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Engaging student dietitians in 'sustainability principles' throughout the curriculum: an exploratory pedagogic workshop

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Public Health

Applicability of the Mediterranean diet score to a South Asian population in the UK

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Background: South Asian populations are at higher risk of cardiovascular disease (CVD) in comparison to other ethnicities, showing an earlier onset of coronary heart disease and stroke^(1,2). Following a Mediterranean diet (MD) is encouraged as a cardioprotective eating pattern⁽³⁾, and is characterised by a higher intake of fruit, vegetables, and legumes, and lower intake of meat and dairy. Greater adherence to a MD may be particularly important in individuals at heightened CVD risk such as the South Asian population. Accurately determining adherence to this eating pattern is an important step in facilitating uptake, and several scoring tools are available to measure adherence. However, whilst such tools may indicate a level of adherence to the MD, population and cultural differences in food items may mean that such tools are not applicable to all groups. The aim of this study was to examine the adherence to a MD and applicability of a MD score (MDS) tool in a South Asian population living in the UK.

Method: Participants were recruited from local community settings in central Manchester, UK. Those meeting entry criteria of South Asian ethnicity and absence of overt cardiovascular disease were assessed for adherence to the MD using a validated MDS tool⁽⁴⁾. Overall dietary intake was assessed using a 3-day food diary. Participants were split by tertile of MDS and intakes of food and nutrients assessed across groups to evaluate applicability of the MDS. Analyses were repeated stratified by sex. Data were analysed using IBMTM SPSS v23. Mean MDS for men and women was compared using independent samples t-Test. Nutrient and food group intake were compared using a one-way ANOVA. A *P* value of <0.05 was regarded as significant. All procedures were approved by the research ethics committee at Manchester Metropolitan University.

Results: Of the 108 screened individuals, 90 met the inclusion criteria. 50 people completed the dietary questionnaires and were included in analyses (20 men and 30 women). Mean MDS for the group was 26.3 ± 6.3 . MDS did not differ significantly between men and women (24.5 ± 7.1 vs. 27.7 ± 5.4 , respectively, *p* = 0.577). A greater number of servings of fruit, vegetables, and legumes were found in the highest tertile of

MDS vs. the lowest, and fewer servings of full-fat dairy, red meat and meat products, and poultry (*p* < 0.001). Comparing highest and lowest tertiles of MDS, women in the highest tertile had significantly greater intakes of fruit, vegetables, legumes (all *p* < 0.001), and less full-fat dairy products (*p* = 0.015). Men in the highest tertile reported greater consumption of fruit (*p* < 0.001), greater use of olive oil in cooking (*p* = 0.012), and less red meat (*p* = 0.008) and poultry (*p* = 0.001) intakes. Overall, the MDS was able to identify individuals with increased consumption of cardioprotective foods and provided a means of assessing adherence to a MD. However, individuals in the highest tertile of score did not routinely show increased consumption of cardioprotective nutrients such as mono- and polyunsaturated fats potentially showing limited applicability of the tool.

Discussion: The food intakes of the South Asian population with the highest adherence to the MD in this study reflected the traditional MD pattern of increased fruit, vegetables, and legumes, and lower intake of meat and dairy, although there were differences by sex in the foods consumed by those with the highest adherence. Greater adherence to the MD is typically associated with a better cardioprotective nutrient profile⁽⁴⁾, however in this study population there were no differences in nutrient intake by MDS tertile and therefore may suggest a limited applicability of the MDS tool.

Conclusion: This study suggests a MDS tool may need to be sex-specific and adjusted to account for cultural differences in sources of nutrients when used in South Asian populations.

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An investigation of the sugar content of children's breakfast cereals, branded versus budget

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Background: There is an increasing amount of evidence of the harmful effects of high sugar intakes and recent guidelines have halved recommendations for free sugars intake to 5% of dietary energy^(1,2). Children aged 4–10 years in England consume more than 11 g of sugar at breakfast; sugary breakfast cereals are one of the main sources of sugar at this time⁽³⁾. The aim of this study is to investigate whether cost is

associated with the sugar content of children's breakfast cereals in the UK.

Methods: A quantitative approach was used to undertake the research. Eight, regular sized, branded children's breakfast cereals and their budget counterparts were selected from six supermarkets with the largest shares of sales in England⁽⁴⁾. Supermarket own brand products were used to represent budget options as there were few 'value' range children's cereals available to sample from. The data were collected online and in supermarkets in Coventry where online information was not available. Cereals targeted towards children were identified using criteria described by Schwarz et al.⁽⁵⁾ which include use of cartoon characters or other characteristics that would appeal to children. Price (pence) and quantity of sugar (grams) per 30 g portion of cereal were recorded. Data were analysed using an independent samples t- test. Ethical approval was gained from the HLS Faculty Ethics Committee at Coventry University.

Results: The mean sugar content of branded cereal, 6.8 g (SD = 3.38) and budget cereal, 6.2 g (SD = 3.10) per 30 g portion were not significantly different, $t(54) = 0.5$, $p = 0.647$. Sugar content of the cereals sampled ranged from 0.4 g to 11.0 g per 30 g serving. A significant difference was found between mean cost of branded and budget cereal, 14p (SD 3.77) and 7p (SD 2.08) per 30 g portion respectively, $t(7.7) = 5.3$, $p < 0.001$, showing branded cereals to cost 50% more than budget.

Discussion: The findings of this study suggest cost is not associated with the sugar content of children's breakfast cereals in the UK. These findings are consistent with previous research which found the nutritional content of branded and budget products to be similar, although sugar content was not investigated⁽⁶⁾. This study indicated a 30 g portion of children's breakfast cereals to be providing an average of 6.5 g of sugar, equivalent to a third of the daily sugar allowance for 4–6 year olds (19 g sugar per day) and a quarter of that for 7–10 year olds (24 g sugar per day)⁽⁷⁾.

Conclusion: Dietitians and health promoters should be aware that branded and budget varieties of children's breakfast cereals contain similar amounts of sugar and may be contributing a significant source of sugar to the diets of young consumers; this may be an area to target in future campaigns to reduce children's sugar intake. Further research is indicated to investigate the full nutrient profile of branded and budget children's cereals and other low cost foods to help those supporting clients on low incomes and inform future public health programmes.

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Awareness and use of nutrition information during online grocery shopping for "healthy" foods: a think aloud qualitative analysis with older adults

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Background: Online grocery shopping in the UK is a growth retail channel, which for older adults has the potential to support evaluation of and access to healthy foods. Nutrition information (NI) became mandatory for foods sold online in 2016, yet consumer perception and use is not known. This research aimed to investigate older adult awareness and perceptions of NI in online supermarket websites when finding "healthy" foods.

Methods: A convenience sample of eight regular online supermarket shoppers (aged 50–66 yrs) were interviewed in their own homes, following University ethical approval. Participants were asked to "think-aloud" whilst using their preferred supermarket website to perform tasks. Based on previous in-store research⁽¹⁾ aiming to explore engagement with product health and NI, tasks included asking participants to find what they perceived to be the "healthiest" soup and a "healthy" lasagne product. Verbal data were transcribed together with analysis of corresponding computer screen recordings. Open coding was conducted after multiple transcript readings, with rigour enhanced by an independent researcher coding a subset of transcripts. Following agreement between coders, emerging themes were identified.

Results: Only one participant used the website's "Healthy Options" menu option to produce product listings, whilst others (n = 4) referred to this method but were not able to locate it. The majority (n = 7) used their own knowledge and

assumptions together with various product information to locate “healthy” products including: Product type (i.e. “fresh, rather than tinned”, vegetarian, organic), brand (i.e. “healthy lifestyle” or weight management brand), and price (“I’d go for more expensive”). Four participants attempted to locate the product’s NI, of which, three stated they had not done so before. All four were unfamiliar with locating or using the NI table, appearing at the bottom of the product “full details” window. Attempts to compare products based on NI were mentioned (n = 3) but not performed due to unfamiliarity with this functionality. Where displayed on the product photograph, front of pack nutrition (traffic light) information was accessed and used.

(Views “Full Details”) *So it doesn’t give you any salt content or sugar content so...erm ..apart from going into store and reading the label...’cos I do go into store as well I don’t just shop online. So if there’s something in particular I might just search it out and look on the packaging ‘cos it doesn’t tell you there. (Hovers over product photograph) It’s showing you the label a little bit. You can just make it out...that there are four green and not reds. I think that’s the best you’re going to get I think, online”.* (Female regular online shopper, 55 yrs old)

Habitually using saved shopping lists and visiting store to evaluate products were explanations given for unfamiliarity with NI and finding “healthy” products online.

Discussion: Finding “healthy options” in online supermarket websites was a challenge for most participants despite information provision. Nutrition knowledge of participants, known to influence NI engagement, was not included here. Low awareness and unfamiliarity with NI found here reflects recent quantitative and qualitative research exploring consumer behaviour in online supermarkets which suggested NI was viewed much less⁽²⁾ than other “up-front” product information, and the perceived “time saving” of this shopping channel negated the need to examine any extra product information⁽³⁾.

Conclusion: Despite provision of nutrition information on supermarket websites, older-adult consumer awareness and engagement with NI appears low. Further exploration of different consumer types is warranted. Supporting use of NI in online supermarkets may help consumers’ make healthier food choices.

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Engaging student dietitians in ‘sustainability principles’ throughout the curriculum: an exploratory pedagogic workshop

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Background: Prevailing global food systems are implicated in the rising burden of obesity and non-communicable disease. Despite suggestions of opportunities for dietitians in this emerging area (1), debates remain about the precise nature of the role they should play in addressing such wider ‘ecological’ food system issues (2). This is confirmed by the British Dietetic Association’s historical policy statement recognising the need for dietitians to develop skills that ‘align health and sustainability issues around food’ (3). As the future of the dietetic profession, student voices are important in this emerging topic. The aim of this project was to gather dietetic students’ views on ‘sustainability principles’ broadly and where they should fit within the curriculum.

Methods: A participatory student workshop with n = 18 conveniently sampled level 6 dietetic students at Plymouth University was run in October 2016. It consisted of four ‘sustainability’ strands: (i) delivery (Public Health Nutrition module) of key learning materials; (ii) interactive survey questions on definitional aspects; (iii) interactive group work activity; and (iv) plenary discussion. After an introduction by the module lead, surveys were distributed to students for completion at set stages throughout topic delivery. Participants were then divided up into small groups to discuss the challenges for and role of dietitians in different workplace settings: acute, primary care, public health and media. Results of these were then fed back in plenary discussions. All discussions were captured on flipchart paper, and audio-recorded for later transcription. Analyses are ongoing using inductive content analysis (4). Ethical approval was obtained by the University of Plymouth Faculty Research Ethics Committee, reference number: 15/16–611

Results: The interactive workshop illustrated breadth and depth of perceptions around ‘sustainability principles’ for student dietitians and categories emerged as follows:

1. Understanding of ‘sustainable eating’ - an awareness of ethical dimensions and link between health and environment e.g. “Sustainable eating is eating for the future” (student 1)
2. Dietitian’s perceived role - the challenges and practicalities of incorporating sustainability into dietary advice in different settings e.g. “liaising with [hospital] catering team and minimising food/supplement waste” (student 10)
3. Means of engaging with the topic - extending remit of evidence appraisal to learn more about relevant issues e.g. “To learn about different ways of promoting sustainable eating so that it can be put into practical (non-preaching) advice to the public...” (student 7)

4. Modifying dietetic curricula to incorporate more education on sustainability: “it should just be throughout every subject ... so in the ‘Dietetics in Practice’ module, when we’re talking about practical food advice, get us thinking about sustainability, e.g. less meat “ (student 5)

Discussion: This exploratory pedagogic project shows how dietetic students perceive their potential role as advisers and educators on sustainable eating and wider food system issues, which aligns with general UK student views (5). Dietetic students feel that educational curricula could be modified and further aligned around sustainability principles. The need for more embedded education for sustainability is supported in the nursing literature (6), so more robust research is now needed to consolidate these findings for dietitians.

Conclusion: These preliminary findings provide insight into the emerging topic of sustainability principles for student dietitians. Consideration should be given to curriculum development that effectively embeds this topic, so student dietitians can be fully prepared for their future practice.

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A cross-sectional survey comparing the online price of healthier pre-packaged food products with less healthy alternatives using the Food Standard Agency’s traffic-light rating

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Background: Having a healthy diet is important to promote health and prevent chronic disease. The perception that healthier foods are more expensive can present a barrier to making

healthful dietary choices; particularly among those on low income⁽¹⁾. Conflicting evidence exists concerning the cost of healthier vs less healthy foods^(2–4). This study aimed to investigate the price difference between healthier and less healthy equivalent foods using the cheapest available online price and the Food Standard Agency (FSA) front-of-package traffic-light rating⁽⁵⁾ to define nutritional quality.

Method: The Department for Environmental, Food and Rural Affairs⁽⁶⁾ household food purchases dataset was used to identify a convenient sample of 64 commonly eaten UK foods, representing 4 Eatwell Guide (2016) food groups (carbohydrates, fruit & vegetables, protein sources and dairy). For each food, FSA⁽⁵⁾ traffic-light colours for total fat, saturated fat, sugar and salt content (g/100 g) were assigned an integer (red = 1, amber = 2, green = 3), the sum of which yielded that food’s Health Score (range 4–12; higher score denotes a healthier food of higher nutritional quality). Using the Health Score and fibre content (g/100 g), 32 foods were categorised as healthier (e.g. granary bread) and 32 foods (equivalent alternatives from the same food group) as less healthy (e.g. white bread). Lowest available online prices (£/100 g) across 5 supermarkets were collected from the price comparison website mySupermarket.co.uk during March/April 2017. SPSS (v24) was used to calculate total and mean price (£/100 g) of the healthier vs less healthy foods and Wilcoxon signed ranks to test for differences between groups. Coventry University granted ethical approval.

Results: Total price of the 32 healthier foods was £11.44 vs £8.51 for the 32 less healthy foods ($Z = -2.233$, $p = 0.026$). Overall mean (\pm SD) price of the healthier vs less healthy food items was £0.36/100 g (± 0.25) and £0.27/100 g (± 0.21), respectively ($p = 0.029$); price differences for each of the 4 Eatwell food groups did not reach statistical significance. There was a notable difference in mean (\pm SD) Health Score for the healthier (10.6 ± 1.6) vs less healthy (9.1 ± 1.8) foods ($Z = -4.340$, $p < 0.001$) and also for each of the 4 Eatwell food groups; carbohydrates (11.1 ± 1.1 vs 9.5 ± 2.5 , $Z = -2.041$, $p = 0.041$), fruit & veg (11.5 ± 0.53 vs 10.4 ± 0.52 , $Z = -2.460$, $p = 0.014$), protein sources (9.8 ± 1.5 vs 8.0 ± 1.4 , $Z = -2.392$, $p = 0.017$) and dairy (10.1 ± 2.2 vs 8.5 ± 1.4 , $Z = -2.032$, $p = 0.042$).

Discussion: We examined a varied sample of UK pre-packaged food products, including many dietary staples. Our findings did not concur with those of Snowdon⁽³⁾ or Jones and Monsivais⁽⁴⁾ who found healthier foods mostly cost the same as less healthy ones⁽³⁾ or that healthy foods are less expensive⁽⁴⁾ when prices are reported using weight metrics. Our results do support those of Jones, Conklin, Suhrcke et al. who similarly reported that healthier foods are more expensive although these researchers used the metric energy per 100 g⁽²⁾.

Conclusion: Foods identified as being healthier when categorised using the FSA⁽⁴⁾ traffic-light rating and fibre content are more expensive than their less healthy counterparts. Whilst dietitians can utilise their skills to support those on low

income to make affordable healthier food choices, there are broader implications of these findings for public health policy makers to consider.

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Impact of diabetes and metformin use on B-vitamin status and cognitive outcomes in older adults: evidence from the TUDA cohort study

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Background: Diabetes is estimated to affect 422 million people worldwide, and this is predicted to double by 2035⁽¹⁾. Diabetes and the use of metformin has been associated with lower status of B12, but no study to date has considered the relationship between diabetes and metformin with all the relevant B-vitamins involved in one-carbon metabolism. This is relevant, especially in older age, because low status of vitamin B12, folate and the metabolically related B vitamins (vitamin B6 and riboflavin) have been independently linked with cognitive dysfunction⁽²⁾, an emerging co-morbidity of diabetes⁽³⁾. The aim of this investigation was to investigate the impact of hyperglycaemia and

metformin use on biomarker status of the four relevant B-vitamins and on cognitive outcomes in older adults.

Methods: Community-dwelling older participants (74.0 ± 8.3 years, n = 4860) without dementia, were recruited from Ireland to the Trinity, Ulster, Department of Agriculture (TUDA) Cohort Study in 2008–2012. Participants were classified as: normoglycaemic (n = 3519) or hyperglycaemic (n = 1341), based on glycosylated haemoglobin (HbA_{1c}) ≥ 6.0% (42 mmol/mol), either with (n = 315) or without (n = 1026) metformin treatment. Recruitment and sampling details are described elsewhere⁽⁴⁾ and ethical approval was obtained from the Office for Research Ethics Committee Northern Ireland (ORECNI). Cognitive performance was assessed using the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS)⁽⁵⁾ and the Frontal Assessment Battery (FAB)⁽⁶⁾. Binary logistic regression analyses were conducted between B-vitamin status or cognitive dysfunction and hyperglycaemia with covariate adjustment for age (years), gender, BMI, creatinine, B-vitamin supplement usage, and relevant drug use (proton pump inhibitors, H₂-antagonists and other anti-diabetic drugs) using SPSS software (Version 22.0, SPSS UK Ltd, Chersey, UK).

Results: Hyperglycaemia was associated with a higher risk of vitamin B6 deficiency (plasma pyridoxal 5-phosphate <30.0 nmol/L; odds ratio: 1.25 [95% CI 1.02–1.54]). Metformin use exacerbated this risk (1.68 [1.19–2.39]) and was also associated with an increased risk of vitamin B12 deficiency (serum B12 ≤ 148 pmol/L; 1.67 [1.16–2.40]), an effect not seen in hyperglycaemia without metformin use. Neither hyperglycaemia nor metformin was significantly associated with folate or riboflavin status. Compared to normoglycaemic controls, the risk of cognitive dysfunction was increased in hyperglycaemia especially with metformin, using the Frontal Assessment Battery (1.44 [1.05–1.99]) or the Repeatable Battery for Assessment of Neuropsychological Status (1.41 [1.00–1.99]) among participants 60–75 years.

Discussion: These results show that older adults with or at-risk of diabetes are at a significantly higher risk of B-vitamin deficiency (i.e. vitamin B6), especially if taking metformin (i.e. vitamins B6 and B12), and have poorer cognitive health.

Conclusion: Fortified foods such as breakfast cereals provide a bioavailable source of B-vitamins and may be beneficial for maintaining better cognitive health in older people with diabetes, but this requires confirmation in an intervention trial.

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