal Funding.
NEURAL CORRELATES OF FOOD ADDICTION "DIAGNOSIS" AS ASSESSED BY THE YALE FOOD ADDICTION SCALE: AN EXPLORATORY PILOT STUDY

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Background/Aims: Neuroimaging techniques have identified neurobiological parallels between obesity and substance addiction, with visual food cues activating dopaminergic reward-related brain circuits in a similar way to addictive substances. To date, no studies have assessed neural responsivity to food cues in individuals specifically classified as "food addicted". This pilot study aimed to explore differences in neural activity patterns between individuals classified as "food addicted" (FA) and "not food addicted" (non-FA) using the Yale Food Addiction Scale (YFAS), in response to visual food cues, as detected by blood-oxygen-level-dependent functional MRI (BOLD fMRI).

Methods: Six FA and six non-FA females aged 18-35 years were recruited. Participants attended a single session which included demographics, anthropometrics, and two fMRI scans (fasted and satiated). The fMRI paradigm included task-related fMRI acquisition while participants viewed energy-dense, nutrient-poor food images, fruit/vegetable images, and control images. Correlations between YFAS scores and BOLD responses were calculated.

Results: Participants were 24.1±2.7 years of age with a BMI of 26.4±3.7 kg/m². There were no significant between-group differences in demographics or anthropometrics (p>.05). Between-group differences in neural activity in response to energy-dense, nutrient-poor foods were identified in areas associated with reward processing, decision making, memory and executive functioning (p<.01). However, relationships between food addiction scores and BOLD responses in these areas were only significant in the non-FA group (R=.74-.83, p≤.05).

Conclusions: Preliminary findings suggest that fMRI acquisition is feasible and sensitive to detecting differences in neural responsivity based on YFAS scores. However, the small sample size limited statistical power to detect differences, and larger studies are warranted.

Funding source(s): University of Newcastle
WHEN ASSESSING LIKING AND TASTE PROPERTIES DOES SCALE DIRECTION MATTER?

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Background/Aims: Labelled affect magnitude (LAM) scales are commonly used tools to measure hedonic preferences to foods and taste sensations. This study aimed to determine whether the direction that each scale is presented influences perception of taste, texture and overall liking.

Methods: Adult participants who were not allergic to the foods being tested completed a randomized cross-over study. Participants were provided with 6 test foods to consume in a randomised order on two occasions, separated by 1 week. Vertical and horizontal versions of each scale were prepared and each individual was randomly allocated to the first scale direction. Preferences for taste, texture and overall liking were assessed with 200mm bi-directional LAM scales. Agreement between the versions were assessed using Spearman correlations, Wilcoxon signed-rank tests and Bland-Altman plots.

Results: 40 females (38±13y) and 17 males (34 ± 13y) completed the study. Individual foods showed strong correlations for ratings of liking between the 2 scale directions (all, P<0.05). When all responses were combined, there was no difference between the vertical or horizontal scales for taste (mean difference 0.02 ± 25.4 mm), texture (mean difference 2.3 ± 24.0 mm) and overall liking (mean difference -0.06 ± 23.3 mm) although Bland-Altman plots indicated large individual discrepancies. Participant preference for the scale direction revealed 24 people preferred horizontal, 23 vertical and 10 had no direction preference.

Conclusions: This study demonstrates there is no difference in individuals being able to rate liking on horizontal or vertical scales but scales presented in different directions should not be used interchangeably.

Funding source(s): N/A
Background/Aims: Archival manuscripts are difficult to locate and critically examine, particularly from a medical viewpoint. In this study, a medical report was found which had been written by Dr Hermann Beckler in 1861 after the Supply Party journey from Menindee to Bulloo and return to the Darling River. A second report was published after he returned home to Bavaria. Dr Beckler's extensive writings "In his own words" have now been published for the first time. This material has been used to develop case studies for all eight men on the Supply Party. They suffered grievously in severe drought conditions of mid-Summer. There were three deaths from scurvy and nearly all of the men suffered some signs and symptoms of it.

Conclusions: The original manuscripts have been revealed for further study. They provide useful insight into the environment of north western New South Wales in the 19th Century and its potentially profound effects on the health and survival of explorers and settlers.

Funding source: N/A
Aims: Data on portion size trends in adults are lacking in Australia. This study aimed to examine the changes in portion sizes of commonly consumed foods among Australian adults from 1995 to 2011-12.

Methods: Data from adults aged 19 years and over from 1995 National Nutrition Survey and 2011-12 National Nutrition and Physical Activity Survey were used. Sex and age group specific median portion sizes of commonly consumed core and discretionary foods were calculated using day one dietary data of both surveys. The Mann-Whitney test was used to compare portion sizes between the two surveys.

Results: A total of 48 core and 34 discretionary food categories were examined. More than 50% of food categories revealed significant differences in portion size over time. In all sex and age groups, core foods such as cooked meat, chicken, and canned fish increased in portion size by 10-150%, and portion size of discretionary foods such as fruit drinks, cordials, cakes/buns/muffins, processed meats, pizza, hamburgers and wine increased significantly by 10-190%. Portion sizes of diet drinks, savoury pastries, butter, chocolate, and beer remained similar for all sex and age groups. Some food categories exhibited an incongruent change in portion size among sex and age groups such as cheese, nuts, regular soft drinks and ice cream.

Conclusions: Our study revealed that changes in portion size varied substantially among food categories and disparate portion size trends were found between sex and age groups for some food categories. Increased portion sizes of discretionary foods are of particular concern.

Funding source(s): N/A
FOOD GROUP AND DIETARY FIBRE CONSUMPTION ON PALEOLITHIC AND AUSTRALIAN GUIDE TO HEALTHY EATING DIETS

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Background/Aims: The Paleolithic diet eliminates grains, dairy and legumes. The aim was to compare food patterns, fibre and fibre fraction intakes.

Method: Thirty-nine healthy women were randomised to either the Australian Guide to Healthy Eating (n=17) or Paleolithic diet (PG) (n=22) for 4-weeks. 3-day weighed records were collected pre and post-intervention. Post-intervention food records were used for food groups and fibre analysis. Data were analysed using FoodWorks version 8.0, NZ Food files 2014 and published data.

Results: Consumption of total grains (-3.9 serves/day), dairy (-1.4 serves/day) and legumes (-0.004 serves/day) were significantly lower in the PG, relative to the AGHE group (P<0.05 for all). The PG had a higher intake of fruit (2.9 vs 1.6 serves/day), vegetables (5.8 vs 4.0 serves/day) and protein (4.3 vs 2.6 serves/day), but lower intakes of grains (0.58 vs 4.50 serves/day) and dairy (0.1 vs 1.5 serves/day) (P<0.05 for all). There were no differences between groups in total dietary fibre intake (22.9±7.2 vs 23.6±10.2g/day), soluble (8.2±2.7 vs 8.2±3.3) or insoluble (12.2±4.4 vs 13.9±1.6g/day) fibre (P>0.05 for all). Resistant starch, however, was significantly lower in the PG at both minimum (1.3±0.6g/day vs 2.7±1.5g/day) and maximum (7.3±3.3g/day vs 12.1±7.2g/day estimated intakes.

Conclusions: The Paleolithic group had higher intakes of fruits and vegetables, however, reduced total grain and legume consumption negatively impacted resistant starch intake, which may impact the gut microbiota and subsequently, bowel health. Further research is required to assess the impact of a Paleolithic diet on gut health.

Funding source(s): Edith Cowan University
Background/Aims: Poor diet quality may a way in which lower socioeconomic position (SEP) leads to adverse health outcomes. This cross-sectional study aimed to examine associations between SEP and diet quality in a nationally representative sample of Australian adults.

Methods: Adults (n=4875; aged 19 to 85 years) were included from the nationally representative Australian Health Survey 2011/13. Multi-variable adjusted linear regression analyses investigated associations between SEP (index of socioeconomic disadvantage [quintiles]; education level [tertiary qualification; high-school/diploma; some high school] and household income [quintiles]) and diet quality (estimated from two 24-hour recalls using the Dietary Guideline Index; DGI).

Results: Following adjustment for covariates, DGI was lower in individuals living in areas with greater socio-economic disadvantage (coef: -0.88, SE 0.22; P-trend<0.001), those with a lower education level (coef: -2.25, SE 0.46; P-trend<0.001) and those with lower income (coef: -0.59, SE 0.23; P-trend=0.015).

Conclusions: Lower SEP was associated with lower diet quality in adults, which may increase risk of obesity and chronic disease in this population group. Recognising the importance of also addressing social and economic conditions, healthy eating strategies that are sensitive to the needs of people experiencing socioeconomic disadvantage are warranted.

Funding source(s): Deakin University, NHMRC
EVALUATION OF A MOBILE PHONE TOOL FOR DIETARY ASSESSMENT AND TO GUIDE NUTRITION COUNSELLING AMONG PREGNANT WOMEN

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Background/Aims: To provide pregnant women with tailored nutrition advice, clinicians need appropriate tools for dietary assessment and counselling. Image-based food records captured using smartphones show promise, however validated tools to assess intakes are needed.

Methods: Pregnant women used a smartphone application to record all eating/drinking occasions over three non-consecutive days. The Selected Nutrient and Diet Quality analysis tool (SNaQ) was used to assess intakes of food groups and selected key nutrients. Feedback was provided via brief video summary to participants' smartphone and follow-up call with a dietitian. Agreement between SNaQ tool and nutrient analysis software was established by Spearman's rank correlation and Cohen's Kappa.

Results: Twenty-five (27 recruited, median 29 years, 6-24 weeks gestation) women had image-based food records suitable for analysis. Average intakes were not meeting targets for all food groups and micronutrients. Positive correlations between the use of the SNaQ tool and nutrient analysis software were seen for energy \( (r_s=.898, P<.001) \), iron, zinc, folate, calcium and iodine \( (r_s=.510-.955, all P<.05) \). Kappa showed moderate-substantial agreement for these micronutrients with supplements included \( (K=.488-.803, all P≤.001) \) and for calcium, iodine, and zinc when excluded \( (K=.554-.632, all P<.001) \). Seventeen women reported making dietary changes as a result of receiving feedback.

Conclusions: The SNaQ tool demonstrated acceptability for dietary assessment of pregnant women, and may be a useful tool to support dietitians to provide personalised nutrition advice.

Funding source(s): AA supported by International Postgraduate Award Scholarship, CC by NHMRC Senior Research Fellowship, MR by University of Newcastle New Staff Grant.
THE EFFECT OF AN AUGMENTED REALITY AID ON ERROR ASSOCIATED WITH SERVING FOOD

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Background/Aims: It is difficult to estimate food portions accurately. The presence of an aid when serving can reduce error. This study evaluated the impact of ServAR, an augmented reality portion size aid, on error associated with estimating standard servings.

Methods: Participants were randomised into: 1) no information/aid (control); 2) verbal information on standard serves; or 3) ServAR, an aid which overlayed virtual food servings over a plate using an iPad Mini. Participants served standard serves for nine foods (broccoli, cauliflower, carrots, green beans, corn, kidney beans, potato, rice and pasta) using validated replicas. For each group, Wilcoxon signed-rank tests compared median served weights to reference serve weights (Bonferroni correction applied).

Results: Ninety adults (78.9% female; 25.9±4.3 years; BMI 24.2±4.8 kg/m^2) completed the study. The median servings were significantly different to the reference serves for eight foods in the information only group and seven foods for the control group, compared to five foods for the ServAR group. The proportion of total estimations within ±10% and ±25% of the reference serve was greater for ServAR (30.7%, n=83 and 65.2%, n=176; respectively), compared to information only (19.6%, n=53 and 47.4%, n=128) and control (10.0%, n=27 and 33.7%, n=91).

Conclusions: Use of the ServAR augmented reality aid significantly improved serving accuracy and demonstrates potential as a practical tool to support portion estimation. Further evaluation across a broad range of foods, serve sizes and settings is warranted.

Funding source(s): Priority Research Centre for Physical Activity and Nutrition
THE EARLY YEARS SETTING IS AN UNDERUTILISED ENTRY POINT TO BUILD HEALTHY FOOD ENVIRONMENTS

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Background/Aims: Eating habits are formed early in life; >1 million children spend an average ~ 24-h/week in the Early Years (EY) setting with EY staff who receive minimal training in nutrition education. We planned to investigate whether the EY setting was an underutilised entry point to build healthy food environments, offer curriculum, and policy to address childhood obesity. The aim of this study was to determine the knowledge, attitudes and behaviours of EY staff.

Methods: The SNAC website (Supporting Nutrition in Australia Childcare www.snacwa.com) has >1800 EY members. Prior to professional development on healthy food environments, baseline knowledge, attitudes and behaviours were surveyed using an adapted questionnaire.

Results: 151 female EY staff (61% were <40-y and employed for <10-y) had limited baseline nutrition knowledge about food components, groups, number of serves and serve sizes for children; 21.5% reported discretionary items were consumed daily to weekly in the EY setting; 38% were not confident to make recommendations to parents about healthy eating; 62.5% did not believe or were unsure if food could make a big difference to chances of being healthy; 62.5% disagreed or were unsure if negative ‘staff talk’ about food could influence children’s attitudes to food.

Conclusions: Current nutrition knowledge, attitudes and behaviours to build a healthy food environment is lacking in the EY setting which may contribute to poor health outcomes for children. Education about optimal EY food environments is required.

Funding source(s): Healthway
REDUCING SALT IN BREAD DOES NOT AFFECT SALES IN REMOTE INDIGENOUS COMMUNITY STORES (maximum 125 characters including space)

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Background/Aims: We investigated whether reducing sodium in one of the top-selling breads in remote Indigenous communities (RICs) affected sales of the bread.

Methods: 26 RIC stores where Bush Oven white bread (study bread) represented ≥45% of bread sales consented to the study. After a 23-week baseline period, 11 stores continued to receive the regular salt bread (~400mg Na/100g; control group) while 15 stores received the reduced salt version (300mg Na/100g; treatment group) for 18 weeks (6-week wash-in and 12-week intervention period). Data on all food purchases were collected weekly for all stores from baseline to 6 weeks post-intervention (post-intervention period). Results were analysed using mixed model including main and interaction term for group and period.

Results: Preliminary analysis indicated no significant difference between treatment and control groups in change from baseline to intervention period in sales of the study bread as a percentage of all sales (-0.30%, 95% CI -0.67,0.08; p=0.12) or weekly average dollars. Sodium of all purchased foods and drinks was not significantly reduced (-8 mg Na/MJ; -18.3; p=0.14) however simulation showed 25% reduction across all bread could significantly reduce sodium (-12; -23,-1, p=0.03).

Conclusions: Reducing salt in a top-selling bread in RIC stores did not affect sales. While total sodium of all food and drinks purchases was not significantly reduced, if applied to all bread, an estimated reduction of 12 mg/MJ would be achieved. Making small reductions in the sodium content of commonly consumed foods is a vital strategy for reducing salt intake of at-risk populations.

Funding source(s): N/A
Oral Session 12:

Room P3: Nutrition across the lifespan

14:00 - 15:36

BEVERAGE CONSUMPTION AMONG U.S. CHILDREN AGED 0-24 MONTHS: NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES)

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Background/Aims: Data on beverage consumption patterns in early life are limited. The aim of this study was to describe beverage consumption across sociodemographic characteristics among U.S. children aged 0-24 months.

Methods: Data from 2740 children in the 2005-2012 NHANES were analysed. Food intake was determined via one 24-hr dietary recall. Beverages were categorised according to What We Eat in America groups. Poverty Income Ratio (<1.0, 1.0-1.99, 2.0-3.49, ≥3.5) was used to indicate socioeconomic status (SES). Chi-square was used to assess differences between subgroups accounting for the complex survey design.

Results: During infancy (0-5.9 months and 6-11.9 months) infant formulas were the most commonly consumed beverage, 74.1% and 78.6% of children consuming, respectively. Comparatively fewer children, 41.6% and 24.3%, consumed breast milk. In toddlers (12-24 months), the most commonly consumed beverages were plain milk (83.6%), water (68.6%), 100% fruit juice (51.8%) and sweetened beverages (31.2%). Compared to non-Hispanic white children, non-Hispanic black children were more likely to consume 100% juice (fruit/vegetable) (39.8% vs. 27.1%, p<0.05) and less likely to consume breast milk (9.8% vs. 23.4%, p<0.05), and both Non-Hispanic black and Mexican-American children were more likely to consume sweetened beverages (22.1% and 26.1% vs. 14.6% in non-Hispanic white, p<0.05). Children in the lowest SES group were more likely to consume 100% juice (fruit/vegetable) (33.6%), sweetened beverages (23.1%) and less likely to consume breast milk (12.8%) compared to those in the highest SES group (21.8%, 9.5% and 26.9%, respectively, all p<0.05).

Conclusions: Disparities in beverage consumption by race-ethnicity and SES are apparent in early life.

Funding source(s):
COMPARISON OF SCHOOL DAY EATING BEHAVIOURS OF 8-11 YEAR OLD CHILDREN FROM AUSTRALIA AND THE UNITED KINGDOM

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Background/Aims: Poor nutrition is a major public health concern worldwide. Food environments and cultures vary across countries, therefore comparing policies and eating behaviours across countries provides insights for improving nutrition. This study compared fruit and vegetable intake, and breakfast, lunch and family meal habits in children from Australia (AUS) and the United Kingdom (UK).

Methods: N=772 8-11 year old children (AUS n=347; UK n=425) reported food intake via food frequency questionnaires. Multinomial logistic regressions compared fruit and vegetable intake, breakfast habits, school lunch meals and family dinner frequency in Australian and UK children.

Results: Compared to UK children, Australian children were more likely to consume vegetables daily [OR=4.19; 1.39, 12.58], and have family meals everyday [OR=4.01; 1.88, 8.55], and less likely to consume breakfast [OR=0.26; 0.08, 0.79]. Irrespective of country, children who consumed a school lunch meal (versus packed lunch) were more likely to consume 3-5 vegetable serves [OR=2.48; 1.37,4.47] and over 5 vegetable serves daily [OR=2.86; 1.54,5.33].

Conclusions: Comparing children’s school day food intake across two countries with similar food supply but differing culture and school food provision systems provides evidence of how food provision modes may influence food intake. This comparison of UK and Australian data shows that although overall the food intake of children in both countries needs to be improved, the targets for improvement differ in each country.

Funding source(s): AUS: ARC Linkage Grant with SA Health; UK: National Institute for Health Research Public Health Research.
INTERVENTION STRATEGIES TO REDUCE ENERGY DRINK CONSUMPTION IN YOUNG PEOPLE: FOCUS GROUP FINDINGS


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Background/Aims: Energy drinks have catapulted to popularity amongst young people. Although they are marketed to improve performance, they pose a distinct and independent health risk, over and above that of soft drinks. Energy drinks provide a potent source of caffeine and contain high levels of sugar, sodium, herbal extracts and amino acids. They are linked to serious adverse health effects and tighter regulation has been called for in Australia. The aim of this study was to gain a deeper understanding of the factors associated with energy drink consumption in young people and to identify potential intervention strategies to reduce use.

Methods: In 2015, eight focus groups were conducted with 41 young people aged 12-25 years, recruited through Perth schools and youth groups. A thematic analysis of focus group data was conducted using N-Vivo.

Results: Facilitators of energy drink consumption included perceptions of enhanced energy and concentration, pleasant taste, low cost, peer pressure, easy availability, and energy drink promotions and advertisements. Barriers included experiencing negative side effects, unpleasant taste, high cost, and parental disapproval of energy drinks. Strategies suggested by participants to reduce energy drink consumption included banning energy drinks, changing energy drink packaging, increasing price points, reducing visibility in shopping outlets, and energy drink research and education.

Conclusions: Further investigation is needed to build upon these findings and identify feasible interventions for limiting energy drink consumption in young people.

Funding source(s): Healthway, NHMRC
NUTRITIONAL IMPACT OF DISCRETE STRATEGIES TO REDUCE DISCRETIONARY FOODS IN THE AUSTRALIAN ADULT POPULATION

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Background/Aims: In Australia, discretionary foods contribute over a third of energy and displace core foods. We aimed to evaluate the potential nutritional impact of key discrete strategies to reformulate or reduce discretionary foods in the Australian adult population.

Methods: Dietary intake data from 9435 adults (age 19+ years) who participated in the 2011-13 Australian Health Survey were population weighted and aggregated at the food ID level. Scenario modelling was conducted to investigate the potential impact of literature informed discrete strategies to reduce discretionary foods. Scenarios included: reducing the quantity/sugar content/sodium content of discretionary foods; and substituting water for water-based sugar-sweetened beverages (SSBs).

Results: Reducing discretionary foods by 25% reduced average per person daily energy intake by 761kJ (9%). A 13.5% increase in core foods is required to counter the energy deficit of reducing discretionary foods by 25%, resulting in 6g/person (7%) greater protein intake and 10g (19.9%) less added sugar compared to the current diet. Reducing added sugar in discretionary foods by 25% reduced total energy intake by 184kJ (2.1%). Substituting water for all SSBs reduced energy by 319kJ (3.7%) and added sugar by 17g (33.5%). Reformulation of grain based discretionary foods to reduce sodium by 25% resulted in 64mg (2.6%) lower sodium intake.

Conclusions: Key discrete strategies to reformulate or reduce discretionary foods would have small to moderate impact on the diet quality of the Australian adult population. The impact of combined strategies, or for sub-populations with proportionally higher discretionary food intake would be more substantial.

Funding source(s): NHMRC
BEVERAGE INTAKE OF AUSTRALIANS

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Background/Aims: to examine intake of non-alcoholic, non-dairy drinks by Australians.

Methods: A secondary analysis of one day of intake from 12,153 subjects of the 2011-12 National Nutrition and Physical Activity Survey. Prevalence estimates were population weighted.

Results: On the day of the survey, unsweetened water was consumed by 87% of Australians compared to sugar sweetened beverages (34%), fruit juices without added sugar (17%) and low kilojoule sweetened beverages (10%). Children were more likely than adults to consume fruit juice on the day of the survey (23% compared to 15%, p<0.05), and sugar sweetened beverages (47% compared to 30%, p<0.05), while adults were more likely than children to consume low kilojoule sweetened beverages on the day of the survey (11% compared to 6%, p<0.05). Sugar sweetened beverages were consumed by more men than women (36% compared to 25% on the day of the survey, p<0.05), while prevalence of sugar sweetened soft drinks peaked at 14-18 years of age (43% for boys, 32% for girls, p<0.05). There was no significant difference between males and females in prevalence of intake of low kilojoule sweetened beverages. In total, beverages accounted for 10% of the energy intake from discretionary choices for children, and non-alcoholic beverages accounted for 8% of the energy intake from discretionary food choices for adults. For both children and adults, the overall energy contribution of soft drinks was 4% of the discretionary food energy intake.

Conclusions: Beverages make an important energy contribution to dietary intake.

Funding source(s): Australian Beverages Council Ltd
EFFECTS OF A MEDITERRANEAN-STYLE DIET ON MENTAL HEALTH AND QUALITY OF LIFE IN PEOPLE WITH DEPRESSION


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Background/Aims: Poor diets are an independent risk factor for depression while healthy diets are protective. Traditional Mediterranean diets (MedDiet) are associated with reduced cardiovascular disease risk which overlaps with depression. We investigated whether MedDiet can improve mental health.

Methods: 163 adults aged 18-65 with self-reported depression participated in a randomised controlled trial (RCT) providing nutrition education and fortnightly food hampers and cooking workshops for 3 months with 6 month follow-up. The control group attended fortnightly social groups. Participants completed mental health, quality of life (QoL) and dietary questionnaires. Data were analysed using linear mixed modelling and Pearson correlations.

Results: In comparison to the control group at 3 months the treatment group had a higher MedDiet score (t=4.27, P<0.001), consumed more vegetables (t=3.95, P<0.001), fruit (t=2.11, P=0.037), nuts (t=2.43, P=0.016), wholegrains (t=2.39, P=0.018) and legumes (t=2.45, P=0.016), greater diversity of vegetables (t=3.46, P=0.001) and fruit (t=2.08, P=0.040) and less unhealthy snacks (t=-2.20, P=0.030) and red meat/chicken (t=-2.25, P=0.026). The treatment group had reduced depression scores (t=-2.02, P=0.045), and higher mental health QoL scores (t=2.17, P=0.032). Reduced depression scores were correlated with increased MedDiet (r=-.251, P=0.011), legumes (r=-.233, P=0.018), and greater diversity of vegetables (r=-.284, P=0.004). Similar correlations were seen with other mental health and QoL improvements, particularly for legumes and diversity of vegetables and fruit. All changes were sustained at 6 months.

Conclusions: This is one of the first RCTs to show a benefit of diet for mental health.

Funding source(s): NHMRC Program Grant
**Background/Aims:** Malnutrition is common in institutionalised elderly, exacerbated by inadequate provision of protein-rich foods. Dairy foods are a good source of high-quality protein therefore we aimed to determine if increasing dairy intake (~4 serves daily) would improve nutritional markers in female aged-care residents with inadequate protein intakes.

**Methods:** Data were analysed for 57 females (mean age 86±8 years) with low protein intakes (77±16% of RDI) from 27 aged-care facilities randomised to 12 months of high-dairy (n=8) or usual (n=19) menu. Food service specialists assisted staff to implement high-dairy menus. Food consumption was measured and nutritional assessment undertaken using the mini nutrition assessment (MNA) tool. Fasting morning bloods were analysed for nutritional biomarkers. Recommended protein intakes were based on Australian standards. Group differences were determined using ANOVA.

**Results:** When consuming from regular menus, reductions in albumin (37±3 vs 35±3g/L) and Hb (130±13 vs 123±12g/L) were observed (p<0.001), while levels were maintained in those consuming from high-dairy menus (albumin; 36±4 vs 35±4, Hb; 128±11 vs 129±14g/L). Both absolute and percentage differences between groups for albumin and Hb were significant (p<0.05). No differences were observed for IGF-1 or MNA.

**Conclusions:** Improving protein intake using dairy foods abated age-related declines in albumin and maintained haemoglobin in elderly females in aged-care.

**Funding source(s):** Consortium of seven dairy organisations.
PROTEIN INTAKE IN OLDER COMMUNITY DWELLING AUSTRALIANS AT RISK OF CHRONIC DISEASE

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Background/Aims: Sarcopenia is related to age-related reductions in skeletal muscle protein synthesis, and is accelerated by poor nutrition, inactivity and co-morbid disease. Increasing protein intake in older age may reduce progression of sarcopenia, and Australia has raised recommended daily intake (RDI) of protein for those over 70y to 1.07 g/kg for men and 0.94 g/kg for women. The aim of this research was to examine whether older adults are meeting these protein intakes.

Methods: In a cross-sectional study of 485 adults aged ≥60y at increased risk of cardiovascular disease, protein intake was measured by 4d food record (analysed using FoodWorks), and risk factors, including estimated glomerular filtration rate (eGFR), examined. Multivariate regression was used to examine associations between protein intake and eGFR.

Results: In the cohort as a whole, 67% met their RDI for protein, 81% of those under 70y, but only 58% of those over 70y of age. Women were significantly more likely to meet the RDI for protein than men (75% vs 61%, p=0.002). Those meeting the protein RDI did not differ significantly from those not meeting for risk factors such as fasting plasma glucose. Adjusted for age, protein intake was modestly positively associated with eGFR (Standardised beta= 0.099, p=0.036), not suggestive of any adverse effects of high protein intake on renal function in this older-aged cohort.

Conclusions: In this cohort of older community-dwelling Australians at increased chronic disease risk, 3 in 5 of those aged ≥70y were meeting recommended protein intakes.

Funding source(s): Monash University, NHMRC
**Poster Session 5:**

**Room M7: Maternal, childhood and adolescent nutrition**

**16:00 - 18:00**

**HUMAN MILK INHIBITS THE GROWTH OF PATHOGENIC E.COLI**

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**Background/Aims:** Diarrhoea is one of the major causes of death in children under age of 5 globally. Diarrhoea is induced by pathogenic viruses and bacteria. Human milk (HM) contains bioactive immune proteins that are known to protect infant against diarrhoea. The aim the study is to determine the immune capability of human milk in reducing the growth of pathogenic E. coli.

**Methods:** Pathogenic *E.coli*: O16 was used in this study. 12.5MCFU/ml of it was mixed with HM, bovine milk powder or terrific broth and incubated in shaker at 37°C for 6 hours. At each hour, a mixed suspension was removed from the shaker. CFU/ml of the suspensions were determined by cell culture method and nitrogen content by the Kjeldahl method.

**Results:** During the 6 hours incubation, the HM suspension had a log 1 increase of pathogenic E. coli, whereas the terrific broth and bovine milk powder had a log 3 increase. The averages of total, non-protein and protein nitrogen in HM were 2.41±0.32, 0.80±0.09 and 1.60±0.26g/l, respectively and in bovine milk powder were 4.16±0.43, 0.68±0.12 and 3.47±0.42g/l, respectively.

**Conclusions:** The bioactive components of HM appeared to inhibit the growth of pathogenic *E. coli*. Minimal changes in the non-protein nitrogen indicated that there was minimal degradation of immune proteins. HM may protect the infant by inhibition of the growth of pathogenic E. coli.

**Funding source(s):** This study was funded by The University of Notre Dame Australia and an unrestricted grant from Medela AG administered by The University of Western Australia.
PARENTAL FEEDING CONTROL BUT NOT USE OF FOOD-TO-SOOTHE AT AGE 3.5 YEARS IS ASSOCIATED WITH LATER ADIPOSITY

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Background/Aims: Associations of parental feeding practices with adiposity are mixed and are mostly from cross-sectional studies. We aimed to study the associations between parental feeding control and using food to soothe at 3.5 years on adiposity at 7 and 15 years, in a large longitudinal cohort.

Methods: Participants were from the Avon Longitudinal Study of Parents and Children (n=7312). Feeding control was assessed by asking 'how much choice do you allow him/her in deciding what foods he eats at meals?' Use of food to soothe was reported by mothers on the item 'how often do you use sweets or other foods to stop his/her crying or fussing?' BMI at 7 and 15 years was converted to sex- and age-adjusted z-scores (Cole et al. Arch. Dis. Child. 1995; 73: 25-29). Fat mass was assessed at 15 years using dual energy X-ray absorptiometry. The associations between feeding control, use of food to soothe and BMI z-scores and fat mass were estimated by confounder-adjusted linear regression.

Results: In fully-adjusted models, children given the least choice had lower BMI z-scores (7 years: -0.08 (95%CI -0.17, 0.01); 15 years: -0.12 (-0.23, -0.02)), and lower fat mass (15 years: -1.54 kg (-2.35, -0.74)), than children with the most choices. There was no evidence of an association between using food to soothe and adiposity.

Conclusions: Contrary to some studies, higher parental control over food choice was associated with lower adiposity, but use of food to soothe was not associated with adiposity at ages 7 and 15.

Funding source(s): University of Adelaide and the Fraser Mustard Centre scholarships
FEEDING THE BRAIN - THE EFFECTS OF MICRONUTRIENT INTERVENTIONS ON COGNITIVE PERFORMANCE AMONG SCHOOL-AGED CHILDREN: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS

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Background/Aims: Micronutrient interventions have been shown to benefit children's cognitive development, particularly in subjects who were micronutrient-deficient at baseline. However, the results on healthy subjects remain inconsistent and effect on different cognitive domains remains equivocal. This systematic review highlights the effects of single and multiple micronutrient inventions on different cognitive domains among school-aged children from both developing and developed countries.

Methods: A systematic search of Medline, CINAHL Plus and Academic Search database was conducted to identify trials published after year 2000. Randomized controlled trials (RCTs) that evaluated the effect of micronutrient interventions on cognitive performance or academic performance among children aged 4-18 years were included. Data were extracted by 2 researchers. The cognitive outcomes assessed were grouped into seven cognitive domains for qualitative analysis.

Results: 19 RCTs were included for qualitative synthesis. The major cognitive domains assessed included fluid intelligence, crystallized intelligence, short-term memory, long-term memory, cognitive processing speed, attention and concentration, and school performance. Eight of ten trials reported significant improvement in the fluid intelligence domain among micronutrient-deficient children following micronutrient interventions, especially those who were iron-deficient or iodine-deficient at baseline. The effects of micronutrient interventions on other domains were inconsistent.

Conclusions: Improvement in fluid intelligence among micronutrient-deficient children was consistently reported. Further research is needed to provide more definitive evidence on the beneficial effects of micronutrient inventions on other cognitive domains and the effects in healthy subject from both developing and developed countries.

Funding source(s): None
CHANGES IN FATTY ACID COMPOSITION OF HUMAN MILK IN RESPONSE TO COLD-LIKE SYMPTOMS IN THE LACTATING MOTHER AND INFANT

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Background/Aims: Infants are reliant on their innate immune systems to protect them from infection. Along with maternal antibodies and multiple bioactive factors human milk (HM) contains fatty acids (FA) and monoglycerides that are known to exhibit antiviral and antibacterial properties in vitro. The specific fat content of HM will determine the FA profile and may potentially affect the efficacy of this antimicrobial activity. This preliminary study investigates whether the concentrations of FA in HM change in response to infections leading to cold-like symptoms in the mother or infant.

Methods: Milk samples from were obtained from mothers (n=26) when they and their infants were healthy, and when mother, infant or both suffered cold-like symptoms. The milk was hydrolysed and FA concentrations were measured using gas chromatography. Fifteen FAs were recorded, of which eight were detected in sufficient quantities for statistical analysis. For each fatty acid, the data were analysed by developing linear mixed models; variables considered were infant age and maternal, infant and dyad health, gestational age, birth weight and maternal age. The random effects of the models were infant age and mother. Results were considered significant where p<0.05.

Results: HM concentrations of capric (10 n-0) and lauric acids (12 n-0) were significantly higher and palmitic acid (16 n-0) was lower (p<0.05, for all) when mothers and infants were healthy compared to infection samples. The concentration differences detected were small (less than 0.5%).

Conclusions: Changes in specific FA were in HM when either the mother or infant or both had cold like symptoms. Whilst differences in FA were small the effects maybe additive and potentially have a protective function.

Funding source(s): This study was funded by an unrestricted grant from Medela AG administered by The University of Western Australia.
NEONATAL HYPOGLYCAEMIA AND SCHOOL OUTCOMES AT AGE 8 YEARS

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Background/Aims: Hypoglycaemia is a common condition among neonates that has potential to harm the developing brain. In one of the largest studies of this kind, we aimed to use population-level data to examine whether neonatal hypoglycaemia was associated with poorer school outcomes at age 8.

Methods: Whole-of-population data from all births in South Australia (2001-2005) was linked to grade 3 reading, writing, grammar, spelling and numeracy domains collected from the National Assessment Program in Literacy and Numeracy (NAPLAN). Neonatal hypoglycaemia was identified with ICD10 codes. We calculated the RR of poor school outcomes in the whole cohort and after removing infants born preterm, low- or high-birthweight as these infants have complex aetiologies that might confound the hypoglycaemia - schooling association. The main analysis included imputation to address missing information and adjustment for a large battery of perinatal and sociodemographic characteristics. We also undertook a negative control outcome analysis to investigate the potential for residual confounding.

Results: 2% of infants had hypoglycaemia (n=504/25227). In the whole cohort analysis, hypoglycaemia was associated with slightly higher RR of poor school outcomes (ranging from 1.07 (0.89-1.29) to 1.16 (1.02-1.31) across domains). These results were attenuated in the sample restricted to the healthiest neonates (RR ranged 0.83 (0.61-1.12) to 1.12 (0.79-1.58)). The negative control outcome analysis showed RR 1.09 (1.01-1.17) suggesting that the main analyses remained residually confounded.

Conclusions: These results suggest that hospitalisation and treatment for hypoglycaemia in the neonatal period is unlikely to have lasting effects on academic outcomes.

Funding source(s): NHMRC Partnership grant
RELATIONSHIP BETWEEN URINARY IODINE EXCRETION, MILK AND BREAD INTAKE IN A SAMPLE OF VICTORIAN SCHOOLCHILDREN

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Background/Aims: In response to the re-emergence of iodine deficiency in Australia in the late 1990s, addition of iodised salt to bread was made mandatory in 2009. A decline in iodine concentration in milk may have contributed to the decline in iodine intakes. The present study aimed to: i) identify the major sources of dietary iodine post fortification, and ii) assess the association between food sources of iodine and 24-hour urinary iodine excretion (UIE), a biomarker of iodine intake, in Australian schoolchildren.

Hypothesis: Bread will be the main source of iodine.

Methods: Twenty-four hour urine samples and 24-hour food recalls were collected from schoolchildren aged 5-12 years from 42 schools across Victoria between 2010-13. Population proportion formula was used to determine dietary sources of iodine. The association between food sources of iodine and UIE was examined using Pearson's correlation.

Results: A valid 24-hour urine and 24-hour recall were provided by 454 children (55% male, mean (SD) age 10.1 (1.25) y). Mean UIE was 108 (54) μg/day. Major food sources of dietary iodine included bread (29%) and milk (27%). Those consuming bread (n=313, 69%) and milk (n=356, 78%), consumed 92 (52) g bread/day and 278 (186) g milk/day, respectively. In consumers, milk was associated with UIE (r=0.115, P=0.04), but there was no association between bread intake and UIE (r=0.048, P=0.4).

Conclusions: These results confirm that Australian children are no longer iodine deficient. Both bread and milk were major food sources of iodine, but only milk was significantly associated with UIE.

Funding source(s): Australian Postgraduate Award
SODIUM INTAKE ASSESSMENT IN A SAMPLE OF AUSTRALIAN PRE-SCHOOL CHILDREN ATTENDING LONG DAY CARE

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Background: Approximately half of Australian pre-school children attend Long Day Care (LDC). Lunch is regularly provided at these centres and children may typically consume 50% of their total daily energy and nutrient requirements whilst in LDC.

Aims: To determine the sodium content of lunches provided and sodium intake in a sample of Australian pre-school children attending LDC.

Methods: A convenience sample of pre-school children attending LDC from the Geelong Region was recruited. Individual children's sodium intake was estimated by a validated visual plate waste scale method on one lunch day and the sodium content of lunches consumed was also assessed.

Results: Ninety-five pre-school children (50 males) aged between 3-4 years from 7 LDC centres were assessed. At five centres lunch was served by staff. Children served themselves at the remaining two centres. The mean sodium content of the staff served lunches was 222 (SD 103) mg; range 124-342 mg and the mean sodium content of self-served lunches was 214 (96) mg; range 91-281 mg. The average sodium intake across the two serving approaches was 128 (99) mg; range 96-238 mg.

Conclusions: These findings show that centre provision and pre-school children's consumption of sodium varies across LDC centres, representing 9% to ~30% of the recommended Upper Level for sodium for this age group. LDC settings may provide important opportunities to reduce pre-school children's sodium consumption to acceptable levels.

Funding source(s): N/A
FOOD ADDICTION IN CHILDREN: ASSOCIATIONS WITH OBESITY, PARENTAL FOOD ADDICTION AND FEEDING PRACTICES

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Background/Aims: Food addiction research in children is limited, and to date addictive-like eating behaviors within families have not been investigated. The aim of this study is to understand factors associated with addictive-like eating in children. The association between food addiction in children with obesity, parental food addiction, and parental feeding practices (i.e., restriction, pressure to eat, monitoring) was investigated.

Methods: Parents/primary caregivers (aged ≥18 years) of children aged 5-12 years, recruited via MTurk, completed an online cross-sectional survey including demographics, the Yale Food Addiction Scale (YFAS), and the Child Feeding Questionnaire (CFQ). Parents, reporting on themselves and one of their children, were given a food addiction diagnosis and symptom score according to the YFAS predefined criteria.

Results: The total sample consisted of 150 parents/primary caregivers (48% male) and 150 children (51% male). Food addiction was found to be 12.0% in parents and 22.7% in children. In children, food addiction was significantly associated with higher child BMI z-scores. Children with higher food addiction symptoms had parents with higher food addiction scores. Parents of FA children reported significantly higher levels of Restriction and Pressure to eat feeding practices, but not Monitoring.

Conclusions: Children with elevated YFAS-C scores may be at greater risk for eating-related problems. Children of parents with higher YFAS scores may benefit from early intervention.

Funding source(s): University of Michigan Internal funding
CORRELATES OF MEAL SKIPPING IN YOUNG ADULTS: A SYSTEMATIC REVIEW

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Background/Aims: Meal skipping rates may be highest during young adulthood, a period of transition and development. Although these dietary behaviours may increase future risk of chronic disease, limited research has investigated correlates of meal skipping in young adults.

Methods: A systematic literature search was conducted to identify studies that investigated correlates of meal skipping behaviours in young adults (aged 18-30 years). EBSCO host, MEDLINE Complete, Global Health, SCOPOS, EMBASE, Web of Science and Informit platforms were searched for eligible articles.

Results: Three-hundred and thirty-one articles were identified, 141 full-text articles assessed for eligibility, resulting in 35 included studies. Multiple methodological and reporting weaknesses were apparent in the reviewed studies with 28 of the 35 studies scoring a negative rating in the risk of bias assessment. Total meal skipping was reported in 12 studies with prevalence ranging between 5-83%. The remaining 25 studies identified specific meals and their skipping rates, with breakfast the most frequently skipped meal 14-88% compared to lunch 8-57% and dinner 4-57%. Lack of time was consistently reported as an important correlate of meal skipping compared with correlates such as cost and weight control (n=10), while sex was the most commonly reported associated correlate (n=12). Breakfast skipping was more common among men while lunch or dinner skipping being more common among women.

Conclusions: This review is the first to examine potential correlates of meal skipping in young adults with perceived lack of time the most frequently reported correlate of meal skipping.

However methodology quality of the majority of studies reviewed was poor, and the field would benefit from stronger study design and reporting of methodology.

Funding source(s): ARC, Australian Postgraduate Award Stipend, NHMRC, Deakin University
THE ASSOCIATION BETWEEN ANTHROPOMETRIC MEASURES AND TUMOR NECROSIS FACTOR-α (TNF-α) AMONG OVERWEIGHT AND OBESE ADOLESCENTS

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Background/Aims: Overweight and obesity is associated with elevated levels of pro-inflammatory markers, which could lead to increased risk of cardiovascular disease (CVD). This study aims to investigate the association between measures of adiposity using anthropometric measures and plasma tumor necrosis factor-α (TNF-α) among overweight and obese adolescents.

Methods: This study is an observational analysis with a cross-sectional design of 116 overweight and obese high school students in City of Yogyakarta, Indonesia. Height and weight were measured to calculate z-score of body mass index (BMI) by age. Waist circumference was measured using microtoise and is used to calculate waist and height ratio (WHtR). Plasma TNF-α were quantified using ELISA. Statistical analysis was performed using SPSS version 24.

Results: Among 116 subjects, 102 (87.9%) of them were obese with overall plasma TNF-α level of 74.71 pg/mL. Using linear regression, plasma TNF-α was not significantly associated with various adiposity measures: z-score (p=0.291), waist circumference (p=0.942) and WHtR (p=0.745).

Conclusions: Despite previous evidence showing association between increased adiposity and plasma TNF-α, this study did not show significant association between plasma TNF-α with z-score BMI-by-age, waist circumference and WHtR. This may be due to the homogenous population with already increased accumulation of adiposity. Therefore, further analysis of including normal weight subjects is necessary to elucidate the association between plasma TNF-α and anthropometric measures better.

Funding source(s): Indonesia's Ministry of Health Risbin Iptekdok
DO YOUNG ADULTS SKIP MEALS?

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Background/Aims: Meal skipping is associated with diet-related chronic conditions, including obesity and insulin resistance. Young adults are reported to have the highest rates of meal skipping. Prevalence of meal skipping varies across studies (24-87%), possibly due to the variety of assessment tools and definitions used with unknown validity. This study examined the prevalence of meal skipping in young adults using a real-time dietary assessment method.

Methods: Participants aged 18-30 years used a purpose-designed smartphone application over four non-consecutive days to record food and beverage consumption. The day following each reporting day, participants were asked about their previous day's eating occasions; if any eating occasions were not reported or if any were skipped.

Results: Three hundred and thirty-eight participants provided following day responses for four reporting days (1352 reporting days). Half (51%) reported skipping at least one meal, on at least one of their reporting days. Of the 172 meal skipping participants, 94 (55%) skipped at least one meal on one reporting day, 35 (18%) skipped at least one meal on two reporting days, 31 (18%) skipped at least one meal on three reporting days and 12 (7%) skipped at least one meal on all four reporting days.

Conclusions: This study was the first to measure meal skipping by this 'real time' method. Findings, suggest that meal skipping behaviours are highly prevalent among young adults. The next phase of this research will examine the determinants of meal skipping, to inform interventions targeted at the reduction of meal skipping among young adults.

Funding source(s): Australian Research Council, Australian Postgraduate Award Stipend
SYSTEMATIC REVIEW AND META-ANALYSIS OF THE IMPACT OF PRECONCEPTION LIFESTYLE INTERVENTIONS IN FEMALES AND MALES

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Background: Many preconception modifiable factors may affect pregnancy and fetal outcomes, but no consensus is available for multicomponent lifestyle interventions. This systematic review aims to consolidate evidence on preconception lifestyle interventions in males and females and the impact on pregnancy, obstetric and fetal outcomes.

Methods: Databases were searched for randomised controlled trials assessing lifestyle interventions compared to standard care. Interventions solely focused on micronutrient supplementation, diabetes, alcohol or smoking were excluded. Pregnancy, obstetrics, fetal, anthropometric and metabolic outcomes were analysed and meta-analysis performed where appropriate.

Results: Total of 10 articles comprising of 7 studies met inclusion criteria. Interventions were heterogeneous in design and duration. Where meta-analysis couldn't be performed, individual studies did not show significant difference in assisted reproductive technology adverse events, delivery complications or anxiety score. Where meta-analysis could be performed, there were statistically significant difference in spontaneous pregnancy in favour of control groups (p=0.003), and weight (p<0.00001) and BMI (p<0.00001) reduction in favour of intervention group. No significant differences were detected in overall pregnancy, live birth, birthweight, premature birth, gestational diabetes, pregnancy loss, preeclampsia or neonatal mortality. No studies were found pertaining to male lifestyle interventions.

Conclusions: The majority of randomised controlled trials in preconception interventions focused on overweight or obese subfertile women, which showed weight loss benefits from structured lifestyle intervention. However, this does not necessarily translate to better obstetric or fetal outcomes. There is considerable paucity of literature on effective holistic preconception interventions, especially in the male population.
EVALUATING THE EFFECTIVENESS OF A GROUP INTERVENTION FOR REDUCING EXCESSIVE GESTATIONAL WEIGHT GAIN

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Background/Aims: Excessive Gestational Weight Gain (GWG) is associated with an increased risk of obstetric complications. At present, the best approach to prevent excessive GWG in overweight and obese women is undetermined. We evaluated the effectiveness of a group-based outpatient dietary intervention for limiting gestational weight gain. We hypothesised that the dietary intervention would limit excessive GWG.

Methods: A hospital in Western Sydney conducted an antenatal dietary intervention. Overweight and obese women chose whether to attend a 90-minute group education session combined with an individualised dietetic consult or receive standard care alone. Total GWG, maternal and neonatal outcomes and dietary intake were assessed and compared with women of normal BMI, who had a similar parity and age. Data were analysed using conditional logistic regression, Student t, Mann Whitney and Chi-squared tests as appropriate.

Results: Those who attended the intervention had low micronutrient compliance and saturated fat intake exceeded recommendations. No significant reduction in GWG was observed with this intervention (P=0.012). Overweight and obese women had a lower rate of breastfeeding (P<0.001), a greater length of stay (P=0.020) and an increase in caesarean section rate (P<0.001) when compared to matched controls.

Conclusions: A low-intensity antenatal dietary intervention was ineffectual in limiting excessive GWG; a high-intensity dietary intervention is warranted to facilitate an improvement in maternal and neonatal outcomes.

Funding source(s): N/A
VALIDATION OF AN IMAGE-BASED DIETARY ASSESSMENT METHOD USING SMARTPHONES FOR PREGNANT WOMEN

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Background/Aims: Image-based food records captured using smartphones are emerging as a novel method of dietary intake assessment. However image-based dietary assessment methods have not yet been validated among pregnant women.

Methods: In the Diet Bytes and Baby Bumps study, pregnant women used a smartphone app to capture image-based food records of all eating and drinking occasions over three non-consecutive days. Twenty-four hour food recalls were subsequently collected once per week for the three weeks after the image-based record. Relative validity of the image-based method was established by comparison with nutrient intakes assessed from three 24-hr recalls. Data collected from each method were analysed in nutrient analysis software, via Pearson correlation and Bland-Altman plots.

Results: Twenty-five women (27 recruited, median 29 years, 6-24 weeks gestation) had image-based food records suitable for analysis. Comparison of the image-based records to 24-hr recalls demonstrated moderate-to-strong correlations for energy and macronutrients ($r=.58-.70$, all $P<.05$), zinc, iodine, folate, calcium and fibre ($r=.47-.94$, all $P<.05$). When vitamin/mineral supplements were removed from the analysis, image-records continued to show moderate-strong positive correlations with 24-hr recalls for the selected micronutrients ($r=.40-.58$, all $P<.05$). Bland-Altman plots showed acceptable agreement and no obvious bias for the methods.

Conclusions: The image-based dietary record method demonstrated acceptable relative validity for dietary intake assessment of pregnant women.

Funding source(s): AA is supported by an International Postgraduate Award Scholarship. CC is supported by an NHMRC Senior Research Fellowship. Components of this study were supported by a University of Newcastle New Staff Grant awarded to MR.
ENGAGING THE PUBLIC IN NUTRITION: EXTENDING REACH AND INFLUENCE

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Background/Aims: The internet, social media and celebrities provide a plethora of information to the public about food, nutrition and health. This makes it hard for the public to make evidence based decisions.

Methods: 'Food as Medicine’ was designed for those with no prior science knowledge, delivered as a free Massive Open On-Line Course (MOOC) via the FutureLearn platform, UK. Recruitment was via the FutureLearn database and social media. The 3-week course covered topics relating to food, diet and health, aimed to give participants skills to synthesise and critique information about food and provide evidence based nutritional information.

Results: Over 63,000 participants from 158 countries enrolled, with the majority being Australia (41%) and UK (22%). Learners were predominately female, older than average MOOC participants: 22% being 18-35 and 40% over 56 years. Over half had not participated in an on-line course previously. Sixty percent were the target group (no previous academic or professional knowledge) with 29% reporting work or study in this field. Consistent with other MOOCs, over a third competed the whole course and spent 3-4 hours per week on-line. Over 100,000 comments were made by learners. Eighty two percent reported the course met or exceeded their expectations.

Conclusions: Free open courses provide an opportunity to disseminate evidence based unbiased knowledge about food and health. This novel route of education has enormous scope and reach. More research is required as to their possible effectiveness as an education tool.

Funding source(s): Office of the Vice-Provost Learning & Teaching and the School of Clinical Sciences, Monash University
EXPERTS’ OPINIONS ON SECONDARY SCHOOL FOOD AND NUTRITION EDUCATION

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**Background/Aims:** Food and nutrition education provides knowledge and skills that support the acquisition of healthy eating by students. The aim of this qualitative study was to explore food and nutrition experts' opinions about senior secondary school food and nutrition education.

**Methods:** Face-to-face or phone interviews were conducted with 34 food and nutrition experts from the food production, food processing and distribution, food marketing, food service, and education sectors in Victoria. Recorded interviews were transcribed and thematically analysed using NVivo software.

**Results:** All most all participants believed that food and nutrition education is needed for students. Some of them indicated secondary schooling years as an important stage to deliver food and nutrition education, while some emphasised the importance of initiating this education in primary school. Participants suggested school to be a very suitable setting to deliver food and nutrition knowledge and skills to children and adolescents. Development of cooking skills and awareness of healthier food choices were viewed as an important feature of food and nutrition education. Some participants suggested that food and nutrition education helps in future career pathways and others believed that this education helps in establishment of critical thinking skills around the social value of food and the food system.

**Conclusions:** These results suggest the need for food and nutrition education at secondary as well as primary school. This education could help students to develop healthy eating patterns, broaden their views of food-related issues and better prepare them for future careers.

**Funding source(s):** Deakin University International PhD Scholarship
Background/Aims: Food education is an important subject within the secondary school curriculum, however it is unclear which specific knowledge and skills should be included. The aim of this study was to determine the food knowledge and skills that parents of adolescents think are important for consumers, compared to the views of parents of younger children only and those with no children.

Methods: Data from three groups of respondents were selected from an online food knowledge survey: parents of adolescents, parents of younger children only and adults with no children at home. Responses to the open-ended question "What food-related knowledge or skills do you think everyone needs in order to be active, healthy consumers?" were qualitatively analysed using the Leximancer thematic analysis program.

Results: The four most frequently mentioned concepts were the same for all three groups ('healthy', 'cook', 'nutrition' and 'prepare'). In addition, parents of adolescents frequently mentioned 'bad', 'fat' and 'skills'. 'Takeaway' and 'marketing' were mentioned often by parents of adolescents and parents of young children but not at all by those without children. Other main themes for parents of adolescents were 'nutrition', 'healthy', 'nutrients', 'food types' and 'energy-dense, nutrient-poor foods'. 'Cooking' was the most frequently mentioned theme in all three groups.

Conclusions: Parents of adolescents hold quite distinct views of food knowledge and skills. This information will help to design a better food curriculum for secondary schools.
Background/Aims: Clinical trials to support dietary modification or supplementation in the treatment of the Multiple Sclerosis (MS) have provided inconclusive findings. Despite this, many internet sites provide advice relating to diet for symptomatic management of MS. We investigated the dietary information available in an internet search that people with MS, or their carers, might perform.

Methods: A systematic search of websites, providing dietary advice and opinions for the management of MS was undertaken using the Google search engine. Websites from the first two pages of results (which accounts for 97% of the viewing traffic) from a search using the term 'MS diet', were mapped and qualitatively assessed for dietary advice, anticipated benefit and supporting evidence.

Results: The search returned 19 results of which two were inaccessible. Seventeen sites in total were analysed and categorised as blogs (n=11), societies (n=4) and sponsored sites (n=2). Of these, five sites stated there was no evidence supporting dietary intervention for management of MS symptoms (3 societies, 2 blogs). The remaining sites indicated dietary changes aided in preventing disease progression (n=6), disease progression and fatigue (n=1), fatigue alone (n=1) or reduced relapses (n=5). Dietary changes suggested by websites were the Swank diet (n=5), the Wahl's diet (n=3) and paleo diet (n=1). Several sites suggested addition of omega-3, vitamin D and biotin as supplements. Dairy, gluten-rich, fried and salty foods were items commonly recommended to be removed from diets. The advice was not supported by the scientific literature.

Conclusions: Despite inconclusive evidence, most websites (13 out of 17) suggest disease progression and relapses in MS can be improved with diet.

Funding source(s): NA
NUTRISCIENCE PROJECT: A WEB-BASED INTERVENTION TO IMPROVE NUTRITIONAL LITERACY IN FAMILIES AND EDUCATORS OF PRE-SCHOOL CHILDREN

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Background: Recent evidence shows a positive association between nutritional literacy and healthy eating. However, traditional nutrition education strategies have shown little effect. We aim to investigate the impact of an intervention program, based on innovative models, in healthy eating learning process.

Methods: The Nutriscience project is a prospective follow-up evaluation program, for families and educators of pre-school children from the national schools' network. The program consists in a web-based intervention, using an on-line interactive platform, focus on fruit and vegetables, sugar, and salt topics. This tool acts as a social network where educational materials, games, and nutritional challenges are proposed in a gamification approach. A parental self-reported questionnaire assessing sociodemographic characteristics and nutritional literacy is administered at the baseline and at the end of the intervention. A Nutrition Massive Online Open Course-MOOC was also developed for educators, and a National healthy culinary contest will be promoted on a TV channel.

Results: A pilot intervention was performed in pre-school and school children (34 institutions, 946 families and 249 educators) during 3 months. Considering the baseline nutritional literacy, 97% of the families scored more ≥ 50% on the parental self-reported questionnaire (ranging from 0 to 26 points), and the mean (SD) score was 74.0 (13.7)%. A total of 1312 recipes, photographs, videos and comments published by families' were uploaded, and 200 educators have attended the nutrition MOOC.

Conclusions: The Nutriscience project will give important information about the best practices for interventions in families. Likewise, intervention programs using a digital and entertaining interactive platform seems to be a useful, easily adapted, and disseminated educational tool for healthy eating learning process.

Funding source: EEA Grants Program
ASSOCIATIONS BETWEEN DIETARY SUGAR KNOWLEDGE & ATTITUDES WITH FREE SUGAR INTAKE & PRACTICES: A SYSTEMATIC REVIEW

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Background/Aims: Excess free sugar consumption is concerning. Two antecedents of health behaviour are knowledge and attitudes. We conducted a systematic review: (1) to identify factors influencing dietary sugar knowledge and attitudes; and (2) to determine if there is an association between dietary sugar knowledge and attitudes and free sugar intake or dietary practices.

Methods: 15 electronic databases were searched from inception for peer-reviewed and grey literature published in English involving adults (>=18 years). Effective Public Health Practice Project tool was used for assessing study quality. PRISMA guidelines were followed to report the study selection and findings were summarised meta-narratively.

Results: Of 3287 papers identified, 21 (11 for each objective) were included. Receiving nutrition education from health professionals (e.g. nurse, diabetes educator, dietician) and from advertising were associated with higher sugar knowledge and positive attitudes towards lower sugar consumption. In addition, lower intake of sugar-sweetened beverages and use of sugar-specific food labelling were associated with positive attitudes towards lowering sugar consumption. Negative attitudes towards lower dietary sugar consumption were influenced by peers. Inconsistent associations were found for the role of sugar knowledge and attitudes in determining free sugar intake or dietary practices. The overall quality of evidence was weak.

Conclusions: The findings of the available literature on determinants of dietary sugar knowledge and attitudes, and role of knowledge and attitudes in determining sugar consumption are inconclusive. More robust research is warranted.

Funding source(s): Adelaide Scholarships International
READY, STEADY, GO! HEALTHY CHOICES IN CELEBRITY CHEF RECIPE

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Background/Aims: There are numerous methods for consumers to identify healthy food choices in supermarkets and eating out-of-home. Relatively few of these methods have been used to analyse recipes, particularly those from celebrity chef (CC) books. This aim of this study was to systematically analyse CC recipes from a range of Australian and British chefs using a traffic light system.

Methods: Three CC who had published 'standard' (CCS) and 'health focussed' (CCH) recipe books (n=700 recipes), were randomly selected from the public domain and were analysed using Foodworks (v7, Xyris Software Ltd). A mixed method approach to ensure the correct yield factors were applied to recipes. Known values were used for qualitative food quantity descriptions e.g. handful, dash etc. Traffic light labelling was applied using the Victorian Healthy Choices Traffic Light system. Data were analysed using descriptive statistics, chi-square and Mann-Whitney U tests.

Results: The majority of recipes (68%) were classified as red, with no significant difference between CCS (37%) and CCH (31%, P=0.445) books. Less than 5% of recipes were green and 28% were amber. Recipes labelled as red were more energy dense with a significantly smaller serving size (294g (187,421)) than green (409g (331,532) P<0.001) and higher energy per serve (2228kJ (1524,3065) Vs 1387kJ (960,2129) P<0.001). There was no difference in the % energy from protein, fat and carbohydrate (P>0.05).

Conclusions: CC Recipe books that were apparently 'health focussed' were no healthier than standard recipe books. These analyses highlight the usefulness of traffic light labelling to assist consumers identifying healthy food choices from CC recipe books.

Funding source(s): None
DO HEALTHIER PACKAGED FOODS COST MORE? A PILOT STUDY EVALUATING HEALTH STARS AND FOOD PRICES

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Background/Aims: The Health Star Rating (HSR) is a front-of-pack label designed to help consumers identify healthier packaged foods. As price is an important determinant of food choice, this pilot study investigated the association of the HSR and price for breakfast cereals, juices, and cereal bars.

Methods: Price of packaged foods was collected from shopping receipts provided by participants of an Australian food label trial (June 2014 to June 2016). Nutrient data were obtained from the Nutrient Information Panel, and HSR calculated according to government criteria. The associations between HSR and level of nutrients, as well HSR and food price (cents/100kJ) were assessed by linear regression.

Results: HSR ranged between 2-5 for breakfast cereals (n=173), 0.5-5 for juices (n=95) and 1-4 for cereal bars (n=148). For each product category, higher HSR was associated with healthier nutrient and energy profiles. For example, each unit increase in HSR was associated with less sodium (-81.5mg/100g), carbohydrate (-9.3g/100g), and energy (-54.4kJ/100g); and more protein (1.5g/100g) for breakfast cereals (P<0.001 for each). HSR was not significantly associated with food price (regression coefficients per unit higher HSR) for breakfast cereals (1 cent/100kJ, P=0.16) and juices (11 cents/100kJ, P=0.11); and showed a small positive association with the price for cereal bars (1.9 cents/100kJ, P=0.01). Findings were consistent when food price was calculated as cents/100g.

Conclusions: There is no appreciable association between healthier packaged food products as determined by the HSR and prices of breakfast cereals, juices, and cereal bars, highlighting the possibility that using HSR to choose healthier packaged products may not necessarily come at substantial additional cost for consumers.

Funding source(s): N/A
KNOWLEDGE REGARDING PRESERVATIVES, ADDITIVES AND ARTIFICIAL SWEETENERS AS COMPONENTS OF FOOD LABELING

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Background: With the increase use of preservatives, additives and artificial sweeteners in packaged foods, the objective of the study was to analyse consumer's knowledge regarding preservatives, additives and artificial sweeteners.

Methods: A cross sectional study was conducted in 200 women aged 18-60 years from Mumbai, India visiting food mart. Structured questionnaire was used to collect data and were analysed using SPSS (version 16). Cross tabulations with chi-square test was used to difference in knowledge according to age.

Results: From the 200 women, 156 (78%) were aware about preservative used in packaged foods; 117 (58.5%) identified salt, 107 (53.5%) identified sugar, 85 (42.5%) identified citric acid, 28 (14%) identified benzoic acid, 84 (42%) identified mono-sodium glutamate as preservatives. Eighty-two (41%) were aware about additives. Significantly higher percentage of women <40 years reported that additives caused irritability as compared to women >40 years of age (χ² = 4.341, p<0.05). 54 (27%) identified aspartame, 91 (45.5%) identified saccharine, 34 (17%) identified stevia and 68 (34%) identified sucralose as sweeteners. Significantly higher percentage of women <40 years identified sucralose as sweetener as compared to women >40 years of age (p<0.05).

Conclusions: Less than fifty percent women in Mumbai city are aware about preservatives, additives and sweeteners. Consumer education camps should be planned to increase awareness in Mumbai city.

Funding source(s): N/A
EXPERIENCING FOOD INSECURITY – PERSPECTIVES FROM THOSE RELYING ON FOOD CHARITIES

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Background/Aim: Previous stereotypes of people who are food insecure are no longer valid; food insecurity is experienced by diverse people in different ways. Food is multifaceted, while providing nutrients for the body, it also engenders social connection. This study explores food security from the perspective of people who experience food insecurity.

Methods: A qualitative approach using in-depth interviews with a researcher previously known to some participants, who were accessing food charities as their main source of food. Fourteen men and one woman were interviewed. Data was analysed independently by the researchers and key themes derived.

Results: Emerging themes included: dependency on charity as essential provider of food; enabling stability in living arrangements. Charity attendance was an essential part of social connectedness. Interestingly, the woman reported a sense vulnerability seeking food from a charity. All had intermittent periods being homeless. Alcohol, drugs, smoking, poor dentition, and mental illness contributed to homelessness and food insecurity.

Food provision was variable in quality, yet plentiful, with a tendency towards being high in carbohydrate and fat. Weight gain is an issue. Paradoxically, participant knowledge of food and diet was exceptional, as was self-awareness of their health and how they lived.

Conclusions: This vulnerable group, demonstrate a dependency on food charity to support them remaining in stable, secure, living arrangements, having regular food and social connections. Interestingly, variable food quality in itself impacts on their already labile health. The food relief sector is challenged whereby provision creates dependency, and this requires further exploration.

Funding source(s): Nil
“WE RESCUE FOOD IN ORDER TO RESCUE PEOPLE”

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Background/Aim: An estimated 1.2 million (5-8%) Australians experience food insecurity. In Australia, around 3-4,000 charitable food programs offer food aid and support to individuals in need. While research has focused on charity operations, effectiveness, and policy development, little is understood in terms of the relationship between charities, food and the client. The aim of this study was to explore food access and the role of charities in providing food to their clients.

Methods: A qualitative case study analysis of three food charities was undertaken. Nine semi-structured interviews were conducted with a manager, a staff member and a volunteer from each. Observational data was gathered over a one week period in each charity to observe food preparation, service and client/staff relationship around food provision. Data was analysed independently by the researchers and key themes derived.

Results: Four key themes were identified; donations and budget restrictions, food provision and access, food quality and food as a tool for social, mental, and dietary support. Food was essential in making contact and establishing relationships, building trust and demonstrating mutual respect. However, funding and resource limitations heavily influenced the quantity and quality of food at each charity.

Conclusions: Although the charities experience food insecurity, charity staff and volunteers viewed the quality of food as highly important, and the various supportive roles established through food are used as communicative tools for establishing relationships. Future research is needed in Australia to investigate the provision of food from the client’s perspective thus further advancing client contact and support.

Funding source(s): Nil
EQUIPPING OUR FUTURE NUTRITION WORKFORCE WITH THE TOOLS TO MEND A BROKEN FOOD SYSTEM

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Background/Aims: Internationally the food system is broken, creating irreversible environmental damage and increasing diet-related disease due to an intermittent supply of nutritious food. The causes of this are complex and require multi-sectorial, innovative and evidence-based solutions. Limited tertiary-based learning opportunities specific to this complex issue exist for nutritionists in Australia. This case study describes an innovative approach to build the capacity of Australia's future nutrition workforce to improve the food system.

Methods: In 2016 a compulsory unit, Food and the Environment was introduced to the Nutrition Science program at Monash University. This unit explores the sustainability of the global and national food supply and its impact on public health. Learning outcomes ensure that students understand the economic, social, political and environmental factors that influence the food system. Assessment against these learning outcomes is authentic and facilitates the opportunity for students to develop skills applicable for the workplace. Evaluation of the unit was via an online survey and focussed on student satisfaction, attitudes towards pursuing work in the field and students' self-perceived ability to translate theory into practice.

Results: Unit evaluations (60% response rate) were positive with an overall satisfaction rating of 4.67/5 reported. Students reported confidence in pursuing a career in this field (score of 76/100) and that the unit would significantly influence their professional behaviours and lifestyle (score of 76/100)

Conclusions: This unit has the capacity to positively influence Australia's future nutrition workforce by equipping them with essential knowledge and skills to improve our food system.

Funding source(s): N/A
Background/Aims: Evidence from the US suggests increased risk for weight gain among first-year university students (Freshman 15), but evidence in Australia is scant. This study aimed to examine weight and dietary quality of Australian first-year university students over 12-months.

Methods: Twenty-two (5M/17F) first-year university students with a mean age of 21.1±6.8yrs were recruited. Body weight was measured monthly and three-day food diaries (two university and one non-university days) were administered three monthly. Diet quality was analysed at zero, six and 12-months via AGHE food-group analysis. Weight and dietary changes over 12-months was analysed using general linear model for repeated measures ANOVA.

Results: Females gained (+0.9, +1.5, +1.2 kg, p=<0.05) at 2, 3 and 4-months, respectively, but returned to baseline weight after 12-months. Sodium (2702mg/d), saturated fat (11.5% of total E) and sugar (15.8% of total E) intake all exceeded recommendations. Food group analyses revealed that intakes were not significantly different between university and non-university days, and remained unchanged throughout 12-months, except for lower discretionary sweet foods after 12-months (p=0.03).

Conclusions: First-year university students may not be consuming adequate servings from the AGHE food groups and female university students are prone to weight gain at the beginning of the academic year.

Funding source(s): University of South Australia & BUPA
VICTORIAN HEALTHY EATING ENTERPRISE: A COLLABORATIVE APPROACH TO ADDRESSING DIET’S INFLUENCE ON CHRONIC DISEASE

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Background/Aims: Diet is a major risk factor accounting for the greatest burden of disease in Australia. Recognising the importance of a coordinated approach to improving health outcomes, the Victorian Healthy Eating Enterprise (VHEE) was established as a platform for collaboration to improve healthy eating. With over 20% of men and 10% of women in Victoria drinking soft drinks daily and only 7.7% meeting recommendations for vegetable intake, a strong evidence base supported identification of two VHEE priority areas: decreasing consumption of sugar sweetened beverages; and increasing fruit and vegetable consumption.

Methods: The 50+ VHEE partners work across two network groups, supported by online resource hubs detailing evidence and resources for use by partner organisations and health professionals.

Results: The VHEE is a successful example of effective, strategic coordination. According to VHEE partners interviewed for the VHEE network evaluation, priority areas have helped to focus action, and results in these areas have built momentum for further change. Most indicated it is an effective to achieving greater reach throughout the food system by working together, rather than in isolation.

Conclusions: Working on multiple initiatives under each priority area, the VHEE partners are scaling up action in over 5,000 locations, including schools, hospitals, parks, workplaces and sport and recreation centres.

Funding source(s): N/A
Poster Session 7:  
Room M9: Aging  
16:00 - 18:00

EFFECTS OF GENDER ON SUPPRESSION OF ENERGY INTAKE BY WHEY PROTEIN IN OLDER PEOPLE

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Background/Aims: Protein-rich supplements are used widely to manage undernutrition in older people. Their use could, however, be counter-productive by reducing overall energy intake, if protein has the same high satiating effect in older as in younger people. Previously, we showed suppression of energy intake by oral protein (30g/120kcal, 70g/280kcal) compared to control (~0kcal) was less in older than younger men. The aim of this study was to determine the protein-load effect on subsequent ad libitum energy intake and underlying appetite-related gastrointestinal mechanisms in older women as well as men.

Methods: In randomised, double-blind order, administration of whey-protein drinks (30g/120kcal, 70g/280kcal, ~450ml), or an iso-palatable control drink (~0kcal) were followed by measurements of gastric emptying (ultrasonography) and gastrointestinal hormones (0-180min), and a buffet-style meal thereafter in older women (n=8, 70±3yrs, 25±3kg/m^2) and men (n=8, 73±4yrs, 26±4kg/m^2).

Statistical analyses: repeated-measures ANOVA.

Results: Control day energy intake was lower in women than men (548±61kcal vs. 1042±69kcal, P<0.001). There was no suppression of energy intake by protein compared to control (P=0.828) in either men or women, resulting in a protein-load dependent increase in energy intake (P<0.001). There were protein-load effects for gastric emptying (P<0.001) and plasma concentrations (AUC) of ghrelin, CCK, GIP, GLP-1, glucagon and insulin in both men and women (P<0.05).

Conclusions: There was no suppression of energy intake by whey protein in either older men or women, supporting the usage of 'pure' protein to increase protein and energy intake in older men and women at risk of undernutrition.

Funding source(s): GTRAC-Resthaven Grant
Background/Aims: Body shape index (BSI) is a new anthropometric tool which relies on waist circumference but free from weight, height, BMI to predict mortality. There is no study on relationship between BSI, sarcopenia and nutrition status among elderly. Aim of this preliminary work is to define association between BSI, sarcopenia and nutrition status in a small elderly population without cognitive impairment.

Methods: In this single centred and observational study patients were age equal to or greater than 65 years underwent comprehensive geriatric assessment tests. After comprehensive geriatric assessment patients who defined as cognitively normal were underwent assessment. Demographic futures, standardized comprehensive geriatric assessments results, hand grip strength, 5 meter walking speed and skeletal muscle mass (SMM), skeletal muscle mass index (SMI) and anthropometric measurements which were weight, height waist circumference and hip circumference were recorded.

Results: Sixty one patients fulfilled inclusion criteria and underwent assessment. Mean age were 76.11±7.10 years, 60.7% were woman, 18% were sarcopenic, 11.5% were presarcopenic and 18% were at malnutrition risk. BSI was significantly positive correlated with SMM (r=0.875, p<0.01), SMI (r=0.521, p<0.01), muscle power (r=0.671, p<0.01) and MNA-sf score (r=0.521, p<0.01) while BMI was only significantly correlated with SMI (r=0.601, p<0.01).

Conclusions: Results of current work indicated that BSI appeared to be good alternative to BMI on predicting body composition and nutrition status in elderly. Further studies including patients with dementia are warranted to define clinical usefulness of BSI.

Funding source(s): None
ASSOCIATION BETWEEN SODIUM TO POTASSIUM RATIO AND BLOOD PRESSURE IN ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background/Aims: Both sodium and potassium affect the blood pressure regulation. Evidence shows that excessive intake of sodium and inadequate intake of potassium is associated with high blood pressure. The aim of this study was to investigate the effect of sodium to potassium ratio on blood pressure in adults.

Methods: This review was registered on the International Prospective Register of Systematic Reviews (CRD42016035296). Three databases (Scopus, Web of Science and MEDLINE) were searched for relevant articles to February 2016. Search terms and combinations related to sodium and potassium ratio and hypertension were used. Inclusion criteria were randomised controlled trials (RCTs) in adults which assessed the sodium to potassium ratio in the diet. Random effects meta-analyses were conducted to assess the weighted mean differences (WMD) (with 95% confidence intervals) in change or final mean values for systolic and diastolic blood pressure.

Results: Five RCTs reporting the association between sodium to potassium ratio with blood pressure in adults (n=1310) were included in the meta-analysis. A lower sodium to potassium ratio was associated with a significant reduction in systolic and diastolic blood pressure (WMD: -4.38 [95% CI: -5.90, -2.87] and -2.60 [95% CI: -3.73, -1.48] respectively).

Conclusions: A lower sodium to potassium ratio was associated with significant reductions in blood pressure in adults. Recommending a lower sodium to potassium diet may be beneficial for blood pressure control. However, the body of evidence is limited. Further research is required to clarify the benefits of lower sodium to potassium ratio in blood pressure management.

Funding source(s): N/A
DIET QUALITY AND COGNITIVE FUNCTION IN OLDER AUSTRALIAN MEN AND WOMEN

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Background/Aims: Previous research into the association between nutrition and cognitive function has focussed on individual nutrients or foods, with inconsistent results. The aim of this study is to examine associations between diet quality and cognitive function in older adults.

Methods: Adults aged 55 and over in the Wellbeing, Eating and Exercise for a Long Life (WELL) study (n = 617) completed an 111-item food frequency questionnaire in 2010 and 2014. The dietary guideline index (DGI), a measure of adherence to the Australian Dietary Guidelines, assessed diet quality. The Telephone Interview of Cognitive Status modified (TICS-m) assessed cognitive function in 2014. Associations between previous (2010) and recent (2014) diet quality and cognitive function were assessed using linear regression. The associations with key food groups and dietary behaviours (diet variety, adding salt, low-fat, high-fibre) were also investigated.

Results: There was no association between 2010 DGI score and TICS-m. After adjustment for age, education, urban/rural area, depression, physical activity, BMI and cardiovascular conditions, a higher 2014 DGI score was associated with a higher TICS-m score in men (coefficient=0.04, 95% CI 0.01, 0.07). Associations between high-fibre bread (coef=1.05, 95% CI 0.11, 1.99), added salt (coef=-1.79, 95% CI -2.90, -0.68) and TICS-m were also observed in men. No other associations were observed.

Conclusions: Cross-sectionally, men who consumed a diet closer to the Australian Dietary Guidelines reported better cognitive function. Future studies should investigate trajectories of dietary change over time as cognitive function determinants.

Funding source(s): ARC; Diabetes Australia Research Trust, Medibank Health Research Fund, NHMRC.
CHANGES IN BLOOD PRESSURE, URINARY SODIUM AND SODIUM-TO-POTASSIUM RATIO IN A CLINICAL SAMPLE OF OVERWEIGHT ADULTS

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Background/Aims: High blood pressure (BP) is a major risk factor for cardiovascular disease and is clearly associated with dietary sodium, and possibly sodium-to-potassium ratio. This study aimed to explore these relationships in a lifestyle intervention trial.

Methods: This was a secondary analysis of baseline and 3 mo data from 214 participants (mean age; 44.4y, mean BMI; 32.3kg/m²) in the HealthTrack trial comprising 3 groups: intervention+walnut (supplemented with 30g/day of walnuts), intervention and control (ANZCTR12614000581662). Non-parametric tests were applied for within group comparisons of changes in resting BP and 24-hour urinary sodium (Na) and potassium (K). Multiple linear regression was conducted to explore relationships between changes in urinary Na and BP.

Results: After 3 months intervention, systolic (SBP)/diastolic (DBP) BP was significantly reduced in all 3 groups (intervention+walnut -7/-4 mmHg, p<0.001; intervention -6/-4 mmHg, p<0.001; control -3/-2 mmHg, p<0.002 SBP, p=0.069 DBP). Urinary Na was significantly reduced in the intervention+walnut and control groups (-29.5 mmol/d, p<0.001; -49.0 mmol/d, p=0.003 respectively). The Na:K ratio was significantly reduced only in the intervention+walnut group (-0.23, p=0.007). After controlling for confounders, a reduction in urinary Na was significantly associated with reduced DBP (F;6,60 = 2.341, p=0.036) only in the control group.

Conclusions: In this trial, intervention resulted in reduced BP for all groups, but reductions in Na or Na:K excretion varied, as did the relationship between urinary Na and reduced BP. Further investigations of dietary patterns may be informative.

Funding source(s): Illawarra Health and Medical Research Institute, California Walnut Commission
ULTRASONOGRAPHIC MUSCLE AND SUBCUTANEOUS FAT THICKNESS AS A MEASURE OF BODY COMPOSITION AND MUSCLE FUNCTION

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Background/Aims: Intentional and unintentional weight loss are associated with loss of skeletal muscle. Protein-rich supplements are being used widely to prevent muscle loss. Currently, it is challenging to monitor the efficacy of these nutritional strategies in the community, hospitals and nursing homes. The aim was to determine correlations between local muscle and fat measurements by ultrasonography with whole-body composition and functional capacity outcomes.

Methods: Correlations between (i) thickness of biceps brachii and quadriceps muscles and adjacent subcutaneous fat measured by 2D-ultrasonography, (ii) whole-body lean and fat mass measured by Dual-Energy X-ray Absorptiometry, and (iii) hand-grip strength and time to perform five repeated chair stands were analysed in 98 individuals; 59 men 39 women, age 59±20yrs (range 19-84yrs), body weight 77±13kg (51-116kg), BMI 26.8±4.2kg/m² (19.0-42.4kg/m²).

Results: Thickness of biceps brachii (2.8±0.1cm) and adjacent fat (0.6±0.04cm) correlated with whole-body lean (50.7±1.5kg) and fat mass (24.2±1.1kg) respectively (r=0.675 P<0.001; r=0.622 P<0.001). Both biceps brachii thickness and whole-body lean mass correlated with hand-grip strength (32.1±1.3kg, r=0.638 P<0.001, r=0.838 P<0.001). Thickness of quadriceps adjacent fat (1.0±0.06cm) correlated with whole-body fat mass (r=0.584 P=0.001). Quadriceps muscle thickness (2.6±0.1cm) did not correlate with whole-body lean mass (r=-0.020 P=0.858). Quadriceps muscle thickness, but not whole body lean mass, correlated with repeated chair stands (9.4±0.4s, r=-0.448, P=0.003), -0.014, P=0.921).

Conclusions: Muscle and fat thickness measured by ultrasound can be considered as a suitable method to assess state of body composition in people with difficulties to measure whole-body composition with traditional methods, such as frail older individuals and ICU patients.
RESIDENTIAL ALTITUDE AND FISH CONSUMPTION: EFFECT ON SYSTOLIC BLOOD PRESSURE IN ELDERLY: MEDIS STUDY CROSS-SECTIONAL RESULTS

Background/Aims: Frequent consumption of fish is associated with decreased SBP levels. Both aging and living at high altitude are associated with significant increases in Systolic Blood Pressure (SBP) levels. The aim of this analysis was to examine the potential interaction between fish consumption and high altitude on SBP in elderly cohort.

Methods: Mediterranean islands study (MEDIS) recruited 2749 older (65+ yoa) individuals from 2005-2015. Participants were selected from 21 Mediterranean islands and the rural Mani region (Peloponnesus) of Greece. Dietary habits, energy intake, physical activity status, socio-demographic characteristics and clinical profile aspects (blood pressure) were measured. The altitude of the area was also recorded.

Results: In total, 81.5% of the sample resided in areas with altitudes (0-250m above the sea level) while 18.5% in areas above the 250m (median altitude). Residents in high altitudes consumed less fish portions (1 (1-2.5)) per week as compared to resident in lower altitudes (2.5 (1-2.5)), p<0.001. In models adjusted for gender, age, smoking, BMI and daily walking time, increased in fish consumption was independent predictor of lower SBP (b=-2.028, p=0.023), but only for low altitude residents (p =0.976; higher altitudes).

Conclusions: Increased fish consumption was associated with regulating systolic blood pressure regulator for subjects residing in low but not for subjects in high altitude areas.

Funding sources: Hellenic Heart Foundation, Harokopio University in Athens, Foundation for Education and European Culture (IPEP)
A SCOPING REVIEW ON FOOD INSECURITY AMONG OLDER PEOPLE IN RURAL COMMUNITIES

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Background/Aims: Nutrition is a key determinant of longevity and healthy ageing. Diet-related diseases account for 11% of the total burden of disease in Australia and significantly increase morbidity and mortality among older people. The aim of this scoping review is to examine evidence on food insecurity among older people living in rural communities.

Methods: This scoping review used Arksey and O'Malley's framework (2005). Key databases and grey literatures were searched and contact with international nutrition and dietetic bodies was made. Articles included were written in English, focused on ageing populations (>65yrs) in non-metropolitan areas and were related to the primary question or subtopics.

Results: Malnutrition, chronic diseases and age-related physiological changes are identified as major nutrition issues for the elderly living in rural communities. Malnutrition in older populations living in rural areas is complex and exacerbated by factors that restrict food intake including food insecurity, poor dentition and reduced mobility. Interventions and programs to prevent and improve these issues are documented in the literature. Innovative interventions were examined to identify what constitutes a successful intervention, with comprehensive measurement tools to identify food insecurity and nutrition status in rural elders deemed important. Therefore, measures of nutritional status and food security in older people were reviewed and analysed to establish best practice tools.

Conclusions: This review highlights an ongoing and serious issue for rural ageing populations, and identifies best practice measurement tools and innovative interventions to address it.

Funding source(s): PhD scholarship through La Trobe University
MAGNESIUM INTAKE AND SLEEP SYMPTOMS: FINDINGS FROM THE JIANGSU NUTRITION COHORT STUDY OF CHINESE ADULTS

Y Cao, AW Taylor, R Adams, S Appleton, Z Shi

Background/Aims: Dietary magnesium has been found to improve insomnia symptoms in clinical trials. However, little is known about the role of dietary magnesium in sleep symptoms at the population level. We aimed to investigate the associations between dietary magnesium intake and sleep symptoms over five years among Chinese residents.

Methods: Data of 1487 Chinese subjects aged 20 and above at follow up from the Jiangsu Nutrition Study was analysed. Baseline dietary magnesium was measured by 3-day weighed food records. Sleep symptoms including daytime falling asleep, sleepiness and snoring during night were self-reported using a sleep questionnaire at five-year follow up. Logistic/Poisson regression models were performed for sleep symptoms at follow up with various adjustments.

Results: The mean intake of magnesium was 332.5 mg/d. In total, 5.3% of the subjects reported daytime falling asleep, 13.2% reported daytime sleepiness, and 35.7% reported snoring during sleep. Compared with the lowest quartile of magnesium intake, the highest quartile was associated with decreased likelihood of falling asleep in women (odds ratio (OR) 0.10 (95%CI 0.02, 0.53)) in women but not in men after adjusting for demographic, anthropometric, lifestyle factors, hypertension and food consumption (fruit, vegetable and meat). No associations were found between dietary magnesium intake and daytime sleepiness nor night snoring in either gender.

Conclusions: Dietary magnesium intake may have a long term benefits in reducing the likelihood of daytime falling asleep in women.

Funding source(s): NA
VENOUS LEG ULCERS AND EFFECTS OF NUTRITION AND NUTRITIONAL STATUS: A SYSTEMATIC REVIEW

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Background/Aims: Venous leg ulcers (VLU) are the most prevalent lower limb ulcer, however there is little evidence regarding the effect of nutritional status on healing. This systematic review aimed to determine nutritional characteristics of patients with VLUs and effect of nutrition interventions on VLU outcomes.

Methods: Five databases were searched from January 2004 to November 2015 for studies involving adults with VLUs measuring nutritional interventions or characteristics using Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Results: Of 4542 articles, 16 were included in the review. These included cohort, cross-sectional, case-control and quasi-experimental studies. All participants had C5 or C6 (CEAP classification) ulcers in a range of settings with relatively small sample sizes. Included studies reported a range of wound outcomes. The majority of VLU patients were found to be overweight or obese, which was also identified as a factor for delayed wound healing. Vitamin D and folic acid reported some effect on healing. Dietary intake of omega-3, vitamin C and zinc was low for some patients. Most patients consumed adequate protein. The effect of malnutrition on prevalence and recurrence of VLUs had conflicting results.

Conclusions: The current evidence suggests VLU patients are more likely to be overweight or obese. There is low-level evidence that vitamin C, vitamin D and zinc improve healing and being underweight may increase VLU recurrence risk. The available evidence is low quality due to the risk of bias and small sample sizes in the included studies. Further high quality studies are required.

Funding source(s): N/A
ASSOCIATIONS BETWEEN DIETARY PATTERNS AND DEPRESSIVE SYMPTOMS IN OLDER ADULTS

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Background/Aims: Although several studies have examined associations between dietary patterns and depressive symptoms, few have examined these associations in older adults. This study examines associations between past (2010) and current (2014) dietary patterns and depressive symptoms in community dwelling men and women.

Methods: Adults aged 55 years and over (n=4082, 49% men) were recruited into the Wellbeing, Eating and Exercise for a Long Life (WELL) study in Victoria, Australia. Dietary intake was assessed in 2010 and 2014 by an 111-item food frequency questionnaire. Dietary patterns were determined using principal component analysis in 2010 and replicated in 2014. Depressive symptoms were assessed using the Geriatric Depression Scale in 2014. Associations were assessed using linear regression adjusted for covariates.

Results: Two similar dietary patterns were identified in men and women; a healthy pattern characterised by vegetables, fruit and fish and an unhealthy pattern characterised by processed meats and refined grains. In women a higher current and past healthy pattern was associated with lower levels of depressive symptoms (β = -0.260 CI: -0.451, -0.070 and β = -0.201 CI: -0.390, -0.013, respectively). An association between a higher current unhealthy pattern and higher depressive symptoms was also observed also in women (β = 1.367 CI: 0.679, 2.055). There were no associations in men.

Conclusions: In older women dietary patterns were associated with depressive symptoms yet these association were not seen in older men. Interventions are required to further investigate the role of whole diet in depression.

Funding source(s): Diabetes Australia Research Trust, Australian Research Council
ADHERENCE TO MEDITERRANEAN DIET; NOT OLIVE OIL CONSUMPTION ALONE PREDICTS HYPERCHOLESTEROLEMIA IN ELDERLY: THE MEDIS STUDY.

Background/Aims: Adherence to Mediterranean diet is widely accepted to demonstrate protective with respect to Cardiovascular Disease (CVD) risk, including hypercholesterolemia. Interestingly, the consumption of olive oil specifically and not the global dietary pattern has also been suggested to exhibit protective effects on CVD risk. To date, no comparative analysis has been performed. Therefore, this analysis aimed to compare the role of olive oil consumption with that of Mediterranean diet on their diagnostic value for the presence of Hypercholesterolemia.

Methods: Mediterranean islands study (MEDIS) recruited 2749 older (over 65 yoa) individuals between 2005-2015. Recruitment occurred from 21 Mediterranean islands and the rural Mani region (Peloponnesus) of Greece. Dietary habits, energy intake, physical activity status, socio-demographic characteristics (altitude in residing area, lifestyle parameters) and clinical profile aspects (including blood lipids) were measured. The level of adherence to Mediterranean diet was assessed using the a-priori index MedDietScore and olive oil consumption was assessed with a validated FFQ. The diagnostic value of the food data was assessed using the AUC for the presence of hypercholesterolemia. The p-value for the comparison of AUC with 0.5 was performed with Likelihood Ratio test.

Results: From diagnostic value of the presence of Hypercholesterolemia, MedDietScore was the only significant diagnostic tool ((AUC)=0.547, p=0.001), but neither the number of olive oil servings per week (AUC=0.476, p=0.096), nor the mean calories consumed from of olive oil daily (AUC=0.492, p=0.560) were effective diagnostic tools for the presence of Hypercholesterolemia.

Conclusions: The overall pattern of Mediterranean diet and not individual foods or food-groups, could be responsible for the protection against CVD risk factors. More emphasis should be given to holistic approaches in dietary consultation, in order to achieve the most effective CVD prevention.

Funding sources: Hellenic Heart Foundation, Harokopio University in Athens, Foundation for Education and European Culture (IPEP) and grants.
THE EFFECTS OF L-THEANINE AND EGCG ON PALMITIC ACID INDUCED INFLAMMATION IN MOUSE HYPOTHALAMIC NEURONAL CELL LINES (mHypoE-N42)

1D Sergi, 1LM Williams, 2J Thomas, 2DD Mellor, 2N Naumovski

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Background/Aims: The consumption of long-chain saturated fatty acids induces hypothalamic inflammation associated with insulin and leptin resistance. In contrast, bioactive compounds such as epigallocatechin gallate (EGCG) and L-theanine (L-THE) were reported to exhibit antioxidant and anti-inflammatory properties. This study determined the effect of EGCG on mitochondrial morphology and L-THE on mitochondrial morphology and the expression of pro-inflammatory markers in cultured hypothalamic neurons (mHypoE-N42) after palmitic acid (PA) challenge.

Methods: mHypoE-N42 cells were treated with BSA (50µM) or PA (200µM) in the presence or absence of L-THE (50µM). Semi-quantitative RT-PCR was used to assess the expression of IL-6 and TNFa. For mitochondrial morphology, mHypoE-N42 cells were incubated with BSA (50µM) or PA (200µM) in the presence or absence of L-THE (50µM) or EGCG (50µM). Mitochondria were stained using MitoTracker Red CMXRos. One-way ANOVA followed by Tukey's test was used to determine the differences.

Results: PA upregulated the expression of both IL-6 (2.1±0.3; p<0.001) and TNFa (1.7±0.1; p<0.01) relative to BSA. Additionally, L-THE decreased TNFa mRNA levels (0.68±0.18; p<0.05), but did not downregulate IL-6 expression compared to PA treated cells (0.98±0.09; p>0.05). PA decreased mitochondria size and density compared to BSA and this effect was ameliorated when L-THE was added alongside PA. No improvement in mitochondria density or size were observed when EGCG was used in combination with PA.

Conclusions: L-THE inhibits PA-induced TNFa upregulation and can putatively ameliorate high-fat diet-induced hypothalamic inflammation and obesity.

Funding: Scottish Universities Life Sciences Alliance studentship; University of Canberra
Poster Session 8:

Room M10: Dietary strategies

16:00 - 18:00

CHANGING DIET AND PHYSICAL ACTIVITY IN TIME-POOR POPULATIONS

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Background/Aims: Nurses have long and rotational shift work, which lead to irregular meal patterns, frequent snacking on energy-dense nutrient poor foods (EDNP), inactivity, and thus a high prevalence of overweight and obesity (62%). The aim of this study was to deliver a 3-month workplace intervention study to improve diet and physical activity behaviours (PA) in nurses.

Methods: Intervention materials included pedometers, a smartphone app, and a dedicated Facebook group. Diet quality (food frequency questionnaire) and PA (accelerometer) were the primary outcomes. Secondary outcomes included weight, BMI, waist circumference, and blood pressure. All measurements were taken at baseline, end of the intervention (3-months) and follow-up (6-months). Changes pre and post were analysed with paired two-tailed T-test, and repeated measures were used to analyse changes across baseline, 3- and 6-months.

Results: 47 nurses, 41.4±12.1 years old and 87% female working at two hospitals in Brisbane (Australia) participated in the study. At 3-months, total energy intake coming from fruit and vegetables significantly increased by 3.8% (p=0.04), while it decreased for EDNP foods (-0.8%, p=0.38). There was a -0.5% decrease on time spent in moderate-to-vigorous PA, and a decreased in average daily steps by 500 steps/day (both p<0.02). At 6-months, dietary outcomes were maintained, while daily steps and sedentary time slightly decreased from 3-months. There were small changes on weight and BMI at 3- and 6-months (p>0.30).

Conclusions: Participants indicated that changing both behaviours was too hard, suggesting that in time-poor and stressed populations changing one behaviour at the time could be more feasible and effective. Social media and smartphone app could be effective at promoting diet behaviour but not PA.
REVIEW OF BEHAVIOUR CHANGE INTERVENTIONS TO REDUCE POPULATION SALT INTAKE

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Background/Aims: Majority of the population around the world consume excess salt intake causing raised blood pressure and cardiovascular disease- the leading cause of death worldwide. Although behaviour change interventions aiming to influence consumers' salt related behaviours are commonly implemented, their effectiveness is unclear. This systematic review investigates the effectiveness of behaviour change interventions that aim to reduce salt intake on a population level.

Methods: Studies of behaviour change interventions with a population or sub-population focus were identified from a peer-reviewed and grey literature search. Study and intervention characteristics were extracted for descriptive synthesis. The quality of studies were assessed against a modified Cochrane risk of bias tool.

Results: 22 studies involving 41,448 participants were included. Behaviour change interventions were categorised as health education interventions (14), public awareness campaigns (4) and multi-component interventions (4). 19 of the 22 studies found behaviour change interventions significantly reduced salt intake (ranging from 0.9g/d to 4.4g/d) and/or improved salt-related behaviours. Based on the gold standard method of measuring salt intake (24-hour urine collection), two of six studies reported a significant reduction. All studies scored high risk of bias in one or more domains.

Conclusions: The majority of behaviour change interventions successfully improved salt-related behaviours or reduced salt intake, but the overall strength of the evidence is moderate to weak. More research is required in LMICs where behaviour change interventions potentially have greater impact as salt added by individuals remains a major contributor of salt intake.

Funding source(s): NHMRC, VicHealth, Australian Primary Health Care Research Institute
IMPROVING THE HEALTH OF SOUTH AUSTRALIAN TRUCK DRIVERS: A 6-WEEK LIFESTYLE INTERVENTION

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Background/Aims: The occupational duties of truck driving enforce long periods of time sitting, and are often accompanied by unhealthy dietary behaviours. These factors increase risk for overweight/obesity and associated chronic diseases. The aim of this study was to implement a 6-week lifestyle intervention in municipal truck drivers.

Methods: Ten overweight adult truck drivers participated in a 6-week nutrition-focused intervention including individualised dietary counselling and education. Weight, waist circumference (WC) and blood pressure (BP) were assessed at Weeks 0 and 6. Three-day weighed food records (providing nutrient intake and food distribution according to the AGHE) and physical activity diaries were completed prior to commencing the study and at Week 6. Pre-post differences in weight, WC, BP, nutrient and food intake, and physical activity (min) were tested using the Wilcoxon signed-rank test.

Results: Six drivers completed the intervention (mean age 42.2 y; BMI: 32.9 kg/m²). Energy intake (kJ), time spent in physical activity, weight, WC and BP remained unchanged. Consumption of discretionary foods decreased significantly from 8 serves/day at Week 0 to 2.5 serves/day at Week 6 (P<0.05). Total fat and SFA intakes decreased significantly by Week 6 (-5.7% and -3.2%, respectively P<0.05).

Conclusions: Dietary education resulted in reduced intake of discretionary foods, total fat and SFA. This suggests that appropriately powered longer-term corporate-based interventions may lead to anthropometric improvements in this population.

Funding source(s): School of Pharmacy and Medical Sciences
A SYSTEMATIC REVIEW OF BRIEF NUTRITION INTERVENTIONS IN ADULTS

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Background/Aims: Brief interventions are effective in improving health behaviours including alcohol intake, however the utility of this approach for nutrition outcomes has not been determined. The objective of this review was to assess the effectiveness of brief interventions aiming to improve nutrition outcomes in adults.

Methods: A systematic review of RCTs was conducted following PRISMA guidelines. The protocol, registered with Prospero, included 2 reviewers at each stage and used the Academy of Nutrition and Dietetics Quality Assessment tool. Seven databases (MEDLINE, MEDLINE in process, EMBASE, PsycINFO, Scopus, CINAHL, Cochrane) were searched for studies published in English to March 2016.

Results: 4849 titles and abstracts were identified, with 28 studies included in the review. All interventions were 'brief', defined as delivered during a single point of contact. Most studies were from Europe (n=12), with others from US (n=9), UK (n=5) and Australia (n=2). Eleven interventions targeted a single nutrition outcome, including fat (n=5), fruit (n=4), breakfast (n=1) and soda (n=1) consumption; the remaining targeted multiple outcomes, including: fruit and veg (n=7); fruit, veg and fat (n=6); overall diet (n=4). Length of follow-up ranged from one week to 24 months. Nineteen interventions used paper-based resources, four of which included face-to-face contact; seven used technology (eg. computers), and two compared paper and technology interventions. Sixteen studies reported a positive intervention effect for one or more nutrition outcome.

Conclusions: A majority of brief interventions were effective in improving nutrition outcomes. Minimal interventions have potential for large scale dissemination and wide-reaching impact.

Funding source(s): N/A
ENERGY DRINK CONSUMPTION AND MENTAL HEALTH PROBLEMS IN YOUNG ADULTS: A PROSPECTIVE INVESTIGATION

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Background/Aims: Energy drinks are non-alcoholic beverages that contain high levels of caffeine, sugar, taurine, ginseng, guarana, B-vitamins and herbal extracts. Whilst previous research has reported cross-sectional associations between energy drink consumption and mental health difficulties, few prospective studies exist. The aim of this study was to examine longitudinal associations between energy drink consumption and symptoms of anxiety, depression and stress in young adults.

Methods: This study used data collected from the Western Australia Pregnancy Cohort (Raine). Self-report questionnaires were used to collect data on energy drink consumption and mental health problems (Depression Anxiety Stress Scale-21; DASS-21) at the 20-year (n=1236) and 22-year (n=1115) follow-up. Linear regression analyses examined whether change in energy drink use across the two-year period was associated with change in DASS-21 scores. Results were stratified by gender and adjusted for baseline DASS-21 scores, socio-demographics, lifestyle factors (physical activity, drug and alcohol use, BMI) dietary intake and parental mental health.

Results: After adjustment for potential confounding factors, changing from a non-energy drink user to an energy drink user across the two-year follow-up was associated with an increase in DASS depression, anxiety and stress scores in males (β=6.09; 95% CI=3.36, 8.81, 95% CI=1.82, 5.70, 95% CI=0.47, 5.97, respectively). No significant associations were found for females.

Conclusions: We found longitudinal evidence of an association between energy drink consumption and increased anxiety, depression and stress in young adult males. Further research into the possible contribution of energy drinks to the development of mental health problems in young adults is needed.

Funding source(s): Healthway, NHMRC
DIETARY EDUCATION AIMED AT INCREASING DAIRY CONSUMPTION
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Background / Aims: The consumption of dairy in Japan is extremely low. Although children up to the age of 15 are provided with 200ml of milk per day with school meals as part of a national initiative, milk intake decreases dramatically once this age is passed. For this reason, dietary education aimed at increasing dairy intake is essential.

Nudges, defined as "gradual stimuli," are currently the focus of much attention. Accordingly, a study was conducted on 10-year-olds wherein the children were provided with an environment where they could select to have milk or yoghurt with their school meals (so-called nudges) for three months. Then, a year later, the changes in their dairy consumption were examined.

Method: The 10-year-olds(n=80) were split up into a group that was provided with both milk and yoghurt, and a group that was provided with only milk, and the study was conducted for three months. Twenty percent of the children in both groups consumed dairy products less than once a week and would leave their milk unfinished even if it was given to them with school meals. The amount of dairy consumed by these children a year later was then compared.

Result: After one year, the experimental group showed a 10% higher dairy intake compared to the control group, and there were no longer any children in the group who consumed no dairy products at all (ANOVA, p<0.05).

Conclusion: Although dietary education classes have been conducted numerous times in the past, their effects are short-term. However, this study has persist for one year.

Funding source(s): DANONE JAPAN Research Grant
EVALUATION OF DIETARY SIMULATION MODELS ESTIMATING THE EFFECT OF DIETARY STRATEGIES ON NUTRITIONAL INTAKE: A SYSTEMATIC REVIEW

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Background/Aims: Dietary simulation modelling can determine dietary strategies that predict optimal and feasible improvements in diet quality or health outcomes. Simulation modelling can inform the development of effective interventions, or policy and practice where intervention studies are unfeasible. The aim was to undertake a systematic review of simulation studies that model dietary strategies aiming to improve nutritional intake, body weight and related chronic disease.

Methods: PRISMA guided the search strategy with studies located through electronic searches (Cochrane Library, Ovid [Medline and Embase], EbscoHost [CINAHL], and Scopus). Study findings were described and dietary modelling methodology and reporting quality critiqued using a set of purpose-developed quality criteria based on general modelling guidelines.

Results: Forty-one studies were included (n=28 government-level strategies; n=13 individual-level strategies). Most studies clearly defined model formation and development; some lacked critical assumptions and most lacked sensitivity analyses. Modelled strategies that predicted diet quality improvements were: government strategies (food labelling) - demonstrating reductions in saturated fat, sodium and added sugar intake; individual strategies - substitution of discretionary choices for healthier alternatives, or a direct increase in core food consumption. There was some potential for government-led reformulation strategies to decrease sodium and increase wholegrain intake.

Conclusions: Dietary strategies modelled to date highlight the 'best case scenario' but fail to examine the parameter uncertainties and the practicalities of the strategy if implemented. Improvements in the quality of simulation modelling studies would provide greater insight into the likely effectiveness of dietary strategies.

Funding source(s): NHMRC
A SYSTEMATIC REVIEW OF THE EFFECT OF HIGH GLYCAEMIC INDEX DIET FEEDING IN RODENTS

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Background/Aims: The glycaemic index (GI) is a means of classifying carbohydrates and thus diets. The impact of varying GI diets on rodent metabolism has been extensively reported; however, an overall consensus has not been reached as most diets are confounded by factors such as differing macronutrient and fibre content. The aim of this review was to identify and compare studies investigating the effect of high glycaemic index (HGI) versus low glycaemic index (LGI) diets on body composition and glucose metabolism in rodents.

Methods: The databases Medline, PubMed, Scopus and Web Of Science were searched for HGI diets applied in a mouse or rat experiment, and the relevant articles identified based on strict inclusion and exclusion criteria. The applicable information was then extracted, and the results assessed in terms of the effect on rodent metabolism; specifically body composition and glucose homeostasis.

Results: 30 articles were obtained; 14 in mice, 14 in rats and two using both mice and rats. In most studies, animals fed a HGI diet compared to a LGI diet reported a comparative increase in body fatness and plasma insulin in response to a glucose challenge, but relatively similar fasting plasma glucose levels. However, conflicting results were present in all areas. No study controlled for both digestible macronutrient and fibre content.

Conclusions: Across the 25 articles examined, most reported a relative increase in body fat and fasting insulin on a HGI diet. However, this effect could not be attributed to differences in GI per se, due to the uncontrolled nature of the diets.

Funding source(s): N/A
CORRELATION BETWEEN CANCER AND DIETARY PATTERNS: A MULTICENTER CROSS-SECTIONAL STUDY

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Background & aims: In 1990, NIC presented a list of "designer foods," approximately 40 types of fruits and vegetables effective in the prevention of cancer. Among families who eat meals together, it is assumed that the risk of incidence of cancer caused by dietary patterns is analogous. Accordingly, in this research we focused on nutrients identified as protective factors against cancer, and examined the intake of such nutrients.

Methods: The dietary patterns of our subjects - three generations of women (n=1051) consisting of daughters in their twenties, their biological mothers, and their biological grandmothers - were recorded in brief-type self-administered diet history questionnaires, and the nutritional intake of two groups of mothers and daughters, divided by the grandmother's medical history of cancer, was compared.

Result: Among the generation of mothers descendent from grandmothers having a medical history of cancer, there was a higher intake of four types of nutrients (vitamin E, K, B6, folic acid. p<0.05. Furthermore, intake of vegetable and pulse food groups was also higher (p<0.05). A medical history of cancer in the grandmother gives rise to an increased vegetable intake and vitamin intake among the mother generation. In other words, it gives rise to reverse causality. Conversely, there was no difference in nutritional intake between the two daughter-generation groups.

Conclusion: It is suggested that a medical history of cancer in the grandmother gives rise to reverse causality, improving the vitamin intake of the mother generation. In Japan, similar results pertaining to elevated blood pressure and table salt intake have also been obtained.

Funding source(s): JSPS KAKENHI from Japan Society for the Promotion of Science
THE RELATIONSHIP BETWEEN HEART DISEASE & VITAMIN E INTAKE: A MULTICENTER CROSS-SECTIONAL STUDY

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Background & aims: Heart disease cases are on the rise in Japan. This outbreak is associated with adult lifestyle habits such as eating habits, exercise, and smoking. It is hypothesized that the risk of heart disease primarily caused by eating habits is similar among families that eat meals together. This study will therefore focus on vitamin E, identified as a protective factor against heart disease.

Methods: The study examined three generations of subjects: women in their twenties, their biological mothers, and their biological grandmothers. The subjects recorded their eating habits using a brief-type self-administered diet history questionnaire (BDHQ). The mothers and daughters were then divided into two groups based on the grandmothers' history of heart disease, and their intake of pulses, natto, and vitamin E was compared.

Results: Natto intake was low among grandmothers with heart disease (With heart disease 12±15, Control 16±17 g/day, p<0.05). This difference in natto intake consequently led to a difference in intake of γ-tocopherols (With heart disease 10.9±4.2, Control 11.9±4.6 mg/day, p<0.05). A similar trend was observed in pulses intake among the mothers and daughters(p<0.05).

Conclusion: Natto represents approximately 15% of pulse intake in Japan. Low intake of pulses (particularly natto) means a low intake of γ-tocopherols, one of the eight isomers of vitamin E, and represents a risk factor for heart disease.

Funding source(s): JSPS KAKENHI from Japan Society for the Promotion of Science
NEU5AC, NEU5GC AND KDN LEVEL IN DIFFERENT ORGANS OF THREE ANIMAL SPECIES AND POTENTIAL RELATIONSHIP WITH MEAT QUALITY AND DISEASE

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Background/Aims: Due to the human specific loss of de novo biosynthesis of N-glycolylneuraminic acid (Neu5Gc), dietary source, in particular, red meat is the only possible source of tissue incorporation of Neu5Gc which eventually act as a xeno-autoantigen, react with circulating anti-Neu5Gc antibodies and could contribute to carcinogenesis or other diseases exacerbated by chronic inflammation. The aim of this study is to determine the concentration of N-acetylneuraminic acid (Neu5Ac), Neu5Gc and Ketodeoxynonulpsonic acid (KDN) in the skeletal muscle and organs of thee animal species and to discuss the potential relationship between meat quality and human health.

Methods: The fresh spleen, kidney, lung, heart, liver, fat tissue and skeletal muscle from sheep, goat and cattle were analyzed using our published Ultra-high performance liquid chromatography (UHPLC) method.

Results: Among all tissue organs, skeletal muscle and fat tissue had the lowest concentration of total Neu5Gc in all 3 species of animals compared to organs. For instance in sheep Neu5Gc content in muscle and fat tissue was 6.54 and 15.02 µg/g wet tissue respectively, which was 3 ~15 fold lower than any other organ tissues. While the lung (103.64µg/g wet tissue) in sheep contained the highest Neu5Gc, followed by the spleen, kidney, liver and heart. However, spleen had the highest Neu5Gc concentration in cattle and goat. Overall, there was significant difference in Neu5Ac, Neu5Gc, KDN and total Sia concentration in different organs of the same species, and the same organs of different species.

Conclusions: Sia concentration is species and organ tissue specific.

Funding source(s): IPRS
MALE PARTICIPANTS CONSUMING HIGHER QUANTITIES OF ALCOHOL AT BASELINE IN HEALTHY LIFESTYLE STUDY

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Background/Aims: The NHMRC recommends limiting alcohol consumption to no more than two standard drinks per day to reduce the risk of harm from disease or injury. In clinical settings, alcohol consumption would be considered in view of other social factors. Using data from a healthy lifestyle clinical trial (the HealthTrack study) this secondary analysis aimed to compare alcohol consumption of male and female participants and to examine associations between alcohol consumption and mental health parameters (stress, depression, anxiety).

Methods: Baseline dietary data from n=377 (female n=278, male n=99) participants was made available from dietary history interviews, and mental health data was available using the the Depression Anxiety Stress Scale (DASS-21) online survey. Chi-square analysis was used to compare serves of alcohol per day between genders and spearman's rho to examine correlations between alcohol intake and DASS-21 scores by gender.

Results: Median intakes of alcohol at baseline were 8.17g/day and 2.53g/day for males and females, respectively. Males (69.7%) were more likely than females (50.4%) to exceed NHMRC recommendations ((2)=13.887, p<.001). A significant correlation was found alcohol consumption and anxiety scores ($r_{(98)}=-.208, p=0.019$) in males only.

Conclusions: This secondary analysis of HealthTrack data demonstrated that greater than 50% of the overweight/obese sample consumed alcohol above recommended levels, with men consuming significantly greater levels than women. This analysis provides insights for clinical practice where consideration of alcohol consumption is clearly part of lifestyle management.

Funding source(s): Illawarra Health and Medical Research Institute and the Californian Walnut Commission.
FOOD AND DIETARY BEHAVIOURS AS CARDIOMETABOLIC RISK FACTORS IN LIVER TRANSPLANT RECIPIENTS

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Background/Aims: In liver transplant recipients (LTR) survival is compromised by cardiometabolic risk factors. Post-transplant dietary intakes of LTR are largely unknown, therefore this cross-sectional study aimed to assess the dietary behaviours of 53 LTR and investigate relationships with cardiometabolic risk factors.

Methods: Dietary data were collected via diet history and compared to the Australian population. Medical and anthropometric data were collected from medical records. Altered glucose metabolism was defined as either elevated fasting glucose or presence of diabetes. Simple non-parametric statistical tests were used for between group comparisons.

Results: Median age of LTR participants was 55 years (47-61) and median time since transplant 2.5 years (1.0-4.5). They were overweight (BMI 27.6±5.0kg/m²), with 30 (56.6%) experiencing altered glucose metabolism and 21 (40%) having metabolic syndrome. Their diets were consistent with a Western-style eating pattern favouring refined grains (4.1 serves/day) and meat (3 serves/day); consuming low amounts of fruits (1.7 serves/day) and vegetables (3.5 serves/day); and consuming high amounts of saturated fats (14±4% of energy/day). When compared to the Australian population, LTR consumed significantly less discretionary foods, sodium, and free sugar. LTR with altered glucose consumed significantly less polyunsaturated fats (4.2 ± 1.6 vs 5.6 ± 2.2 % of energy, p=0.04) and related food sources than those with normal glucose.

Conclusions: These results suggest significant manipulation of food intake is needed to achieve a cardio-protective dietary pattern. Our detailed dietary assessment of LTR has revealed a novel target for dietary intervention.

Funding source(s): Dietitians' Association of Australia
PREMENSTRUAL SYNDROME IS ASSOCIATED WITH DIETARY AND LIFESTYLE HABITS AMONG COLLEGE STUDENTS: A CROSS-SECTIONAL STUDY

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Background/Aim: Premenstrual syndrome (PMS) is a combination of physical, psychological and behavioural symptoms that affect adult women and interfere with their daily life activities and personal relationships. However, little is known about the prevalence of PMS and its associated dietary, lifestyle and body composition variables in the Arab, especially Gulf, area, including UAE. This study aims to find out the prevalence of PMS and its severity among college students in Sharjah/UAE, and to find out its association with dietary, lifestyle factors, and body composition variables.

Methods: A cross-sectional study was conducted and included 300 adult female college students aged from 18-24. Data collection was performed using pre-tested, self-administration structured PMS, dietary, and lifestyle questionnaires, along with undertaking anthropometric measurements. Chi-square and Spearmen tests, and logistic regression were performed to calculate the associations and correlations between PMS and dietary and lifestyle factors, and body composition variables as well.

Results: PMS was reported in 106 (35.3%) of the study participants. A significant \( P < 0.05 \) association was found between severe PMS symptoms and frequent consumption of caffeine and starchy foods, and low intake of vegetables. A significant \( P < 0.05 \) correlation between severe PMS and physical inactivity and smoking \( r = -0.051 \) and \( r = 0.178 \), respectively) was found, while body composition variables did not show any significant association or correlation with PMS.

Conclusions: Moderate prevalence of PMS was reported, with significant associations were found between the severity of PMS with dietary habits and lifestyle factors.

Funding source: Nutrition and Food Research Group/ Sharjah Institute for Medical Research (SIMR), University of Sharjah/UAE