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2021 Annual Scientific Meeting of the Nutrition Society of New Zealand

Tūhono - Reconnecting

Edited by
Rachel Brown, Sally Mackay,
Helen Eyles and Shabnam Jalili-Moghaddam

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2021 Annual Scientific Meeting of the Nutrition Society of New Zealand: Tūhono—Reconnecting

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Editors

Rachel Brown
Sally Mackay
Helen Eyles
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About the Editors

Rachel Brown

Rachel is a Registered Nutritionist and professor at the Department of Human Nutrition at the University of Otago. She has research experience working in the areas of health outcomes associated with the consumption of nuts on blood lipid and lipoproteins, glycaemic response, sensory science, inflammatory markers, endothelial function, appetite control, diet quality, body weight regulation, and energy balance. Other research specialties include the measurement of food and nutrient intake and assessment of biochemical status among populations. She is currently president of the Nutrition Society of New Zealand.

Sally Mackay

Sally is a Registered Nutritionist who works as a Senior Lecturer in the School of Population Health at the University of Auckland. Her research interests include monitoring the healthiness of the food environment, particularly food composition, food affordability, and restricting children's exposure to unhealthy food marketing as well as healthy and sustainable diets. She is part of International Network for Food and Obesity/non-communicable diseases, Research, Monitoring and Action Support (INFORMAS). She worked with the New Zealand INFORMAS team to assess the government's implementation of policies to improve food environments and conduct a comprehensive assessment of food environments. She is part of the team developing methods for the next national nutrition survey in New Zealand and the team monitoring the implementation of the Healthy Food and Drink Policy by District Health Boards. She is co-chair of the Health Coalition Aotearoa Food Expert Panel.

Helen Eyles

Dr Helen Eyles is a public health nutritionist and Senior Lecturer at the University of Auckland. The aim of her research is to monitor the food environment, and test promising interventions that could support improvements in the population's nutrition levels. Helen's current research focuses on food composition, mobile health technologies, sodium and potassium intakes, and blood-pressure-lowering interventions. She is also the lead investigator of Nutritrack, an online searchable database of packaged food and beverage products that are available for sale at major New Zealand supermarkets and fast-food restaurants. Helen is the Secretary of the Council of the Nutrition Society of New Zealand and a Senior Fellow of the Heart Foundation of New Zealand.

Shabnam Jalili-Moghaddam

Shabnam is a Registered Nutritionist, qualified as both a Researcher and Lecturer at Auckland University of Technology (AUT). She has international experience as a nutritionist in community and academic settings, working with research teams in birth cohorts and clinical trial studies. At present, she is working as a Research Officer–Project Manager at the National Institute for Stroke and Applied Neurosciences (NISAN) and is also managing the New Zealand arm of an international clinical trial, PERsonalised Knowledge to reduce the risk of Stroke (PERKS). Her main research interest is the role of eating patterns and behaviours, particularly ethnic differences, on chronic diseases, seeking to inform actions that will positively impact health across the lifecycle. She is a Council Member of the Nutrition Society of New Zealand.

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Editorial

Nutrition Society of New Zealand Annual Conference Held Virtually, New Zealand, 2nd and 3rd December 2021 †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

The annual scientific conference of the Nutrition Society of New Zealand took place virtually on the 2nd and 3rd December 2021. The aim of the annual conference is to foster discussion and disseminate the results of nutrition-related research. The conference also provides an opportunity for those working in practice to share experiences and keep up to date with scientific advancements. The theme of the conference was 'Reconnecting-Tūhono'. One hundred and sixty-nine delegates attended over the two days. The programme comprised five plenary sessions, five concurrent oral sessions, and twenty-three short, prerecorded videos, with the latter as a replacement for the traditional poster format. Highlights of the five plenary sessions included presentations on *Food sovereignty* by Dr. Bevan Eruti and Christina McKerchar; *Women's health* by Dr. Megan Ogilvie and Dane Baker; *Sustainable diets* by Dr. Brent Clothier, Dr. Nick Smith, and Dr. Cristina Cleghorn; *Healthy environments for children* by Jasmin Jackson; and the *Gut–brain axis and future foods* by Dr. Pramod Gopal, Tracey Bear, and Dr. Jocelyn Eason. The Muriel Bell Lecture entitled 'Lick the plate clean: the intersection of food, nutrition, and waste' was presented by Professor Sheila Skeaff of the Department of Human Nutrition, University of Otago.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

BIA-Sustainability: Development of A Business Impact Assessment of Food Companies †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Unsustainable food systems are responsible for unhealthy diets and significant environmental degradation globally. The environmental impact of food companies extends along the food supply chain. The International Network for Food and Obesity/Non-communicable Diseases Research, Monitoring and Action Support (INFORMAS) is a global research network that aims to monitor, benchmark and support public and private sector actions to reduce obesity and non-communicable diseases. The Business Impact Assessment on Obesity and Population Nutrition (BIA-Obesity) tool for monitoring the nutrition commitments of food manufacturers, retailers and quick-service restaurants has been successfully used in various countries. This research aims to develop a companion tool to monitor the commitments of food companies to sustainability and verify the relevance and feasibility of the proposed indicators with experts. An inventory of existing indicators was created to guide the creation of domains and indicators. The eleven proposed domains were: packaging, energy use, emissions, water and discharge, biodiversity, climate change adaptation, food loss and waste, environmental compliance, relationships with other organisations, corporate sustainability strategy and reducing ruminant-based products. The Global Reporting Initiative is the most widely used sustainability reporting framework, so selected indicators were modified, and additional indicators and a scoring system were added. Feedback was provided from six academic experts in New Zealand and Australia, sustainability managers from three major food companies in New Zealand and from the INFORMAS Food Sustainability Advisory team (international sustainability experts). In each feedback step, the indicators were modified to improve the specificity of commitments, clarify definitions, add or remove indicators and to modify the scoring of indicators. Feedback highlighted the complexity for food companies in setting commitments, how to incorporate the supply chain into the indicators, how to focus on priority areas of environmental impact for an individual company, and challenges in developing indicators for biodiversity. The resulting 35 indicators will be piloted in selected countries.

Keywords: sustainability; food companies; indicators

Citation: Mackay, S.; Renker-Darby, A.; Robinson, E.; Shaw, G.; Sacks, G. BIA-Sustainability: Development of A Business Impact Assessment of Food Companies. *Med. Sci. Forum* **2022**, *9*, 1. https://doi.org/10.3390/msf2022009001

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Abstract

Food Frequency Questionnaire: Is It Time for a Re-Vamp? A Kaupapa Māori Critique of Dietary Recall and Assessment Tools †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Cardiovascular disease (CVD) is the largest cause of death in New Zealand, Aotearoa, causing 33% of all deaths, with one in twenty-one adults currently living with heart disease. There is a well-known equity gap in disease prevalence and mortality rate between Māori and other New Zealanders, with the total CVD mortality being twice as high for Māori compared to others. From a nutritional perspective, when considering how to address these significant inequities, it is essential to develop tools that provide practical solutions to effectively engage Māori communities and whānau and are also fit for purpose. The assessment of dietary recall is often undertaken to establish the association between dietary intake, health and disease. A food frequency questionnaire (FFQ) is often used as a dietary assessment tool within clinical, community and research settings. Anecdotal evidence gained from discussions with researchers, academics and Māori research participants involved in a recent Kaupapa Māori nutrition intervention funded by the Heart Foundation identified a potential need for an in-depth look at how fit for purpose current dietary recall tools are, such as the food frequency questionnaire. This presentation will form part of a scoping exercise to inform a Kaupapa Māori Master's thesis looking at barriers and enablers to administering and filling out dietary recall questionnaires to assess dietary intake. It will briefly look at FFQ examples and discuss qualitative feedback received from research participants. The focus of the presentation will look at the different protocols commonly utilised in administering FFQs and any adaptations or alternatives used to support different populations. Furthermore, it will look at what challenges participants have in completing FFQs. Results: Feedback from Māori participants of the Heart Foundation nutrition research highlighted challenges to the cultural appropriateness, health literacy and ease of filling out FFQs.

Keywords: Kaupapa Māori; dietary recall assessment; food frequency questionnaire

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Abstract

Dietary Sources of Sodium across the Diverse New Zealand Adult Population †

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Abstract: Diets high in sodium increase blood pressure, which in turn raises the risk of cardiovascular disease. New Zealand (NZ) adults consume 40% more sodium than the World Health Organization recommendations, yet information on the major dietary sources of this nutrient is lacking. Our aim was to determine major dietary sources of sodium for NZ adults by gender, ethnicity, and age. Nationally representative sodium intake data were sourced from the most recent Adult Nutrition Survey (2008/09; n = 4721) including 33 high-level food groups and 343 smaller food categories. Outcomes were: (1) proportional contribution of sodium from high-level food groups up to ~80% consumed, and (2) proportional contribution of sodium from the top 10 smaller food categories. All outcomes were assessed for the total population and by gender, ethnic group (Māori, Pacific, Asian, Other), and age group (15–10, 21–40, 41–60, 61+ years). Average percentage sodium consumed from food groups and categories was calculated using individual weighted 24 h recall data. For the total population, 15 high-level food groups contributed ~80% of sodium consumed; the top three were Bread (18%), Bread-based dishes (11%), and Grains and pasta (7%). Other top three high-level sources for specific groups were Pork (Māori, Other ethnicity, 41–60 years, 61+ years), Sausages and processed meats (Māori, Pacific), Vegetables (Asian), and Soups and stocks (61+ years). For the total population, the top three smaller food category sources were White bread (7%), Sandwiches and filled rolls (6%), and Mixed grain bread (6%). Other top three smaller food category sources for specific groups were Sausages (Māori, Pacific, 21–40 years, 60 years+), Noodles (Pacific, Asian), Fried rice/sushi/risotto (Asian), and Burgers and hot dogs (15–20 years.). The findings should be used to inform much-needed sodium reduction interventions and policies, and a national sodium reduction strategy. Differences by population sub-group should be considered to help reduce disparities in heart health in Aotearoa NZ.

Keywords: sodium; salt; food sources; diet; blood pressure; New Zealand

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Abstract

Effects of Oral Nutritional Supplement with HMB on Biochemical and Haematological Indices in Community-Dwelling Older Adults at Risk of Malnutrition †

Siew Ling Tey [1,*], Dieu Thi Thu Huynh [1], Jeffery Oliver [2], Geraldine Baggs [2], Yen Ling Low [1], Choon How How [3], Magdalin Cheong [4], Wai Leng Chow [5], Ngiap Chuan Tan [6] and Samuel Teong Huang Chew [7]

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Abstract: Malnutrition is associated with abnormal biochemical and haematological indices in older adults. There are few studies examining the impact of nutrition intervention on the above indices in community-dwelling older adults at risk of malnutrition. The objective of this study was to investigate the effects of an oral nutritional supplement (ONS) containing beta-hydroxy-beta-methylbutyrate (HMB) on biochemical and haematological indices in community-dwelling older adults at risk of malnutrition. A total of 811 older adults aged 65 years and above took part in the Strengthening Health in ELDerly through nutrition (SHIELD) study. This was a randomised, double-blind, placebo-controlled, multi-centre study across four sites in Singapore. The participants were randomly allocated to one of the two treatments: ONSs containing either HMB or a placebo. Both groups received dietary counselling and consumed the study products twice a day for 180 days. The data were collected at baseline, on day 90, and on day 180. We previously reported that ONSs containing HMB significantly improved nutritional outcomes and muscle health. The current analyses showed that pre-albumin, urea, globulin, corrected calcium, potassium, and vitamin B12 levels were significantly greater in the intervention group compared to the placebo group over 180 days (all $p \leq 0.032$). The mean platelet volume, reticulocyte absolute, and reticulocyte percentage were also significantly higher in the intervention group (all $p \leq 0.003$). In addition, there were tendencies of significant improvement in the total protein, monocyte absolute, monocyte percentage, and eosinophil percentage (all $p \leq 0.095$). These improvements are attributable to the consumption of the ONS containing HMB in the intervention group. In conclusion, daily consumption of ONS containing HMB for six months significantly improved biochemical and haematological indices in community-dwelling older adults at risk of malnutrition. Early intervention after the identification of malnutrition is essential to optimise the nutritional status and markers of haemopoiesis.

Keywords: aging; older adults; malnutrition; biochemical indices; haematological indices; oral nutritional supplement; beta-hydroxy-beta-methylbutyrate (HMB)

Author Contributions: Conceptualization, S.L.T., D.T.T.H., G.B., Y.L.L., C.H.H., M.C., W.L.C., N.C.T. and S.T.H.C.; methodology, S.L.T. and S.T.H.C.; formal analysis, J.O. and G.B.; investigation, S.T.H.C.; data curation, S.L.T.; writing—original draft preparation, S.L.T. and S.T.H.C.; writing—review and editing, S.L.T., D.T.T.H., J.O., G.B., Y.L.L., C.H.H., M.C., W.L.C., N.C.T. and S.T.H.C. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the SingHealth Centralized Institutional Review Board in Singapore reference number 2017/2273.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: All relevant data are within the article.

Conflicts of Interest: S.L.T., D.T.T.H., J.O., G.B., and Y.L.L. are employees of Abbott. S.T.H.C. has previously received study co-funding, travel grant, and honoraria from Abbott Nutrition. All other authors declare no conflict of interests.

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Abstract

Temporal Relationship between Urinary HMB Levels and Muscle Health in Community-Dwelling Older Adults at Risk of Malnutrition †

Siew Ling Tey [1,*], Dieu Thi Thu Huynh [1], Jeffery Oliver [2], Geraldine Baggs [2], Suzette Pereira [2], Yen Ling Low [1], Choon How How [3], Magdalin Cheong [4], Wai Leng Chow [5], Ngiap Chuan Tan [6] and Samuel Teong Huang Chew [7]

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Abstract: Beta-hydroxy-beta-methylbutyrate (HMB) is the natural metabolite of leucine. There are very few studies which report on the temporal relationship between HMB levels following supplementation and muscle health. The objectives of this study were: (1) to investigate the effect of oral nutritional supplement (ONS) containing HMB on urinary HMB levels and (2) to determine the association between changes in HMB levels and muscle health. Urinary HMB levels indicate long-term HMB intake because levels increase and reach steady state over time. Data for analysis were derived from the SHIELD study, which was a randomised, double-blind, placebo-controlled trial consisting of 811 community-dwelling older adults at risk of malnutrition in Singapore. Participants were randomly allocated to either ONS containing HMB (0.74 g calcium HMB per serving) or placebo. Both groups received dietary counselling and consumed study products twice a day for 180 days. Data were collected at baseline, as well as days 30, 90, and 180. ONS containing HMB significantly increased urinary HMB levels in the intervention group over 180 days compared to placebo ($p < 0.0001$). The changes in HMB levels in the intervention group were positively correlated with changes in the total balance test score at day 90, ASMI, the SPPB score, and the score for the five chair stands at day 180, and negatively correlated with time taken for five chair stands at day 180 (all $p \leq 0.0425$). There were also tendencies of positive association between HMB levels and calf circumference at day 90 and fat free mass at day 180 (both $p \leq 0.0591$). However, no such associations were seen in the placebo group for the same measures above (all $p \geq 0.2537$). In conclusion, consuming ONS containing HMB in community-dwelling older adults at risk of malnutrition significantly increased urinary HMB levels and correlated with improved muscle health. Therefore, ONS containing HMB should be incorporated in interventions for older adults with poor muscle health.

Keywords: ageing; older adults; malnutrition; oral nutritional supplement; beta-hydroxy-beta-methylbutyrate (HMB); muscle mass; muscle strength; physical performance

Author Contributions: Conceptualization, S.L.T., D.T.T.H., G.B., Y.L.L., C.H.H., M.C., W.L.C., N.C.T. and S.T.H.C.; methodology, S.L.T. and S.T.H.C.; formal analysis, J.O. and G.B.; investigation, S.T.H.C.; data curation, S.L.T.; writing—original draft preparation, S.L.T. and S.T.H.C.; writing—review and editing, S.L.T., D.T.T.H., J.O., G.B., S.P., Y.L.L., C.H.H., M.C., W.L.C., N.C.T. and S.T.H.C. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest: S.L.T., D.T.T.H., J.O., G.B., S.P. and Y.L.L. are employees of Abbott. S.T.H.C. has previously received study co-funding, travel grant, and honoraria from Abbott Nutrition. All other authors declare no conflict of interests.

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Abstract

Rooibos Tea Extract May Help to Reduce Incretin Demand in Healthier Prediabetes Subgroup †

Wen Xin Janice Lim [1,2], Cheryl S. Gammon [1], Pamela von Hurst [3], Lynne Chepulis [4], Owen Mugridge [3] and Rachel A. Page [5,6,*]

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Abstract: Rooibos tea (*Apalathus linearis*) extract, rich in glycosylated polyphenols (aspalathin and nothofagin), has been shown to improve glycaemic responses in individuals with prediabetes, a high-risk state for developing type 2 diabetes (T2D). However, evidence is scarce regarding its impact on Glucagon-like-peptide-1 (GLP-1). GLP-1 stimulates 50–70% of insulin production during a meal, also known as the incretin effect. Individuals with prediabetes may therefore benefit from an increase in GLP-1 concentration. On the other hand, a decrease in GLP-1 may indicate heightened incretin sensitivity, resulting in a reduced demand for GLP-1 secretion needed to improve glycaemic responses. We conducted an acute, single-blind, placebo-controlled, non-randomised, crossover study (GLARE study; ACTRN12617000837325) examining the impact of rooibos tea extract on GLP-1_{total} and GLP-1_{active} concentrations in participants with prediabetes. Nineteen participants (aged 65.0 ± 1.6 years, BMI 27.3 ± 1.1 kg/m^2, and HbA1c 42 ± 1 mmol/mol) were given a placebo or rooibos tea extract on separate occasions before an oral glucose tolerance test (OGTT). Blood samples were collected at 0, 30, 60, 90 and 120 min. Data were analysed using a linear mixed model for repeated measures. Secondary analysis was conducted by stratifying participants into either a healthier or less healthy prediabetes subgroup, with the less healthy group experiencing delayed postprandial glucose and/or insulin peaks. The study outcomes demonstrated that although prior to stratification there were no significant changes in the overall total incremental area under the curve (iAUC_{total}) of GLP-1_{total} and GLP-1_{active} in participants ($p > 0.05$), the healthier prediabetes subgroup exhibited a significant reduction in GLP-1_{active} compared to the control group (479.4 vs. 1046.7 pM.min, $p = 0.038$, effect size Cohen's d = 0.6). This suggests that rooibos tea extract may reduce postprandial incretin demand in people with prediabetes. More study is warranted to confirm this observation.

Keywords: functional food; polyphenol; hyperglycaemia; impaired glycaemic control; impaired glucose tolerance; impaired fasting glucose; glucagon-like-peptide-1

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Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

The Science behind 'Mood Food', the Link between Diet and Depression/Anxiety: What We Know, What We Don't Know, and Where to Next †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Around 20% of New Zealanders will suffer from depression and/or anxiety in their lifetime. There is emerging evidence that an unhealthy dietary pattern may increase the risk of developing depression or anxiety, whereas a healthy dietary pattern may decrease it. There are a number of proposed mechanisms for the diet–mood relationship, including micronutrient and omega-3 intake, modulation of inflammatory processes, and alterations in gut microbiota composition and function. The potential for clinical dietary interventions as adjunct therapy for mood disorders, or just to increase mental wellbeing, is exciting; however, our understanding of the diet–mood relationship is still developing and there are sometimes conflicting results among studies. This presentation will discuss the complexities of the diet–mood relationship, including the challenges in researching this area, the impact of individual differences in biology and psychology, the bidirectional nature of the relationship, and the interaction with the gut microbiome and stress.

Keywords: depression; anxiety; mood; mental health; diet; food; inflammation; microbiome-gut-brain axis

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Abstract

He Wairua tō te Kai: Nutrition, Food Security, and Well-Being in Children in Regional New Zealand †

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Abstract: Our current food system is failing to deliver on health and well-being, equity, and food security and Hawke's Bay has one of the fastest-growing rates of childhood obesity. 'He wairua tō te kai' suggests that there is more to food than nutrition and advances a cultural connectedness approach to food and nourishment of tamariki (children) and rangatahi (youth). A stakeholder and community enquiry directed this initiative to focus on children's Hauora in a holistic fashion in order to build food security; include mātauranga Māori throughout the project; work with existing initiatives, community, and whānau; start its implementation in schools. Quantitative baseline monitoring was carried out in 43 primary and secondary schools with 2300 students (Age 9 or 13) with surveys covering food security, well-being (WHO5), food behaviours (sources of lunch, breakfast, etc.), and we measured age-standardised BMI for each student. Our food security results indicate that, while approximately one in five children live in households that regularly run out of food, up to two-thirds of students in a school may be affected, and this is not restricted to students in low-decile schools (where most nutritional programmes focus). Overall, only half of the student population in Hawke's Bay was a healthy weight. This study is the first of its kind to present a detailed picture of Hauora for a comprehensive community-wide sample across 43 schools including schools participating in the Ka Ora, Ka Ako School Lunch programme. These data form the baseline of a before–after evaluation of the programme's impact on multiple aspects of food environments and nutritional well-being.

Keywords: Hauora; childhood well-being; nutrition; food security; obesity

Citation: McKelvie-Sebileau, P.; Swinburn, B.; Gerritsen, S.; D'Souza, E.; Tipene-Leach, D. He Wairua tō te Kai: Nutrition, Food Security, and Well-Being in Children in Regional New Zealand. *Med. Sci. Forum* **2022**, *9*, 8. https://doi.org/10.3390/msf2022009008

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Data Availability Statement: The data are available on reasonable request of the authors.

Conflicts of Interest: The authors report no conflict of interest.

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Abstract

Lick the Plate Clean: The Intersection of Food, Nutrition, and Waste †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Many factors affect food choice, including hunger, cost, time, culture, and knowledge. Food choice can also be guided by food and nutrition guidelines, which promote human health and, ideally, planetary health. The Eating and Physical Activity Guidelines for New Zealand adults include six Eating Statements. The first Eating Statement is to "Enjoy a variety of nutritious foods every day", and this includes grain foods. Globally, a common source of grain is bread. The 2008/09 Adult Nutrition Survey reported that the bread group was the single largest contributor of carbohydrate, protein, dietary fibre, many B vitamins, iodine, selenium, and sodium to the diet. Despite being one of the most nutritious foods that we eat, bread is also the food that is most commonly thrown out by New Zealand households. A study conducted by WasteMINZ in 2014/15 estimated that 29 million loaves of bread were wasted each year in New Zealand. Globally, 40% of food that is produced is wasted, and this waste occurs throughout the food supply chain: from production, processing, distribution, and retailers to consumers. Not only are food loss and waste inefficient uses of resources, but they also contribute to climate change. The food system is responsible for 21–37% of total greenhouse gas emissions. One of the goals of the first ever UN Food Systems Summit, held in September 2021, was to devise actions to help the world "transition towards diets that are healthier, safer, climate and nature-positive" and "to eliminate food waste and build circular food economies". The phrase to "lick your plate clean" historically meant to eat everything on your plate, either from hunger or because the meal was so delicious. The time has come to redefine the phrase: nutritious (and delicious) food should not be wasted.

Keywords: dietary guidelines; food choice; greenhouse gas emissions; food systems; food waste

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Abstract

"Can I Eat That?"—New Zealand Mothers' Views of Pregnancy and Early-Life Nutrition Information †

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Abstract: Exposure to both poor nutrition and maternal stress during the earliest stages of life—from pre-conception until age two—have been identified as potential risk factors for the development of adult non-communicable disease. A booklet entitled "First 1000 Days: Nutrition Matters for Lifelong Health", providing evidence-based maternal and infant dietary guidelines, has been distributed to pregnant women in Australia/New Zealand since 2016. This pilot study explored New Zealand mothers' perceptions of the resource in conjunction with other nutrition information they received during pregnancy. First-time mothers (n = 9), recruited via social media and antenatal classes, attended semi-structured focus groups or one-on-one interviews in Auckland. Thematic analysis was used to identify three major themes in the data: 1. Differences in the mothers' preferences for seeking and receiving nutrition information, depending on their apparent health literacy; 2. A strong focus on "forbidden foods" lists, highlighting a tendency for women to rely on perceived nutrition "rules" rather than evaluating guidance in the context of their personal circumstances when making food decisions; and 3. Feelings of pressure to comply with perceived "rules" and guilt or shame when unable to do so. We conclude that early-life nutrition resources should aim to provide a basis for discussion and personal risk assessment rather than a one-size-fits-all list of recommendations. Further consultation with parents and the wider community is recommended to develop a resource that assists in the healthy interpretation of nutrition guidelines during pregnancy and early life.

Keywords: education resources; knowledge translation; early-life; pregnancy; infancy

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Abstract

Online Parental Views of Baby Food Pouches †

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Abstract: Globally, the value sales of baby food pouches increased by 28% in December 2013–2014. Although baby food pouches are an increasingly popular choice for parents, a number of health agencies have raised concerns about their possible long-term health effects. The wealth of online parenting forums provides easily accessed opportunities for parents to discuss a wide range of topics on food and nutrition, including the use of baby food pouches. This study aimed to describe parental perceptions of the use of baby food pouches during complementary feeding (i.e., the transition from an entirely milk-based diet to solid foods) using a netnographic analysis of discussions on publicly available forums. Netnography is an innovative methodology which uses internet-based communications on social networking sites as a data source to understand a community. In this study, the community was parents of young children. Six parenting forums were identified through a Google search using defined selection criteria. Discussion threads relating to baby food pouches were collected and imported into NVivo 12 for thematic analysis via inductive reasoning. Perceptions of baby food pouches fell within two broad categories—benefits and concerns. The most commonly reported themes related to benefits were: convenience, health, baby enjoyment, variety, and cost; and those related to concerns were: health, cost, lack of dietary exposure, dependence, and waste. Many parents reported both benefits and concerns. To conclude, the convenience of baby food pouches was the primary benefit reported, although the parents also had concerns, particularly regarding health effects. Research is still needed to determine whether baby food pouches provide a net benefit or harm to infant health. Once this has been determined, communication to parents to either encourage or discourage their use is likely to be more effective if it takes into account the benefits and concerns reported here by parents.

Keywords: qualitative research; netnography; infant food pouches; complementary feeding; infants

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Data Availability Statement: Data was obtained through the search engine Google from parenting forums that were publicly available with no membership or password protection.

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Abstract

Indolamine Contents in New Zealand's Grown Cherries †

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Abstract: Monoamine neurotransmitters such as indolamines including melatonin (5-methoxytryptamine) and serotonin (5hydroxytryptamine) were first identified in mammals and now have been ubiquitously found in plants. Melatonin, known as the sleep hormone, is synthesised in the pineal gland of humans, and can be obtained from some foods. Melatonin can modulate energy, circadian rhythms, and has antioxidant effects. Melatonin is biosynthesized from tryptophan. The potential effects of melatonin and tryptophan on human health and their functions in plants are well known. However, there are scarce data on indolamine content in NZ cherries and other common fruits. NZ's export quality cherries are produced in central Otago because of mineral-rich soil and an ideal climate. We hypothesise that, because of a unique growing environment (UV index, volcanic soil, etc.), there will be elevated levels of melatonin and tryptophan in NZ-grown cherries. The primary objective was to develop an extraction and analytical method for the detection and quantification of indamines for NZ cherries using HPLC–fluorescence. In this study, we detected and quantified, for the first time, the levels of melatonin and its precursors, serotonin, tryptophan, and tryptamine, in five varieties of NZ-grown cherries. The highest melatonin levels were found in lapin variety cherry (130 ± 0.003 ng/g of dry weight), and the highest tryptophan levels were detected in lapin cherry (721 ± 18.0 µg/g of dry weight). No serotonin and tryptamine contents were found in the analysed varieties of cherry.

Keywords: melatonin; tryptophan; HPLC method development

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Abstract

Māmā ki Tama: Feeding Families in a Food Insecure Environment: A Qualitative Study †

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Abstract: More than one in five children in New Zealand live in food poverty, meaning that they live without access to sufficient wholesome food for good health. Evidence suggests that Māori mothers are more likely to experience food insecurity due to inequities in income, education, employment, and housing security. The aim of the study was to explore the perspectives, experiences, and strategies employed by Māori mothers to meet food access needs for their whānau. In-depth unstructured interviews were conducted with twenty Māori mothers living in Kaitaia in the far north of New Zealand who had at least one child aged two years or younger. An inductive approach was undertaken to allow findings to emerge from the data. Interviews investigated dietary habits and routines, methods of food procurement, nutrition knowledge, skills, and perceptions towards healthy food. Recorded interviews were transcribed and thematic analysis using NVivo was undertaken to identify, analyse, and report themes. Three key themes were identified. Firstly, ensuring whānau are fed using inexpensive but less nutritious foods, they reported missing meals, and feeding tamariki was prioritised. Secondly, accessing food from multiple avenues is a time-consuming journey. Participants reported accessing food grants and food banks to ensure adequate food for the household, which required time and effort, increasing stress and anxiety. Finally, the need to cope with the unexpected and unplanned, such as health and housing issues, influenced food access needs. Being well-connected to whānau, community groups, support services, and online digital access was pivotal for Māori mothers to meet whānau food needs. Māori mothers placed priority on ensuring that their whānau were fed, despite understanding healthy food choices, cost, and taste of food were driving factors in food purchase decisions. Connections were key to navigating multiple avenues to access food and cope with unexpected and unplanned circumstances.

Keywords: food security; Māori mothers; food access

Citation: Urlich, J.; Kira, G.; Wham, C. Māmā ki Tama: Feeding Families in a Food Insecure Environment: A Qualitative Study. *Med. Sci. Forum* **2022**, *9*, 13. https://doi.org/10.3390/msf2022009013

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Data Availability Statement: Data available on request due to restrictions e.g., privacy or ethical The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy and permission of participants.

Conflicts of Interest: No conflict of interest.

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Abstract

Changes in Knowledge, Attitude and Behaviours towards Vitamin D and Sun Exposure of Parents of Infants and Young Children in New Zealand †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Vitamin D deficiency can have serious health implications for infants and young children. In 2012, the Ministry of Health released a Consensus Statement on Vitamin D and Sun Exposure. Following this, a Companion Statement for Pregnancy and Infancy was released in 2013 with subsequent public health messaging. We aimed to identify the impact of these statements on parents' vitamin D and sun exposure knowledge, attitudes and behaviours and investigate their sources of information. This ecological study utilised a cross-sectional questionnaire in 2009 and 2021 to collect data from parents of infants and young children throughout New Zealand. Descriptive statistics were conducted to analyse the results. A total of 9834 parents completed the questionnaire (2009 N = 8032, 2021 N = 1802). A similar percentage of parents (63.1%, 61.3%) identified the role of vitamin D in bone health, with greater awareness of its role in immunity in 2021 (29.1%, 48.2%). Most parents lacked knowledge of high-risk factors for deficiency, including exclusive breastfeeding (98.1, 95.1%) and darker skin colour (92.9%, 77.5%). Health professionals were not the main source of information to parents (15.8%, 24.8%), with low rates of advice on supplementation and sun exposure reported. However, 60.2% reported health professionals or the Ministry of Health as their preferred source of information, followed by the media, including social media (24.5%), in 2021. Safe sun exposure practices were performed frequently amongst children and pregnant mothers, with 86.5% and 83.3% concerned about skin cancer. With 72.4% and 78.4% reporting they find vitamin D and sun exposure recommendations confusing because of skin cancer prevention messages. Overall, the impact of the Ministry of Health statements and subsequent public health messaging on parents' knowledge has been minimal. To ensure public health information is communicated effectively to parents, the Ministry of Health and health professionals could utilise emerging tools, including social media, to improve parents' knowledge.

Keywords: vitamin D; sun exposure; knowledge; attitudes; behaviours; parents; children; New Zealand

Citation: Reynolds, E.M.; Conlon, C.A.; von Hurst, P.R. Changes in Knowledge, Attitude and Behaviours towards Vitamin D and Sun Exposure of Parents of Infants and Young Children in New Zealand. *Med. Sci. Forum* **2022**, *9*, 14. https://doi.org/10.3390/msf2022009014

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Abstract

Dietary Recommendations for Women with Gestational Diabetes Mellitus: A Systematic Review of Clinical Practice Guidelines †

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Abstract: Dietary intervention is key in the management of gestational diabetes mellitus (GDM). However, the ideal diet to reduce the adverse health outcomes associated with GDM is unknown. The aim of this systematic review is to identify and compare the international dietary recommendations made for the management of GDM, to assess the evidence base behind the recommendations, to identify any research gaps, and to assess the guideline quality. A systematic search between 2000 and 2019 of international and national guidelines on the dietary management of GDM was conducted in six databases. Two reviewers independently assessed the guidelines using the AGREE II tool, assessed the evidence base, and identified research gaps. Of the 31 guidelines included in this systematic review, 68% of guidelines were of low quality, 22% were of moderate quality and 10% were of high quality. All 31 guidelines recommended dietary advice as the first line treatment for GDM management. The remaining dietary recommendations were inconsistent and sometimes contradictory. Most guidelines made strong dietary recommendations but were based on very low quality or low quality evidence. Research gaps were identified for all diet related topics, including effective dietary interventions, the ideal distribution of meals and snacks, and effective follow-up during and after pregnancy. Future research on the dietary management of GDM should be of high quality to address the research gaps identified and improve the evidence base. Most guidelines were of low quality and needed to improve editorial independence and rigour of development to help reduce bias, standardise dietary recommendations, and improve the treatment of women with GDM.

Keywords: evidence based practice; gestational diabetes mellitus; research gaps; clinical practice guidelines; systematic review

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Abstract

Micronutrient Status of Vegetarians and Non-Vegetarians in a Sample of New Zealand Female Adolescents †

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Abstract: Vegetarianism appears to be increasing in Western countries. The health benefits of following a vegetarian diet include improved cardiovascular health, lower body mass, and a decreased risk of non-communicable diseases. However, restrictive food selection can result in suboptimal intakes of critical nutrients, increasing the risk of deficiencies. This is particularly important for female adolescents who have increased nutritional requirements. Most of the information on vegetarian diets and adolescent health was collected decades ago. Much less is known about the micronutrient status of modern female adolescent vegetarians. We aimed to compare the nutritional and biochemical status of vegetarian and non-vegetarian adolescent females in New Zealand. Adolescent females aged 15–18 years were recruited from eight locations throughout New Zealand. Micronutrient intakes were assessed via two 24 h diet recalls, which were adjusted to represent usual intakes. Blood samples were analysed for haemoglobin, and serum concentrations of ferritin, soluble transferrin receptor, zinc, selenium, retinol binding protein, folate, B12, C-reactive protein, and alpha-1-acid glycoprotein. Of the 182 participants who provided a blood sample, 15% self-identified as vegetarian (n = 27). Vegetarians had significantly lower daily mean intakes of vitamin B12 ($p < 0.001$), zinc ($p < 0.001$) and selenium ($p = 0.039$). On average, vegetarians had 3.1% (95% CI −5.8 to −0.4, $p = 0.025$) lower haemoglobin, 9.5% (95% CI −15.4 to −3.2, $p = 0.004$) lower selenium, and 80.5% (95% CI 45.7 to 123.7, $p < 0.001$) higher serum folate concentrations. Serum B12 concentrations were also lower (−18.2% (95% CI −33.7 to 0.9)), although not statistically significantly different ($p = 0.060$). The prevalence of anaemia, zinc, and selenium deficiency among vegetarians (15%, 50% and 54%, respectively) was higher than for non-vegetarians (5%, 21%, and 30%, respectively). Female adolescent vegetarians may be at increased risk of deficiency of nutrients commonly found in animal products, including iron, selenium and zinc. It is important for vegetarian adolescent females to follow dietary practices that enhance micronutrient intake and absorption.

Keywords: vegetarian; female adolescents; micronutrient status; iron status; iron deficiency; vegetarianism

Citation: Gale, J.; Haszard, J.; Scott, T.; Brown, R.; Houghton, L.; Heath, A.-L.; Peddie, M. Micronutrient Status of Vegetarians and Non-Vegetarians in a Sample of New Zealand Female Adolescents. *Med. Sci. Forum* **2022**, *9*, 16. https://doi.org/10.3390/msf2022009016

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by University of Otago Human Research Ethics Committee (H19/004). This trial was registered on the Australia, New Zealand Clinical trial website (ACTRN12619000290190).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data described in the manuscript will be made available upon request to the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Knowledge on Signs and Symptoms of Relative Energy Deficiency in Sports among Healthcare Professionals and Physically Active Individuals †

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Abstract: To reduce the risk of Relative Energy Deficiency in Sports (RED-S), athletes and their support teams first require sufficient knowledge about the signs and symptoms of RED-S in athletic performance, recovery and overall health. Thus, our study aimed to assess knowledge of the signs and symptoms of RED-S among healthcare professionals and physically active individuals. We also assessed the level of comfort that healthcare professionals experienced when providing health and nutrition advice to athletes. A convenience sample of 97 healthcare professionals and 77 physically active individuals were recruited via personal communication and social media. An 18-item validated questionnaire was used to assess knowledge. Health professionals rated their level of comfort when providing advice to athletes on 100 mm visual analogue scales (VAS). A higher proportion of participants (41%) had heard of Triad, compared to those who had heard of Low Energy Availability (20%) (LEA) and RED-S (15%). On the knowledge questionnaire, out of the highest possible score of 18, healthcare professionals scored a mean ± SD of 14 ± 3, which was significantly higher than the average score of 11 ± 3 achieved by the physically active individuals. Participants with some nutrition education scored significantly higher than those with no nutrition education (mean difference = 2.5; $p < 0.001$). The healthcare professionals reported being more comfortable providing advice on menstruation, compared to providing advice on disordered eating/eating disorders, and weight management (median on a 100 mm VAS scale: 80 mm, 58 mm and 61 mm, respectively). All participants agreed that an athletes' health is an important consideration, and rated weight and leanness as less important. Overall, our study demonstrated that participants, particularly healthcare professionals, have some understanding of the signs and symptoms of RED-S. Healthcare professionals have adequate comfort in addressing some elements of RED-S with athletes. However, continuing education is necessary to ensure that these groups are well equipped for the identification, treatment and prevention of RED-S.

Keywords: Relative Energy Deficiency in Sport (RED-S) knowledge; education; healthcare professionals; active individuals

Citation: Pai, N.N.; Brown, R.C.; Haszard, J.J.; Black, K.E. Knowledge on Signs and Symptoms of Relative Energy Deficiency in Sports among Healthcare Professionals and Physically Active Individuals. *Med. Sci. Forum* **2022**, *9*, 17. https://doi.org/10.3390/msf2022009017

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Abstract

Identifying Gaps in the Nutritional Education of Nurses †

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Abstract: Evidence suggests that many nurses are unable to provide nutritional care in clinical practice. A modification of the nursing curriculum is needed to enable nurses to apply this knowledge more effectively in clinical practice and improve patient outcomes. Aim: To identify gaps in nurses' nutritional knowledge, skills, and confidence to counsel, to enable recommendations to modify the nursing curriculum. All 89 third-year nursing students at one New Zealand university were invited to participate in the validated NUTCOMP questionnaire, which assessed self-perceived nutritional knowledge, skills, attitudes, and confidence to counsel through QUALTRICS. A steering group including Maori, Pacific and Asian health researchers, nurse practitioners, registered nutritionists, and dietitians was established to develop a focus group for questions related to perspectives on nurses' nutritional education and application in clinical practice. Students, lecturers, clinical staff, and dietitians working in hospitals, communities, or residential care homes were invited to attend one of four focus groups. Data were analysed for themes regarding nurses' nutritional knowledge, skills, attitudes, and confidence to counsel. The response rate for the questionnaire was 76.4% (n = 68). Students reported a high (mean score ± SD 35.2 ± 3.4, out of 40) importance of nutritional care, with 81% perceiving a need for further nutritional education. Participants reported moderate confidence in nutritional knowledge and skills (20.2 ± 3.4 out of 35, and 31.5 ± 5.9 out of 50, respectively). Twenty-one health professionals participated in focus groups with 4–6 students per group. All participants agreed that nurses need competency in basic nutritional care. Three themes related to nutritional care emerged from the discourse analysis: the importance of cultural and family context; a team approach; and appropriate placement in the nursing curriculum. Undergraduate nurses perceive a need for further nutritional education to enable them to provide nutritional care in (clinical) practice. The findings from this study provide direction for improvements in nutritional education to the undergraduate nursing curriculum.

Keywords: nutrition care; nurses; education; NUTCOMP

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Abstract

The Development of the Women's Wellness Program for Irritable Bowel Syndrome †

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Abstract: Irritable bowel syndrome (IBS) is a chronic, relapsing, remitting functional disorder of the gut, characterised by abdominal pain, bloating, and changes in bowel habits, and associated with poor quality of life and depression. A common disorder in primary and specialty care, IBS affects 10–18% of New Zealanders and imposes significant personal, societal, and economic burdens. Although it is a condition of both mind and body, there is no holistic support program for people with IBS in Aotearoa. This project aimed: (1) To explore the impact of IBS with affected women and their health professionals. (2) Determine whether the Australian Women's Wellness Program is adaptable, acceptable, and feasible for women in Aotearoa with IBS. (3) To codesign a prototype Women's Wellness (IBS Aotearoa) program with affected women and their clinicians ready for feasibility testing. Eligible IBS participants (n = 15) comprising women 18 years or over, and legally able to consent, and separately health professionals or researchers (n = 15) working in the field of IBS participated in an in-depth individual or focus group interview. They were asked questions about their IBS journey, including diagnosis and treatment. Their feedback detailed how IBS adversely affected all aspects of quality of life, raised issues with diagnosis and treatment and articulated desired support approaches. When given information about the Women's Wellness program and asked to provide feedback on it, all 30 interviewed participants agreed that a Women's Wellness program health promotion approach for IBS was feasible, relevant, and warranted. A lifestyle program prototype based on the Women's Wellness Program, tailored for those with IBS and led by an trained IBS health professional, is developed from these data ready for feasibility testing.

Keywords: irritable bowel syndrome; Women's Wellness; lifestyle program

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Abstract

Comparison of the Nutrient Content and Cost of Canned and Dried Legumes and Plant-Based Meat Alternatives Available in Supermarkets †

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Abstract: Plant-based diets are recommended for personal health and to protect the environment. Plant-based protein foods available in supermarkets include traditional options, such as canned and dried legumes, and an increasing range of meat analogues such as plant-based sausages. This study aims to compare the nutritional content, healthiness, and cost of canned and reconstituted dried legumes with the same factors of plant-based meat alternatives. Information on the nutritional content, ingredients, and nutrient claims of canned legumes (N = 112), dried legumes (N = 21), and meat alternatives (tofu, felafels, and meat analogues) (N = 68) was obtained from Nutritrack (2019), a database of New Zealand (NZ) packaged foods available in supermarkets. The mean (SD) energy, protein, total fat, sodium, and fibre content, and the proportion of products fortified with iron, B_{12}, and zinc was calculated. Healthiness was assessed using estimated Health Star Rating (HSR) and comparison with United Kingdom (UK) sodium targets. Product data were linked with household purchasing data from Nielsen Homescan® to compare the mean purchase price/100 g. The number and type of nutrient claims on packaging were identified. All canned and dried legumes and plain tofu scored an HSR $\geq$ 3.5; for other sub-categories of meat alternatives, 29% or fewer products scored $\geq$3.5. Although all tofu met UK sodium targets, less than half of the products within other categories met the associated target; meat alternatives (46%), canned legumes (21%), and baked beans (17%). Reconstituted dried legumes were the cheapest plant protein source (Mean = NZ$0.30, SD = 0.16/100 g (lowest of four categories)) compared to meat alternatives ('Other' meat-free products mean = NZ$2.57, SD = 0.88/100 g (highest of six categories)). The most common nutrient claims on meat alternatives were vegetarian/vegan, protein, and dietary fibre. Fifteen percent of meat alternatives were fortified with iron, and 12% each for Vitamin B12 and zinc. Although meat alternatives offer consumers more choice, these products may be less healthy and are more expensive than the more traditional plant-based protein sources—canned and dried legumes.

Keywords: plant-based protein; meat alternatives; legumes; cost; health star rating; nutrient content

Citation: Young, L.; Mackay, S.; Raphael, A.; Tan, J.; Cao, C.; Bradbury, K. Comparison of the Nutrient Content and Cost of Canned and Dried Legumes and Plant-Based Meat Alternatives Available in Supermarkets. *Med. Sci. Forum* **2022**, *9*, 20. https://doi.org/10.3390/msf2022009020

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Data Availability Statement: Because of the commercial and legal restrictions to the use of copyrighted material, it is not possible to share data openly, but unredacted versions of the dataset are available with a licensed agreement that they will be restricted to non-commercial use. For access to Nutritrack, please contact the National Institute for Health Innovation at the University of Auckland at enquiries@nihi.auckland.ac.nz.

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Abstract

Macronutrient Intakes of a Sample of New Zealand Adolescent Females Consuming Vegetarian and Omnivorous Diets †

Meredith Peddie *, Tessa Scott, Chaya Ranasinghe, Elizabeth Fleming, Kirsten Webster, Rachel Brown, Lisa Houghton and Jillian Haszard

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Abstract: Many of the descriptions of the macronutrient intakes of adolescent vegetarians are close to 20 years old. The aim of this study was to describe the macronutrient intake of vegetarians and non-vegetarian adolescent females and to compare the main food sources of these nutrients. Adolescent females aged 15 to 18 years were recruited across eight locations throughout New Zealand. Macronutrient intakes were assessed via two 24 h diet recalls, which were adjusted to represent usual intake using the multiple source method. Of the 254 participants who completed diet recalls, 38 self-identified as vegetarians. These vegetarians had similar carbohydrate and total fat intakes compared with non-vegetarians; however, their protein intakes were 9 g per day lower (95% CI −12.7 to −5.3 g). Vegetarians also consumed 2.2 g less saturated fat (95% CI −4.6 to 0.1 g), 2.7 g (95% CI 1.4 to 4.0 g) more polyunsaturated fat, and 5 g (95% CI 1.8 to 8.0) more fibre per day than their non-vegetarian peers. With the exception of red meat and sausages and processed meat, the only other food groups that contributed markedly different amounts of macronutrients were vegetables, legumes, and soups, sauces, and condiments, which provided more fat and carbohydrate to the diets of vegetarians when compared with non-vegetarians. Some adolescents, including vegetarians, were obtaining high amounts of fat and carbohydrate from foods groups associated with poorer dietary quality (such as discretionary foods and pies and pasties). We recommend further research to assess how the changing food environment influences vegetarian eating patterns in the wider population.

Keywords: adolescence; fat; carbohydrate; protein; food groups

Citation: Peddie, M.; Scott, T.; Ranasinghe, C.; Fleming, E.; Webster, K.; Brown, R.; Houghton, L.; Haszard, J. Macronutrient Intakes of a Sample of New Zealand Adolescent Females Consuming Vegetarian and Omnivorous Diets. *Med. Sci. Forum* **2022**, *9*, 21. https://doi.org/10.3390/msf2022009021

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Abstract

The Effect of a 2-Week Ketogenic Diet, versus a Carbohydrate-Based Diet, on Cognitive Performance, Mood and Subjective Sleepiness during 36 Hours of Extended Wakefulness in Military Personnel †

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Abstract: Sleep deprivation compromises the cognitive performance of military personnel, jeopardising operational safety. Sleep deprivation-related performance deficits coincide with decreased glucose metabolism in associated brain regions, suggesting the potential utility of a ketogenic diet (KD) to provide an alternative fuel source during sleep deprivation. A randomised, cross-over trial was conducted with military personnel. Participants ingested an iso-energetic KD (CHO, ~25 g·day^{-1}) or a carbohydrate (CHO)-based diet (CHO, ~285 g·day^{-1}) for 14 days, immediately followed by 36 h of wakefulness and separated by a 12-day washout period. Cognitive performance (5-minute Psychomotor Vigilance Task; PVT), mood, subjective sleepiness, capillary blood glucose and D-β-hydroxybutyrate (D-βHB) were measured every 2 h. Linear mixed models tested the interaction and main effects of diet, period (six 6-hourly bins), and test time (1–3) within periods. D-βHB was higher in the KD than the CHO diet (+0.75 to +1.45 mM; $p < 0.001$), whilst glucose was lower (−0.26 to −1.16 mM; $p < 0.01$). The KD improved performance for all PVT variables (lapses, mean reciprocal reaction time (RT), slowest 10% RT and fastest 10% RT) ($p < 0.05$), mood ($p = 0.001$) and sleepiness ($p < 0.001$) compared with the CHO diet. Sleep deprivation-related deficits independent of diet were found for lapses, mean reciprocal RT, slowest 10% RT, mood and subjective sleepiness (all $p < 0.01$). Circadian effects were also observed independent of diet; fastest 10% RT was slower in periods 4 and 5 (0130–1330) compared with periods 1, 2 and 3 (0730–0130), but was faster in period 6 (1330–1930) compared with period 4 (all $p < 0.01$); and mood declined and sleepiness increased from period 1 (0730–1330) to period 4 (0130–0730) ($p < 0.001$), but stabilised across periods 4, 5 and 6 (0130–1830). The KD appeared to improve cognitive performance, mood and sleepiness during 36 h of extended wakefulness compared with the CHO-based diet. This suggests the KD could be considered for military operations when sleep deprivation is anticipated.

Keywords: sleep deprivation; psychomotor vigilance task; keto-adaptation; randomised cross-over trial

Citation: Henderson, L.; van den Berg, M.; Shaw, D.M. The Effect of a 2-Week Ketogenic Diet, versus a Carbohydrate-Based Diet, on Cognitive Performance, Mood and Subjective Sleepiness during 36 Hours of Extended Wakefulness in Military Personnel. *Med. Sci. Forum* **2022**, *9*, 22. https://doi.org/10.3390/msf2022009022

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the New Zealand Defence Force Ethics Committee and Massey University Ethics Committee (SOA 20/47). The study was retrospectively registered with the Australian New Zealand Clinical Trials Registry (ACTRN12621000105842).

Informed Consent Statement: Informed written consent was obtained from all participants involved in the study.

Data Availability Statement: Data is currently publicly unavailable.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Modelling the Impact of a Voluntary Food Reformulation Initiative to Reduce Sodium Intake in the New Zealand Diet †

Nanxin Wang [1,2], Sheila A Skeaff [1], Claire Cameron [3], Elizabeth Fleming [1] and Rachael McLean [2,*]

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Abstract: Our study aimed to model the potential impact of a food reformulation initiative on the sodium intake of New Zealand (NZ) adults. The initiative, HeartSAFE 2020, is led by the NZ Heart Foundation and has set sodium targets for foods in 17 categories. Participants' sodium intakes of 840 foods included in HeartSAFE 2020 were estimated using 24 h diet recall data collected in the 2008/09 NZ Adult Nutrition Survey (NZANS). The 2008/09 NZANS was conducted prior to the targets being introduced and was used for baseline data. We estimated the mean baseline and modelled sodium intake, assuming that all HeartSAFE targets were met, as well as the corresponding sodium reduction for each food category. Population level estimates were also analyzed by applying sampling weights. The sample included 4721 participants aged 15 years old and over. The mean baseline sodium intake from foods included in HeartSAFE 2020 was 1307 mg/day (95% CI 1279, 1336). Following alterations of sodium content using the HeartSAFE 2020 targets, the mean modelled sodium intake was 1048 mg/day (95% CI 1024, 1027). This corresponds to 260 mg/day (95% CI 252, 268) of the mean sodium intake reduction. Food sub-categories that resulted in the most sodium intake reduction were ready meals (710 mg/person/day), Asian sauces (546 mg/person/day), bacon (242 mg/person/day), canned baked beans (238 mg/person/day), and pizza (222 mg/person/day), for those who consumed these foods. Overall, meeting the HeartSAFE targets only resulted in a 20% reduction in sodium intake from the foods included in the program, and about 8% of total sodium intake. Current food reformulation targets are insufficient to meet the 30% sodium reduction target set by the World Health Organization. To do so, NZ will need to introduce more comprehensive strategies, such as those recommended in the WHO SHAKE Technical Package.

Keywords: food reformulation; sodium; salt; New Zealand

Citation: Wang, N.; Skeaff, S.A.; Cameron, C.; Fleming, E.; McLean, R. Modelling the Impact of a Voluntary Food Reformulation Initiative to Reduce Sodium Intake in the New Zealand Diet. *Med. Sci. Forum* **2022**, *9*, 24. https://doi.org/10.3390/msf2022009024

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Institutional Review Board Statement: The New Zealand Health and Disability Multi-Region Ethics Committee granted approval for the 2008/09 NZANS (MEC/08/04/049).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data is publicly available from Ministry of Health New Zealand.

Conflicts of Interest: Rachael McLean is an unpaid member of the New Zealand Heart Foundation scientific advisory group. The New Zealand Heart Foundation had no role in the design or implementation of the study.

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Abstract

Analysis of the Phytochemical Patterns Present in the 'Monty's Surprise' Heritage Apple Cultivar: Implications for Cancer Prevention †

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Abstract: Apples are a commonly consumed fruit linked with reducing the risk of several chronic diseases, including cancer. Some of the health benefits of apples are related to their secondary metabolites, known as phytochemicals. The type of phytochemicals and their distribution differ within the various parts of an apple (skin vs. flesh) and are affected by cultivar type and food processing methods. Several studies have reported higher content of apple phytochemicals in the skin compared to the flesh, but the skin only makes up 10% of the weight of the apple. Only a few studies have reported on differences in the phytochemical content relative to the weight of the skin compared to the whole apple. In this comparative study, we used liquid chromatography–mass spectrometry (UPLC-QTOF-MSLC-MS) to identified phenolics (flavonoids and phenolic acids) and triterpenoids as the main phytochemicals in the skin and flesh of a New Zealand (NZ) heritage apple cultivar known as 'Monty's Surprise'. We further evaluate the effect of two simple household processing techniques, puree and air dehydration, on phytochemical concentration. Our preliminary analysis showed that 'Monty's Surprise' contained a higher concentration of catechin, epicatechin, total procyanidins and chlorogenic acid when compared to the commercial apple cultivars 'Red Delicious' and 'Braeburn'. Furthermore, flavonols (quercetin glycosides) were present mainly in the skin, whereas chlorogenic acid levels were higher in the flesh. Moreover, our data showed that apple puree retains a phytochemical concentration similar to that of fresh apple, whereas air dehydration appears to be more destructive to apple phytochemicals. The findings from this study point out that, to obtain the greatest health benefits from apples, it is important to consume the whole apple, including skin. Additionally, an apple's health effects vary in relation to the phytochemical profile of the apple that is consumed. Furthermore, this study identifies a simple household processing method for long-term storage that preserves the apple's phytochemical profile to achieve maximum health benefits.

Keywords: fruit; apples; phytochemicals; cancer; prevention; antioxidants; phenolics; triterpenoids

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Citation: Nezbedova, L.; McGhie, T.; Christensen, M.; Heyes, J.; Nasef, N.A.; Mehta, S. Analysis of the Phytochemical Patterns Present in the 'Monty's Surprise' Heritage Apple Cultivar: Implications for Cancer Prevention. *Med. Sci. Forum* **2022**, *9*, 25. https://doi.org/10.3390/msf2022009025

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Institutional Review Board Statement: Not applicable.

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Data Availability Statement: Not applicable.

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Abstract

The Impact of COVID-19 on the Lifestyle of Tertiary Students in an NZ Polytechnic †

Mary R. Yan [1,2,*], Arun Deo [3], Elaine C. Rush [2], Norberto Ricacho [1] and Shamim Shaikh [4]

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Abstract: The COVID-19 pandemic altered people's life dramatically worldwide, with major concerns in different economic, political, scientific, and public health aspects. The impact on the lifestyle behaviour of the young generation was larger than anticipated. To better understand the influential factors on the lifestyle of tertiary students in an NZ polytechnic due to the COVID-19 pandemic and their correlations, a questionnaire was administrated online by SurveyMonkey to investigate the impact of COVID-19 on life overall, study time and reasons for changing, stress level, living conditions, eating patterns, choice of food, physical activity level, social activities, and sleep time. Data were analysed using descriptive statistics, frequency, and correlations to explore the patterns of the influences and the impact of COVID-19 on the proposed questions. The results showed that the extent of the impact of COVID-19 on students' life, in general, was 3.8 (from 0: not at all to 5: considerably). The main reasons for students who either needed an extension or time-off or changed to part-time study were increased stress level (63%), financial reasons (16%), and family responsibilities (14%). For the comparison aspects (prior vs. post-COVID-19 lockdown), meaningful differences were observed in physical activity level (3.26 vs. 2.50) (from 1: very light to 5: very active); and the importance of factors that influenced the choice of food was convenience (3.62 vs. 3.41) and nutrition value (3.65 vs. 3.50) (from 1: very less important to 5: very important). Students were anxious because of fear of infection, lacked physical exercise due to lockdown, and had trouble sleeping. The results of the study provide useful information on the impact on daily life for tertiary students in pandemic times. The research findings can inform health professionals of these influences for appropriate policy decisions and public health practices to promote a healthy lifestyle during a pandemic.

Keywords: COVID-19; lifestyle; tertiary students; eating pattern; physical activity level

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Informed Consent Statement: No hard copies of consent form obtained. The on-line survey is anonymous and contained a statement that consent to participate is implied by completion of the survey.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Designing an Audit Tool to Evaluate the National Healthy Food and Drink Policy: The HYPE Study †

Stephanie Shen [1,*], Bruce Kidd [1], Sally Mackay [2], Lisa Te Morenga [3], Sarah Gerritsen [2], Yannan Jiang [1], Magda Rosin [2], Elaine Umali [1] and Cliona Ni Mhurchu [1]

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Abstract: The National Healthy Food and Drink Policy (NHFDP) was developed to promote healthy food environments for the New Zealand District Health Board (DHB) staff and visitors. The policy classifies food and drinks as red, amber, or green and sets benchmarks for the proportions of red, amber, and green foods that should be available on-site. The HYPE (Healthy Policy Evaluation) study is the first national evaluation of the implementation and impact of the NHFDP. We designed an electronic audit tool to collect detailed food and drink data across a range of food settings (vending machines and all food outlets) at New Zealand DHBs and some government agencies. The electronic audit tool collects all the information required to classify food and drinks under the NHFDP (photographs of foods and drinks, item weight/volume, energy and nutrient content, ingredient composition, and Health Star Rating). The web-based tool was created using Drupal (web content management framework) and pilot tested. The tool is now in use by the HYPE team in DHBs across New Zealand. Data collection commenced in March 2021 and has been completed for nine DHBs (5700 products) so far. Audit results detailing the proportion of red, amber, and green food items available at all participating institutions will be available in late 2022. Ongoing stakeholder feedback and requirements have been incorporated throughout the design process and used to improve the audit tool. This feedback has informed key lessons such as agreeing the tool's aims and objectives collectively with stakeholders/potential end users, pilot testing the tool prior to use, and ensuring the tool is simple and accessible for all end-users. This new electronic food setting audit tool has successfully facilitated comprehensive and standardised data collection across a range of retail settings.

Keywords: food environments; nutrition policy; policy evaluation

Citation: Shen, S.; Kidd, B.; Mackay, S.; Te Morenga, L.; Gerritsen, S.; Jiang, Y.; Rosin, M.; Umali, E.; Ni Mhurchu, C. Designing an Audit Tool to Evaluate the National Healthy Food and Drink Policy: The HYPE Study. *Med. Sci. Forum* **2022**, *9*, 27. https://doi.org/10.3390/msf2022009027

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Abstract

Barriers and Facilitators to Implementation of Healthy Food and Drink Policies in Public Sector Workplaces: A Systematic Literature Review †

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Abstract: Many countries and institutions have adopted policies to promote healthier food and drink availability in various settings, including public sector workplaces. However, studies reporting barriers and facilitators experienced by food vendors and caterers in providing healthy and nutritious foods and drinks have not been collated and synthesised, representing a significant gap in workplace health promotion knowledge. Our objective was to systematically synthesise evidence on barriers and facilitators relative to the implementation of and compliance with healthy food and drink policies aimed at the general adult population in public sector workplaces internationally. Nine scientific databases, nine grey literature sources, and government websites in key English-speaking countries were searched between April and June 2021. All identified records (n = 8559) were assessed for eligibility. Studies reporting barriers and facilitators were included irrespective of the study design and methods used, but they were excluded if they were published before the year 2000 or in a non-English language. Methodological strengths and limitations of the included studies were assessed with the CASP Qualitative Studies Checklist. Drawing on a thematic synthesis approach, primary findings were generated through research question-led coding and theme development. Forty-one studies were eligible for inclusion, and they were mainly from Australia, the United States, and Canada. The most common workplace settings were healthcare facilities, sports and recreation centres, and government agencies. Generally, poorly reported data collection and analysis methods were observed. Preliminary findings suggest that although vendors encounter challenges, there are also factors that support healthy food and drink policy implementation in public sector workplaces. Generated codes indicate that barriers and facilitators fall into five broad categories of financial ramifications, availability of healthier products, existence of supporting tools and resources, institutional leadership support, and communication between stakeholders. Understanding barriers and facilitators to successful policy implementation will significantly benefit stakeholders interested in or engaging in healthy food and drink policy development and implementation.

Keywords: workplace; food environment; healthy food policy; implementation; barrier; facilitator

Citation: Rosin, M.; Mackay, S.; Gerritsen, S.; Morenga, L.T.; Terry, G.; Mhurchu, C.N. Barriers and Facilitators to Implementation of Healthy Food and Drink Policies in Public Sector Workplaces: A Systematic Literature Review. *Med. Sci. Forum* **2022**, *9*, 28. https://doi.org/10.3390/msf2022009028

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Abstract

Barriers to Implementing a Healthy Food and Drink Environment in New Zealand Schools: Baseline Results from the Healthy Active Learning Evaluation †

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Abstract: Dietary habits established during childhood and adolescence influence behaviours in adulthood and may impact health later in life. Primary and secondary schools have the unique ability to reach almost all children and young people during the first two decades of their lives, making them ideal settings for influencing health. Healthy Active Learning (HAL) is a 5-year joint government initiative between Sport NZ, the Ministry of Health, and the Ministry of Education which seeks to improve the wellbeing of students through healthy eating and drinking, and quality physical activity in schools. A baseline evaluation of HAL undertaken by Massey University commenced in July 2020. School leaders, teachers, and parents and family were invited to complete surveys and participate in focus groups. Measures included an evaluation of the healthy food environment, including food policies, practices, and food availability (menus). Surveys were created using online survey software, and focus groups were facilitated by two experienced qualitative researchers. Food environment and food availability surveys were completed by 257 and 173 schools, respectively. Most schools had a healthy food and drink policy (82.9%); 59.2% of these schools stipulated water and milk only policies. Barriers to implementing a healthy food and drink environment included convenience and ease of access to processed and ready-to-eat foods, resistance from parents, and loss of profits. Survey responses from 1060 teachers (including 184 responses from principals/school leaders) were received. Teachers agreed that their schools saw healthy eating and drinking as a key part of student wellbeing (84.4%), yet only 57.4% of teachers felt that they upheld their school food policy. Food insecurity was identified from 53 teacher focus groups (n = 307 teachers) as a key barrier to implementing food policy. Support from the nutrition promotion workforce may help schools achieve a healthy food environment in an equitable way.

Keywords: food policy; food practices; school food environment; children; teachers; nutrition promotion

Citation: Pillay, D.; Ali, A.; Turner, S.; Wham, C. Barriers to Implementing a Healthy Food and Drink Environment in New Zealand Schools: Baseline Results from the Healthy Active Learning Evaluation. *Med. Sci. Forum* **2022**, *9*, 29. https://doi.org/10.3390/msf2022009029

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Abstract

Acute Evening Consumption of Green Kiwifruit in Young Men Enhances Waking Alertness, Mood and Increases 5-Hydroxyindoleacetic Acid in Urine †

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Abstract: Emerging evidence suggests that consuming two New Zealand green kiwifruit (*Actinidia deliciosa* cv. *Hayward*) daily for four weeks may improve sleep quality. The subjective and objective acute responses and underlying physiological responses are unknown. The current study aimed to investigate the acute effects of fresh and dried green kiwifruit compared to a water control on sleep quality and mood measures, and concentration of urinary serotonin and melatonin metabolites. In a randomised, single-blind crossover study, 24 men (age: 29 ± 1 years old, body mass index (BMI): 24 ± 1 kg/m^2) with either poor or good sleep quality were recruited. They consumed an evening standardised meal with one of three treatments; (i) two fresh green kiwifruit (without skin); (ii) 32 g dried green kiwifruit powder (including the skin; equivalent to two fresh fruit) mixed with water; or (iii) a water control, on three separate nights separated by 6–8 days. The subjective (Leeds Sleep Evaluation Questionnaire, Stanford sleepiness scale) and objective (actigraphy) sleep quality, mood (profile of mood states), and 5-Hydroxyindoleacetic acid [5-HIAA] and 6-Sulfatoxymelatonin concentrations in morning urine were determined. In poor sleepers, ease of awakening improved 24% after dried kiwifruit ($p = 0.005$) and trended to improve after fresh kiwifruit ($p = 0.052$), compared to the control. Good sleepers trended towards improved ratings of getting to sleep with fresh kiwifruit ($p = 0.053$) and no improvement after dried ($p > 0.1$) compared to control. Regardless of sleeper type, compared to control, both fresh and dried kiwifruit treatments trended ($p < 0.1$) toward improved esteem and total mood disturbances. Furthermore, after dried kiwifruit, ratings of morning alertness ($p = 0.012$), behaviour following wakening and vigour were higher ($p < 0.05$) compared to control. Both kiwifruit treatments increased urinary concentrations of the serotonin metabolite 5-HIAA (+1.56 ± 0.4 ng/g (fresh) $p = 0.001$, +1.30 ± 0.4 ng/g (dried) $p = 0.004$) compared to the control (4.32 ± 0.4 ng/g). This study is the first to demonstrate that a single evening intake of kiwifruit improves aspects of sleep quality and mood.

Keywords: kiwifruit; sleep quality; mood; serotonin

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Citation: Kanon, A.P.; Giezenaar, C.; Roy, N.C.; McNabb, W.C.; Henare, S.J. Acute Evening Consumption of Green Kiwifruit in Young Men Enhances Waking Alertness, Mood and Increases 5-Hydroxyindoleacetic Acid in Urine. *Med. Sci. Forum* **2022**, *9*, 30. https://doi.org/10.3390/msf2022009030

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Ethics Committee of Massey University (Massey University HEC: Southern A application-20/52, 11 December 2020).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data available on request from the authors.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Dietary Patterns and Associations with Macronutrients, Body Fat Percentage and BMI in Older New Zealand Adults: The REACH Study †

Karen Mumme [1], Cathryn Conlon [1], Pamela von Hurst [1], Beatrix Jones [2], Jamie de Seymour [1], Welma Stonehouse [3], Anne-Louise Heath [4], Jane Coad [5], Crystal Haskell-Ramsay [6], Owen Mugridge [1], Cassandra Slade [1] and Kathryn Beck [1,*]

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Citation: Mumme, K.; Conlon, C.; von Hurst, P.; Jones, B.; de Seymour, J.; Stonehouse, W.; Heath, A.-L.; Coad, J.; Haskell-Ramsay, C.; Mugridge, O.; et al. Dietary Patterns and Associations with Macronutrients, Body Fat Percentage and BMI in Older New Zealand Adults: The REACH Study. *Med. Sci. Forum* **2022**, *9*, 31. https://doi.org/10.3390/msf2022009031

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Abstract: Dietary patterns (DPs) explore one's whole diet and can be used to investigate associations between dietary intake and obesity. This study investigates the DPs of community-dwelling adults (65–74 years, 36% male) and associations with body mass index (BMI), body fat percent (BF%) and macronutrient intake. Dietary data (validated 109-item food frequency questionnaire) collected in the Research Eating, Activity, and Cognitive Health (REACH) study (n = 367) were collapsed into 57 food groups. The percent of macronutrient intake contributing to energy intake was calculated. BMI was calculated using measured height and weight. BF% was measured using Dual-energy X-ray Absorptiometry. Confounding factors (age, sex, physical activity and index of multiple deprivation) were collected using a questionnaire. The mean percent of energy intake from protein (18%) was within, carbohydrate (40%) below, and both total and saturated fat (36%, 15%) were above acceptable macronutrient distribution ranges. Using principal component analysis, three DPs were extracted explaining 18% of the variation in the diet: Mediterranean-style (vegetables, avocados/olives, alliums, nuts/seeds, shellfish, white/oily fish, berries and fruit), Western (processed meat/fish, sauces/condiments, cakes/biscuits/puddings and meat pies/hot chips) and prudent (legumes, soy-based foods, whole grains and carrots). Using multiple linear regression and adjusting for confounding factors, the Western DP was positively associated with BMI (β = 0.87; 95% confidence interval (CI) 0.20, 1.54; $p = 0.01$) and BF% (β = 0.86; 95% CI 0.12, 1.60; $p = 0.02$). The prudent DP was negatively associated with BMI (β = −0.65; 95% CI −1.14, −0.16; $p = 0.01$) and BF% (β = −0.66; 95% CI −1.20, −0.12; $p = 0.02$). The Mediterranean-style DP was not associated with BMI (β = −0.49; 95% CI −0,99, 0.01; $p = 0.06$) or BF% (β = −0.49; 95% CI −1.04, 0.06; $p = 0.08$). The percent of energy from carbohydrate increased and total and saturated fat decreased as Western and prudent DP scores increased. Fibre intake also increased as prudent DP scores increased. Western and prudent, but not Mediterranean-style, dietary patterns and their macronutrient intakes explain some variation in body composition.

Keywords: body composition; dietary assessment; macronutrients; obesity; older adults

Author Contributions: Conceptualization, K.B., C.C., P.v.H., B.J., W.S., A.-L.H., J.C., C.H.-R.; methodology, K.B., C.C., P.v.H., B.J.,W.S., A.-L.H., J.C., C.H.-R., K.M.; formal analysis, K.M.; investigation, K.B., C.C., J.d.S., P.v.H., K.M., O.M., C.S.; data curation, K.M.; writing—original draft preparation, K.M.; writing—review and editing, K.M., K.B.; supervision, K.B., C.C., P.v.H., B.J.; project administration, K.B., C.C., P.v.H., O.M., C.S.; funding acquisition, K.B., C.C., P.v.H., B.J., W.S., A.-L.H., J.C., C.H.-R. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: Ethical approval for the REACH study was obtained from the Massey University Human Ethics Committee Southern A, Application 17/69.

Informed Consent Statement: Written informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Consent was not obtained from study subjects to release data.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Vegetables as First Foods for Babies: Results from a Randomised Controlled Trial †

Jeanette Rapson [1], Pamela von Hurst [1], Marion Hetherington [2], Hajar Mazahery [1] and Cathryn Conlon [1,*]

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Many children do not meet vegetable intake recommendations. However, starting complementary feeding (CF) with vegetables only may improve child vegetable consumption. The aim was to examine whether exposure to a vegetables-only diet during the first 4 weeks of CF increases later vegetable acceptance, compared with a control group including fruit and vegetables. In this randomised controlled trial, 108 Auckland infants received either vegetables only (Veg-only, n = 56) or a combination of fruit and vegetables (control, n = 52) for a duration of four weeks at home, starting from the first day of CF; plain cooked meat, fish and/or poultry purée could also be offered to meet iron requirements. At 9 months of age all infants were offered two target vegetables (broccoli, spinach) and a fruit (pear), and the primary outcome measure was intake (grams) of target vegetables. Vegetable liking, rate of acceptance/eating and daily consumption of vegetables/fruit were additional measures. Independent *t*-test or Mann–Whitney tests were used to compare group differences. Veg-only infants ate significantly more of the target vegetables than controls: median (25th, 75th percentile) broccoli was 47 (27, 72) vs. 30.0 (16, 62) grams, $p = 0.024$, respectively; spinach was 37 (19, 55) vs. 24 (12, 41) grams, $p = 0.028$, respectively. Veg-only infants accepted and ate vegetables at a greater rate; daily vegetable intake was also higher (Veg-only 86 (53, 146) grams vs. controls (68 (38, 101) grams, $p = 0.042$). Fruit intake and other acceptance variables were similar. Providing vegetables as first foods increased vegetable intake at 9 months of age, and may be a simple strategy to help parents improve their child's vegetable consumption.

Keywords: infants; weaning; introducing vegetables; food preference; vegetable intake

Citation: Rapson, J.; von Hurst, P.; Hetherington, M.; Mazahery, H.; Conlon, C. Vegetables as First Foods for Babies: Results from a Randomised Controlled Trial. *Med. Sci. Forum* **2022**, *9*, 32. https://doi.org/10.3390/msf2022009032

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Institutional Review Board Statement: The study was conducted in accordance with the Code of Ethical Conduct for Research, Teaching and Evaluations Involving Human Participants, and approved by the Human Ethics Committee of MASSEY UNIVERSITY (protocol code Southern A, Application SOA 18/56 and date of 27 September 2018).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data described in the manuscript, code book, and analytic code will not be made available because this was not stated in the ethics application.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Changes in Plasma and Liver Lycopene Concentrations, Body Composition and Gut Bacteria Following 'Red' versus 'Moonglow' Tomato Feeding in Ovariectomized Rats †

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Abstract: *Cis-* isomers of lycopene have been reported to be more bioavailable than all-*trans*-lycopene. 'Moonglow'(MG) is an orange heirloom tomato variety with >90% of its lycopene in the more bioavailable *cis*-isomeric form, compared to 'Red' (R) tomatoes with all *trans-* lycopene. Oestrogen deficiency after menopause changes the body composition and gut microbes. This study evaluated the plasma and liver lycopene concentration and the effect of lycopene on body composition and gut microbiota in female ovariectomised rats following 'Red' versus 'Moonglow' tomato feeding. Female Sprague Dawley rats underwent no surgery (Sham) or ovariectomy (OVX) surgery at the age of 16 weeks to induce a menopause-like status. Sham-C and OVX-C groups received a daily dietary supplement containing no tomato powder; 'post-R' and 'post-MG' received dietary supplements containing tomato powder for 8 weeks post-surgery; 'pre-R' and 'pre-MG' received dietary supplements containing tomato powder for 8 weeks prior to and post-surgery (N = 12–15/group). Each dietary tomato supplement contained 0.172 mg of lycopene (~0.35 mg lycopene/kg body weight/day). After 8 or 16 weeks of tomato supplementation, the mean plasma lycopene concentrations in 'pre-MG' and 'post-MG' groups were ~8X higher than 'pre-R' and 'post-R' groups, but liver lycopene stores did not differ between the groups. Caecal pH ranged from 6.79 ± 0.08 to 7.05 ± 0.11 and was not significantly different among the groups. Ovariectomy reduced the abundance of gut bacteria compared to Sham-C. Both 'pre-MG' and 'post-MG' restored the numbers of *Lactobacillus*, *Enterococcus*, *Bacteroides* and *E. coli*, whereas the 'post-R' group only increased *Lactobacillus*. A significant increase in fat mass and reduction in lean mass was found in all OVX rats compared to Sham-C after 16 weeks, and individual fat pad weights strongly correlated with total body fat, with no benefit from lycopene supplementation. These results demonstrate that 'Moonglow' *cis-* lycopene is significantly more bioavailable than 'Red' *trans-* lycopene and that 'Moonglow' tomato has a greater prebiotic-like effect.

Keywords: lycopene; ovariectomy; gut bacteria; body composition; menopause

Citation: Walallawita, U.S.; Wolber, F.M.; Ziv-Gal, A.; Kruger, M.C.; Heyes, J.A. Changes in Plasma and Liver Lycopene Concentrations, Body Composition and Gut Bacteria Following 'Red' versus 'Moonglow' Tomato Feeding in Ovariectomized Rats. *Med. Sci. Forum* **2022**, *9*, 33. https://doi.org/10.3390/msf2022009033

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Institutional Review Board Statement: The animal study protocol was approved by the Massey University Animal Ethic Committee (Protocol code: 19/12 on 4 February 2019).

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Benchmarking the Energy, Sodium, Sugar and Saturated Fat Content of Products and Meal Combos at NZ Fast-Food Outlets in 2020 †

Sally Mackay [1,*], Teresa Gontijo de Castro [1,2], Helen Eyles [1,3], Leanne Young [3], Grace Shaw [1] and Cliona Ni Mhurchu [3]

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Food consumed away from home is contributing an increasing proportion of household food budgets in New Zealand (NZ). This study aimed to benchmark the healthiness of the NZ fast-food supply in 2020. Data on the serving size and nutrient content of products were collected from company websites and in-store visits of 27 fast-food chains. For each fast-food category and type of combo meal, the medians and interquartile ranges were calculated for serving size (g/mL) and energy (kilojoules-kJ), sodium (mg), total sugar (g) and saturated fat (g) per serving. The nutrient contents/servings were benchmarked against the United Kingdom (UK) soft drinks levy thresholds and targets for salt for foods consumed away from home; the NZ daily intake guidelines for energy, sodium and saturated fat; and the WHO recommendation for free sugars. Nutrition information was available for 1777 products and 176 meal combos. More than one in ten drinks would qualify for a UK soft drinks levy, and 47% (n = 1072) of products with sodium data exceeded the relevant UK targets. The categories with the highest median energy and nutrient contents per serving were: burgers (2585 kJ-energy and 1091 mg-sodium), savoury pastries (13 g saturated fat) and milkshakes/smoothies (49 g total sugar). The meal combos represented one meal occasion, but an average combo provided 50% of the daily energy requirement, 89% of the maximum sodium recommendation, 81% of the recommended sugar intake, and 46% of the recommended saturated fat intake. Fast-food products and combo meals in NZ contribute far more energy and negative nutrients to the recommended daily intake targets than is optimal for good health. The NZ Government needs to set reformulation targets and portion-size guidance to reduce the potential impact that increasing fast-food consumption is likely to have on the health of New Zealanders. All fast-food chains need to provide sufficient nutrition information about their products to inform consumers.

Keywords: fast food; sodium; total sugars; population health; food environments

Citation: Mackay, S.; Gontijo de Castro, T.; Eyles, H.; Young, L.; Shaw, G.; Ni Mhurchu, C. Benchmarking the Energy, Sodium, Sugar and Saturated Fat Content of Products and Meal Combos at NZ Fast-Food Outlets in 2020. *Med. Sci. Forum* **2022**, *9*, 34. https://doi.org/10.3390/msf2022009034

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Data Availability Statement: Because of the commercial and legal restrictions to the use of copyrighted material, it is not possible to share data openly, but unredacted versions of the dataset are available with a licensed agreement that they will be restricted to non-commercial use. For access to Nutritrack, please contact the National Institute for Health Innovation at the University of Auckland at enquiries@nihi.auckland.ac.nz.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Healthy Sustainable Diets †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Climate change is one of the top threats to human health and strategies to mitigate climate change are essential. International research has shown that policies to shift dietary consumption away from foods with high green-house gas (GHG) emissions associated with their production may produce health and climate co-benefits. A multi-state life-table model was used to estimate the health (in quality adjusted life years, QALY), health system costs and equity impacts of several scenarios in the New Zealand population. GHG emissions that have been assigned to the foods consumed by New Zealanders in the 2008/09 Adult Nutrition Survey have been added to this model to estimate the climate co-benefits of these scenarios. This presentation will outline an optimised healthy, sustainable diet for New Zealanders and describe the potential health and climate impacts of this and other population-wide theoretical shifts in dietary intake. Modelling results of price policies that could be implemented in New Zealand to shift dietary intake towards more healthy and sustainable foods will also be presented. Having information on the health and climate co-benefits of dietary shifts, policies and interventions can provide justification for policy makers to implement policies that both improve the health of the population and help to mitigate climate change.

Keywords: sustainable diets; health and climate co-benefits; food intake; greenhouse gas emissions

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Abstract

Trends, Determinants, and Health Consequences of Overweight and Obesity in Indonesia: A Longitudinal Study †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Obesity has become a concern in low- and middle-income countries, such as Indonesia, in recent years. This is an important issue for the country because the detrimental health impacts of obesity on non-communicable diseases are well established. The aims of this research are to understand the epidemiology of overweight and obesity and to model the trajectories of body mass index (BMI) in the Indonesian population. Data come from the Indonesian Family Life Survey, a large population-based longitudinal study over a 21-year period (1993–2014). The survey included 42,537 adults (20,778 males; 21,759 females) aged 19 to 75+ years and 105,820 total observations (49,684 males; 56,136 females). We examined changes in BMI across time, by gender, age, and birth cohort. A Group Based Trajectory Model (GBTM) was used to estimate the shape and number of BMI trajectory groups. A GBTM uses a finite mixture model to identify groups of individuals following similar developmental trajectories of BMI over time. Probability distributions based on maximum likelihood estimation were used to determine group membership. The mean BMI in adults increased between 1993 and 2014 (21.4 kg/m^2 in 1993 to 23.5 kg/m^2 in 2014), with females having a higher mean BMI than males. Mean BMI increased with time more rapidly for those born in recent decades (people born in the 1930s had average BMIs of 20.7 kg/m^2 in 1993 and 20.5 kg/m^2 in 2014, while people born in the 1970s had average BMIs of 20.8 kg/m^2 in 1993 and 24.4 kg/m^2 in 2014). Three distinct BMI trajectories were identified: group 1 (56.7%—maintained a healthy weight throughout adulthood), group 2 (34.7%—BMI increased from a healthy weight to obese), group 3 (8.6%—consistently obese over the adult years). The shape of these trajectories differed by gender ($p < 0.001$) and birth cohort ($p < 0.001$). These findings support the urgent need for overweight and obesity prevention and intervention programs in Indonesia.

Keywords: obesity; trend; change

Citation: Widyastuti, N.; McLean, R.; Turner, R.; Harcombe, H. Trends, Determinants, and Health Consequences of Overweight and Obesity in Indonesia: A Longitudinal Study. *Med. Sci. Forum* **2022**, *9*, 36. https://doi.org/10.3390/msf2022009036

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Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Snacking on Almonds Reduces Short-Term Energy Intake †

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Abstract: Snacking has increased over recent years and may account for excess energy intake and observed increases in overweight and obesity. Whole nuts are more commonly consumed as snacks than meals. Research suggests that nut consumption increases satiety, and so may support energy balance, as well as improving diet quality compared to other commonly consumed snacks. We aimed to compare the effects of consuming almonds versus sweet biscuits on appetite, energy intake, and diet quality. We used an acute crossover study involving 25 males and 75 females. Participants consumed isocaloric amounts (energy equivalent to 1030 kJ (42.5 g almonds) or 10% total energy, whichever was higher) of almonds or sweet biscuits in random order. Participants attended two clinic sessions where they initially consumed a standardised breakfast, followed two hours later by consumption of the snack food. Appetite ratings were measured before consuming the snack and at 15- or 30-min time intervals for two hours post-snack consumption. Two hours after consuming the snack, participants were offered an ad libitum lunch. They were then asked to record their food and beverage intake for the remainder of the day. Appetite ratings over the two hours did not differ between snacks (all $p \geq 0.097$) and there was no difference in energy intake at the ad libitum lunch ($p = 0.113$). However, energy intakes over the remainder of the day were significantly lower after consuming almonds (mean (95% CI) difference: 638 kJ (44, 1233), $p = 0.035$). There was also a non-statistically significant pattern of lower absolute intakes of saturated fat ($p = 0.056$) and sugar ($p = 0.053$) after consuming the almond snack. Encouraging the regular consumption of nuts as a snack food may support energy balance and improve diet quality. Long-term studies are required to determine the effects on long-term anthropometry and nutrient intakes.

Keywords: almonds; nuts; snack foods; energy intake; diet quality; satiety

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Institutional Review Board Statement: The study was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. The study was approved by the Ethics Committee (Health) of University of Otago (protocol code H18/109), 24 September 2018.

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Abstract

Twenty-Four-Hour Urinary Sodium and Potassium Excretion in Children and Young People: A Systematic Review and Meta-Analysis †

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Abstract: In children and other young people, diets high in sodium and low in potassium lead to increases in blood pressure and a higher risk of cardiovascular disease later in life. Our primary objective was to assess daily sodium and potassium intakes in children and young people aged 2–18 years from upper-middle and high-income countries, using gold-standard 24 h urinary sodium and potassium excretion studies. Secondary objectives were to assess: (1) the sodium-to-potassium molar ratio; (2) differences by gender, age, and geographical region; and (3) the sodium concentration in children's diets. The following databases were searched to identify relevant studies published between 1998 and 2021: Cochrane Database of Systematic Reviews, Embase, Food Science and Technology Abstracts, Google Scholar, MEDLINE and Scopus. Data were pooled using random-effects meta-analysis, and meta-regression was used to quantify heterogeneity. A total of 2592 studies were identified, with 22 meeting the inclusion criteria (n = 5323, 48% girls; mean age 9.7 years). Mean 24 h urinary sodium excretion in boys was 2730 mg/d (95% CI, 2460–3001), potassium excretion was 1564 mg/d (95% CI, 1400–1728), and the sodium-to-potassium molar ratio was 3.2 (95% CI, 2.8–3.6). Corresponding values for girls were 2336 mg/d (95% CI, 2139–2534), 1428 mg/d (95% CI, 1300–1556), and 3.0 (95% CI, 2.6–3.4), respectively. There was a positive association between sodium and potassium excretion and the sodium-to-potassium ratio and age. Geographically, European and Oceanian participants excreted more potassium and had a lower mean sodium-to-potassium ratio than their Asian counterparts. Mean sodium intake in children as young as 5–6 years old exceeded the World Health Organization (WHO) upper limit of 2000 mg/d, while potassium intake was subpar. Public health monitoring, policies, and programmes to reduce dietary sodium and increase potassium intake are essential to protect the future cardiovascular health of children and young people.

Keywords: dietary sodium; dietary potassium; children and young people; meta-analysis

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Abstract

Can the Metabolome Be Used to Assess Dietary Pattern Consumption? A Systematic Review of Evidence from Observational Studies †

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Abstract: Accurate dietary assessment is difficult yet fundamental for deriving meaningful findings from diet-related studies. Commonly used dietary assessment methods such as food diaries, recalls, and questionnaires rely on self-reporting and are often subject to bias. Furthermore, nutrition research often focuses on individual foods and nutrients, which has several limitations. Dietary pattern analysis considers the total diet and combinations of food eaten and can be derived empirically (e.g., factor analysis) using a diet index or a combination of both (e.g., reduced rank regression). Metabolomics, the study of low-molecular-weight compounds (metabolites), has been used for disease biomarker detection, and the technologies employed have advanced rapidly in recent years. As such, studies exploring the application of metabolomics for identifying objective biomarkers of dietary intake have also increased. The aim of our systematic review was to investigate observational studies exploring the relationship between dietary pattern consumption and the metabolome. A comprehensive search strategy was employed, using five search databases. Of the 14,328 studies screened, 35 met the pre-defined inclusion criteria and were included. All studies found a significant correlation between metabolites measured and dietary pattern scores. This demonstrates the potential for using the metabolome as a source of objective biomarkers of dietary pattern consumption. However, similar dietary patterns did not always result in similar metabolomic profiles across different study populations. This is likely due to the wide range of metabolomics methodologies employed, different biospecimens analysed, and a wide variety of populations and dietary patterns explored. In conclusion, although there is evidence that dietary pattern consumption can be reflected in the metabolomic profile of individuals, robust markers for specific dietary patterns have not yet been identified. Future studies should consider performing discovery and validation studies within a similar population, replicating the same methodology, to determine robust biomarkers of dietary pattern consumption.

Keywords: biomarkers; dietary patterns; dietary assessment; metabolites; nutrition; systematic review

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Abstract

Protein Sources across the Day in Community-Dwelling Older Adults Living in Auckland, New Zealand †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Background: Animal protein sources are more efficient in increasing muscle protein synthesis and maintaining muscle mass in older adults, but little is known about when they are consumed across the day in New Zealand (NZ) older adults. Objectives: to investigate sources of protein across the day and at each meal in community-dwelling older adults living in NZ. Methods: data were obtained from the Researching Eating Activity and Cognitive Health (REACH) study, a cross-sectional study aimed at investigating dietary patterns and associations with cognitive function and metabolic syndrome in adults aged 65 to 74 years. Dietary intake was collected using a 4-day food record. Sources of protein intake were assessed across the day and at breakfast, midday and the evening meal. Results are presented as a percentage of the total protein intake for the day and for each meal. Results: participants (n = 327; 65.4% female) had a median relative protein intake of 1.2 [0.9, 1.4] g/kg in males and 1.1 [0.9, 1.3] g/kg in females. At breakfast, participants primarily consumed protein from milk (28.1%), breakfast cereal (21.6%) and bread (12.2%). Protein intake at the midday meal was derived from bread (17.4%), cheese (9.5%) and milk (9.2%). At the evening meal, 21.2%, 15.2% and 13.6% of total protein was derived from red meat (beef, lamb, pork), poultry and fish, respectively. Conclusion: in this cohort, cereals and dairy products at breakfast and the midday meal, and meat sources at the evening meal contributed the most to daily protein intake.

Keywords: aging; muscle; protein requirements; protein distribution

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Abstract

Yacon Concentrate NZFOS+, Its Phytochemical Contents, Health-Related Properties and Potential Applications †

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Abstract: Yacon (*Smallanthus sonchifolius*), a sustainable foodstuff, is perceived as a functional food because it contains biologically active components, e.g., fructooligosaccharides (FOS), inulin, and phenolic compounds that may provide physiological benefits beyond basic nutrition to reduce the risk of chronic diseases. There is a growing public interest in why and how to use yacon. Yacon, originally from South America, has been grown in New Zealand (NZ) since the 1980's. NZ-produced yacon concentrate NZFOS+ contains the purest natural prebiotic FOS. Our study aimed to examine the phytochemical contents of NZFOS+ and its health-related properties. The glycemic index of yacon concentrate was measured by ISO 26642:2010(E) (n = 10). Total phenolic and flavonoid contents were measured by the spectrometric method. The chlorogenic acid content and phenolic profiling were measured using the liquid chromatography coupled with mass spectrometry (LC-MS). The antioxidant activity of the yacon concentrate and Manuka honey were compared using the cupric reducing antioxidant capacity (CUPRAC), ferric ion reducing antioxidant power (FRAP), and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays. The results indicated that compared to Manuka honey, yacon concentrate has a lower glycemic index (40 vs. 52); a higher content of total phenolic (5430 mg vs. 744 mg GAE/100 g), total flavonoid (329 mg vs. 22 mg QE/100 g), and chlorogenic acid (11.88 µg vs. 0.08 µg CA/g); and across all assays observed, a significantly higher antioxidant capacity (CUPRAC assay, 892 mg vs. 52.6 mg TE/100 g; FRAP assay, 633 mg vs. 47 mg TE/100 g; DPPH assay, 383 mg vs. 22 mg TE/100 g, respectively). Yacon concentrate has proven potential health benefits and applications associated with the maintenance of health and wellbeing and prevention of chronic diseases. Further investigations are needed for human studies and new applications and use of yacon concentrate. Yacon concentrate (NZFOS+) has potential markets in the development of new food products and new diet therapy applications, e.g., in the form of syrup, and functional prebiotic drinks.

Keywords: yacon concentrate; fructo-oligosaccharides; phenolic compounds; antioxidant activity

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Abstract

How Healthy Are Aotearoa New Zealand's Food Environments? Assessing the Impact of Recent Food Policies 2018–2021 †

Sally Mackay [1,*], Kelly Garton [1], Sarah Gerritsen [2], Fiona Sing [1] and Boyd Swinburn [1]

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Food policies can make healthier foods more accessible for the population. In this study, progress on implementing recent policies and commitments of the government and food companies was monitored. Sub-studies were conducted following INFORMAS (International Network for Obesity/non-communicable diseases, Research, Monitoring and Action Support) protocols: benchmarking government implementation of healthy food policies; the impact of a voluntary advertising code on the exposure of children to unhealthy food marketing; the impact of healthy food and drink policies on retailers in district health boards and on the beverage environments in leisure centres; supermarket retail environments; food composition and display of the 'Health Star Rating'; and commitments of food companies to nutrition. The level of implementation of food policy by the New Zealand government has not improved over nine years. The voluntary Children and Young People's Advertising Code is too weak to have an impact on the exposure of children to unhealthy food marketing. Improvements to the beverage environment in leisure centres occurred where sufficient support was available, and all District Health Boards adopted a healthy food policy. There is considerable variation in the actions of the major food companies: in 2019 the Health Star Rating was displayed on 94% of private label products but only 25% of packaged foods overall; one-third of supermarkets did not have a check-out free of junk food, and two-thirds of the major food companies improved on their nutrition commitments since 2017. New Zealand's food environments are largely unhealthy and policy implementation is low. Where policies, codes and commitments by government and food industry do exist, the progress on implementing these is patchy and there are many remaining gaps. There is considerable scope for the government, food companies, and local setting to make major changes towards a healthier, more equitable food environment with food policy in the form of mandatory regulations required to ensure real progress.

Keywords: food environments; monitoring; nutrition policies

Citation: Mackay, S.; Garton, K.; Gerritsen, S.; Sing, F.; Swinburn, B. How Healthy Are Aotearoa New Zealand's Food Environments? Assessing the Impact of Recent Food Policies 2018–2021. *Med. Sci. Forum* **2022**, *9*, 9042. https://doi.org/10.3390/msf2022009042

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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Abstract

Adherence to the Updated Healthy Eating Guidelines by Breastfeeding Women †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Optimal dietary intakes are essential for the health of both breastfeeding women and their infants. Few recent dietary intake data exist concerning this group in New Zealand. This study aimed to determine the adherence to national dietary recommendations of breastfeeding women living in New Zealand. A cohort of breastfeeding women residing in the Palmerston North area was enrolled in the longitudinal follow-up Mother and Infant Nutrition Investigation study. Seventy-six women completed a weighed four-day diet diary at three months postpartum. Maternal demographic information was collected via a self-administered online questionnaire. The number of servings consumed for each food group was calculated based on the revised Eating and Activity Guidelines for New Zealand Adults (2020). All data were analysed using IBM SPSS version 20. Overall, 25% of women met the recommended number of servings (RNS) for fruits (≥2 servings/day), and none met the RNS for vegetables (≥7.5 servings/day). Only 5% of women reached the RNS for grain foods (≥9 servings/day), 34% met the RNS for meat and eggs (≥2.5 servings/day), and 13% met the RNS for milk and milk products including plant-based products (≥2.5 servings/day). In total, 49% of women met the RNS for one food group, but none of the women met the recommendations for all food groups. Based on independent t tests, women who had tertiary qualifications consumed a higher number of servings of grain foods ($p = 0.001$) and vegetables ($p = 0.010$) compared with those without tertiary education. Pearson correlation showed the number of servings consumed in the meat and eggs was positively correlated with the number of servings of vegetables ($r = 0.350$, $p = 0.02$). This research shows a low adherence to the current national dietary guidelines among this cohort. Future research is required to identify the barriers to healthy eating and develop effective initiatives to encourage and support breastfeeding women to achieve healthy eating behaviours.

Keywords: eating and activity guidelines; diet; breastfeeding; New Zealand

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Abstract

Nutrient Intake from Diet and Micronutrient Supplements among Breastfeeding Women: Comparison to Nutrient Recommendations †

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Abstract: An optimal nutrient intake is required for the health of both breastfeeding women and their infants. This study aims to assess the nutrient adequacy of breastfeeding women living in New Zealand. A cohort of breastfeeding women residing in the Palmerston North area was enrolled in the longitudinal follow-up Mother and Infant Nutrition Investigation study. Seventy-six women completed a weighed four-day diet diary, including supplement use at three months postpartum. Maternal demographic information was collected via a self-administered online questionnaire. Dietary data were analysed using Foodworks 9 Professional (Xyris Software, Australia) using the dataset from New Zealand Foodfiles 2016. Nutrient intakes from food were compared to the nutrient reference values for Australia and New Zealand (2006) to assess dietary adequacy. Considering food only, the median (Q1, Q3) energy intake was 9706 (8143, 10,952) kJ. Median intakes of macronutrients as a percentage of energy were 16.6% for protein, 37.8% for total fat, 15.5% for saturated/trans-fat and 40.0% for carbohydrates. Many participant intakes were above the acceptable macronutrient distribution range (AMDR) for total fat (68%) and saturated/trans-fat (88%) and below the AMDR for carbohydrates (80%). The median fibre intake was 29 (21, 34) g with 55% below the estimated average requirement (EAR) of 30g. Many participants had intakes below the EAR or adequate intake and were at risk of dietary inadequacy for micronutrients, including thiamin (26%), folate (42%), vitamin A (38%), vitamin E (61%), calcium (36%), selenium (59%) and zinc (32%). Considering both food and supplements, some participants had intakes above the upper level of intake (UL), including iron (12%, 45 mg/day) and folic acid (3%, 1000 mcg/day). This research suggests a high-fat, low-carbohydrate intake coupled with micronutrient inadequacy among breastfeeding women. Some women had high intakes of micronutrients from supplements. Research is required to determine whether such deviations from recommendations have detrimental effects on mothers and infants.

Keywords: nutrient reference values for Australia and New Zealand; nutrients; breastfeeding; New Zealand

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Abstract

Achieving Sustainable Nutrient Adequacy Globally and Locally †

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Abstract: Our ability to effectively nourish an increasing global population is one of the key challenges facing humanity. The global food system is incredibly complex: it is the world's largest economic sector; it has multiple inputs and outputs; it is often politicised; it is subject to various social and cultural forces; and it touches every human being on the planet through food. There are a range of voices telling us how we should change the food system. Before we know what to think about changes to make to our diets or food supply, we need to first determine how to think about the food system. Under what scenarios is it *possible* for the global food system to provide the bioavailable nutrients to feed the global population? What scenarios are *practical* to deliver, for example, in terms of level of change required, cost of that change, or affordability of food? What is the most *optimal* to deliver a sustainable food system? This talk will focus on several aspects of the work of the Riddet Institute and the Sustainable Nutrition Initiative® that aim to inform the future of food systems and nutrition. At the foundation of this work is the idea that nutrition is integral to a sustainable food system: if we fail to produce and provide the food and nutrients to enable people to survive and thrive, we have failed, regardless of what else we achieve. The presentation will cover the DELTA Model®, our tool for assessing the nutritional adequacy of global food system scenarios; NZ nutrient production, trade and availability; global nutrient trade and its impact on nutrition.

Keywords: population nutrition; mathematical modelling; sustainable food systems; human nutrition

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Abstract

Use of Galactagogues and Perceptions of Breast Milk Supply among Breastfeeding Women †

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Abstract: Perceived insufficient milk supply (PIM) is the most common reason for breastfeeding women to introduce formula before 6 months postpartum. Anecdotal evidence suggests that galactagogues (substances to enhance breast milk supply) are commonly used in Aotearoa New Zealand. The aim of this study is to investigate galactagogue use and its relationship to mother's perceptions of their breast milk supply. Breastfeeding women with an infant aged 1–7 months old were invited to complete a survey that included a series of questions to evaluate PIM and other perceptions of their breast milk supply. Participants self-reported the use of galactagogues, including medications, herbs, and supplements as well as special foods. Women were also asked to keep 24 h breastfeeding records. Seventy-two women completed the survey. A total of 64% of the women (n = 46) used galactagogues, with 52% of them (n = 24) using more than one galactagogue. There were no differences between galactagogue users and non-users in terms of maternal age, education, parity, or breastfeeding frequency and total breastfeeding time over 24 h. Frequently used galactagogues were lactation cookies (n = 28), lactation teas (n = 10), and lactation blends (n = 7), and most of them were commercial products. Most of the participants perceived their milk as being in good quality and nutritious and that their infants were satisfied with the amount of breast milk received. However, 18% women (n = 13) reported PIM. Galactagogue use was not associated with PIM or other perceptions of breast milk supply. Interestingly, 59% of the women who thought they had sufficient milk used galactagogues. Galactagogues were widely used regardless of the women's perceptions of their breast milk supply. Research in a sample including more women reporting PIM is required to understand how galactagogues are used in response to PIM.

Keywords: perceived insufficient milk supply; galactagogue; breastfeeding

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Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

A Qualitative Study of New Zealand Consumer Perceptions, Use and Understandings of Nutrition Content and Health Claims †

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Abstract: Nutrition content and health claims are voluntary statements regarding the nutrition content of food or how it relates to health. They are commonly used on food labels and in food advertising. The majority of packaged food products in New Zealand display nutrition content or a health claim on the label. This study aimed to investigate how consumers in New Zealand understand, perceive, and use the nutrition content and health claims on food labels. The study used a qualitative approach with semi-structured in-depth online interviews and in-person focus groups. Participants who were aged > 25 years and who were responsible for the food shopping in their household were selected. Ten participants took part in the interviews and the seven focus groups consisted of 39 participants. Transcripts were analysed using reflexive thematic analysis, where inductive coding identified five themes: (1) aware of claims but did not use, (2) mistrust and scepticism of nutrition content and health claims, (3) confusion and misinterpretation of nutrition content and health claims, (4) using claims to guide food choice, and (5) not all claims are equal. The findings from this study showed that nutrition content and health claims were used by a minority subgroup of consumers with specific dietary requirements. However, most consumers perceived nutrition content and health claims with scepticism and mistrust and were not aware that these are highly regulated, but rather believed that the claims were simply marketing tactics to increase product appeal and sales.

Keywords: nutrition claims; health claims; food labelling; qualitative research

Citation: Stuthridge, L.; Alexander, D.; Stubbe, M.; Eme, P.; Smith, C. A Qualitative Study of New Zealand Consumer Perceptions, Use and Understandings of Nutrition Content and Health Claims. *Med. Sci. Forum* **2022**, *9*, 47. https://doi.org/10.3390/msf2022009047

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Abstract

The DELTA Model: Applying a Global Perspective to 'Sustainable' Individual Dietary Choices to Explore Their Practicality †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: As pressure rises in the fight to reduce global warming, increasing scrutiny is falling on food systems. A growing number of individuals are looking to optimise their own diets for the benefit of the environment. To gain a holistic understanding on the impact of these choices on the world, and to ensure true sustainability for future populations, it is essential to consider these diets from the perspective of the global food production system and its nutrient supply. The DELTA Model is a tool to simulate global food production scenarios and the nutrients they supply. The model was used to simulate future scenarios of food production that aligned with common diets often adopted for improved environmental sustainability (vegan, vegetarian, and the EAT-Lancet reference diet). This was performed by altering production quantities of specific food groups. The resulting nutrient supply of the scenario was then analysed. All the modified scenarios saw reduced availability of many nutrients in future years (2030 and 2050) compared to 2018 data. Nutrient availability was compared to nutrient reference values scaled to the global population. All modified scenarios had a global nutrient undersupply, including calcium (>31% below requirement), iron (>27%), zinc (>26%), Vitamin B12 (>67%), and Vitamin E (>10%). It was also found that the increased cropland area required to produce food in these modified scenarios would put strain on the world's limited resources. A transition to these scenarios irrespective of filling nutrient undersupply was estimated to increase the land area required to produce food by >22% compared to 2018, and >33% if nutrient requirements were fulfilled. The results of the DELTA Model emphasise the essential need to consider the practicalities and capacity of global food production systems, as well as the nutrition of populations, when advocating for worldwide diet adaptation.

Keywords: sustainable nutrition; food production; nutrient supply; modelling

Citation: van der Lee, C.J.; Smith, N.W.; Hill, J.P.; Fletcher, A.J.; McNabb, W.C. The DELTA Model: Applying a Global Perspective to 'Sustainable' Individual Dietary Choices to Explore Their Practicality. *Med. Sci. Forum* **2022**, *9*, 48. https://doi.org/10.3390/msf2022009048

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Abstract

What Are the Most Promising Strategies to Decrease Animal Protein and/or Increase Plant Protein Uptake in Foodservice Settings? †

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Abstract: Moving towards healthy sustainable diets which replace a proportion of animal with plant-based protein requires effective population-based strategies. A variety of strategies in food service settings can support this. This systematic review aimed to evaluate the effectiveness of strategies to decrease animal protein and/or increase plant protein in foodservice settings. Outcomes included uptake (primary outcome), satisfaction, financial, environmental, and dietary intake (secondary outcomes). Both quantitative and qualitative outcomes were included. Seven databases were searched to identify peer-reviewed studies conducted in commercial and institutional foodservices using any strategy to decrease beef, lamb, pork, poultry, eggs, fish or seafood and/or increase legumes/pulses, legume/pulse-based meat substitutes or nuts. Titles/abstracts then full texts were screened independently by two authors. Quality appraisal was completed using the Mixed Methods Appraisal Tool. From 20,002 records identified, 38 studies from 29 manuscripts met the eligibility criteria, of which 16% were high quality. Almost half the manuscripts were published in the last two years. Most took place in institutional settings (n = 30) and all were in Europe or the United States. Strategies included forced restriction (n = 4), menu re-design (n = 6), recipe re-design (n = 6), service re-design (n = 4), menu labelling (n = 7), prompt at point of sale (n = 7) and multi-pronged strategies (n = 4). Menu labelling and re-designing menus, recipes, and service increased uptake of target foods in most studies with the largest consistent changes with menu re-design. Most recipe and service re-design strategies had a positive or neutral effect on satisfaction. Few studies explored financial, dietary or environmental outcomes. Future meat reduction initiatives should focus on menu and recipe re-design as these do not appear to negatively impact consumer satisfaction. More studies are needed to evaluate financial, environmental, and dietary outcomes.

Keywords: sustainability; vegetarian; plant-based; plant-forward; foodservice

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Abstract

Food Advertising to Children in New Zealand: A Critical Review of the Performance of a Self-Regulatory Complaints System Using a Public Health Law Framework †

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Abstract: New Zealand has the second highest overweight and obese child population in the Organization for Economic Co-operation and Development (OECD). This paper evaluates whether New Zealand's self-regulatory controls on the advertising of unhealthy food and beverages to children and young people adequately protects children from the exposure to, and power of, such marketing, in order to limit its impact on children's food and beverage preferences. First, an analysis of the relevant New Zealand Advertising Standards Authority (ASA) Codes was conducted, including the ASA Complaints Board and Appeals Board decisions from 2017–2019 to determine the application of the Codes in practice. Second, a public health law framework was applied to the self-regulatory system. Of the 16 complaints assessed, 12 were not upheld, and only one was upheld under the Children and Young People's Advertising Code (CYPA Code). Three complaints were upheld under the Advertising Standards Code (ASC) but not the CYPA Code. An analysis of the Codes and their interpretation by the Complaints Board found that many facets of the public health law framework were not met. The self-regulatory system does not adequately protect children from the exposure to, and power of, unhealthy food and beverage marketing, and government-led, comprehensive, and enforceable marketing restrictions are required.

Keywords: advertising; self-regulation; children; food

Citation: Sing, F.; Mackay, S.; Culpin, A.; Hughes, S.; Swinburn, B. Food Advertising to Children in New Zealand: A Critical Review of the Performance of a Self-Regulatory Complaints System Using a Public Health Law Framework. *Med. Sci. Forum* **2022**, *9*, 50. https://doi.org/10.3390/msf2022009050

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Abstract

Human Gut Microbiota, Gut–Brain Axis and the Role of Diet †

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Abstract: Human intestinal microbiota comprises bacteria, viruses, fungi, yeasts and bacteriophages. The human microbiota has a fundamental role in host physiology and pathology. This community starts to develop at birth and continues for two to three years, until it reaches a stable composition. It, however, continues to be influenced by different environmental and lifestyle factors throughout the host's lifespan. It has now become apparent that human gut microbiota plays a fundamental role in human health and physiology. Increasing evidence in last ten years has shown that intestinal bacteria can affect the central nervous system and behavior. The nervous system and the gastrointestinal tract are connected through a bidirectional network of signaling pathways called the gut–brain axis, which consists of multiple mechanisms including the vagus nerve, the immune system and bacterial metabolites and products. Diet is one of the major factors involved in shaping the composition of human gut microbiota. One of the emerging areas of research is whether and how diet can affect the nervous system via its effect on gut microbiota. The majority of studies have employed animal models to advance our understanding of the role of nutritional interventions on the microbiota–gut–brain axis and its potential benefits for mental health. Although animal studies have shown great promise, evidence from human clinical studies is still limited.

Keywords: gut-brain axis; microbiome; diet

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Abstract

Sarcopenia Prevalence and Risk Factors among Residents in Aged Care †

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Abstract: Sarcopenia is defined as the age-related decline in muscle mass and function and is associated with adverse health outcomes and the loss of independence. The aim of this study was to evaluate the prevalence and risk factors of sarcopenia among older adults living in Residential Aged Care (RAC). This cross-sectional study recruited 91 older adults (63% women), with a mean age of 86.0 ± 8.3 years, across three RAC facilities within Auckland, New Zealand. Personal interviews were conducted, and physical measurements were taken by trained researchers. Using the European Working Group on Sarcopenia in Older People criteria, sarcopenia was diagnosed from the assessment of appendicular muscle mass/height^2, using an InBody S10- body composition analyser and a SECA portable stadiometer; grip strength using a JAMAR handheld dynamometer; and physical performance with a 2.4 m gait speed test. Demographic, anthropometric and health data were collected. Malnutrition risk was assessed using the MNA-SF, and depression was assessed using the Geriatric Depression Scale. Most (83%) residents were malnourished or at risk of malnutrition, half (52%) had > five comorbidities and 44% took > seven medications. Overall, 41% of the participants were found to be sarcopenic. Univariate logistic regression found increasing age, lower MNA-SF score, lower percent body fat, higher depressive symptoms and hospital versus rest home level of care were associated with sarcopenia. Multivariate regression analysis showed that only lower body mass index (BMI) (OR = 1.4, 95% CI: 1.1, 1.7, p = 0.003) and lower MNA-SF scores (OR = 1.6, 95% CI: 1.0, 2.4, p = 0.047) were predictive of sarcopenia after controlling for age, level of care, depression and number of medications. Among these older residents, a high prevalence of sarcopenia was observed. Both low BMI and low MNA-SF scores were predictive of sarcopenia. These findings support the need for regular screening to identify the risk of malnutrition and a rationale for effective exercise and dietary interventions in older adults living in RAC.

Keywords: sarcopenia; aged care; malnutrition

Citation: Darroch, P.; O'Brien, W.; Mazahery, H.; Wham, C. Sarcopenia Prevalence and Risk Factors among Residents in Aged Care. *Med. Sci. Forum* **2022**, *9*, 52. https://doi.org/10.3390/msf2022009052

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Abstract

Feeding the Human Superorganism—Food and Diet Quality Are Key to a Healthy Future †

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Abstract: Lowered energy availability (LEA) leading to the female athlete triad or Relative Energy Deficiency in sport are conditions that are becoming increasingly prevalent in athletes. The concept of low energy availability and the accompanied impaired physiological functioning will be discussed. Whilst the male athlete triad will be acknowledged, the increased research availability in women will dominate these talks. How LEA presents and how it is diagnosed will be discussed and the key focus will be the vital role that the dietician plays in diagnosis, management and education. Why this condition is important to athlete health and performance will be covered. How to guide an athlete to maintain an appropriate energy availability that leads to optimised health and performance will also be outlined.

Keywords: LEA; human superorganism

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Abstract

Four-Year Health Outcomes Associated with Nutrition Risk in Community-Living Older Adults in the New Zealand Health, Work and Retirement Study †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Objective: To determine four-year outcomes of community-living older adults identified as being at 'malnutrition risk' in the 2014 Health, Work and Retirement (HWR) study. Design: A longitudinal analysis of the 2014 and 2018 HWR cohort. Setting: New Zealand. Participants: 1471 adults aged 49–87. Nutrition risk was assessed using the validated Seniors in the Community: Risk Evaluation for Eating and Nutrition, abbreviated version (SCREENII-AB) by postal survey. Other measures included demographic, social and health characteristics. Physical and mental functioning and overall health-related quality of life was assessed using the 12-item Short-Form Health Survey (SF-12v2). Depression was assessed using the verified shortened 10-item Center for Epidemiologic Studies Depression Scale (CES-D-10). Social provisions were determined with the 24-item Social Provisions Scale. Alcohol intake was determined by using the Alcohol Use Disorders Identification Test (AUDIT-C). Of the 61.6% of participants that returned both 2014 and 2018 questionnaires, one third (33.9%) of the participants were at nutritional risk (SCREEN II-AB score $\leq$ 38). The direct effects of nutrition risk showed that significant differences between at-risk and not-at-risk groups at baseline remained at follow up. Over time, physical health scores and alcohol use scores were reduced. Mental health improved over time for the not-at-risk group, whilst it remained static for the at-risk group. Time had non-significant interactions and small effects on all other indicators. The distinctions between the at-risk and not-at-risk groups remained the same and were not resolved with the passage of time, the only caveat being mental health. This highlights the importance of screening in primary care for targeted intervention as risk factors remain stable over time.

Keywords: nutrition risk outcomes; New Zealand; older adults; community

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Informed Consent Statement: Informed consent was obtained from all participants involved in the study.

Data Availability Statement: The data presented in this are available upon request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Nutrition of Young Children Living in Households Accessing Food Grants and Foodbanks: Findings from the *Growing Up in New Zealand* Cohort Study †

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Abstract: Good nutrition in early childhood is essential for optimal brain development, growth, learning to eat, and establishing healthy food preferences. Little is known about exposure to food insecurity among young children in Aotearoa New Zealand and the impact of this on child nutrition. This study sought to understand the relationship between household food grant/foodbank use when children were aged 9- and 54-months old and eight indicators of early childhood nutrition. Data were from the *Growing Up in New Zealand* cohort (n = 6032) born in 2009/10. Descriptive and multivariate logistic regression were used. At 9 months of age, 12% of mothers reported using food grants/foodbanks in the past 12-months, decreasing to 8.4% at 54-months. However, these were largely different families. Ethnic inequities were marked: 34.5% of tamariki Māori and 40.3% of Pasifika children experienced food grant/foodbank use at either or both time points. Children living in households accessing food grants/foodbanks were significantly more likely to have poorer nutrition across the eight indicators. After adjustment for differences in household income and size, child ethnicity, mother's age and education, and neighbourhood deprivation, infants whose mothers had made use of special food grants/foodbanks were more likely to have tried sugary drinks (AOR:1.45, $p < 0.01$) and unhealthy foods (AOR:1.44, $p < 0.01$) compared to other infants. At 54-months of age, they were nearly twice as likely to be served a low variety of vegetables (AOR:1.91, $p < 0.01$) compared to other children. In the early 2010s, the use of food grants/foodbanks was common in young families, and ethnic inequities were stark and persistent. Food insecurity was associated with multiple aspects of child nutrition. Policy responses to food insecurity must be made in meaningful partnerships with Māori and Pasifika whānau and communities, and enable sufficient support for families with young children, to ensure all tamariki have the best nutritional start in life.

Keywords: food insecurity; poverty; child nutrition; longitudinal cohort; infant feeding; early childhood

Citation: Gerritsen, S.; D'Souza, A.; Goodsell-Matthews, T.; Paine, S.-J.; Swinburn, B.; Wall, C. Nutrition of Young Children Living in Households Accessing Food Grants and Foodbanks: Findings from the *Growing Up in New Zealand* Cohort Study. *Med. Sci. Forum* **2022**, *9*, 55. https://doi.org/10.3390/msf2022009055

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Institutional Review Board Statement: The Growing Up in New Zealand study was conducted in accordance with the Declaration of Helsinki, and approved by the Health & Disability Ethics Committee, Ministry of Health (NTY0806055).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Access to *Growing Up in New Zealand* data is restricted, with approval granted by the *GUiNZ* Data Access Committee. More information is available from https://www.growingup.co.nz/access-growing-data.

Conflicts of Interest: The authors declare no conflict of interest.

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Abstract

Rescuing the Human Gut Ecosystem: Therapeutic Strategies for the Restoration of Gut Microbial Health in Gastro-Intestinal Disease, a Narrative Literature Review †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: Gastrointestinal illnesses affect an estimated 40% of persons worldwide. From severe inflammation and cancer to disturbances in gut motility and increased food sensitivity, they encompass a broad spectrum of diseases with a range of underlying mechanisms. The recent evidence suggests that disturbances in the gut microbial ecosystem (known as dysbiosis) could be a common and perhaps overlooked underlying factor. Dysbiosis has been shown to occur in a number of gastrointestinal conditions. Therapeutic strategies aimed at correcting dysbiosis and restoring microbial balance, utilising dietary therapies, probiotics, prebiotics, and fermented foods, are a current source of research interest. This review objective was to investigate the potential to restore gastrointestinal wellbeing, utilising non-pharmaceutical interventions that favourably alter microbial equilibrium. This was discussed in the context of a selection of common gastrointestinal conditions—irritable bowel syndrome, inflammatory bowel disease, colo-rectal cancer, post-surgical complications, constipation, helicobacter pylori infection, and proton pump inhibitor sequelae. The literature was located using the Ovid Medline Database focusing on three categories—(a) gastrointestinal disorders, (b) dietary therapy treatment, nutraceutical therapies, and functional food therapies, (c) gut microbiome alterations and effects. After exclusion criteria were applied, there was a final total of 32 relevant studies. Most explored the use of probiotic, and prebiotic supplements, with a few focusing on fermented foods, plant foods, and dietary therapies. The presented data revealed an informative research snapshot containing a rich resource for those interested in applying the benefits of these strategies. It also provided a greater knowledge base regarding the microbiota varieties involved in both beneficial and pathological activities in the gut. While the causation of dysbiosis and its relation to disease has yet to be demonstrated, continued research in these areas will provide a crucial evidence base that may yield substantive and constructive results.

Keywords: gastrointestinal microbiome; gastrointestinal diseases; nutrition therapy

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Abstract

Northcote Urban Development Programme: Community-Identified Food, Activity and Socialisation Opportunities †

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† Presented at the Nutrition Society of New Zealand Annual Conference, Online, 2–3 December 2021.

Abstract: The Northcote area is undergoing major urban regeneration and the diverse community residents there are experiencing significant changes that may affect wellbeing. It is important that the community identifies social and environmental changes they perceive would be of benefit. This strengths-based community-led study sought to identify how Northcote's Development programme could benefit the wellbeing of the Northcote Central community. Two focus groups were thematically analysed, and a written survey was completed by 27 Northcote residents. In this case, 22 residents lived in Kāinga Ora (n = 14) and private rental homes (n = 8). Participants were older than 45 years, and identified as Māori, Pacific, and NZ-European. The need for more and different kinds of spaces for community use were identified by the focus groups and the survey. Half of the participants wanted more outdoor and green community space. Some Kāinga Ora participants shared their regrets about the demolition of the previous social housing stock and their shift into newly developed more intensive housing. Previous homes had more space inside and outside space which supported the diverse needs of whanau. The need for outdoor spaces suitable for gardening particularly vegetables, games, living, and hangi was identified. Overall participants believed that their health and wellbeing would be improved with more physical activity (75%), consuming more fresh and whole foods (52%), and opportunities for better relationships with family, friends and neighbours (37%). Urban design including more shared spaces could have a significant positive impact on the wellbeing of residents. The Te Ara Awataha greenway project aims to form a 1.5km network of parks, public spaces and quiet streets and may help the Northcote community to be able to access more outdoor spaces for physical activity and more community gardening that would help address food security.

Keywords: Northcote; wellbeing; space; urban regeneration; food security

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