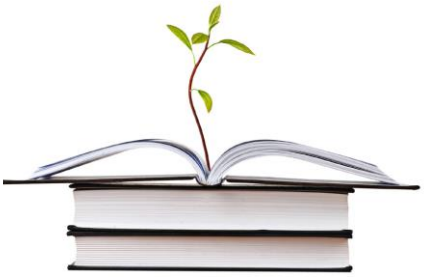
BDA RESEARCH



BDA Research Symposium
Wednesday 2 December 2020, Virtual

Abstract Booklet 2020

BDA events.
create.excite.innovate.

#BDAResearch

Contents Page

Clinical Nutrition

Return to contents page

Impact of Dietetic input on patient nutritional outcomes in the falls pathway.

H. Beagan, R. Lander, J. James, K. Greig, J. Kingsley.
Sheffield Teaching Hospitals, Northern General Hospital, Sheffield, England, S5 7AU.

Corresponding Author: Helen Beagan

Background: An estimated 220,160 falls related hospital admissions occur in patients aged 65 years and over annually.[1] Dietitians have a central role in providing expert nutritional advice to identify and treat malnutrition. Malnutrition, resulting in low body mass index and low hand grip, may predict risk of falls and fracture. [2] Vitamin D has an important role in bone strength, muscle strength and function. Risk of poor musculoskeletal health increases at a serum 25 hydroxyvitamin D level less than 25nmol/l. Supplementation of vitamin D should be considered in high risk populations including those over 65 years, persons who are frail or housebound [3] Limited provisions of community dietetic services in this large UK city means that some patients cannot access expert dietetic intervention. This service evaluation aims to review dietetic impact on patient nutritional outcomes in the falls pathway.

Methods: A dietitian was seconded into the community falls pathway for four months. The service was offered to the south and east sectors of the city only, due to time constraints for delivery of staff education, clinical capacity and to ensure visibility in the MDT. This MDT consisted of a consultant geriatrician, nurses, physiotherapists, therapy assistants and occupational therapists. These professionals referred patients identified with a Malnutrition Universal Screening Tool (MUST) score of 1 or above and who had at least one fall in the last 12 months, for dietetic assessment. A home visit service was provided by the dietitian. The dietitian actively participated in MDT meetings to engage the team. Patient anthropometrics that were collected included body weight, Body Mass Index (BMI) and hand grip strength. Vitamin D status for each patient was also considered.

Results: Twenty-five patients referred to the dietitian were included in analysis. Ten patients were excluded, including those who died, were admitted to hospital, declined follow up or patients who required only one assessment. Average MUST score on referral was 2 (high risk). Following dietetic input, seventy-two percent of patients gained weight (mean 3% weight gain). Ninety-two percent of patients maintained or increased handgrip strength (mean 14% increase). Eighty percent of patients had an increase in Body Mass Index (BMI) (mean 3% increase). Vitamin D status was available for 56% of patients. The dietitian identified 14% of these were deficient in vitamin D (levels below 25nmol/l) and required high dose vitamin D replacement therapy. 21% had levels below 50nmol/l (low vitamin D) and supplementation was requested from the GP.

Discussion: Dietetic input improved anthropometric outcomes in most patients referred to the dietitian, potentially influencing their risk of recurrent falls.[2] Input helped to identify and recommend treatment for patients who were vitamin D deficient. Longer data collection is required to understand the impact of dietetic involvement on falls incidence**.** Review of admissions data in the 6-12 months post intervention would be useful to understand the impact of dietetic impact on falls related hospital admissions Furthermore, due to onset of COVID-19, final reviews for some patients were completed remotely, relying on self-reported weights, which may reduce accuracy. There was also a small sample size due to the short term funding for the secondment.

Conclusion: This evaluation suggests that a dietitian in the falls pathway can help identify malnutrition and improve patient nutritional outcomes.

References:

1. Public Health England (2020). *Falls: applying all our health*. Available at: https://www.gov.uk/government/publications/falls-applying-all-our-health/falls-applying-all-our-health (Accessed 20.5.2020).
2. Balogun, S., Winzenberg, T., Wills, K. *et al*., (2017). Prospective associations of low muscle mass and function with 10-year falls risk, incident fracture and mortality in community-dwelling older adults. *Journal of nutrition, health & aging*, *21*(7), pp.843-848.
3. NICE (2014) NICE (2018). *Vitamin D deficiency in adults - treatment and prevention.* Available at https://cks.nice.org.uk/vitamin-d-deficiency-in-adults-treatment-and-prevention (Accessed 10.10.2020).

Feasibility of standardising the documentation for the nutritional monitoring and enteral feeding tube care for people in care homes.

H. Beagan,[1] J. Murphy,[2] R. Marsh, [2] K. Evans, [2] C. Howard, [2] K. Hodgson, [2] G. Simpson, [1] M. Fee, [1] S. Stenson, [2] M Memmott- Richardson, [2] R. Tatton-Kelly, [2] J. Green, [2] J. Franklin [2]. S. White. [1]

1. Care Home working group, Dietetic Department, Sheffield Teaching Hospitals (STH) Northern General Hospital, Herries Road, Sheffield, England, S5 7AU.
2. Teesside University (TU), Southfield Road, Middlesbrough, TS1 BX

Corresponding Author: Helen Beagan

Background: Many people on Home Enteral Feeding (HEF) require care home placement. An audit in 2018, of patient documentation for 82 patients receiving enteral feeding, identified that care standards were not being met.[1] Only 68% of patients had their Body Mass Index (BMI) calculated and percentage weight loss was recorded in just 10% of cases. Tube and stoma care were not always recorded. Effective nutritional monitoring and enteral feeding tube care is essential to reduce the incidence of complications and achieve positive nutritional and clinical outcomes.[2,3] The project aimed to evaluate the introduction of standardised documentation in 2019 compared to practice in 2018 and to assess nurse acceptance of the standardised documentation.

Methods: A PDSA (Plan, Do, Study, Act) model for improvement was adopted. Standardised documentation was co-designed with stakeholders, including care home managers, care home nurses, dietitians and enteral feeding nurses.[2] This was piloted for one month with 23 patients on enteral feeding in three care homes. The care homes selected had larger numbers of patients on enteral feeding. Like in 2018, the completion of the new documentation was audited against local and national standards. These standards highlight the recommended care of enteral feeding tubes and effective nutritional monitoring practice.[2, 3] 100% compliance represents the gold standard. A questionnaire was distributed to permanent nurses, experienced in using both old and new documentation, exploring attitudes towards the standardised documentation. This included Likert scale questions evaluating the effectiveness of the documentation in supporting improvements in the delivery of evidenced based practice (EBP) and the influence of the documentation on time management. It included open questions for suggested improvements. The project was registered as a service evaluation with STU and STH. Ethical approval was not required.

Results: In the three care homes, comparing results to 2018, BMI and percentage weight loss documentation improved following standardisation. BMI was calculated for 78% of patients compared to 48% in 2018. Similarly, 74% had a documented percentage weight loss compared to 0% pre-service improvement. 100% of patients had an enteral feeding plan, balloon water changes and enteral tube ancillary replacement documented. 58% of nurses (n=7) returned the questionnaire. Staff questionnaires identified that 100% agreed or strongly agreed that standardised documentation might support care agency nurses to deliver standard care. 86% agreed that this documentation would support delivery of EBP. However, 57% disagreed that this method was preferable to previous record keeping or reduced documentation time. Some staff suggested this was possibly due to staff duplicating records in old notes.

Discussion: The results suggest that standardisation improves adherence to documentation standards. Despite a high proportion of staff preferring previous documentation methods, compliance with documentation was increased when standardised. This suggests that although some staff resisted the change in documentation, standardisation enhances recording of BMI and weight loss, thus enabling improved patient care. Future work will involve disseminating findings to stakeholders and amending the documentation. The documentation will then be implemented in all care homes in the locality for one year and re-audited.

Conclusion: This pilot evaluation suggests that standardisation may improve documentation standards for patients on enteral feeding and the importance of considering staff attitudes to ensure effectiveness of any service improvement before embedding in practice.

References:

1. Beagan, H., Murphy, R., Marsh, R., *et al*., (2020). A time to act in the PDSA cycle. A service improvement initiative to improve the monitoring of patients on enteral feeding living in care homes*. Clin Nutrition ESPEN* **35**: 244-245.

2. National Institute of Clinical Excellence (NICE) (2006). *Nutrition Support for Adults. Oral nutrition support, enteral tube feeding and parenteral nutrition*). Available: http://www.nice.org.uk/CG32.(Accessed 25.5.2018).

3. National Nurse Nutrition Group (NNNG) (2016).[PDF] *Changing of a Balloon Gastrostomy Tube (BGT) into the Stomach for Adults and Children. Available www.nnng.org.uk/wp content/uploads/2016/06/Good-practice-changing-a-gastrostomy-tube-Final-June-20161.pdf* (Accessed 25.9.2020)

A cross-sectional study investigating the relationship between protein intake and outcomes related to functional status in community-dwelling older adults

C Brennan[1], C Baldwin[2], C E Weekes[3]
[2] Department of Nutrition and Dietetics, King's College London, 150 Stamford Street, London, SE1 9NH, [3]Department of Nutrition and Dietetics, Guy's & St Thomas' NHS Foundation Trust, London SE1 7EH

Corresponding Author: Ciara Brennan, ciara.brennan@kcl.ac.uk

Background: Adequate dietary protein intake is important for the maintenance of muscle mass and strength in older adults(1). The aim of this study was to investigate the relationship between dietary protein intake and outcomes related to functional status in community-dwelling older adults.
Methods: A secondary analysis of participants from the NUTRICOM cohort study (NIHR portfolio: 19045), which recruited 570 community-dwelling people aged ≥ 60 years from four different care settings: hospital discharge, intermediate care, general practice (GP), and the voluntary sector (VS). The NUTRICOM study was granted ethical approval and consent was obtained from all participants for the use of their data for secondary analysis. Participants were assessed for nutritional status, functional status, and dietary intake at baseline, 3, 6- and 12-months during home visits. Participants from the GP and VS, with an accessible, complete, baseline food diary were eligible for inclusion. Dietary protein intake was assessed using the multiple-pass 24-hour dietary recall method and dietary analyses were conducted using Dietplan (Forestfield software, version 7.00). Data were analysed using IBM SPSS 26. The association between protein intake (quantity, source, and distribution throughout the day) and the outcomes of frailty, sarcopenia, handgrip strength, quality of life and activities of daily living (ADL), were examined using logistic regression analysis, adjusting for potential confounders.
Results: 72 participants were recruited, thirty-six (50%) of which were recruited from the GP, with the remainder recruited from the VS. The study population had a median age of 71.5 years, median BMI of 26kg/m^2 and 68% were female. Fifty-five participants achieved the UK reference nutrient intake (RNI) of 0.75g/kg of protein per day(2). In the sub-set of participants aged 65 years and over, 30 participants (56%) achieved the ESPEN recommendation of 1.0g/kg/day of protein(1). An intake below the UK RNI was associated with poor grip strength, sarcopenia, and a reduced QoL (OR= 6.86, p = .003; OR = 5.88, p = .006; OR = 7.81, p = .004 respectively). Despite recent recommendations by expert groups to increase the protein requirement in older adults, no differences in outcomes were found between those with an intake above or below 1.0g/kg/day (1). Protein intake (g/kg) and intake of animal protein (g/day) were inversely associated with handgrip strength after adjusting for age, gender, comorbidity score and nutrition risk status (OR = 0.06, p = .01; OR = 0.96, p = .019 respectively). No association was found between the dietary protein distribution across the day and any of the outcomes assessed.
Discussion: This study suggests that an inadequate protein intake is associated with poor grip strength, sarcopenia, and a reduced quality of life. These results corroborate findings from a recent descriptive study in the UK(3), suggesting that 23-35% of UK older adults are not meeting the UK RNI for protein intake and it supports findings from a recent review(4) that the total quantity of protein consumed over the day is more important than how its consumption is distributed across meals.
Conclusions: The quantity and source of protein consumed are associated with grip strength and other outcomes related to functional status in older adults. Further research should be focused on determining the optimal protein intake required to delay functional decline in older adults.

References:

1. Bauer J, Biolo G, Cederholm T, et al. Evidence-Based Recommendations for Optimal Dietary Protein Intake in Older People: A Position Paper From the PROT-AGE Study Group. J Am Med Dir Assoc. 2013;14:542-59.
2. Department of Health. Dietary reference values for food energy and nutrients for the United Kingdom. Report of the Panel on Dietary Reference Values of the Committee on Medical Aspects of Food Policy. Rep Health Soc Subj (Lond). 1991;41:1-210.
3. Morris S, Cater JD, Green MA, et al. Inadequacy of Protein Intake in Older UK Adults. Geriatrics. 2020;5.
4. Baum JI, Kim IY, Wolfe RR. Protein Consumption and the Elderly: What Is the Optimal Level of Intake? Nutrients. 2016;8.

Bridles: Does position and movement compromise their effectiveness; a quality improvement project

K Campbell, F Greer. Dietetic Department, Southmead Hospital, Bristol BS10 5NB. Neurosurgical Dietitians.

Corresponding Author: Kathryn Campbell, Kathryn.Campbell@nbt.nhs.uk

Background: In 2019 a policy was introduced within a Bristol NHS Trust intensive care unit (ICU) outlining that all patients being fed by nasogastric tube (NGT) have a bridle inserted[(1)]. Consequently, this led to an increase in bridles stepping down from ICU to specific wards. It was observed on stepdown that the position of the bridles vary greatly when compared to manufactures guide [(2)] which posed the question, are they placed correctly or do they move whilst in situ? The aim of this observational quality improvement project was to assess if bridles were inserted correctly, if they moved or stretched and to assess whether their effectiveness is compromised the longer they are in situ.

Method: All new admissions to ICU requiring NGT and bridle insertion on Monday- Friday were included. These patients were referred to RD via the standard route and the position of bridle was measured by the authors from base of septum to bridle clip using the same tape measure each time. This was repeated every 3 days until bridle was removed/ no longer indicated. Data was recorded in an Excel spreadsheet using simple formulas. All patients included had the AMT Pro bridle insitu. Any NGT and bridle inserted more than 24hours before the first bridle measurement could be obtained were excluded. Any bridles placed by RD were excluded, as it was assumed that these might unfairly bias the results. Subsequently 26 patients were included within this project. No ethical approval was needed as standard insertion and care of bridle was provided.

Results: 15 (58%) bridles were >1.5cm away from the nose on day 0 and with increasing time every bridle that remained in situ moved further away from the nose as shown in Table 1. 14 (54%) bridles moved between 1-2.7cm towards or away from the septum. Only 3 (12%) bridles were pulled out by patients. All of these were inserted with the bridle >2.5cm from the septum and remained so until the tube was pulled out.

Table 1: Range of bridle lengths every 3 days

Day	Length of bridle from septum	Number of bridles still insitu	N (%) of bridles <1cm from septum	N (%)of bridles 1-1.5cm from septum	N (%) of bridles >1.5cm from septum
0	0.5- 4.3cm	26	3 (12)	8 (30)	15 (58)
2	0.0- 3.8cm	23	1 (4)	7 (30)	15 (66)
5	0.0- 3.5cm	18	2 (11)	4 (22)	12 (67)
8	0.4- 3.8cm	15	3 (20)	1 (7)	11 (73)
11	0.0- 3.6cm	9	2 (22)	1 (11)	6 (67)
14	0.0- 2.5cm	6	1 (16.5)	1 (16.5)	4 (67)
17	0.3- 3.3cm	6	1 (17)	0 (0)	5 (83)
20	1.3- 3.3cm	5	0 (0)	1 (20)	4 (80)
23	1.2- 4.0cm	4	0 (0)	1 (25)	3 (75)

Discussion: Only a small proportion of tubes were lost through patient pulling so is unclear if the incorrect position and/ or movement reduced effectiveness of the bridle. It is also unclear if initial incorrect position affects movement whilst in situ. The high number of bridles positioned >1cm from septum could have safety implications (e.g. pressure injury/ choking).

Conclusion: The majority of bridles were not being inserted correctly and move with increasing time in situ. More education, training and quality improvement projects are needed to ensure bridles are placed and managed correctly.

References:

1. Taylor S. Enteral nutrition Policy (Adult and Paediatric). Southmead Hospital Bristol; North Bristol trust. April 2018. Report no.: CP6a.
2. GBUK Enteral Ltd. AMT Bridle pocket guide. Yorkshire: Applied Medical Technology Inc; 2016.

A multi-disciplinary, national survey for long-term coeliac disease management in the UK.

C Davis[1] , M Brookes[2] & C Andrews[3] & M Lomer[1]
[1] Department of Nutrition and Dietetics, King's College London, Franklin Wilkins Building, 150 Stamford Street, London, SE1 9NH**.** [2] Gastroenterology Unit, Royal Wolverhampton NHS Trust, Wednesfield Road, Wolverhampton, WV10 OQP. [3] The Pulteney Surgery, 35 Great Pulteney Street, Bath, BA2 4BY

Corresponding Author: Chloe Davis, chloe.rose.davis@gmail.com

Background: A gluten-free diet (GFD) is widely accepted as the mainstay of coeliac disease (CD) management (1). Given the complexities of following a GFD, a planned strategy for long-term follow-up is essential (2). Guidelines from the National Institute of Health and Care Excellence (NICE) (3) and British Society for Gastroenterology (BSG) (1) recommend that all CD patients receive, at least, an annual review. This should include anthropometric, biochemical, clinical and dietary assessments as standard. However, despite the existence of national and international guidelines, ambiguity remains regarding who should conduct follow-up appointments, when these should be conducted and what should be covered(4). Current practices in long-term CD management in the NHS and the roles of gastroenterologists, GPs and dietitians are unclear.

Methods: An online questionnaire was developed and distributed to members of the BSG, Primary Care Society for Gastroenterology (PCSG), British Dietetic Association (BDA) Gastroenterology Specialist Group and BDA members with an interest in gastroenterology that were currently practising in the NHS and had experiencing in managing patients with CD. Questions related to the provision, format and content of follow-up appointments, education sessions, resource provision and prescription of ACBS-approved GF products. Ethical approval was obtained from King's College London Research Ethics Committee (LRS-19/20-14550).

Results: The survey was sent to 4,369 healthcare professionals (HCPs) and was completed by 50/1369 (3.7%) dietitians, 51/1800 (2.8%) gastroenterologists and 86/1200 (7.2%) GPs. Thirty-eight (76.0%) dietitians, 21 (41.2%) gastroenterologists and 26 (30.2%) GPs offered patients, at least, an annual review. Dietitians (n=50,100%) were the HCP primarily responsible for providing dietary advice with 27 (52.9%) gastroenterologists and 38 (44.2%) GPs reporting that they, too, were involved. Pharmacists and nurses were also involved. Coeliac UK resources were the most commonly used resources amongst all professions. ACBS-approved GF products were prescribed by 18 (36.0%) dietitians, 2 (3.9%) gastroenterologists and 58 (67.4%) GPs. Anthropometric (n=44, 95.7%) and dietary (n=46, 100%) assessments were most commonly conducted by dietitians. Twenty-two (84.6%) gastroenterologist and 8 (24.2%) GPs conducted anthropometric assessment. Twenty-five (96.2%) gastroenterologists and 24 (72.7%) GPs conducted dietary assessment. Biochemical was the least common assessment amongst dietitians (n=39, 84.8%).

Discussion: The suboptimal rates of annual review observed are similar to the findings of a UK patient survey(5) and, with evidence that dietary adherence is improved with access to regular follow-up(6), is a concern. Many HCPs are involved in long-term CD management in the NHS and, given the observed differences in follow-up delivery, the existence of a postcode lottery in long-term CD management is plausible. However, given the low response rates obtained, it is unclear how accurately the data represent current practices in the NHS. Furthermore, disseminating the questionnaires through the BDA, BSG and PCSG alone introduces selection bias by failing to represent HCPs that are not members of their professional bodies.

Conclusion: Given the small sample sizes obtained, it is unclear how accurately our data reflects the current practices of GPs, gastroenterologists and dietitians involved in long-term CD management in the NHS. However, our limited data supports existing evidence that that current practices are varied with suboptimal provision of annual review. More research is needed to truly understand the current situation in the NHS, inform future practice and improve quality of care.

References:

1) Ludvigsson, J. F., Bai, J. C., Biagi, F., et al. (2014). Diagnosis and management of adult coeliac disease: guidelines from the British Society of Gastroenterology. *Gut,* 63(8), pp. 1210-1228. 2) Haines, M. L., Anderson, R. P. & Gibson, P. R. (2008). Systematic review: the evidence base for long-term management of coeliac disease. *Alimentary Pharmacology & Therapeutics,* 28(9), pp. 1042-1066.
3) NICE. (2015). *Coeliac disease: recognition, assessment and management.* [Online]. [Accessed 10 October 2019]. Available at: https://www.nice.org.uk/guidance/ng20. 4) Silvester, J. A. & Rashid, M. (2007). Long-term follow-up of individuals with celiac disease: An evaluation of current practice guidelines. *Canadian Journal of Gastroenterology,* 21(9), pp. 557-564. 5) Bebb, J. R., Lawson, A., Knight, et al. (2006). Long-term follow-up of coeliac disease – what do coeliac patients want?. *Alimentary Pharmacology & Therapeutics,* 23(6), pp. 827-831. 6) Bardella, M. T., Molteni, N., Prampolini, N., et al. (1994). Need for follow up in coeliac disease. *Archives of Disease in Childhood*, 70(3), pp. 211-213.

An assessment of Midlands (UK) Food Bank volunteers' knowledge of gluten free diets to accommodate service users with Coeliac Disease: a cross-sectional quantitative study.

F Howard and A Green
Faculty of Health and Life Sciences, Coventry University, Coventry, CV1 5FB, UK

Corresponding Author: Fiona Howard, fiona@miltonfest.co.uk

Background: Approximately 1 in 100 people have Coeliac Disease (CD) [(1)]. There were 1,583,668 food parcels given out by UK food banks last year [(2)], and it is likely a proportion of those reliant on food banks have CD. Additionally, the high cost and limited accessibility of gluten free (GF) foods have a greater impact on those with lower incomes [(3)]. This study aimed to assess Coventry Food Bank volunteers' knowledge of CD and GF foods to determine if they can adequately accommodate service users with CD. To date, previous research on this topic has not been published.

Methods: This cross-sectional research study assessed the knowledge of conveniently sampled participants invited to complete a piloted paper questionnaire during the opening hours of 2 foodbanks. The correct answers to 20 quantitative questions of equal weighting determined a knowledge score (KS) for each participant. Categories of Negligible (0-4/20), Extremely Poor (5-9/20), Poor (10-14/20), Good (15-18/20) or Excellent (18-20/20) were determined by the researcher prior to data collection. A further 2 questions regarding foodbank location and frequency of volunteering allowed comparison of KS to participant characteristics, and the final 3 mixed-method questions regarding personal experience of CD and provision of training at the Foodbank informed the discussion. Chi-Squared, Mann Whitney and Kruskal-Wallis statistical tests were used to assess for associations between knowledge scores, participant characteristics, previous experience and training. The study received approval from Coventry University Faculty Ethics Board (ID: P94569).

Results: A total of 20 Midlands (UK) Food Bank volunteers across 2 locations participated (Foodbank A n=8, Foodbank B n =12), of a potential 22 qualifying volunteers (90.9% Response Rate). Overall, the average participant KS of 10.5/20 (range 0-15) was deemed 'poor'. No associations between KS and frequency of volunteering or previous experience of CD were found. Only 3 participants (15%) correctly identified all gluten containing grains. Of all valid answers, 100% correctly identified wheat, 55% barley and 40% rye. Food items with a high wheat content such as bread, pasta and biscuits were commonly categorised as gluten-containing by participants (65%, 57.9% and 55% respectively), however, milk, tea and potatoes were the most correctly categorised overall (73.7%, 90% and 75%). Egg noodles and Chinese soy sauce elicited the most incorrect categorisations (66.7% and 61.1%). No association between participant KS and the correct categorisation of grains or food and drinks was found, except for the categorisation of barley squash; participants with a higher KS were more likely to answer correctly (p=0.012). No volunteers reported to have received any training regarding CD at the foodbank, and 5 participants specifically asked for training to be provided.

Discussion: The knowledge of food bank volunteers surveyed is not adequate to effectively accommodate service users with CD. The provision of potentially unsuitable food bank parcels being given to those with CD leaves service users with little choice regarding dietary adherence. Equipping food banks with training and increasing awareness may help improve adherence amongst service users with CD as suitable food parcels are provided.

Conclusion: This study has found that of the 20 Coventry Food Bank volunteers surveyed, there was an inadequate knowledge of CD and a GF diet to cater for service users with CD effectively. Further research into the development, and effectiveness, of CD training interventions to improve the knowledge of food bank volunteers is indicated.

References:

1. Coeliac UK (n.d.) Coeliac Disease. https://www.coeliac.org.uk/information-and-support/coeliac-disease/ (accessed February 2020)
2. Trussell Trust (2020) End of year stats. https://www.trusselltrust.org/news-and-blog/latest-stats/end-year-stats/ (accessed February 2020)
3. Abu-Janb, N. & Jaana, M. Facilitators and barriers to adherence to gluten-free diet among adults with celiac disease: a systematic review. J.Hum Nutr Diet. 2020.

Perceived acceptability towards long term use of oral nutritional supplements in adolescent and adult patients with Crohn's Disease

**K Keetarut *N Richards *H Kikuchi *Xiaolu N, *King B, *Xia X **PS Patel **K Fragkos
*University College London **University College London Hospital NHS Foundation Trust

Corresponding Author: Katie Keetarut

Introduction: Evidence mainly from Japan suggests replacing 35-50% of food intake with partial enteral nutrition (PEN) can prolong disease remission and increase drug effectiveness in Crohn's Disease (CD)[1-2]. The aim of our cross-sectional feasibility study was to explore the acceptability of using PEN in the UK population by looking at perceived ease of use, benefits and barriers and organoleptic ratings of oral nutritional supplements (ONS) drinks.

Methods: Patients with confirmed CD were recruited between June-July 2017-2019 from the gastroenterology outpatient clinic using convenience sampling. Full ethical approval was obtained from London-Brent Research Ethics Committee. Patients were asked to sample five commercially available ONS drinks and rate them using a 9-point hedonic rating scale[3]. Perceived benefits and barriers of long-term consumption was assessed using a non-validated questionnaire and a subset of patients took home a one week supply. All questions were rated for internal consistency using the Cronbach equation[4] .

Results: 123 CD patients 35.4 (±15.6) 52 males were recruited and 30 took home a week trial. Overall impression scores did not significantly vary with gender, body mass index (BMI), handgrip strength (HGS), mid-upper arm muscle circumference (MUAMC) or PTC sensitivity. Ensure plus™ milkshake rated highest for overall impression (6.5) ($p=<0.0001$) and all organoleptic properties ($p<0.0001$). The main perceived benefits related to assurance of nutrient intake (83.5%), convenience (74.6%), and maintenance of a healthy weight (78%). The main perceived barriers were reduced pleasure from eating (65.3%), feeling excluded at mealtimes (45.5%) and struggling to consume the volume required (47.2%). Confidence in consumption for 3 months was 80.1% but this dropped to 62.6% and 38.2% at 6 and 12 months respectively. Perceived ease of use as a meal replacement dropped significantly after the one week trial ($p=0.0124$). 63.4% of patients would consider using PEN as a maintenance treatment option and this did not correlate to predicted length or volume of consumption.

Discussion: ONS drinks were perceived to have high benefits with daily consumption and appear to be a feasible option for 3-6 months but not for long-term use, particularly over nine months due to perceived negative social impact and taste fatigue.

Conclusion: Despite high perceived benefits of PEN confidence in long term consumption is low.

References:

1. Akobeng AK, Zhang D, GORDON M. et al. (2018). Enteral nutrition for maintenance of remission in Crohn's disease. *Cochrane Database Syst Rev.* **8.** CD005984.
2. Yamamoto T, Nakahigashi M, Umegae S. et al. (2010). Enteral nutrition for the maintenance of remission in Crohn's disease: a systematic review. *Eur J Gastroenterol Hepatol,* **22** 1-8.
3. Peryam DR, Pilgrim FJ. Hedonic scale method of measuring food preferences. 1957. *Food Technol.* **11** 9–14.
4. Bland J. and Altman, D. (1997) Statistics Notes: Cronbach's Alpha. *BMJ* **314**, 572.

A national survey of dietitians on the dietary management of inflammatory bowel disease.

O'Neill A (Department of Nutrition and Dietetics, King's College London 150 Stamford Street, London, SE1 9NH)
O'Hanlon D (Department of Nutrition & Dietetics St Thomas' Hospital, Westminster Bridge Road London SE1 7EH),
Syme G (Department of Nutrition and Dietetics Barts NHS Trust, The Royal London Hospital, Whitechapel, London E1 1BB),
Lomer M (Department of Nutrition and Dietetics, King's College London 150 Stamford Street, London, SE1 9NH),

Corresponding Author: Aoife O'Neill, aoife.o'neill@kcl.ac.uk

Background: Nutritional therapy is important in the management of inflammatory bowel disease (IBD) patients due to the prevalence of malnutrition and the role of exclusive enteral nutrition (EEN) in the induction of disease remission. The UK IBD Standards[(1)] provide a benchmark for nutritional assessment and nutritional therapy for IBD. The aim of this study was to elucidate the dietary management strategies that are utilised in UK clinical practice for IBD patients and to assess whether the National IBD Standards are being met in relation to the provision of nutritional therapy.
Methods: A cross-sectional observational study was undertaken using a questionnaire survey of NHS dietitians working with IBD patients. Participants were invited to take part via an email disseminated by the British Dietetic Association. Data collection was conducted between February-March 2020 using an electronic self-administered questionnaire in Qualtrics software. Frequency *n*(%) was used to report the results of categorical data. Pearson's chi-squared or Fisher's exact test was used to determine association with a p-value of 0.05 to determine statistical significance. Ethical approval was granted by Research Ethics Committee at King's College London (MRA-19/20-17352).
Results: Complete responses were obtained from 43 dietitians. Thirteen (30.2%) dietitians reported less than 1.0 whole time equivalent (WTE) gastroenterology dietitian for their Trust. Dietitians more frequently reported 'always' for inpatients (n=14 (32.6%)) having an assessment of nutritional status than newly diagnosed IBD outpatients (n=3 (7%)). Higher gastroenterology dietetic resourcing (≥1.0WTE) was associated with a higher frequency of nutritional assessment for inpatients compared to <1.0WTE (p=0.006). EEN for Crohn's disease (CD) was considered by 42 (98%) dietitians. The most frequently reported indications for EEN were 'adjunct therapy' (n=31 (72.1%)) or 'obstructive stricturing CD' (n=31 (72.1%)) and less frequently 'primary therapy' (n=22 (51.2%)) or 'pre-surgical optimisation' (n=21 (48.8%)). The reported duration for EEN ranged from 2 weeks to 3 months, with 6 weeks being the most frequently reported (n=16 (37.2%)) duration. Less than half (n=18 (41.9%)) of the sample reported that clinical outcomes of EEN were monitored.
Discussion: The UK IBD Standards indicate that on admission and after diagnosis all IBD patients should have an assessment of nutritional status[(1)]. The findings from this study highlighted the low frequency of routine nutritional assessment in these patient groups, similar to previous findings[(2)]. Limited gastroenterology dietetic resourcing and a lack of standardised assessment tools may be contributing to the low frequency of assessment. The UK IBD Standards state that IBD patients should have access to "all forms of nutritional therapy" including EEN[(1)], therefore, it was positive to find that the majority of dietitians reported that EEN was considered for CD patients. However, the results elucidated that there is considerable variation in the indications for use, duration and monitoring of EEN, similar to the results of a previous cross-sectional study[(3)]. The variation may have been attributed to a disparity in therapy goals as suggested by the differing indications for EEN.
Conclusion: The findings demonstrate that there is inconsistency in the nutritional assessment and dietary management of IBD across the UK. Further research is necessary to determine the optimal protocols for IBD nutritional therapy to ensure equality in the provision of IBD dietetic care and to enable consistent compliance with the IBD National Standards.

References:

1. IBD UK. IBD Standards Core Statements. 2019;1–8. Available from: https://ibduk.org/ibd-standards (Accessed 21/07/20)
2. Lomer MCE, Cahill O, Baschali A et al. A multicentre Study of Nutrition Risk Assessment in Adult Patients with Inflammatory Bowel Disease Attending Outpatient Clinics. Ann Nutr Metab. 2019;74(1):18–23.
3. Lawley M, Wu JW, Navas-López VM, et al. Global Variation in Use of Enteral Nutrition for Pediatric Crohn Disease. J Pediatr Gastroenterol Nutr. 2018;67(2):E22-29.

GASTROENTEROLOGY

Supported by BDA Gastroenterology Specialist Group

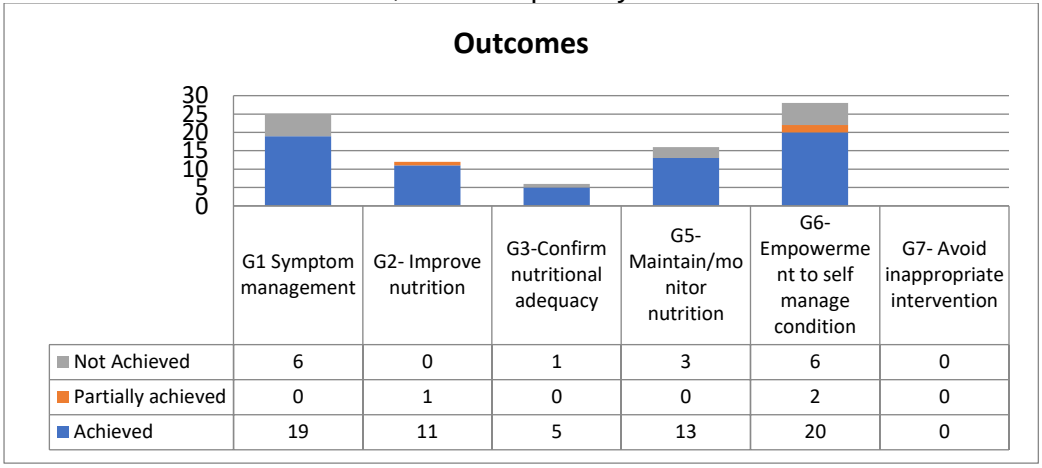
Return to contents page

Patient Outcome Data from Specialist Dietetic Input in a Consultant Led Clinic for Patients with Neuroendocrine Tumours.

C Dowd Department of Nutrition and Dietetics, Services Accommodation Centre, University Hospital of Wales, Heath Park, Cardiff, South Glamorgan CF14 4XW, M S Khan Directorate of Gastroenterology and Hepatology, University Hospital of Wales, Heath Park, Cardiff, South Glamorgan CF14 4XW

Corresponding Author: Charlotte Dowd, charlotte.dowd2@wales.nhs.uk

Background: Neuroendocrine tumours (NET)s are a group of cancers that can occur most places in the body. Although once classed as a rare cancer, their incidence is rising[1].There are a range of gastrointestinal side-effects which can be related to the NET, medication or surgical interventions[2]. Many of these side-effects can have nutritional consequences or be improved through altering diet with the support of a specialist dietitian.
In October 2018 there was funding for a 0.2 WTE specialist gastroenterology dietitian to introduce a new service by joining the weekly consultant led clinic for 12 months. The aim of the service evaluation was to assess the impact of dietetic input as part of the South Wales NET Clinic on patient outcome data.
Methods: Ethical approval was not required due to being a service evaluation. Referrals received by the MDT were assessed by the NET dietitian and a minimum of one outcome measure was selected with the patient using a dietetics outcome framework. Patients were included if their outcomes were reviewed in clinic or over the telephone within the 12 months. Statistical tests were unable to be used due to the number of patients seen.
Results: 35 patients had at least one outcome measure identified and reviewed over the 12 months. 78% of total outcomes were achieved, 4% were partially achieved and 18% not achieved.



	G1 Symptom management	G2- Improve nutrition	G3-Confirm nutritional adequacy	G5- Maintain/monitor nutrition	G6- Empowerment to self manage condition	G7- Avoid inappropriate intervention
Not Achieved	6	0	1	3	6	0
Partially achieved	0	1	0	0	2	0
Achieved	19	11	5	13	20	0

Discussion: The results of this show that outcomes were achieved or partially achieved by most patients. The 12 month service evaluation has been used to support securing a permanent part-time specialist NET dietitian as part of the MDT.
Conclusion: Specialist dietetic input as part of a NET MDT should be recommended as it is effective at improving patients' symptoms and nutritional status.

References:

1. Ramage J. Guidelines for the management of gastroenteropancreatic neuroendocrine (including carcinoid) tumours. Gut. 2005;54(suppl_4):iv1-iv16.
2. Sagar V, Cooper S, Johnson J, Shetty S, Shah T. Gastrointestinal manifestations of neuroendocrine tumours: their investigation and management. Postgraduate Medical Journal. 2017;93(1102):494-497.

Audit on the adherence to a specialist dietetic led Irritable Bowel Syndrome (IBS) pathway across a Northern Ireland trust.

L Drumm, C McConnell, A McEneaney, J Whelan.
Specialist gastroenterology dietitians, Tyrone and Fermanagh hospital, Omagh, Co. Tyrone, BT79 0AP, Western health and social care trust (WHSCT)

Corresponding Author: Laura Drumm, laura.drumm@westerntrust.hscni.net

Background: A dietetic led IBS pathway was implemented Trust wide in 2019 by dietetic posts funded via temporary transformation funding from the department of health. The aim of this service was to engage with GPs and educate on using the IBS pathway to allow direct referral to the service preventing unnecessary referral to gastroenterology outpatient services, subsequent unnecessary invasive endoscopy procedures (EP) and to release consultant outpatient appointments thereby creating capacity for those with needs that are more acute. The current trust waiting list for routine/urgent EPs is eighteen months compared to six weeks for specialist IBS dietetic appointment (1). IBS diagnosis does not require an endoscopy and is confirmed using a range of blood tests and if patients meet the ROME IV criteria (2). The aim of this audit was to calculate the cost of EPs that would not have been completed if the pathway was followed and patients were referred directly from GPs to the dietetic led IBS service.

Methods: 135 endoscopy reports from patients referred to the IBS Dietetic led service from October 2019 until June 2020 were reviewed and prioritisation noted. Some patients had more than one endoscopy procedure completed i.e. colonoscopy and oesophagogastroduodenoscopy (OGD). Exclusion criteria included those EPs prioritised as 'red flag' to rule out cancer diagnosis (43/135) and EPs performed in private hospitals (18/135), as we did not have access to private hospital reports. 74/135 endoscopy reports were included in this audit. Ethical approval was considered but not required as this was an audit of the service pathway and does not include personally identifiable data.

Results: 74/135 (54%) urgent/routine endoscopy procedures were completed prior to IBS dietetic referral and patients attended at least one new outpatient gastroenterology appointment for each scope completed. Adherence to the IBS pathway would have resulted in a saving of **£88778.69** (3)**.**

Total Urgent (U) & Routine(R) scopes completed	Total cost (scope+New Gastroenterology review for U&R)	Cost of dietetic review	Cost difference
74	93855.09	8506.4	**88778.69**

Table 1: Cost comparison of gastroenterology review + endoscopy procedure versus dietetic review

Discussion: This research identified that the pathway is not being adhered to as a high number of IBS patients 74/135 (54%) that meet our referral criteria are being referred by GPs to gastroenterology and having unnecessary urgent/routine endoscopy procedures. 43/135 (32%) scopes were prioritised for 'red flag' procedures but these patients were ultimately referred to our service after these procedures were completed. This highlights the need to educate GPs that all patients who meet the referral criteria, including those awaiting red flag endoscopies should be referred to the dietitian led IBS service and this can be done while awaiting these procedures to prevent delay in dietetic intervention. The results recognised that adherence to our pathway would result in cost savings.

Conclusion: Adherence to the dietetic led IBS pathway will lead to a reduction in number of patients having invasive routine/urgent endoscopy procedures, allow dietetic input for patients awaiting red flag endoscopy procedures, reduce the waiting list for endoscopy procedures and gastroenterology consultant appointments and prevent delaying dietetic interventions.

References:

1. Estimated waiting list times, Endoscopy department, Acute services, WHSCT.
2. National Institute for health and Care Excellence (NICE) (2017) Irritable bowel syndrome in adults: diagnosis and management. https://www.nice.org.uk/guidance/cg61/resources/irritable-bowel-syndrome-in-adults-diagnosis-and-management-pdf-975562917829 (accessed October 2020)
3. 2018/19 figures for WHSCT endoscopy procedures (excluding histopathology),Finance dept,WHSCT

GET

General Education Trust

Supported by The BDA General Education Trust

Return to contents page

Experiences and Perceptions of Dietitians for Obesity Management: A General Practice Qualitative Study

Corresponding Author: Sally Abbott

Background: Multi-component lifestyle interventions are the first line treatment for obesity. Dietitians are ideally placed healthcare professionals to deliver such interventions. However, only a small proportion of patients with obesity are referred by general practice to dietitians, and the reasons for this are not clear. The aim of this study was to explore general practice healthcare professionals' (GPHCPs) experiences and perceptions of dietitians in the context of obesity management.
Method: A convenience sample of GPHCPs practicing in the UK was recruited via a targeted social media strategy, using virtual snowball sampling. Data were collected using semi-structured interviews and analysed using framework analysis.
Results: 20 participants were interviewed (11 GPNs and 9 GPs). Experiences of referring patients with obesity for dietetic intervention resulted in two main themes: (i) access barriers; (ii) the dietetic consult experience. Three themes emerged from participants' perceptions of a role for general practice dietitians: (i) utilising dietetic expertise; (ii) access to dietitian; (iii) time. Participants experienced barriers to accessing dietitians for obesity management and felt that having a dietitian working within their general practice team would help address this. Having a dietitian embedded within their general practice team was perceived to have the potential to alleviate GPHCPs' clinical time pressures, offer opportunities for upskilling; and may improve patient engagement with obesity management.
Conclusion: GPHCPs perceived that embedding a dietitian within their general practice team would be valuable and beneficial for obesity management. Our findings provide support for the funding of general practice dietitian roles in the UK.

A mixed methods study to develop a core outcome set for refractory childhood epilepsy treated with ketogenic diet therapy: Preliminary findings

JH Carroll [1]
M Hickson [1], JH Cross [2], E Williams [3], V Aldridge[3], A Collinson[1]
[1] Faculty of Health, University of Plymouth, Devon, UK. [2] Developmental Neurosciences, UCL - NIHR BRC Great Ormond Street Institute of Child Health, London, UK and [3] Matthew's Friends Charity & Clinics, Lingfield, Surrey, UK.

Corresponding Author: Jennifer Carroll, Jennifer.carroll@plymouth.ac.uk

Background: Clinical trials contain a wide range of outcomes with differing methods of measurement and reporting. However, measured outcomes are often not the most important perceived by patients and those making decisions about healthcare. A core outcome set is an agreed standardised set of outcomes that should be measured and reported, as a minimum, in all clinical trials in a specific area of healthcare (1), aiming to increase quality and relevance of research by ensuring consistency. This study aims to identify a core outcome set for refractory childhood epilepsy treated with ketogenic diet therapy.
Methods: Ethical approval was granted (London-Surrey Research Ethics Committee,19/LO/1680). Outcomes measured and reported in all previous studies of childhood epilepsy treated with ketogenic diet therapy were identified in a scoping review (2). Parents of a child aged 0-18yrs with refractory childhood epilepsy currently or recently treated with ketogenic diet, were interviewed to explore outcomes important to them. Content analysis identified all outcomes in the interview transcripts. These sources of data were collated to generate a comprehensive list of outcomes, then grouped into domains according to the COMET Taxonomy.
Results: Searches identified 2663 articles, 147 met the inclusion criteria. 912 verbatim outcomes were sorted into 90 unique outcome categories, then classified into 21 domains. Only 52% of outcomes were reported more than once. Most commonly reported outcomes include seizure frequency (12.8%), vascular adverse effects (7.5%) and growth (6.8%). 41% of verbatim outcomes were objective and 59% subjective. Only 13 articles used validated assessment tools to measure outcomes. Analysis showed parents (n=21) identified only 33 outcomes from the scoping review as being important considerations for their child. They reported 9 new outcomes of importance including independence *"The other thing for us is independence. I would like to get to a place, I don't know if it will happen, where he can walk to school"* and participation *"It's hard on him, we're only just now starting to be comfortable putting him in group play groups, and little toddler classes".*
Discussion: There is little consistency in the wide range of outcomes used in research and these are often measured subjectively through parent or clinician reporting, with validated assessment tools rarely used. Parents identified just over a third of the existing outcomes, suggesting the remainder may be of less importance to them. However, they valued new functional outcomes for their child which had never been measured. A finding echoed in other core outcome sets that sought the opinion of service users. Parents, health professionals and researchers will be invited to participate in a two round online Delphi study to establish consensus on priority outcomes. Following which, the core outcome set will be ratified at a face to face consensus meeting and disseminated for use.
Conclusion: Variability in reported outcomes demonstrates a clear need for a core outcome set for paediatric epilepsy and ketogenic diet (COMET registration #1116). The core outcome set will guide outcome measurement and reporting in future studies of childhood epilepsy treated with ketogenic diet therapy and clinical practice through audit and service evaluation.

References:

1. Williamson PR, Altman DG, Bagley H, et al. The COMET Handbook: version 1.0. Trials. 2017;18 (suppl 3):280.
2. Carroll J, Martin-McGill K, Cross H, et al. Outcome measurement and reporting in childhood epilepsy treated with ketogenic diet therapy: a scoping review protocol. JBI Database of Systematic Reviews and Implementation Reports. 2019;17(5):633-9.

The development of dietary guidelines for the management of chronic constipation to improve evidence-based dietetic practice

E Dimidi, A van der Schoot, K Whelan
Department of Nutritional Sciences, King's College London, 150 Stamford Street, SE1 9NH, United Kingdom

Corresponding Author: Eirini Dimidi, eirini.dimidi@kcl.ac.uk

Background: Constipation is a common, bothersome disorder that affects 14% of the general population[(1)]. Despite the increased burden and healthcare usage of chronic constipation, there are no formal dietary guidelines for its management. There is therefore an urgent need to produce evidence-based dietary guidelines for the management of chronic constipation. The aim of this project is to systematically review the literature and develop dietary guidelines for the management of chronic constipation in adults.
Methods: A two-step approach has been adopted. Step 1 involves performing four systematic reviews and meta-analyses to identify, synthesize and critically analyse all relevant existing research on the effect of dietary intervention in constipation. The four systematic reviews will investigate the effectiveness of: (i) probiotics and synbiotics; (ii) prebiotics and fibre supplements; (iii) foods, drinks, herbs, spices and whole diets; and (iv) food-derived extracts, vitamins and minerals. The PRISMA guidelines for systematic review and meta-analyses will be followed. Effect sizes will be calculated using standardised mean differences or mean differences. Statistical heterogeneity will be assessed using the chi-square test and quantified by using the I^2 statistic. Step 2 focuses on using the systematic-reviews and meta-analyses to develop dietary guidelines for the management of chronic constipation using the GRADE assessment tool. The recommendations will be devised following an agreement of a multidisciplinary steering committee.
Progress and discussion: The scope and protocol of the systematic reviews and guidelines have been finalised. The first systematic review and meta-analysis, which examines the effect of fibre supplements in chronic constipation, is ongoing. Thus far, eligibility screening has revealed 17 potentially eligible articles, and meta-analysis is ongoing. The completion date for this project is estimated to be July 2021.The systematic reviews, as well as the dietary guidelines, will be pivotal in improving dietetic practice, increasing confidence to dietitians when delivering dietary advice to patients with constipation, and improving patients' access to high quality and evidence-based dietary care.

References:

1. Suares NC, Ford AC. Prevalence of, and risk factors for, chronic idiopathic constipation in the community: systematic review and meta-analysis. American Journal of gastroenterology. 2011;106(9):1582-91; quiz 1, 92.

Prenatal diet and the risk of Autism Spectrum Disorder in offspring: a social perspective

C Friel[1], AH Leyland[1], J Anderson[2], and R Dundas[1]
[1]MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, Glasgow, G2 3AX. [2]Public Health Research Group, University of Glasgow, Glasgow, G12 8RZ.

Corresponding Author: Catherine Friel, c.friel.1@research.gla.ac.uk

Background: Autism Spectrum Disorder (ASD) is a significant and lifelong neurodevelopmental disorder that typically presents early in childhood. ASD is estimated to cost the UK £27 billion annually due to the consequences on health, education, social and economic outcomes[1]. A potential prevention strategy is healthy prenatal nutrition which has been associated with a reduced risk of offspring ASD[2]. Additionally, socioeconomic position may modify the association between prenatal diet and offspring ASD, as both poor diet and ASD are more prevalent in deprived groups[3]. However, measures of association from observational studies are prone to bias and confounding, yet many causal questions, such as this, cannot be answered in randomised controlled trials due to ethical and practical barriers. To enhance causal inference from observational data we can triangulate various approaches with differing sources of bias[4]. We aimed to firstly, estimate the association between prenatal diet and offspring ASD, and secondly triangulate this evidence with nonconventional approaches. Lastly, we will assess if the strength of association varies by socioeconomic position.

Methods: We conducted a prospective cohort study based on the Norwegian Mother, Father and Child cohort (MoBa) and Avon Longitudinal Study of Parents and Children (ALSPAC). MoBa recruited 95,244 mothers between July 1999 and December 2008 and inclusion criteria was Norwegian language. Baseline covariates were collected via questionnaire at 17-18 weeks gestation, a food frequency questionnaire was obtained at 22 weeks gestation and ASD diagnosis is based on ICD-9 criteria. ALSPAC includes 13,988 live births delivered between April 1991 and December 1992, and exclusion criteria were migration from the attachment area. Baseline covariates were collected between 8-42 weeks gestation, a food frequency questionnaire was completed at 32 weeks gestation and ASD diagnosis is based on ICD-9 or DSM-4 criteria. Prenatal diet quality was scored based on adherence to nutritional recommendations in pregnancy. The association between prenatal diet and offspring ASD will be estimated with a marginal structural model, adjusted for the inverse probability of treatment weights. We will stratify the results by maternal education to measure effect modification by socioeconomic status. Furthermore, we will triangulate these approaches with Mendelian randomisation and a sibling analysis using conditional logistic regression.

References:

1. Knapp M, Romeo R, Beecham J. Economic cost of autism in the UK. Autism. 2016;13: 317-336.
2. Li M, Francis E, Hinkle S, et al. Preconception and Prenatal Nutrition and Neurodevelopmental Disorders: A systematic review and meta-analysis. Nutrients. 2019;11.
3. Pearce A, Dundas R, Whitehead M, et al. Pathways to inequalities in child health. Arch. Dis. Child. 2019;104:998-1003.
4. Lawlor D, Tilling K, Smith GD. Triangulation in aetiological epidemiology. Int. J. Epidemiol. 2016;45: 1866-1886.

Development of Consensus Guidelines on the Nutritional Assessment and Dietary Management of Patients with Inflammatory Bowel Disease (IBD)

Miranda CE Lomer[1,2], Bridgette Wilson[1,2], Catherine L Wall[2,3]
1 Department of Nutrition and Dietetics, Guy's and St Thomas' NHS Foundation Trust, London, UK
2 Department of Nutritional Sciences, King's College London, London, UK
3 Departments of Human Nutrition and Medicine, University of Otago, Christchurch, New Zealand

Corresponding Author: Miranda Lomer

Background: Despite increased awareness of diet and nutrition being integral to the management of patients with inflammatory bowel disease (IBD), there are still gaps in the knowledge of IBD healthcare providers regarding nutrition[1,2]. Furthermore, high quality evidence on the nutritional assessment and dietary management of patients with IBD is limited. Consensus from a panel of experts known as a Delphi process allows for best-practice guidelines to be developed, especially where high quality evidence is limited. The aim of this research was to develop guidelines for the nutritional assessment and dietary management of inflammatory bowel disease using an e-Delphi online consensus agreement platform.
Methods: Sixteen research topics related to IBD and nutrition were developed in consultation with an IBD specialist group including patients, clinicians and researchers. A systematic review of the literature using a Population, Intervention, Comparison and Outcomes (PICO) framework to search Cochrane, Embase®, Medline® and Scopus® electronic databases for topics on nutritional assessment and dietary management of IBD was performed. Research papers were critically appraised using the GRADE tool and GRADE recommendations and good practice recommendations were developed. Experts from the IBD community (i.e. British Dietetic Association Gastroenterology Specialist Group, British Society of Gastroenterology, Crohn's and Colitis UK and patients with IBD) were invited to vote anonymously on the recommendations in a custom-built online platform (eDelphi). After each voting round, recommendations that did not reach 80% consensus were reformulated and taken to the next round of voting or removed. Two further rounds of voting were carried out with updated iterations of the recommendations and evaluative text based on feedback from the previous round.
Results: From 7326 non-duplicated papers, 95 were critically appraised. Fifty-five participants completed 3 rounds of voting and 14 GRADE recommendations and 42 good practice recommendations achieved 80% consensus. Four GRADE recommendations and 9 good practice recommendations were removed due to not reaching the consesnsus cut off. Comprehensive guidance related to nutrition assessment, nutrition screening and dietary management (induction of disease remission, maintenance of disease remission, functional gut symptoms, strictures, surgery, stoma, short bowel syndrome, fistula, pouchitis and special situations e.g. orofacial granulomatosis) are provided.
Discussion: Guidelines on the nutritional assessment and dietary management of IBD have been developed using an evidence-based consensus. The statements developed demonstrate the level of agreement and the quality and strength of the recommendations and good practice recommendations.
Conclusion: Guidelines have been developed to improve equality of care on the nutritional assessment and dietary management of IBD.

References:

1 Tinsley A, Ehrlich OG, Hwang C*, et al.* Knowledge, attitudes, and beliefs regarding the role of nutrition in IBD among patients and providers. Inflamm Bowel Dis 2016 DOI:10.1097/MIB.0000000000000901.
2 Sigall-Boneh R, Levine A, Lomer M, *et al*. Research gaps in diet and nutrition in inflammatory bowel disease. A Topical Review by D-ECCO Working Group. J Crohns Colitis. 2017 DOI: 10.1093/ecco-jcc/jjx109.

Paediatric Intensive Care Nutrition Priority Setting Partnership (PSP)

Graeme O'Connor RD PhD, Great Ormond Street Hospital

Corresponding Author: Graeme O'Connor

Background: The NIHR James Lind Alliance brings patients, carers and clinicians together. The aim of the Paediatric Intensive Care Nutrition PSP is to identify the unanswered questions about Paediatric Intensive Care Nutrition and then prioritise those that patients, carers and clinicians agree are the most important for research to address. Optimal nutritional support is of paramount importance for critically ill children admitted to the paediatric intensive care unit (PICU); critically ill children have limited macronutrient stores and relatively higher energy requirements than adults. Bedside nutrition practice on PICU continues to be driven largely by expert opinion or consensus, with very few practices supported by high-level evidence.

Methods: Establish a steering group inclusive of parents, carers and clinicians. A national scoping survey will asked respondents to submit their research uncertainties relating to Paediatric Intensive Care Nutrition. Other demographic details about the respondents will be collected.

Results: Refining questions and uncertainties through thematic analysis to generate representative research questions, so-called 'indicative questions'. A detailed systematic review will be delivered for each themed to establish whether there is suitable evidence available.

Conclusion: The final stage of the priority setting process is to prioritise through consensus the identified uncertainties about Nutrition Paediatric Intensive Care. This will involve input from patients, carers and clinicians to identify the 'Top 10 unanswered questions'. Future funding will be sought and begin to answer gaps in dietetic practice on PICU.

Feasibility, acceptability and cost efficiency of using webinars to deliver first-line patient education for people with Irritable Bowel Syndrome as part of a dietetic-led gastroenterology service in primary care

M. Williams[1] Y. Barclay[1] L. Harper[1] C. Marchant[1] L. Seamark[1] & M. Hickson[2,]
1Community Dietetics Service, Somerset NHS Foundation Trust, Taunton, UK
2Institute of Health and Community, University of Plymouth, Plymouth, UK

Corresponding Author: Marianne Williams

Background: Irritable bowel syndrome (IBS) is a chronic functional gastrointestinal disorder. International research suggests dietary intervention as a first line approach, but dietetic services are struggling to cope with demand. Digital technology may offer a solution to deliver appropriate patient education.
Aim: To assess the feasibility, acceptability and cost efficiency of using webinars to deliver first line IBS advice to patients as part of a dietetic-led gastroenterology service in primary care.
Methods: Patients were directed to an IBS First Line Advice webinar on a specialist NHS website. Data were collected from patients pre and post webinar use using an on-line survey.
Results: A total of 1171 attendees completed the pre-webinar survey and 443 completed the post-webinar survey. Attendees ranged from under 17 to over 75 years. 95% found the webinar easy to access, and 91% were satisfied with the content of the webinar. Those with excellent or good knowledge rose from 25% pre-webinar to 67% post-webinar, confidence in managing their condition improved for 74% of attendees. Using the webinars led to a 44% reduction in referrals for one to one appointments with a specialist dietitian in the first year of use. The value of the clinical time saved is estimated at £3,593 per annum. The cost of creating the webinar was £3317.
Conclusion: The use of webinars was a feasible, acceptable and cost-efficient way of delivering first line patient education to people suffering with Irritable Bowel Syndrome as part of a dietetic-led gastroenterology service in primary care.

New to Research

Supported by Yakult

Return to contents page

The nutritional status of a regional adult cystic fibrosis centre and factors associated with BMI – the future impact of new therapies.

J Barrett[a] ,S.A.M Fenton[b], A.E. Topping[c], J. L Whitehouse[a]
[a]West Midlands Adult Cystic Fibrosis Centre, Heartlands Hospital, University Hospitals Birmingham, Birmingham B9 5SS, [b]School of Sport, Exercise and Rehabilitation Sciences, [c]School of Nursing, University of Birmingham Edgbaston Birmingham B15 2TT

Corresponding Author: Joanne Barrett, Joanne.barrett2@nhs.net

Background: Cystic fibrosis (CF) is the most common genetic disease in the UK. CF mutations cause dysfunction of the Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) protein, leading to progressive respiratory disease, pancreatic insufficiency, CF related diabetes, liver disease and osteoporosis. Dietary management is focused on achieving a BMI 22-23kg/m^2 as this is associated with better lung function (1).The first CFTR modulator therapies became available to patients in the UK in 2016 and they are transforming the health and nutritional status of patients with CF (2). The aim of this research was to assess the nutritional status of an adult CF clinic population in 2019 and compare to the nutritional status of the clinic population in 2014, prior to the availability of CFTR modulator therapies.
Method: Demographic and clinical data were collected retrospectively from the electronic medical records of 332 patients who attended the West Midlands Adult CF Centre during 2019. Body Mass Index (BMI) results of all patients who attended in 2019, were compared to 2014 BMI audit data. Independent t-tests were performed to compare differences in BMI according to gender and pancreatic status. Analysis of variance was used to compare; differences in BMI between genotype and CFRD categories and differences in age between BMI categories.
Results: The median age was 31 years (17-81 years), 59% (n=197) were male, 10% (n=33) were Pancreatic Sufficient(PS), and 50% (n=167) had Cystic Fibrosis Related Diabetes (CFRD). For genotype, 54% were homozygous delF508, 34% heterozygous Del F508112/332 and 12% had other genotypes. In total, 18% of patients were receiving CFTR modulator therapy. Considering BMI, 16% were underweight (BMI <20kg/m^2), 56% were healthy weight (20.1-24.9 kg/m^2), 35% BMI 22-24.9 kg/m^2. 23% were overweight (BMI 25-29.9 kg/m^2), and 5% were obese (BMI >30kg/m^2). In comparison to 2014, the percentage of patients who were; underweight decreased by 4%, healthy range decreased by 3%, overweight increased by 4%, and obese increased by 3%. Statistically significant differences in BMI were found according to pancreatic status and genotype($p<0.05$). Age was statistically significantly different according to BMI category with overweight/obese patients tending to be older, PS, and heterozygous for delF508 ($p<0.05$).
Discussion: Since 2014 the nutritional status of this adult population has improved. Less patients fail to achieve an adequate nutritional status, and more are overweight/obese, in common with CF adult patient picture internationally (3). The health implications of overweight and obesity in CF are not fully established, but are unlikely to confer any further benefit to lung function and may increase risks of obesity related disease. Nutritional requirements may reduce with CFTR modulator treatment due to a reduced resting energy expenditure, increased fat intake and improved gut inflammation and absorption(4).Recent access to more effective triple CFTR therapies(Kaftrio®) may increase the prevalence of overweight/obesity in patients with CF and significant weight gain is being observed with patients prescribed this medication in clinical practice. Future nutritional management of CF is likely to have less focus on prevention of malnutrition and more on maintenance of a healthy weight and good quality diet. Individualised dietetic management will need to consider nutritional status, genotype, CFTR modulator therapy and lifestyle.
Conclusions: Patients on triple CFTR therapies will require a significant amount of re-education, behaviour change and support to adjust to weight gain and adopt new dietary habits to minimise the risks associated with obesity.

References:

(1) Cystic Fibrosis Trust. Nutritional Management of CF. 2016.(2) Lopes-Pacheco M. CFTR Modulators: The Changing Face of CF in the Era of Precision Medicine. Frontiers in pharmacology 2020;10:1662. (3) Stephenson AL, Mannik LA, Walsh S, Brotherwood M, Robert R, Darling PB, et al. Longitudinal trends in nutritional status and the relation between lung function and BMI in cystic fibrosis: a population-based cohort study. Am J Clin Nutr 2013;97(4):872-877.(4) Sergeev V, Chou FY, Lam GY, Hamilton CM, Wilcox PG, Quon BS. The extra pulmonary effects of Cystic Fibrosis Transmembrane Conductance Regulators Modulators in Cystic Fibrosis. Annals of American Thoracic Society 2020;17:147-154.

The health environment of a military unit and perceived barriers and facilitators to healthful behaviours of service personnel.

A. Booker[1,2] , M. Arlow[3], N. Sides[4], R. Wray[1], J.L. Fallowfield[2]
[1]Leeds Beckett University, Leeds, UK; [2]Institute of Naval Medicine, Alverstoke, Hampshire, UK; [3]Headquarters 6th Division, Upavon, UK; [4]Army Headquarters, Andover, UK

Corresponding Author: Alison Booker, Alison.Booker104@mod.gov.uk

Background: Overweight and obesity prevalence is increasing in the UK military(1), impacting on the health and injury-risk of Service Personnel (SP). The aetiology of obesity is multifactorial, but an obesogenic-environment appears to be a contributing factor(2). There is a lack of existing research in a military setting, thus the health environment of a military unit, and perceived barriers and facilitators to adopting healthful behaviours, was investigated.
Methods: A mixed-methods design was adopted and ethically approved by Local Research Ethics Committee, Leeds Beckett University (LREC 69014). A military-specific Health Environment Assessment Tool (m-HEAT) was completed by the Unit Health Committee in a British Army establishment to characterise the in-unit health environment. The m-HEAT measured the impact of the military environment and health behaviours, such as food selection, physical activity, smoking, alcohol and sleep. Rank-stratified focus groups (FG) of SP were used (*n* 10 and *n* 8), representing the different departments across the unit. SP verified the m-HEAT data and explored perceptions of barriers and facilitators to healthful behaviours. The FGs were recorded, transcribed and analysed using a thematic approach(3).
Results: The m-HEAT provided a systematic method for describing the features of the military health environment and in-unit support for healthful behaviours. Qualitative comments recorded in the m-HEAT were coded and the veracity of m-HEAT data was corroborated by the perceptions of the FG. Six thematic drivers of SP's health behaviours were identified: structural environment; food and (exercise) facilities provision; local health-promotion initiatives; military duty commitments; unit culture; and leadership. A complex interplay of structural and contextual health challenges was identified, which could inform strategies for health improvement. For example, food provision was determined by organisational contractual agreements and in-unit caterer procurement and cooking capabilities, while SP food selection was driven by SP perceptions of value, quality, nutrition knowledge and duty time-constraints.
Discussion: The m-HEAT demonstrated efficacy in characterising the unit health environment and identified areas for improving the physical environment. Consistent with established models of the health environment(4), health behaviours of SP were influenced at the individual, interpersonal, environmental and organisational levels. Health improvement strategies should therefore aim to improve organisational governance and assurance of provision, visibility and promotion of healthful options, and enhance both SP and leadership knowledge.
Conclusion: A Whole Systems Approach that addresses the physical (health) environment, health education, in-unit culture and leadership would better support healthful behaviours of SP.

References:

1. Sundin, J., et al. (2011). Obesity in the UK Armed Forces: Risk Factors. **Mil Med,** Vol. 176 (5) May, pp. 507-512.
2. Townshend, T., Lake, A. (2017). Obesogenic environments: current evidence of the built and food environments. **Perspectives in Public Health,** Vol. 137 (1), pp. 38-44.
3. Braun, V., Clarke, V. (2006). Using thematic analysis in psychology. **Qualitative Research in Psychology,** Vol 3 (2), pp. 77-101.
4. Sallis, J.F., et al. (2008). Ecological Models of Health Behavior. In: Glanz, K., et al. (eds), **Health Behaviour and Health Education: Theory, Research, and Practice.** San Francisco: Jossey-Bass, pp. 465-486.

A Service Evaluation of the Nutritional Adequacy of Enteral Nutrition Delivered to Patients on ICU.

E Cartwright[1,2], A Cartwright[1], R Thomson[2]
[1]School of Clinical and Applied Sciences, Leeds Beckett University, Leeds, UK
[2]Newcastle Nutrition, Newcastle Upon Tyne Hospital Trust, Newcastle

Corresponding Author: Emma Cartwright

Background: Critically ill patients have an altered metabolism and hence an increased risk of malnutrition. Nutrition, therefore plays a fundamental role in the recovery of patients and is associated with improved health outcomes(1).Research has highlighted that critically ill patients are frequently underfed and this can often be due to feed interruptions(2). The aim of this study is; to evaluate the nutritional adequacy of enteral nutrition (EN) and identify interruptions reasons to EN on an Intensive Care Unit (ICU) in the North East.
Method: An observational longitudinal descriptive study was conducted in a Northern hospital, 20 consecutive patients admitted to the surgical ICU that met the inclusion criteria of; adult patients (≥ 18 years) on the surgical ICU, who were intubated on admission or within 48 hours of admission to ICU, who remained on ICU ≥ 72 hours and showed no contraindication to EN were enrolled. Data were collected retrospectively from patients' records. The nutritional target of EN, quantity of calories and protein delivered, interruption time and reason to feed were recorded. Non-parametric testing was utilised to identify associations between length of ICU stay and adequacy of EN. Data was analysed using Statistical Package for Social Sciences (SPSS) and Microsoft Excel.
Ethical approval was gained by the Local Research Ethics Coordinator and the service evaluation were registered and approved by the Hospital trust where research was completed.
Results: The sample included 14 (70%) surgical patients and 6 (30%) medical patients. Patients received an average of 79.86% and 80.94% of their prescribed target calories and protein respectively. Non-nutritional sources of energy, IV glucose and propofol 1.00% solution, were additional to the prescribed feeding regimens, and contributed to 21.37% of total calories received. There were 321 hours of feed interruption across all 20 patients, with the most common interruption and highest percentage of interrupted time due to admission to theatre, equating to 19.00% of interruptions and 121 hours of missed feed. Results showed no significant (P=.684) association between length of ICU stay and adequacy of feed delivered to patients.
Discussion: Findings from this study are supported by other literature, highlighting that patients' nutritional adequacy on ICU is often poor. Despite results showing patients are not meeting their nutritional targets in this study, they are receiving a higher percentage of nutrients compared to other research(2). There is limited research which incorporates the delivery of non-nutritional sources, meaning no tangible conclusions can be made on the trends of percentage calories from non-nutritional sources. However, this study highlights these sources contribute to a high proportion (21.37%) of patients' total calories. Interruption reasons that caused EN to be stopped and hence a poorer nutritional adequacy consisted of both avoidable reasons (theatre admissions), and unavoidable reasons (vomiting), which is in line with literature. Findings of this research do not statistically show an association between length of stay and nutritional adequacy; nevertheless, findings illustrate a gradual increase in delivered calories during the first 5 days. These do not conclusively agree or disagree with literature; however, there is limited research into this aspect available. Dietitians are a pivotal factor to achieving good delivery rates and play an essential role in optimising enteral feeding, yet two-thirds of ICUs are allocated between a 0.10-0.50 weighting of dietetic resources(3), suggesting a need to re-evaluate services to promote nutritional adequacy.
Conclusion: Overall, it has been identified that feed interruptions often result in patients not receiving adequate nutrition in ICU, with results showing no association between ICU length of stay and the adequacy of calories delivered. This demonstrates the need for re-evaluation of feeding protocols within ICUs to maximise the delivery of enteral nutrition to patients.

References:

1. Heyland, D. Dhaliwal, R. and Drover, J. *Canadian Critical Care Clinical Practice Guidelines Committee: Canadian clinical practice guidelines for nutrition support in mechanically ventilated, critically ill patients*. Journal Parenteral Enteral Nutrition. 2003 Sep-Oct; 27 (5): 355-373.
2. Cahill, N. Dhaliwal, R. Day, A. Jiang, X. and Heyland, D. *Nutrition therapy in the critical care setting: What is "best practice? An international multicenter observational study*. Critical Care Medicine. 2010 Feb; 38 (2): 395-401.
3. Critical Care Network - National Nurse Leads. *National Critical Care Non-Medical - Overview Report.* Available from: https://www.cc3n.org.uk/uploads/9/8/4/2/98425184/national_critical_care_nmws_report_2016_v2.pdf [Accessed 15 April 2020].

An investigation into the compliance of commercially available total diet replacement products with EU legislations and an assessment of consumer and healthcare professional understanding.

B A Copeland[1], W L Hall[1] & K L Johnston[1,2]
[1]King's College London, Department of Nutrition and Dietetics, 150 Stamford Street, London, United Kingdom, SE1 9NH and [2]LighterLife UK Ltd, Cavendish House, Harlow, Essex CM19 5QF

Corresponding Author: Blaise Copeland, blaisecopeland@gmail.com

Background: With obesity prevalence rising, the use of total diet replacement (TDR) for weight control (very low-calorie diet (VLCD) or low-calorie diet (LCD)) is now considered an effective and accepted method for weight loss (1). However, the current guidance and regulations (EU-wide and still applicable to the UK) which govern both the compositional and labelling criteria of these products are complicated and regularly evolving. This research aimed to investigate the compliance of major TDR providers and their products with current EU legislative requirements and other guidance, and assess the understanding of TDR law by Health Care Professionals (HCPs) and TDR consumers.
Methods: A product review was conducted on 4 major commercial TDR providers, and comparisons were made against current guidance and applicable EU regulations, based on their nutrition compositional criteria: VLCD or LCD. The data was presented in tables indicating whether each nutrient met the required quantity specified under the relevant regulation. Following this, each TDR provider was given a total percentage of compliance to the current applicable and future legislation. To assess consumer and HCP understanding, a questionnaire was designed, based on a traditional Likert scale (2), for use in a survey to investigate knowledge and interest in general food law, TDR and food labelling. The survey comprised of 22 or 23 questions for TDR consumers or HCPs respectively. Results from the Likert scale were converted into percentages for each response. Participants were required to be over 18 years to partake and were recruited via social media and by word of mouth (causing a potential source for selection bias). This study was granted ethical approval by King's College London Ethics Committee (reference LRU-19/20-17822).
Results: In total across the 4 TDR providers, 94 products were analysed (with the number of products offered by each provider ranging from 8-49). It was found that just 1 of 3 TDR providers with available data met 100% of the specified compositional criteria for all nutrients according to the guidance applying to VLCDs. 0 of 3 met 100% of the specified criteria for LCDs. When assessed against future legislations (mandatory from 2022 only), none of the providers' current commercial offering met 100% of the desired compositional criteria. The questionnaire, which was completed by 30 TDR consumers and 55 HCPs, revealed 48% of TDR consumers and 34% of HCPs were 'not at all aware' of the required nutritional compositional criteria of TDR products.
Discussion: Food law is deemed by industry and healthcare professionals to be one of the more functional and relevant areas of law (3). However, the complexity of the language and continuous alterations to the law around food, with focus on TDR law, often makes it very difficult for manufacturers, the general public and HCPs to understand and stay up-to-date with the regulations - especially with them differing between VLCDs and LCDs.
Conclusion: This study highlights the marked variation amongst selected TDR providers and their compliance with the regulations governing their TDR products. Given that there are many other additional commercial providers of these types of products, the shortfalls in both consumer and HCP understanding may result in consumers being at risk of receiving inadequate macro- and micronutrients intakes, if purchasing from a manufacturer who does not abide by the law.

References:

1. National Obesity Forum (2010) Position statement on the application of very low energy diets in achieving weight loss in the management of obesity. http://www.nationalobesityforum.org.uk/images/stories/_Final_version_NOF_consensus_statement_VLEDs.pdf (accessed March 2020).
2. Likert, R. A Technique for the measurement of attitudes. Archives of Psychology. 1932;140: 1-55.
3. Van der Meulen, B. Food law. Encyclopaedia of Agriculture and Food Systems. 2014; 1:186-195.

Riboflavin status and risk of anaemia during pregnancy: findings from the OptiPREG study

B. Duffy[1], M.Ward[1], K. Pentieva[1], E. Psara[1], G. Horigan[1], H.McNulty[1]
[1] Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, Ulster University, Coleraine, BT52 1SA, UK

Corresponding Author: Bethany Duffy

Background: Anaemia affects 42% of pregnancies worldwide and is associated with higher risk of adverse maternal and neonatal pregnancy outcomes including postpartum haemorrhage, preterm delivery, stillbirth and reduced offspring birthweight.(1,2) Whilst iron deficiency is considered the most common nutritional cause of anaemia in pregnancy, low status of the B vitamin, riboflavin, may also be implicated as it is required for the flavin-dependent release of stored iron in red blood cell formation.(3) Few studies have reported biomarkers of riboflavin during pregnancy, and studies investigating the association between riboflavin and haemoglobin (Hb) have generally focussed on low-middle income populations only. This study aimed to examine the association of riboflavin status with Hb, and to determine the role of riboflavin as a predictor of anaemia during pregnancy.

Methods: Data for this analysis were obtained from healthy pregnant women in Northern Ireland and the Republic of Ireland, enrolled on the ongoing *Optimal Nutrition for the Prevention of Hypertension in Pregnancy using a Personalised Approach* (OptiPREG) study. Detailed health, dietary and lifestyle information, along with a blood sample for analysis of B vitamin biomarkers and haematological measures, were obtained from all participants at the 12th gestational week (GW; *n*=2,153) and also at the 36th GW in a subset of mothers (*n*=372). Riboflavin status was determined by the functional assay, erythrocyte glutathione reductase activation coefficient (EGRac), whereby higher values indicate lower riboflavin status. Regression analysis (linear and logistic) was used to identify determinants of Hb and anaemia. One-way analysis of covariance (ANCOVA) with Bonferroni post hoc test was used to compare mean Hb concentrations according to riboflavin status. Ethical approval was granted from relevant ethics committees.

Results: Biomarker analysis showed that 68% of pregnant women had low or deficient riboflavin status. Riboflavin status was found to be a significant determinant of Hb at the 12th GW (β=-0.128, P=0.001), whilst the odds of developing anaemia at the 12th GW increased with decreasing riboflavin status (β=2.4, OR:10.9, CI:2.2-53.3, P=0.003). Hb concentrations were 0.32g/dl lower at 12th GW (P=0.026), and 0.64g/dl lower at the 36th GW (P=0.036), among riboflavin deficient (EGRac ≥ 1.4) women compared to women with optimal riboflavin status (EGRac ≤ 1.26), after controlling for known confounders (body mass index, gestational age, parity). Furthermore, among women with riboflavin deficiency, compared to those sufficient in riboflavin at the 12th GW, a significantly higher percentage went on to develop anaemia by the 36th GW (10.6% vs 4.6%, P=0.032).

Discussion: This is one of very few studies to identify riboflavin deficiency during pregnancy using a biomarker measurement and is the first to show that riboflavin status is a significant determinant of Hb and risk of anaemia in pregnancy. The finding of higher Hb concentrations in women sufficient in riboflavin compared to those deficient in pregnancy may be clinically significant, as a 1g/dl increase in maternal Hb is reported in meta-analyses to be associated with a 25% reduced risk of maternal mortality and 27% reduced risk of perinatal mortality.(4) However, the clinical significance of the modest yet significant differences in Hb concentrations shown in the current study remains to be established.

Conclusions: Riboflavin deficiency is more common in pregnancy than generally recognised. Maintenance of a more optimal riboflavin status in pregnancy, through improved diet or supplementation, may improve Hb concentrations and reduce the risk of anaemia, however, this needs to be confirmed in randomised trials with riboflavin, including the ongoing OptiPREG study.

References:

1. Rahman M, Abe S, Rahman M *et al.* (2016) *Am J Clin Nutr* **103**, 495-504
2. Nair M, Churchill D, Robinson S *et al.* (2017) *British Journal of Haematology* **179**, 829-837
3. Sirivech S, Frieden E, Osaki S (1974) *Biochemical Journal* **143**, 311-315
4. Stoltzfus R, Mullany L, Black R (2004) *Comparative quantification of health risks* **3**, 163-209

A feasibility study examining the use of a validated online 24-hour dietary recall tool, myfood24, in adult dietetic outpatient clinics.

C Gianfrancesco[1], C Taylor[2], EJ Croot[3]. [1,2] Dietetic Department, Sheffield Teaching Hospitals NHSF Trust, Sheffield, S5 7AU. [3] School of Health and Related Research, University of Sheffield, Sheffield S1 4DA.

Corresponding Author: Carla Gianfrancesco, carla.gianfrancesco@nhs.net

Background: Dietitians continue to use pen and paper methods for dietary assessment (DA) despite evidence to suggest technology assisted DA reduces healthcare costs and increases assessment accuracy[1]. The study aim was to examine the feasibility of using an online DA tool in out-patient dietetic practice.
Methods: This feasibility study took place in a large adult teaching hospital. Ethical approval was granted by Manchester East REC. Eligible dietitians and their patients were invited to take part by letter. Consent was taken at a study visit and was followed by training on the myfood24 website. This tool is used for research and teaching and was not adapted for this study. Patients were asked to submit at least three 24-hour dietary recalls for dietitians to review before appointments and these were used for DA. Screening, recruitment and baseline demographic data were collected. Validated paper based questionnaires (Q) measuring technology readiness and patient activation provided further baseline data. On completion of the intervention, a validated Q measured the usability of the website and bespoke Qs for both patients and dietitians, based on a theoretical framework, measured the acceptability of the intervention. A post-consultation Q completed by dietitians examined differences with usual care including appointment duration and content. Descriptive and inferential statistical analysis was completed. Chi-squared test was used for categorical data and independent t-test for continuous data, with the significance level 0.05.
Results: Eleven dietitians consented from eight clinical areas. Of 212 patients invited, 39 (18.4%) volunteered to participate. They ranged in age from 18 to 84 years, 56.4% female, 92.3% white and index of multiple deprivation (IMD) showed 46% lived in areas with high levels of deprivation. There was no statistically significant difference in these baseline characteristics between those who consented and declined. 29 (74.4%) patients completed at least three 24-hour recalls. Seven (17.9%) completed no recall due to technology or health issues and technology readiness scores were lowest in this group.The mean usability score was 67.5 (95%CI 58.9, 76.1), 60-69 is marginal acceptable. The intervention was moderately acceptable to both dietitians and patients. However patients found the intervention less of a burden, more effective use of time and a more positive and successful experience. Compared to usual care dietitians found clinic preparation took on average 15 minutes longer but consultation time could be reduced. More time was freed up for education. The software was thought to provided an accurate nutritional assessment.
Discussion: This was the first study using myfood24 as a tool in routine clinical practice. Health technology can potentially widen inequalities; however, a diverse range of participants were recruited in terms of age and IMD, and ethnicity was representative of the clinic population. Completion rates of the intervention were good despite both the technology readiness and software usability score being lower than that found in studies in healthy volunteers[2]. Acceptability scores suggest that despite the technical challenges, patients felt the intervention was worthwhile. Dietitians found this DA method accurate and overall found the intervention to be moderately acceptable. However, pre-clinic preparation, using unfamiliar software not designed for clinical dietetics, was time consuming.
Conclusion: The use of an online 24-hr recall dietary tool by patients prior to their dietetic appointment was a feasible and acceptable method of dietary assessment for both patients and dietitians. Tailoring the software of such tools to clinical dietetics in the future may further improve effectiveness and could enable DA technology to be used more widely in dietetic practice.

References:

1. Foster E, Hawkins A, Delve J AA. Reducing the cost of dietary assessment: Self-completed recall and analysis of nutrition for use with children (SCRAN24). *J Hum Nutr Diet*. 2014;*27*(Supp1):26–35.
2. Carter M; Albar S; Morris M; Mulla U; Hancock N.; Evans C et al. Development of a UK Online 24-h Dietary Assessment Tool: myfood24. *Nutrients*, 2015;*7*(6):4016–32.

Fluid intake of UK healthcare workers and barriers to fluid intake at work: An exploratory cross-sectional study

K Jones[1], A Knight[1], R Gibson[1]
[1]Department of Nutritional Sciences, School of Life School Sciences, King's College London, London, UK

Corresponding Author: Kitty Jones, kitty.jones@kcl.ac.uk

Background: Dehydration has been associated with acute negative effects on cognition, work performance and long-term health(1). Optimal hydration in the healthcare setting may have beneficial effects on staff health, productivity, safety and patient outcomes(2). The aims of this research were to 1) characterise UK healthcare worker fluid intake, 2) assess adherence to European Food Safety Authority (EFSA) adequate intakes (AIs)(3) and 3) identify barriers to fluid intake while at work.

Methods: Ethical approval for this cross-sectional study was granted by King's College London [MRA-18/19-14102]. Self-reported fluid intake at work and over 24-hours on a typical working day were assessed using a modified version of an American beverage intake questionnaire(4). Occupational and demographic data were collected; barriers to intake were assessed using a predefined list and free text option. The questionnaire was disseminated online between 13.11.19 and 26.11.19 via the social media platforms Facebook and Twitter. From 494 responses, 415 were complete and included in the analysis. Associations between intake, workplace environment and role were tested using Mann Whitney U, Kruskal-Wallis and Chi-squared tests.

Results: Median daily intake over 24-hours was 1600ml (IQR 1200 ml) with significant differences across job role and location (Table 1). AIs of 2 L for men and 1.6 L for women were met by 55.7%. Median intake in the workplace was 800ml/day (IQR 800 ml). Barriers to fluid intake (Table 2) were experienced by 84% of respondents. Intentionally restricting fluid intake at work was reported by 49% of these respondents 54% reported this was due to limited toilet access.

Table 1: Job role and location associations with 24-hr fluid intake

Job	**n**	**Median intake (ml)**	**IQR**	**P**
1) AHP	27	2200	1100	
2) Doctor ‡	155	1400	1200	<0.001
3) Nurse † ∓	192	1800	1200	
4) Non-clinical †	41	1600	1200	
Location	**n**	**Median intake (ml)**	**IQR**	**P**
1) Community	276	1600	1000	
2) Hospital ‡	124	2000	1200	0.002
3) Admin/office	10	1400	1250	

Pairwise comparison levels of significance: Different from 1): † p = ≤ 0.05, ‡ p = ≤ 0.01. Different from 2) ∓ p = ≤ 0.05. AHP, Allied health professional

Table 2: Frequency of experiencing barriers to drinking at work

Barrier to drinking	**(%)**
Too busy	73.7
Forget to drink	64.6
Unable to take a break	31.8
Difficulty accessing toilets	26.0
Unable to drink in work environment	12.8
No barrier	11.6
Other	4.6
Work related clothing impedes drinking	1.2

Discussion: The fluid intakes reported in this study are comparable to workplace intakes of non-healthcare workers(5). Adherence to AIs in this study were lower than the 70% reported in the UK Fluid Intake Study(6), suggesting that healthcare workers may be less able to meet recommendations, which could be due to workplace barriers. Limitations of this study include convenience sampling and the lack of a validated UK fluid intake assessment tool.

Conclusion: Approximately half of respondents did not achieve intake recommendations and barriers to fluid intake were experienced by the majority of respondents suggesting the need to promote hydration for people who work in healthcare environments.

References:

1) Liska, D., Mah, E., Brisbois, T., et al. 2019. Narrative review of hydration and selected health outcomes in the general population. Nutrients, 11, 70.
2) Brands, M., Hockey, P., Sced, A. et al. 2017. Fasting and surgical performance: potential source of harm? Brit J Oral Max Surg, 55, 755-756.
3) European Food Standards Authority 2010. Scientific opinion on dietary reference values for water. EFSA Journal, 8(3), p.1459.
4) Hedrick VE, Comber DL, Estabrooks PA (2010) The Beverage Intake Questionnaire: Determining Initial Validity and Reliability. J Am Diet Assoc 110, 1227–1232.
5) Mears, S. A. & Shirreffs, S. M. 2015. Assessing hydration status and reported beverage intake in the workplace. Am J Lifestyle Med, 9, 157-168.
6) Gandy, J. 2012. First findings of the United Kingdom fluid intake study. Nutrition Today, 47, S14-S1

The Clinical Consequences of Post-Diagnosis Weight Gain in Women with Breast Cancer: A Systematic Review

J Kingsnorth [1], L Miller [2], F McCullough [1]

1. Division of Nutritional Sciences, School of Bioscience, University of Nottingham, Sutton Bonington Campus, Loughborough, LE12 5RD
2. Department of Nutrition and Dietetics, City Hospital, Nottingham University Hospitals NHS Trust, Hucknall Road, Nottingham, NG5 1PB

Corresponding Author: Joanne Kingsnorth, jconsidine88@hotmail.com

Background: Weight gain after breast cancer diagnosis is common, and often persists into survivorship. While pre-diagnosis obesity is associated with poorer breast cancer outcomes [1], the clinical consequences of post-diagnosis weight gain require exploration. This systematic review aimed to determine the effects of post-diagnosis weight gain (≥5% bodyweight increase) on prognostic and patient-reported outcomes (PROs) in women with breast cancer.

Methods: Electronic databases were used to identify English-language studies published between 2009 and 2019, including: PubMed, PsycINFO and Web of Science. Articles considered for inclusion were quantitative observational and intervention studies comparing outcomes in adult women who gained weight (≥5% bodyweight increase) post breast cancer diagnosis with those who remained weight-stable (<5% change). A standardised data extraction form was used to report on study design and outcomes. The quality of the included studies was assessed using the Newcastle-Ottawa Scale for observational studies. Ethical approval was not required.

Results: No eligible intervention studies were identified; of eight included cohort studies, five reported prognostic outcomes (disease recurrence and mortality) and three evaluated PROs (physical function, physical health-related quality of life [HRQOL] and hot flush symptoms). Post-diagnosis weight gain was associated with an increased risk of all-cause mortality in two of four studies and breast cancer-specific mortality in one of two studies, but not recurrence. Women who gained weight reported significantly lower physical HRQOL ($p<0.05$), and those whose weight increased by at least 10% also experienced significantly worse hot flush symptoms and physical function than weight-stable women.

Discussion: While post-diagnosis weight gain appears to adversely affect patient-reported outcomes (PROs) the prognostic consequences remain unclear, likely due to heterogeneity in study design such as duration of follow-up and level of covariate adjustment. Previous reviews have similarly reported conflicting findings [2,3], however, these have synthesised results from more dated studies that do not reflect prognostic outcomes in the context of current treatments. Further high-quality cohort studies of standardised design are needed to better define the needs of this patient group and support the development of evidence-based oncological weight management strategies.

Conclusions: Women who gain weight after breast cancer diagnosis may be at greater risk of mortality and poorer PROs (physical wellbeing) than weight-stable women, particularly if gains exceed 10%.

References:

1) Azrad M, Demark-Wahnefried W. The association between adiposity and breast cancer recurrence and survival: A review of the recent literature. Curr Nutr Rep. 2014;3(1):9-15.
2) Vance V, Mourtzakis M, McCargar L, et al. Weight gain in breast cancer survivors: prevalence, pattern and health consequences. Obes Rev. 2011;12(4):282-94.
3) Playdon MC, Bracken MB, Sanft TB, et al. Weight gain after breast cancer diagnosis and all-cause mortality: Systematic review and meta-analysis. J Natl Cancer Inst. 2015;107(12):djv275. Available from: doi: 10.1093/jnci/djv275 [Accessed 26/11/19].

The effect of a food provision improvement strategy on the nutritional quality of the menu plans used within residential homes for Adults with Learning Disabilities, and on the weight of overweight and obese residents.

A Larkin
Sutton Health & Care, Adult Community Dietetic Service, Adult Therapies, Roundshaw Health Centre, First Floor, 6 Mollison Square, Wallington, SM6 9DW

Corresponding Author: Alex Larkin, alex.larkin@nhs.net

Background: While obesity is a major health concern for the general population[1], individuals with learning disabilities experience a disproportionately high risk of obesity and obesity related co-morbidities[2]. People with learning disabilities who live in more restrictive environments (such as residential homes) are also more likely to be obese than the general population[3]. Dietary intake in those with a learning disability is often of poor nutritional quality and outside of recommended values for both macronutrients and micronutrients[4]. A food provision improvement strategy has the potential to improve the quality of the diets consumed by all residents within a residential home (RH). The aim of this study is to evaluate the impact of a staff education programme on the quality of food provided in residential homes for Adults with Learning Disabilities (RHALD) and on the weight of overweight and obese residents.

Methods: From the existing dietetic weight management caseload, fifteen RHALD were identified as having more than one resident who was overweight or obese. Weight of all consenting residents (n=64) was determined at baseline and at three monthly intervals throughout the intervention. Mean intervention length was 28.15 weeks. Dietary education comprising of basic healthy eating principles, portion size guidance and menu planning recommendations was provided by a dietitian, to RH staff. RH staff were instructed to make changes to their standard menu plans, based on the education they received, and further support was provided to ensure that the new menu plans represented a healthy balanced diet. Ethical approval was not required to provide education sessions to RH staff or to complete the service evaluation.

Results: Following the provision of the education programme to RH staff, and subsequent changes to the menu plans used within the RH, 66.7% of overweight and obese residents lost weight. 46.7% of these residents lost a clinically significant amount of weight (≥5% body weight). Mean weight loss of 5.75kg was achieved. The change in frequency that certain food types were included in menu plans was recorded as follows; 65% reduction in red meat; 79% reduction in processed meat; 176% increase in fish; 340% increase in oily fish.

Discussion: The dietetic intervention enabled improvements to the quality of food provision within RHALD, through provision of nutrition education to RH staff. Improved alignment of menu plans with basic healthy eating principles and standard portion size guidelines, may explain the weight loss experienced by some residents. A limitation of this study is that external factors which impact energy balance, such as changes in activity level or health condition, were not measured.

Conclusion: The study highlights the impact that dietetic involvement can have in improving the quality of the diet provided within RHALD. This may promote weight loss in overweight and obese residents. Supporting RHALD to provide healthy, well balanced diets is a time and cost effective first-line alternative to completing individual dietetic assessments for each overweight/obese resident and has an important role in the prevention and treatment of nutritional issues.

References:

1. World Health Organization. Obesity: preventing and managing the global epidemic. Geneva: World Health Organization; 2004.
2. Bhaumik S, Watson J, Thorp C et al. Body Mass Index in Adults with Intellectual Disability: Distribution, Associations and Service Implications. A Population-Based Prevalence Study. J Intellect Disabil Res. 2008, Apr;52(4):287-298.
3. Emerson E. 'From research to practice (and back again): Monitoring quality in supported accommodation for people with learning disabilities'. In: Burton M, Caton S, Kagan C, editors. Broadening the boundaries of learning disability research. Manchester: IOD Research Group; 2001. p.12-13 and 34-37.
4. Hoey E, Staines A, Walsh D, et al. An examination of the nutritional intake and anthropometric status of individuals with intellectual disabilities: Results from the SOPHIE study. J Intellect Disabil. 2017; 21(4):346-365.

A validation study of an updated iodine-intake screening tool for use in UK women of childbearing age

J Lutek*, E Southwick*, S Bath
*Joint first authors; Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, GU2 7XH.

Corresponding Author: Jagoda Lutek, s.bath@surrey.ac.uk

Background: Iodine is vital for the synthesis of thyroid hormones, which are essential for fetal neurodevelopment[1]. Previous studies have highlighted mild-to-moderate iodine deficiency in UK women of childbearing age (including pregnant women), and the subsequent risks to fetal development[1,2]. Current biomarkers are only suitable for the assessment of iodine status in populations, and there is no accurate method of assessing iodine status in individuals. Therefore, an iodine-screening tool has been developed at the University of Surrey to classify risk of iodine deficiency in individuals according to their iodine intake[3]; this tool has recently been updated to reflect iodine-content changes to products on the UK market (e.g. milk-alternatives). The aim of this project was to validate the updated version of the iodine-intake screening tool for estimating iodine intake against a reference method.

Methods: Healthy women of childbearing age (18-50 years) were recruited to the study. Participants completed the iodine-intake screening tool, alongside an un-weighed six-day food diary (the reference method). The screening tool was coded to calculate mean daily iodine intake using intake frequencies and iodine concentration per portion. Food diaries were analysed using the Nutritics software to estimate mean daily iodine intake. Individuals were classified as having an iodine intake that was sufficient (140-600 µg/day), insufficient (<140 µg/day) or excessive (>600 µg/day). Iodine intake was compared using paired t-tests and Spearman Rank Correlation, and Cohen's Kappa measure of agreement was used to compare the intake classifications. A favourable ethical opinion was given by the University of Surrey Ethics Committee (ref: 340-FHMS-17/20.12.2019).

Results: Twenty-six participants were recruited during January-March 2020. The median (25^{th}-75^{th} percentile) iodine intake was below the UK Reference Nutrient Intake (RNI 140 µg/day), whether assessed by the food diaries [94 (58-145) µg/day] or the screening tool [101 (74-161) µg]. None of the participants had excessive intake, and 31% had an intake below the Lower Reference Nutrient Intake (LRNI of 70 µg/day). There was a strong correlation (rs = 0.82, p<0.001) and no significant difference in iodine intake between methods (p = 0.053). There was moderate agreement (κ = 0.660, p<0.001) between both methods for the classification of iodine intake. The screening tool had a sensitivity of 88% (correct classification of insufficient intake), and a specificity of 78% (correct classification of sufficient intake).

Discussion: The screening tool effectively classified participants according to their intake and was less burdensome than completing a six-day food diary. The results were an improvement on the previously-developed tool[4] with a stronger correlation and agreement between the two methods. It also improves on other iodine-specific FFQs in the UK and Europe[5,6]. The data suggest a proportion of this group had low iodine intake and would be at risk of iodine deficiency, which may have consequences for fetal development if they become pregnant. Further work is required to evaluate this tool in other population groups, such as pregnant women, and groups at high-risk of deficiency, such as vegans.

Conclusion: This screening tool is an effective and simple method of assessing iodine intake, by classifying individuals into insufficient and sufficient categories, therefore identifying those at risk of deficiency.

References:

1. Bath SC & Rayman MP (2015) Environ Geochem Health 37, 619-629.
2. Vanderpump et al. (2011). Lancet 377, 2007-2012
3. Alvarez-Goel, A & S.C. Bath (2017) J Hum Nutr Diet; doi.org/10.1111/jhn.12535
4. Patel J, Heighington-Wansbrough A & Bath SC (2019) J Hum Nutr Diet, doi.org/10.1111/jhn.12627
5. Głąbska et al. (2017) Int J Environ Res Public Health; doi: 710.3390/ijerph14070700.
6. Combet et al. (2015). Br J Nutr 114:108–17

A qualitative study to understand the optimum nutrition needs of sickle cell patients and the influencing socio-ecological factors

C. Matthews
Anglia Ruskin University (ARU), Faculty Health, Education, Medicine and Social Care, Bishop Hall Lane, Chelmsford CM1 1SQ
D. Smith
ARU, Faculty Health, Education, Medicine and Social Care, Bishop Hall Lane, Chelmsford CM1 1SQ
M. Hawkins
ARU, Faculty Health, Education, Medicine and Social Care, Bishop Hall Lane, Chelmsford CM1 1SQ
K. Ghebremeskel
Lipidomics and Nutrition Research Centre, London Metropolitan University, 166-220 Holloway Road, N7 8DB

Corresponding Author: Claudine Matthews, cem181@pgr.aru.ac.uk

Background: Sickle Cell Disease (SCD) is the fastest-growing genetically inherited red blood cell disorder in the UK[1]. Nutritional deficiency, which is thought to be the natural consequences of the pathophysiology of the condition[2], is prevalent in sickle cell patients. The deficiency is associated with impaired growth and development and increased morbidity and mortality. Currently, nutrition is not integrated into sickle cell healthcare provision in the UK and other countries. Indeed, the optimal nutrition needs of patients with the disease remain to be fully explored. The study aims to ascertain the knowledge of the optimum nutrition needs of sickle cell patients and the influencing socio-ecological factors.
Method: The research is part of a Professional Doctorate. It is a four-phase qualitative study using a Learning Alliance Methodology, purposive sampling and gatekeepers to recruit sickle cell service users and carers (n=11) and service providers (n=7). Full ethical approval was obtained from Anglia Ruskin University ((ESC-SREP-18-334). The study did not require NHS ethics, as data collection was conducted in non-NHS venues with free-living sickle cell patients. Data collection included zoom enabled focus groups, nutrition network meetings and an evaluation questionnaire. Thematic data analysis was used in the study.
Results:

Participant Group/Topics	Participant Quotes	Interpretation
1.Sickle Cell Service users: Knowledge of nutrition	"All I know about nutrition I've had to self-research"; "I've recently been diagnosed with osteoporosis; why hasn't anyone told me about this risk before?"	Poor access of sickle cell patients to nutrition services may have a negative impact on their knowledge of nutrition and their risk for poor health and wellbeing outcomes.
2.Sickle Cell Service providers: Personal factors influencing nutrition	"We get a lot of depression in the kids"; "children want to fit in with their friends".	Depression, in any age group but particularly in children, is a serious personal psychological factor that may impact on the nutritional intake of vulnerable children.

Discussion: These findings support a case for the provision of a nutrition service in sickle cell healthcare management. Such a provision would help enhance the nutritional knowledge of both service users and providers, and promote health and wellbeing in patients by ameliorating nutritional deficiency and associated complications.
Conclusion: There is a need to provide a nutrition service in sickle cell healthcare management to improve health outcomes for sickle cell patients and address the nutrition knowledge gaps of both sickle cell service users and providers.

References:

1. Sickle Cell Society. Standards for the Clinical Care of Adults with Sickle Cell Disease in the UK; 2018.
2. Hyacinth HI, Gee BE & Hibbert JM. The role of Nutrition in Sickle Cell Disease. Nutr and Met Insights. (2010); 3: 57-67.

Evaluating the impact of digital (Skype) appointments in an antenatal gestational diabetes (GDM) clinic and the effect on related pregnancy outcomes

Shane McAuliffe[1,2,3], Rob Skinner[1] Emma Evans[4], Syed Haris Ahmed[4]
[1] Clinical Sciences and Nutrition, University of Chester, Parkgate Road, Chester, CH1 4BJ, UK.
[2] Liverpool University Hospitals NHS Foundation Trust, Liverpool, L7 8XP, UK.
[3] NNEdPro Global Centre for Nutrition and Health, St John's Innovation Centre Cambridge, CB4 OWS, UK
[4] Countess of Chester Hospital NHS Foundation Trust, Chester, CH2 1UL, UK.

Corresponding Author: Shane McAuliffe, shane95mcauliffe@gmail.com

Background: The reported prevalence of gestational diabetes mellitus (GDM) has risen sharply in recent years, owing to changing diagnostic criteria and population demographics(1). Regular outpatient contact is essential in GDM patients, which is limited by a large demand for these services and comparatively limited capacity to fulfil them(2). For this reason there has been significant interest in alternatives to the standard outpatient model of care(3).
Methods: We analysed retrospective patient data from an antenatal diabetes service. This comprised two groups, one treated via an opt in Skype clinic, held weekly by a dietitian and diabetes specialist nurse (DSN) (n=50). The comparison group were treated as per standard practice (n=50), where an initial group education session was provided before discharge from the dietetic service. We assessed differences in pregnancy outcomes (birth outcomes, mode/onset of delivery) and time to treatment (TTT), or time until medication was required to help achieve blood glucose targets, between the groups. We also assessed patient satisfaction with the Skype service through a treatment satisfaction questionnaire. Ethical approval was granted in partial fulfilment of an MSc research project in the University of Chester (FREC: 1624/20/SMA/CSN).
Results: A significant difference in TTT was observed between the Skype intervention and traditional practice. Skype patients had a significantly longer TTT with metformin (30.5 days [IQR 23.75-46] vs. 10.5 days [IQR 4.25-17.75], p=0.001) and significantly longer TTT with insulin (73.14 ± 40.03 days vs. 27.45 ± 18.92 days, p=0.008) than patients in the traditional treatment group. Overall satisfaction with the Skype service was high. No significant differences were observed between baseline characteristics or pregnancy outcomes between groups.
Discussion: Skype appointments in the antenatal diabetes clinic can offer significant benefits to both the patient and the healthcare provider. We observed similar pregnancy outcomes and high levels of satisfaction with the service. We also saw significantly extended time to treatment with hypoglycaemic medications.
Conclusion: These results highlight the benefits of facilitating regular contact and additional dietetic support in this patient with GDM.

Keywords: Digital Health, Dietitian, Insulin, Metformin

References:

1. Kennelly, M., & McAuliffe, F. (2016). Prediction and prevention of Gestational Diabetes: an update of recent literature. European Journal Of Obstetrics & Gynecology And Reproductive Biology, 202, 92-98. https://doi.org/10.1016/j.ejogrb.2016.03.032
2. Chilelli, N., Dalfrà, M., & Lapolla, A. (2014). The Emerging Role of Telemedicine in Managing Glycemic Control and Psychobehavioral Aspects of Pregnancy Complicated by Diabetes. International Journal Of Telemedicine And Applications, 2014, 1-7. https://doi.org/10.1155/2014/621384
3. Royal College of Physicians (2018). Outpatients: the future – adding value through sustainability. Retrieved from https://www.rcplondon.ac.uk/projects/outputs/outpatients-future-adding-value-through-sustainability

Prevalence of excessive preoccupation with body image and health eating among dietitians in hospitals in the East of England: a cross sectional study

T McBean-Willis, A Mashanova and L Blanchard
School of Life and Medical Sciences, University of Hertfordshire, Hatfield AL10 9AB

Corresponding Author: Tamica McBean-Willis, tamica2007@hotmail.co.uk

Background: Studies have reported a high prevalence of body image dissatisfaction or obsessive preoccupation with "healthy" eating among dietitians and students in nutrition and dietetics [1-2]. The situation in the UK is not documented. This project aimed at exploring the prevalence of appearance anxiety and excessive preoccupation with healthy eating (EPHE) among dietitians working in hospitals in the East of England.

Methods: Dietitians working in hospitals in the East of England were invited in January-March 2020 via the British Dietetics Association East of England Branch to participate in a cross-sectional online survey. The latter included the Appearance Anxiety Inventory (AAI) [3], the widely used Orthorexia Nervosa Assessment Scale 15 (ORTO-15) [4], and a classification of dietetics specialisations based on being typically associated with advising patients to lose weight or not. The scores for each tool were calculated by two researchers independently. Two thresholds were used to suggest EPHE with the ORTO-15: <40 and <35 [4,5]. Data were analysed in SPSS using the Spearman's rank test, independent t-test, and Mann-Whitney U test. Ethical approval was granted by the University of Hertfordshire (LMS/UG/UH/03982).

Results: Twenty-eight dietitians completed the questionnaire, with a median (IQR) of 8.0 (3.3-13.0) for the AAI, and a mean (SD) of 39.4 (3.6) for the ORTO-15. The ORTO-15 suggested that 53.6% were at risk of EPHE using the <40 cut-off, and 11.0% with <35. The AAI and ORTO-15 scores were not correlated (r_s=-0.16, p=0.42, n=28). 21.4% had a specialisation related to weight loss, while 60.7% did not. No difference was found between these groups for both the AAI (U=56, p=0.76) and ORTO-15 (t(21)=-0.71, p=0.48). Among the remaining participants, three reported having both types of specialisation, and two did not have one. There was a statistically significant negative relationship between the AAI and ORTO-15 in the weight-loss specialisation group (r_s=-0.88, p=0.02, n=6).

Discussion: The AAI scores were low compared to those of groups with a clinical diagnosis of body dysmorphic disorder [3]. Similar proportions of dietitians at risk of EPHE have been reported with the ORTO-15 and a threshold of <40 [2]. However, since the ORTO-15 does not measure clinically significant impairment on health and psychosocial dimensions [5], the <35 threshold might provide a more realistic picture.

Conclusion: Few dietitians in the region appear to be highly preoccupied with their body image whereas more might be at risk of EPHE; this needs to be examined on a greater scale and to consider clinical impairment.

References:

1. Toral N, Bauermann Gubert M, Spaniol AM et al. Eating disorders and body image satisfaction among Brazilian undergraduate nutrition students and dietitians. Arch Latinoam Nutr. 2016;66(2):129-134.
2. Tremelling K, Sandon L, Vega GL et al. Orthorexia nervosa and eating disorder symptoms in registered dietitian nutritionists in the United States. J Acad Nutr Diet. 2016;117(10):1612-1617.
3. Veale D, Eshkevari E, Kanakam N et al. The Appearance Anxiety Inventory: validation of a process measure in the treatment of body dysmorphic disorder. Behav Cogn Psychother. 2014;42:605-616.
4. Donini LM, Marsili D, Graziani MP et al. Orthorexia nervosa: Validation of a diagnosis questionnaire. Eat Weight Disord. 2005;10:e28-e32.
5. Dunn T & Bratman S. On orthorexia nervosa: A review of the literature and proposed diagnostic criteria. Eat Behav. 2016;21:11–17

Acknowledgements: The authors would like to thank Joanne Malocca from the BDA East of England Branch for her feedback on the questionnaire and for distributing it.

The knowledge and attitudes of dietitians towards the health effects of vegan diets.

H Pettitt[1], J Clark[1]
[1]Robert Gordon University, School of Health Sciences, Ishbel Gordon Building, Garthdee Road, Aberdeen, AB10 7QE.

Corresponding Author: Holly Pettit, h.pettitt@rgu.ac.uk.

Background: The number of individuals following a vegan diet in the UK is increasing[1] and although some may face nutritional shortfalls, research suggests following a vegan diet has many benefits to health such as reduced risk of type 2 diabetes, coronary heart disease, stroke and certain types of cancer when compared with individuals following non plant-based diets[2]. As nutritional experts, it is vital that dietitians have accurate knowledge of all diet patterns to effectively educate their patients. The aim of this study was to investigate the knowledge and attitudes of dietitians regarding vegan diets to inform further training requirements.
Methods: A cross-sectional survey design incorporating an online questionnaire was developed, piloted among a small group and then distributed via a link posted on the BDA website and to personal contacts of the authors. 77 questions addressing demographic data, experiences of vegan diets, knowledge of the health effects of vegan diets, attitudes towards the health effects of vegan diets and training/support needs were asked. The knowledge section was further categorised into diet definitions, general knowledge, nutrition support and role and sources of specific nutrients. Diet definitions were correct if matched with pre-identified definitions. Questions were a mixture of multiple choice, open text, true/false and 5-Point Likert Scale questions. Statistical analysis was undertaken using SPSS™ looking at demographics and experience vs knowledge and attitude. The level of significance was set at $P<0.05$. Chi-squared test for independence was used to determine significant differences between variables. Demographic variables were compared with Likert scale responses using Kruskal-Wallis and Mann-Whitney U tests and qualitative data was analysed using content analysis of the responses. Ethical approval was obtained via the School of Health Sciences Research Ethics Committee (ref: SHS/19/43).
Results: Seventeen female dietitians from varying grades and specialities completed the survey answering 84.9% of the 36 knowledge questions correctly, however scoring 85.3% incorrectly in the nutrition support section. The Likert scale questions showed dietitians were concerned about the nutritional adequacy of most vegan diets (P=*0.003*) and did not think individuals following a vegan diet had adequate knowledge to prevent deficiency (P=*0.011*). When asked if they believed a well-planned vegan diet was suitable for patients of any age, 41.2% (*n* 7) agreed and 47.1% (*n* 8) disagreed and there were conflicting views when asked about different life stages. Dietitians believed it was important for the profession to have knowledge of vegan diets for future dietetic practice (100%, *n* 17). They also felt they needed further training regarding patients following a vegan diet (P=*0.019*), specifically around key issues to look out for and specific information for the acutely unwell population.
Discussion: To the knowledge of the researcher, this was a novel study that has not been completed before in the UK. In this small study sample, it was found that dietitians would like additional training and information regarding vegan diets. Although knowledge appeared to be adequate, more could be done to improve knowledge in the area of nutrition support and other areas of dietetic practice not investigated in this study. Surprisingly, attitudes towards vegan diets differ slightly to the BDA statement regarding the suitability of a vegan diet and there was debate about which life stages they believed a vegan diet to be suitable for. Further research is required to fully identify UK dietitian training and information needs for vegan diets.
Conclusion: As the sample size was very small these results cannot be generalisable for all dietitians within the UK however, it suggests this may be an area of interest for future research. An important area to explore would be the influence of vegan diets on dietetic practice across different fields and on patients with additional health conditions.

References:

1. The Vegan Society.com [Internet]. Birmingham: The Vegan Society, 2019 [updated 2020, cited 2020 June 30]. Available from: https://www.vegansociety.com/news/media/statistics
2. Tuso PJ, Ismail MH, Ha BP, Bartolotto C. Nutritional update for physicians: plant-based diets. The Permanente Journal. 2013;17(2):61

A retrospective audit of weight changes in adult patients receiving standard protocol enteral feeding on a Neuro Intensive Care Unit

M Widger
Department of Nutrition & Dietetics, Derriford Hospital, University Hospitals Plymouth NHS Trust, Derriford Road, Plymouth, PL6 8DH, UK

Corresponding Author: Maria Widger, maria.widger1@nhs.net

Background: Enteral nutritional intervention on the Intensive Care Unit (ICU) needs to be carefully planned and tailored to each individual[1]. Dietitians have the knowledge and skills to provide the most appropriate enteral feeding regimens and ongoing monitoring for complex critical care patients to minimise weight loss[2]. Significant weight loss is defined as involuntary weight loss of 5% or more in one month[3].The Neuro ICU where this study took place does not routinely refer for dietetic input. A standard ICU protocol feeding regimen is used for all enterally fed patients. The aim of this audit was to determine the extent of weight changes in adults receiving standard protocol enteral feeding whilst on the Neuro ICU.
Methods: A retrospective audit to examine any weight changes that occur in enterally fed patients receiving standard protocol feeding on the Neuro ICU. A total of 35 patients (23 male, 12 female), selected between July and December 2019, met the inclusion criteria of being exclusively enterally fed during their entire stay on the Neuro ICU. Range of ICU length of stay (LOS) was 1 to 30 days. Anonymous data were collected during dietetic assessments of these patients on the acute Neurosurgical ward post ICU stay and via ICU database records. Data collected included; weight upon admission to and leaving the ICU, and length of stay (LOS) on the ICU. Microsoft Excel was used to analyse data. Results were expressed as mean and standard deviation. Ethical approval was not required, however, this audit was registered with the hospital audit office.
Results: Weight loss occurred in 77% (n = 27) of patients. No weight change occurred in 14% (n = 5) of patients. Weight gain occurred in 9% (n = 3) of patients. Mean weight changes for all patients on ICU were decreases of 3Kg (+/- 3.9) and 4% (+/- 4.9) from admission weight. Mean weight changes, by LOS on the ICU, were decreases of 0.8Kg (+/- 1.3) and 1.1% (+/- 1.6) for 1 to 7 days (n = 11), 4.3Kg (+/- 4.0) and 5.2% (+/- 5.2) for 8 to 14 days (n = 16), 3Kg (+/- 0.0) and 5.3% (+/- 1.0) for 15 to 21 days (n = 3) and 4.9Kg (+/- 6.1) and 6.6% (+/- 7.8) for 22 to 30 days (n = 5). The co-efficient of determination values for mean weight decreases were $R^2 = 0.61$ and $R^2 = 0.81$, for Kg and %, respectively.
Discussion: The majority of patients receiving a standard protocol enteral feed lost weight during their ICU stay. The R^2 values indicate a strong correlation between LOS and mean weight loss, i.e., the longer patients remained on the ICU, receiving a standard protocol feed, the more weight they lost. For patients with LOS on the ICU for over 7 days, mean weight loss was significant (over 5%), increasing the risk of malnutrition in this patient population[3]. A limitation of this audit was its relatively small sample size.
Conclusion: The use of a standard feeding protocols on the Neuro ICU appears to contribute towards significant weight loss and an increased risk of malnutrition in exclusively enterally fed patients. This occurs especially when LOS is over 7 days and the longer the LOS, the greater the mean weight loss. A pilot study of how dietetic input could minimise weight loss and risk of malnutrition in this patient population is recommended.

References:

1. Singer, P.; Blaser, A. R.; Berger, M. M., et al. ESPEN guideline on clinical nutrition in the intensive care unit, Clinical Nutrition. 2019, 38, 48 – 79.
2. Terblanche, E., and Bear, D. Guidelines for the provision of Intensive Care services, Intensive Care Society, Edition 2, 2.7, 53 – 55.
3. White, J. V.; Guenter, P.; Jensen, G., et al. Consensus Statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition: Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Under-nutrition). *JPEN J Parent Ent Nutr.* 2012; 36:275-283.

A retrospective audit of the adequacy of energy and protein provision in a standard enteral feeding protocol in patients on a Neuro intensive care unit

M Widger
Department of Nutrition & Dietetics, Derriford Hospital, University Hospitals Plymouth NHS Trust, Derriford Road, Plymouth, PL6 8DH, UK.

Corresponding Author: Maria Widger, maria.widger1@nhs.net

Background: Propofol is a lipid based sedative, containing 1.1kcals/ml, which is regularly used for ventilated patients in the intensive care unit (ICU)[1]. High doses can contribute towards excess energy and inadequate protein intake if enteral feeding is not adjusted appropriately by a dietitian[1]. The Neuro ICU where this study took place does not routinely refer for dietetic input. A standard ICU feeding protocol is used for all enterally fed patients. This does not take into account energy provided by propofol. The aim of this audit was to determine the adequacy of energy and protein provided on the Neuro ICU in comparison with dietitian estimated requirements for each individual.

Methods: A retrospective audit to examine adequacy of energy and protein provision for patients receiving protocol enteral feeding for their entire stay on the Neuro ICU. Anonymous data were collected from the ICU database records; including admission weight, hourly rate of feed and hourly rate of propofol. Total intake over 24 hours was calculated. Estimated requirements for energy and protein were calculated, using ESPEN and PENG critical care guidelines[2, 3]. Appropriate requirement adjustments were made for obese patients. Microsoft Excel was used to analyse data. Results were expressed as mean and standard deviation. Ethical approval for this audit was not required, however, this audit was registered with the hospital audit office.

Results: A total of 35 patients (23 male, 12 female) were included in this study. Length of stay (LOS) ranged from 1 to 30 days, between July and December 2019. Overall differences between provision and estimated requirements was an excess of 18kcals (+/- 377), a deficit of 23g (+/- 12) and a deficit of 45g (+/- 14) for energy, minimum and maximum amount of protein per day respectively.

Table: Mean differences between provision and estimated requirements by propofol (ml/hr) category

Propofol (mls/hr)	**0**	**5**	**10**	**15**	**20**	**25**	**30**
Energy (kcals)	-364	-123	-60	8	173	422	153
Minimum protein (g)	-26	-28	-17	-19	-20	-20	-32
Maximum protein (g)	-49	-51	-39	-39	-43	-41	-57

Discussion: Overall, an excess of energy and a deficit of protein was provided by the protocol enteral feed. Patients receiving propofol at a rate of 0 - 10mls/hr received a deficit of energy and protein. Patients receiving propofol at a rate of 15 – 30mls/hr received an excess of energy but a deficit of protein. The ICU protocol did not adequately provide the optimum amount of energy and protein to this patient group. Adjustment of enteral feeding regimens for each individual on the ICU is essential to avoid overfeeding energy whilst providing adequate protein[1].

Conclusion: The ICU protocol enteral feed is inadequate in the provision of energy and protein to meet individual estimated requirements, putting patients at risk of under or overfeeding of energy and underfeeding of protein. This highlights the need for dietetic input on the Neuro ICU to provide optimum nutrition for each individual.

References:

1. Buckley, C. T. and Dickerson, R. N. Propofol: A risk factor for Caloric overfeeding and inadequate protein delivery. Hospital Pharmacy, 2020, 55, 152 – 153.
2. Singer, P.; Blaser, A. R.; Berger, M. M., et al. ESPEN guideline on clinical nutrition in the intensive care unit, Clinical Nutrition. 2019, 38, 48 – 79.
3. Todorovic, V. E. and Mafrici, B. PENG: A pocket guide to clinical nutrition. 5th ed. 2018, 16.1 – 16.19.

Nutrition Support

Supported by BDA Parenteral & Enteral Specialist Group

Return to contents page

The impact of food fortification on weight and cardiometabolic outcomes in community based elderly individuals: A systematic review

R Haines & R Davies
Faculty of Health and Life Sciences, Coventry University, Coventry, UK

Corresponding Author: Rachel Haines

Background: Food fortification is widely recommended by dietitians in clinical practice [(1)]. High intakes of saturated fat are associated with an increased risk of cardiovascular disease (CVD) and account for 45% of deaths from non-communicable diseases [(2)]. Data suggests that 83.3% of adults aged 65 years and over exceed the daily recommendation of saturated fat intake [(3)]. The aim of this review was to examine whether food fortification is a healthy approach in the elderly population and what impact it has on weight, body mass index (BMI) and cardiometabolic outcomes (blood pressure, total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides and HbA1C).
Methods: CINAHL, MEDLINE, Academic Search Complete, the Cochrane Library and SCOPUS were searched in April 2020. Reference lists of obtained studies were also examined. Studies were included if they met the following criteria: adults > 65 years living in the community or residential service; mean BMI <18.5kg/m2 or identified as being malnourished/ at risk of malnutrition using a validated screening tool; food fortification from everyday foods or dietary advice. Studies that included oral nutritional supplements (ONS) alongside food fortification were excluded. Risk of bias was assessed using the Cochrane risk of bias tool [(4).]
Results: 435 studies were identified from the search. Five studies met the inclusion criteria and were included in the review: three randomised controlled trials and two cluster randomised trials (n=356, mean age 68.9 - 90.9 years). Two studies researched home living individuals and the other three studies were conducted in residential services. In two studies common ingredients (e.g double cream, butter, whole milk) were used to fortify the current diet while the remaining studies provided dietary information. One of these studies also provided the intervention group with a supply of milk powder alongside dietary information. Participants in the intervention groups across all five studies experienced an increase in weight (range 0.48 - 2kg) which was greatest in those that received fortification through common ingredients (+ 1.3kg p = 0.03, +2kg p = 0.001) or milk powder (+ 1.2kg no p value). The control group of this study who received only a leaflet with food fortification advice that was not discussed with them had lost weight (-0.9kg) at 12 months. Only two studies examined changes in BMI with both finding a statistically significant difference (p=0.042, p =0.007). None of the studies reported on cardiometabolic outcomes. All studies showed substantial risk of bias.
Discussion: Findings support the use of food fortification within dietetic practice to promote weight gain. Weight gain was greatest in the studies where participants received the energy dense foods compared to those where only dietary advice was provided. It could be suggested that just providing individual with written information is ineffective as a result of the control group who received this losing weight. None of the studies had assessed the impact on cardiometabolic outcomes and therefore more studies are required in this area.
Conclusion: Food fortification was found to have an increase in weight and BMI. None of the studies reported on the impact of food fortification on cardiometabolic outcomes.

References:

1. Baldwin, C., and Weekes, C. E. (2012) 'Dietary advice with or without oral nutritional supplements for disease-related malnutrition in adults'. *Cochrane Database of Systematic Reviews*. (9), CD002008
2. Scientific Advisory Committee on Nutrition (2019) *Saturated fats and health*. Available from :https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/814995/SACN_report_on_saturated _fat_ and_health [Accessed 26th January 2020]
3. Bates.B., Cox., L., Nicholson, P. et al. (2016) National Diet and Nutrition Survey Results from Years 5 and 6. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/551352/NDNS_Y5_6_UK_Main_Text [Accessed 21st January 2020]
4. Higgins, J. P. T., Saviovic, J., Page, M.J. et al. (2019) Revised Cochrane risk-of-bias tool for randomized trials (RoB 2). Available from <https://sites.google.com/site/riskofbiastool/welcome/rob-2-0-tool/current-version-of-rob-2?authuser=0> [Accessed 1st May 2020]

An exploration of nutritional adequacy in patients receiving extracorporeal membrane oxygenation and effects on gastrointestinal and physical function

T. Karpasiti[1], Dr Z. Puthucheary[2], Dr P. Zolfaghari[2].
[1] St Bartholomew's Hospital, City of London, EC1A 7BE; [2] Queen Mary University of London, Whitechapel, E1 2AD

Corresponding Author: Terpsi Karpasiti, terpsichori.karpasiti@nhs.net

Background: The use of extracorporeal membrane oxygenation (ECMO) in patients with severe cardiorespiratory failure has seen significant growth in the last decade. Despite this, there is paucity of data with regards to the optimum nutritional management of these patients. Recent observational studies have investigated associations between nutritional adequacy and clinical outcomes in ECMO patients[1-2], however data on gastrointestinal (GI) and physical function are limited. This service evaluation aimed to primarily identify barriers to achieving adequate nutritional provision in critically ill ECMO patients, and secondly to explore potential associations between nutritional adequacy, GI complications and physical function. Length of stay, duration on ECMO support and ICU survival were tertiary outcomes of interest.

Methods: A retrospective service evaluation of patients receiving veno-venous (VV) and veno-arterial (VA) ECMO on the intensive care unit (ICU) of a London teaching hospital was conducted. Mechanically ventilated adults admitted with cardiac and/or respiratory failure between January 2017 and December 2019 were included. Cumulative energy and protein delivery in the first 12 days of ICU were compared with estimated targets and reasons for feeding interruptions were identified from clinical records. Adequate nutrition was defined as receipt of ≥70% targets. GI complications (delayed gastric emptying [DGE] [gastric residuals >250ml], diarrhoea, bowel ischaemia) and Chelsea Critical Care Physical Assessment (CPAx)[3] measurements were also identified. Statistical analysis was performed using the Chi-squared test for categorical data (Fisher's Exact if values <5). Numerical data were analysed using the Mann-Whitney U test. A p value of <0.05 was considered statistically significant. Ethical approval was not required, and the project was approved by the Trust's clinical effectiveness unit (Ref 10783).

Results: Thirty-eight eligible patients met the inclusion criteria and were analysed. Median duration of ICU stay was 27 (IQR 18-42) days and ECMO 11 (IQR 9-18) days. All patients included were commenced on enteral nutrition within 48hrs of ICU admission, and 37% patients later required parenteral nutrition. The median 12-day energy delivery was 70.5% (IQR 45.25-79.5) and protein 57.5% (IQR 34.25-73) of targets, with no statistically significant difference between ECMO modalities. Underfeeding of energy occurred in 50% (n=19) and protein in 68% (n=26) patients. The most common reasons for suboptimal nutritional delivery were DGE (84%) followed by therapeutic and diagnostic procedures (68%). Adequate energy delivery (≥70%) was associated with a higher CPAx score on ICU discharge (median 25 vs 2, p <0.001) and lower ICU mortality (25% vs 61%, p=0.024). There were no statistically significant differences in GI complications, length of stay or ECMO duration.

Discussion: These findings are consistent with recently published data showing that inadequate nutritional delivery during ECMO is common[1] and may be associated with greater mortality[2]. The high incidence of DGE in this service evaluation may be attributed to the inclusion of VA-ECMO patients (n=19, 50%), who are more likely to suffer severe haemodynamic compromise on ICU admission. Indeed, haemodynamic instability and shock have been linked to greater incidence of GI complications in enterally-fed ventilated patients[4]. Further, adequate energy provision was associated with a higher CPAx score on ICU discharge. This is the first study investigating the effects of nutrition on the physical recovery of ECMO patients and findings are consistent with recent prospective data in non-ECMO ICU patients[5]. The findings are limited by the single-centred, retrospective study design and lack of data on disease severity. Nevertheless, these observations highlight the need for further prospective studies investigating the effect of nutrition on the clinical and physical recovery of ECMO patients.

Conclusion: Inadequate nutritional delivery during ECMO is common. ECMO patients with <70% energy delivery had a more compromised physical function on ICU discharge and higher ICU mortality.

References:

[1]MacGowan L, Smith E, Elliot-Hammond C et al. Adequacy of nutrition support during ECMO. Clin Nutr. 2019; 38:324-31.
[2]Lu MC, Yang MD, Li PC et al. Effects of nutritional intervention on the survival of patients with cardiopulmonary failure undergoing ECMO therapy. In Vivo. 2018; 32:829–34.
[3]Corner EJ, Soni N, Handy JM et al. Construct validity of the CPAx tool: an observational study of recovery from critical illness. Crit Care. 2014; 18: R55.
[4]Reignier J, Boisrame-Helms J, Brisard L et al. Enteral versus parenteral early nutrition in ventilated adults with shock: a randomised, controlled, multicentre, open-label, parallel-group study. Lancet. 2018; 391:133-43.
[5]Fetterplace K, Beach J, MacIsaac C et al. Associations between nutritional energy delivery, bioimpedance spectroscopy and functional outcomes in survivors of critical illness. J Hum Nutr Diet. 2019; 32:702-12.

Nutritional implications of Transoral Robotic Surgery- an initial review

K.Kholia[1], S.Germain[2], R. Quinn[1], G. Herrity[2].
[1]University Hospitals Birmingham NHS foundation trust. Department of Nutrition and Dietetics. Heartlands Hospital, Bordesley Green East. Birmingham B9 5SS.
[2] University Hospitals Birmingham NHS foundation trust. Speech and Language Therapy Department. Heartlands Hospital, Bordesley Green East. Birmingham B9 5SS

Corresponding Author: Krishna Kholia, krishna.kholia@heartofengland.nhs.uk

Background: Transoral robotic surgery (TORS) is being used more frequently in Head and Neck cancer care, for both diagnostic tongue base mucosectomy (TBM) and radical dissections/resections (RD/RR). Side effects of TORS include bleeding, pain and dysphagia (1) which can impact nutritional intake. There is emerging evidence on the impact of TORS on swallow function, nutritional impact and quality of life; however research in this area is still limited. Initial studies indicate very low rates of tube feeding one year post TORS(2) and less weight loss than patients receiving non-surgical treatments(3). The aim of this review was to investigate the nutritional impact of TORS, including weight loss and use of enteral feeding.
Method: A retrospective review of patients treated with TORS was carried. 11 patients underwent RD/RR (n=6) or TBM (n=5) over a 6 months period. Data was collected during inpatient admission and from routine outpatient appointments. Ethical approval was not required for this service review.
Results: Average BMI prior to TORS surgery was 28.7kg/m^2 (range 23.9-41.5kg/m^2); average post-operative BMI was 28.4kg/m^2 (range 23.8-41.5kg/m^2). Nasogastric feeding tubes remained insitu for an average of 1.7 days (0-11days) with the majority not being commenced on any enteral feed (81%). All patients were managing oral intake on discharge from hospital, however 4 (36%) patients required modified consistencies (2 required modified diet, 1 modified fluid and 1 required modifications to both diet and fluids). Average weight loss after surgery was 3.5kg (3.9% body weight loss), percentage weight loss was comparable in RD/RR and TBM (3.7% and 3.5% respectively). 6 patients proceeded to radiotherapy +/- chemotherapy and experienced a further 8.7% weight loss (3-24%). 1 patient required a prophylactic RIG prior to starting radiotherapy due to ongoing dysphagia and predicted risk of worsening dysphagia during radiotherapy. 1 patient received dietetic input prior to surgery, 2 during admission and 6 patients after surgery/radiotherapy.
Discussion: TORS has limited impact on nutritional status, with patients showing a clinically insignificant amount of weight loss (3.9%) and low dependence on enteral feeding. These findings are consistent with previous research in the area (2). The TORS pathway may provide an opportunity for prehabilitation/optimisation of nutritional status prior to further treatment.
Conclusion: More research, in a larger cohort of patients, is needed to fully understand the nutritional impact of TORS and the level of dietetic input required with these patients.

References:

(1) Hay A, Migliacci J, Karassawa Zanoni D, Boyle JO, Singh B, Wong RJ, Patel SG, Ganly I. Complications following transoral robotic surgery (TORS): A detailed institutional review of complications. Oral Oncol. 2017; 67 (160-166). Available from: https://pubmed.ncbi.nlm.nih.gov/28351571/
(2) Nichols AC, Theurer J, Prisman E, Read N, Berthelet E, Tran E et al. Radiotherapy Versus Trans-Oral Robotic Surgery for Oropharyngeal Squamous Cell Carcinoma: Results of a Randomized Trial. *The Lancet Oncology* 2019; 20 (1349- 1359)
(3) Heah H, Goepfert R, Hutcheson K, Garden A, Gunn G, Fuller C, et al. Decreased gastrostomy tube incidence and weight loss after transoral robotic surgery for low- to intermediate- risk oropharyngeal squamous cell carcinoma. *Head and Neck*. 2018; 40 (11): 2507-2513. Available from: https://doi.org/10.1002/hed.25382

What is the Effect of Clinically Assisted Nutrition and Hydration on the Quality of Life in people with Motor Neurone Disease? A Systematic Review.

A Popowska & B Tighe
Faculty of Health and Life Sciences, Coventry University, Coventry, UK

Corresponding Author: Angelika Popowska, popowska@uni.coventry.ac.uk

Background: Clinically assisted nutrition and hydration (CANH) is routinely offered to people with Motor Neurone Disease (MND) experiencing dysphagia and weight loss. Preserving and improving the quality of life (QOL) is one of the main goals of MND care [(2)]. A 2011 systematic review [(2)] included two studies, which provided anecdotal impressions of an improved QOL as a result of CANH, however failure to use a validated measurement tool led to inconclusive findings. Therefore, the aim of this systematic review was to examine the current evidence base regarding the effect of CANH on QOL in people with MND.
Methods: A systematic search of electronic databases (CINAHL, MEDLINE and Academic Search Complete) and reference lists of key studies was undertaken. The databases were searched from inception with the last search conducted on 28 January 2020. The eligibility criteria included quantitative studies of adult patients with MND, which measured their QOL using validated tools after at least 1 month of receiving CANH by any route. Quality of included studies was assessed using the Critical Appraisal Skills Programme checklist for cohort studies [(1)] and bias in the research process was reduced through transparent reporting of methodology and peer-review. Extracted data was synthesized narratively. The research was granted ethical approval by the Coventry University Ethics committee.
Results: Out of 182 studies identified through the search, 5 cohort studies met the inclusion criteria for this review, providing data from 464 subjects. Four studies failed to show a statistically significant change in QOL 3-6 months post gastrostomy ($p>0.05$). One study found a statistically significant, positive effect in the form of a decelerated decline rate after 3 months (-0.29 vs -0.09, $p=<0.001$). However, the risk of bias was low in just one study (which reported no effect), whereas for the remaining four it was high. This limits the validity of the results.
Discussion: The paucity of good-quality studies was in agreement with the previous systematic review [(3)]. Use of validated, disease specific QOL tools, which include questions about CANH may more fully capture the juxtaposition of benefits and drawbacks of CANH in relation to QOL as highlighted in qualitative research [(4)].
Conclusion: This systematic review did not explicitly show CANH to have a significant effect on QOL in this population, reinstating the urgent need for better-quality research exploring the effect of CANH on QOL in people with MND to support clinical decision making.

References:

1. Critical Appraisal Skills Programme (2018) CASP Cohort Study Checklist [online] available from <https://casp-uk.net/casp-tools-checklists/> [16 July 2020]
2. National Institute for Health and Care Excellence. Motor neurone disease: assessment and management. NICE Guidelines (NG42). 2019.
3. Katzberg HD, Benatar M. Enteral tube feeding for amyotrophic lateral sclerosis/motor neuron disease. Cochrane Database Syst Rev. 2011; 19: CD004030.
4. Starvoulakis, T., Baird, W.O., Baxter, S.K., Walsh, T., Shaw, P.J., McDermott, C.J. (2016) 'The impact of gastrostomy in motor neurone disease: challenges and benefits from a patient and carer perspective.' *BMJ Supportive and Palliative* Care 6 (1), 52-59. DOI:10.1136/bmjspcare-2013-000609.

Obesity

Supported by BDA Obesity Specialist Group

Return to contents page

The diet quality of pregnant women with a high body mass index (BMI); an observational study By

Margaret Charnley[1], Andrew Weeks[2] and Julie Abayomi[1]
[1]Faculty of Health, Social Care & Medicine, Edge Hill University, Ormskirk, Lancashire L39 4QP. [2]Liverpool Women's Hospital, Crown Street, Liverpool L8 7SS.

Corresponding Author: Julie Abayomi

Background: Good maternal nutrition is key to optimal health, development and prevention of non-communicable disease for offspring, throughout the lifecycle [(1)]. Poor quality diet is often associated with obesity and the prevalence and severity of maternal obesity has increased significantly in recent years[(2)] ; This study aimed to observe the dietary intake of pregnant women with BMI ≥ 35kg/m^2, by assessing the quality of diet; comparing nutrient intakes to UK Department of Health dietary reference values (DRVs) [(3)].
Methods: Integrated Research Approval System granted ethical approval. Women with a singleton pregnancy, aged >18 years and BMI ≥35kg/m^2 were recruited from hospital /community antenatal clinics and asked to complete food diaries at 16, 28 and 36 weeks gestation. Dietary information and food portion size were verified using a photographic atlas [(4).] Nutrient intake was determined using 'Microdiet^{TM}' software, then compared to DRVs, namely Estimated Average Requirement (EAR) and Lower Reference Nutrient Intake (LRNI).
Results: Data were collected for 140 women; with mean age of 30 years (+/-6.02); mean BMI of 40kg/m^2 (+/-5.13) and mean birth weight was 3.6kg (+/-0.67). Weight and dietary data were compared to pregnancy outcomes but no associations were found (p>0.05). Energy intake was comparable to EAR: 1849 (+/-591), 1984 (+/-526) & 2066 (+/-587) at each visit. Mean intake of key micronutrients was low, with many (>2.5%) achieving < LRNI (table 1):

Table 1: Percentage of women achieving ≤ LRNI for key pregnancy micronutrients

Micronutrient& UK recommended intake	*DRV*	*Ranges*	*Visit 1 % achieved*	*Visit 2 % achieved*	*Visit 3 % achieved*
Iron (14.8mg)	**<LRNI**	**<7.99**	**31.2**	**23.2**	**17.8**
	LRNI	8.0-14.7	54.8	66.7	63.0
Calcium (700mg)	**<LRNI**	**<399.9**	**5.4**	2.0	**5.5**
	LRNI	400-699.9	28.0	23.2	15.1
Iodine (140*µ*g)	**<LRNI**	**<69.9**	**18.3**	**13.1**	**8.2**
	LRNI	70-139.9	50.5	51.5	35.6

Discussion & Conclusion: This is concerning, as maternal deficiency of iron and iodine are both associated with impaired mental development in offspring [(5)]. We urgently need to ensure that all pregnant women receive sufficient and reliable information about diet before and during pregnancy; with a focus on key micronutrients, regardless of BMI.

References:

1. WHO (2016). *Good maternal nutrition. The best start in life*. Denmark: WHO Regional Office. ISBN 978 9289051545
2. Poston, L., Caleyachetty, R., Cnattingius, S., Corvalán, C., Uauy, R., Herring, S. and Gillman, M.W., 2016. Preconceptional and maternal obesity: epidemiology and health consequences. *The Lancet Diabetes & endocrinology*, *4*(12), pp.1025-1036.
3. COMA (1991) *Dietary Reference Values for Food and Nutrients for the UK*. London: Department of Health. London: Department of Health.
4. Nelson, M., Atkinson, M. and Meyer, J. (2002) *A photographic atlas of food portion sizes,* Food Standards Agency
5. Velasco, I; Bath, S. & Rayman, MP (2018) Iodine as Essential Nutrient during the First 1000 Days of Life. *Nutrients* 10, (3):290 DOI 10.3390/nu10030290

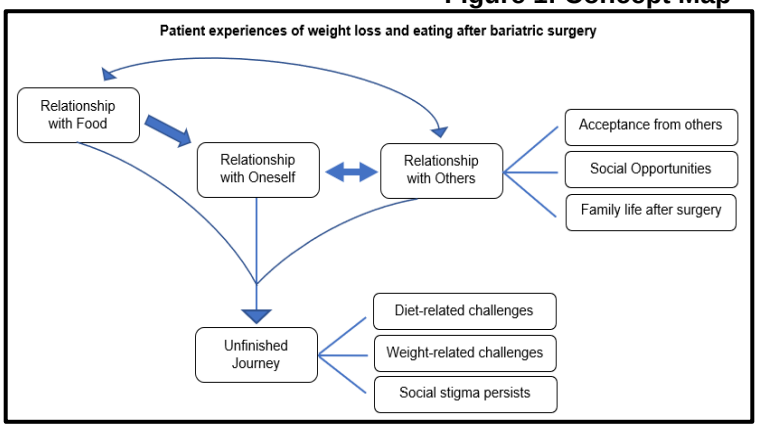
Patient Experiences of Weight Loss and Eating After Bariatric Surgery: A Meta-synthesis

M. Ansari and S. Serjeant
Coventry University, Faculty of Health and Life Sciences, Richard Crossman Building, Priory Street, Coventry, CV1 5FB.

Corresponding Author: Mariha Ansari, ansarim6@uni.coventry.ac.uk

Background: The latest statistics highlighted an estimated 26% of men and 29% of women in the UK are living with obesity [(1)]. Bariatric Surgery (BS) can induce significant weight loss and improve co-morbidity status, however, previous literature also highlights challenges in adjusting to new eating patterns after surgery and longer-term weight regain [(2)]. This meta-synthesis aimed to investigate patient experiences of weight loss and eating in the first two years following BS, to provide recommendations to support this group after surgery.
Methods: A meta-synthesis exploring patient experiences following BS was undertaken. Ethical approval was granted by Coventry University. MEDLINE, CINAHL, Academic Search Complete and Scopus were searched systematically. The inclusion criteria, defined a priori, were: Qualitative studies in English language; adult (≥18 years) experiences of weight loss and/or eating ≤2 years post-surgery. Methodological quality was assessed and poor quality studies were excluded. Data were analysed using a thematic synthesis method [(3)]. Themes were peer reviewed with the project supervisor to aid rigour.

Figure 1: Concept Map



Results: 507 records were screened. Nine studies met the inclusion criteria, representing views of 154 participants (111 women and 43 men). The thematic synthesis yielded four, interlinked analytical themes: relationship with food, relationship with oneself, relationship with others and unfinished journey, as illustrated in Figure 1. For many, BS provided the means to develop a healthier relationship with food, improving physical and psychosocial wellbeing. However, others described an array of challenges in adjusting to life after surgery including unfulfilled eating desires: "Your brain keeps telling you that you are hungry. The stomach on the contrary is about to burst" and body dysmorphia due to the onset of excess skin following significant weight loss: "you always have lumps of skin, it's just too much… and you cannot take it anymore." For many, BS was only part of the solution to the problems associated with obesity, symbolising an 'unfinished journey' after surgery.
Discussion: Findings in this meta-synthesis concur with previous literature and highlight insufficient focus on the psychological aspects of eating in clinical practice and the need for ongoing support which should extend beyond the patient and include family as well given their significant role in the patient's journey. Findings also raise questions regarding whether adequate psychological support is provided to aid adaptation to the post-surgical body.
Conclusions: This meta-synthesis highlights BS leads to diverse experiences and the need for personalised dietary advice and holistic healthcare with consideration for social and familial influences. Ongoing psychological support must be incorporated in care pathways to help patients manage the negative outcomes of surgery such as excess skin.

References:

1. Coulman KD, MacKichan F, Blazeby JM et al. Patient experiences of outcomes of bariatric surgery: a systematic review and qualitative synthesis. *Obesity Reviews* 2017;18: 547-559.
2. National Health Service (2020) Statistics on Obesity, Physical Activity and Diet, England, 2020. https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-obesity-physical-activity-and-diet/england-2020 (accessed May 2020).
3. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. *BioMed Central Medical Research Methodology* 2008; 8: 45–55.

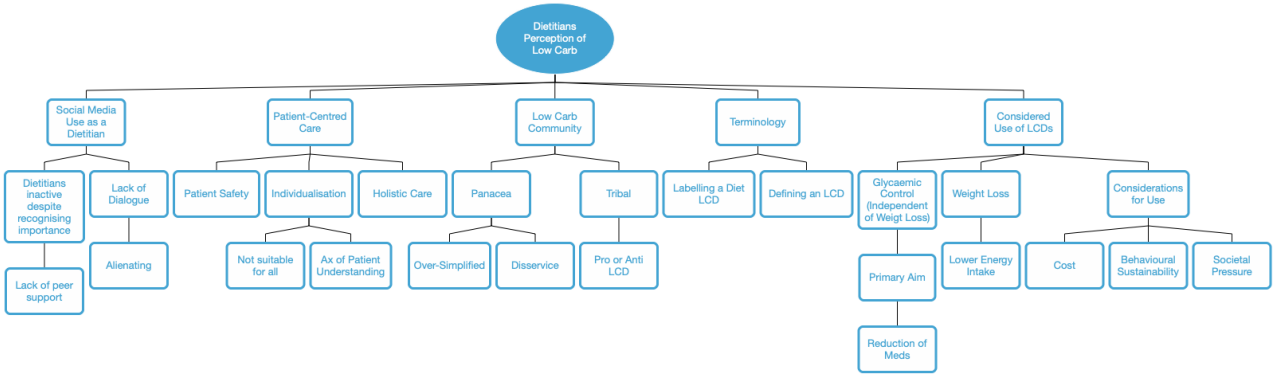
A qualitative study of the perceptions of low carbohydrate diets and their discussion on social media among Dietitians in England

J Bradfield[1, 2]*, T Butler[1], R Skinner[1], S Ray[2]
[(1)]Department of Clinical Sciences and Nutrition, University of Chester, Chester, CH1 4BJ, UK
[(2)]NNEdPro Global Centre, St Johns Innovation Centre, Cambridge, CB4 OWS, UK

Corresponding Author: Thomas Butler, 1804952@chester.ac.uk

Background: Low carbohydrate diets (LCDs) have gained popularity in recent years as a method of weight management and improved glycaemic control. While some research has shown promising results[(1)], no universal definition of 'low carbohydrate' exists, making results difficult to compare. There have been some recent investigations into the practices of dietitians and LCDs[(2, 3)], but none which assessed social media use specifically. This study aimed to assess what a representative sample of dietitians in England believe, think and do with LCDs in their clinical practice
Methods: In total, 10 weight management and diabetes dietitians in England were recruited via social media and undertook a one-to-one, semi-structured interview using online teleconferencing. The interviews lasted approximately 30 minutes and examined their knowledge, attitudes and practices towards LCDs, an example of phenomenology. Interviews were transcribed verbatim before content and thematic analysis was conducted using NVivo. Ethical approval was received from the University of Chester (ref 1616/20/JB/CSN).
Results: Following content analysis, a number of themes became apparent which can be seen in Figure 1. There were also a number of sub-themes for each, presented schematically below.

Figure 1. Emerging Themes



Discussion: Overall, the dietitians in this study were happy to use LCDs with their patients, in a safe and individualised manner. They expressed concerns about how the diets are sometimes represented online as a panacea and the inability to engage in respectful discussion with some of its proponents. These findings add to existing work completed in the area[(2, 3)]. It must be acknowledged that recruitment was primarily conducted on social media and therefore those who took part may not be representative of those not active on social media.
Conclusions: Dietitians working in weight management and diabetes provide individualised care which includes LCDs where appropriate. Agreement on a definition of a low carbohydrate diet as well as education in online engagement could help improve dietitians confidence as well as their practice.

References:

(1) Hallberg S, McKenzie A, Williams P *et al.* Effectiveness and Safety of a Novel Care Model for the Management of Type 2 Diabetes at 1 Year: An Open-Label, Non-Randomized, Controlled Study. *Diabetes Ther*. 2018;9(2):613-621.
(2) Huntriss R, Boocock R, McArdle P. Dietary carbohydrate restriction as a management strategy for adults with type 2 diabetes: Exploring the opinions of dietitians. *Journal of Diabetes Nursing.* 2019;23: JDN104.
(3) McArdle P, Greenfield S, Avery A *et al.* Dietitians' practice in giving carbohydrate advice in the management of type 2 diabetes: a mixed methods study. *J Hum Nutr Diet.* 2016;30(3):385-393.

Raising the issue: the views and perspectives of health care professionals when promoting health with parents around a child's weight

L De'Ath,[1] S Doherty [2]
[1] Nutrition and Dietetics, Dunstable Health Centre, Priory Gardens, Dunstable, LU6 3SU.
[2] Faculty of Health, Education, Medicine and Social Care, Anglia Ruskin University, Bishops Hall Lane, Chelmsford, CM1 1SQ

Corresponding Author: Lisa De'ath, Lisa.de'ath@nhs.net

Background: Childhood obesity is a serious public health problem in the 21st century. In 2016 it was estimated that over 41 million children under 5 were overweight globally (1) and it is well recognised that what happens in the early years of life heavily influence health outcomes later in life. When considering weight status obese children are 5 times more likely to be obese as adults than non-obese children (2) so intervening when children are young should be a priority to reverse the rise of obesity (3). Early year's professionals working in nurseries and pre-schools have regular contact with families and therefore have an opportunity to raise concerns regarding a child's weight. However, early year's professionals report finding this difficult as families can be quite sensitive and defensive when concerns are raised about their child's weight. Other health care professionals are also involved in raising the issue of weight with families and may shed some light on the most effective way to do this. However, literature lacks from the perspective of paediatric dietitians and those working in children's NHS services, such as the 0-19 team (health visitors, nursery nurses, specialist feeding advisers & health visiting assistants). The aim of this study is to explore the views and perspectives of paediatric dietitians and the local 0-19 team on how best to have conversations with parents around a child's weight.
Method: This explorative qualitative study investigated the views and perspectives of paediatric dietitians and the 0-19 team in raising the issue of a child's weight with parents. 4 paediatric dietitians and 10 members of the 0-19 team in Luton, UK participated in 2 separate focus groups in the summer of 2019. Groups were recorded and transcribed. Inductive thematic analysis of the data from the focus groups was carried out to identify the main themes that arose from the groups. Purposive sampling was used to request participation in both focus groups. Ethical approval from the School Research Ethics Panel (SREP) was obtained on 16 May 2019 under the terms of Anglia Ruskin University's Research Ethics Policy
Results: 3 overarching themes emerged: (1) Positive factors to support conversations, such as building good relationships and having supportive resources. (2) Negative factors such as it being a sensitive subject, parents not recognising/accepting there is a problem and cultural/societal and environmental conflicts. Language used also emerged on the above themes as both positive and negative. (3) Early year's environment, which included working together, training for early year's staff and education for families and children.
Discussion: This study aimed to explore the views and perspectives of paediatric dietitians and the 0-19 team around raising the issue of a child's weight. Several themes emerged, some which were previously identified in the background literature and some of which were novel. The study also found how different health care professionals have views and perspectives exclusive to them and may go some to way to show one size does not fit all when having conversations with parents around their child's weight**.**
Conclusions: This study shows how complex and diverse views and perspectives are on this difficult topic. More research is needed to explore the view point from other professionals who come into contact with parents and more specifically conducting research with early year's managers to gather their views and perspectives on the topic.

References:

1. World Health Organisation (WHO) (2018) Global Strategy on Diet, Physical Activity and Health. http://www.who.int/dietphysicalactivity/childhood/en/ (accessed September 2019)
2. Simmonds M, Llewellyn A, Owen CG *et al*. (2016) Predicting adult obesity from childhood obesity: a systematic review and meta-analysis. *Obesity Reviews* **17,** 95-107.
3. Winslade C (2016) Evidence Base for a Healthy Early years programme in London. https://www.london.gov.uk/sites/default/files/evidence_base_for_a_healthy_early_years_programme_in_london_jan_2016.pdf (accessed May 2019)

A call for international consensus on low carbohydrate diet taxonomy to standardise future obesity and Type 2 Diabetes research; a literature review.

A Graham, S Smith, G Baer. Queen Margaret University. Queen Margaret University, Edinburgh, EH21 6UU.

Corresponding Author: Ashleigh Graham, agraham2@qmu.ac.uk

Background: Obesity is a progressive, chronic, relapsing disease of multiple aetiology affecting a large proportion of populations worldwide. The use of a low carbohydrate dietary intervention in the management of obesity and Type 2 Diabetes Mellitus has been studied widely and continues to gain traction. The carbohydrate-insulin model of obesity[1] outlines the theoretical framework underpinning metabolic adaptations of a low carbohydrate diet (LCD) including improved glucoregulation, reduced post-prandial insulin and increased energy expenditure[2]. Inpatient feeding studies have demonstrated greater increases in net fat oxidation and weight loss in CHO restriction compared to a reduced fat diet[3]. Yet the evidence base and claims of effectiveness surrounding LCDs is arguably confounded by variability in CHO quantities and inconsistent nomenclature across studies. Feinman and colleagues[4] propose intermediary categories, defining a LCD as 50—130g CHO/d without ketosis. The scientific rationale for this cut off is that ketosis may be initiated at CHO intakes below 50g/day. The aim of this review was to identify RCTs investigating LCDs as per Feinman's definition, whilst acknowledging the classification was not formally proposed until 2015.
Method: A systematic search of electronic databases (PubMed/MEDLINE, Scopus) was conducted. Titles and abstracts of peer reviewed journals were screened by the lead author. Inclusion criteria included RCTs investigating a LCD; individuals with obesity (1990-2020). Studies described as LCD which tested a ketogenic, very low carbohydrate diet (VLCD) were excluded. To our knowledge, this is the first review to identify RCT's adopting a LCD as per Feinman classification. This review informs an ongoing feasibility RCT investigating the effectiveness of a LCD amongst post-partum women with obesity.
Results: The initial search generated 147 articles. Following removal of duplications 105 articles remained. 13 articles met the inclusion criteria. The remaining articles investigated either moderate CHO intakes or ketogenic VLCD which were frequently described as LCDs.
Discussion: Similar to this review, inconsistent CHO quantities and nomenclature has been highlighted elsewhere[5]. Ketogenic VLCD are frequently and erroneously described as LCD throughout the literature. Described as LCDs, CHO quantities range from a ketogenic ≤20g/day to a moderate intake of up to 150g/d. Due to the marked metabolic and endocrine differentiation across CHO categories, particularly between non-ketogenic LCD and ketogenic VLCD, the term 'low carbohydrate diet' should not be used interchangeably. Perceived risks associated with VLCD elucidate why incorrectly defined LCDs remain controversial. With opposed clinical opinion, LCDs are not widely advocated throughout NHS weight management services despite a growing evidence base supporting equal effectiveness, if not superiority of LCD over low fat diets in inducing weight loss and as a first approach in Diabetes management. Whilst Diabetes UK and various commercial programmes endorse Feinman's definition of a LCD, it has yet to be universally accepted and adopted.
Conclusion: Limitations of studies investigating LCD for weight loss include variation in study design and methodologies, notably in CHO quantities across interventions. With evidence to support Feinman's classification, an international consensus on low carbohydrate taxonomy to standardise future research is warranted.

References

1. Ludwig DS. The glycemic index: physiological mechanisms relating to obesity, diabetes, and cardiovascular disease. *JAMA*2002;287:2414-23. doi:10.1001/jama.287.18.2414 pmid:11988062
2. Ebbeling Cara B, Feldman Henry A, Klein Gloria L, Wong Julia M W, Bielak Lisa, Steltz Sarah K et al. Effects of a low carbohydrate diet on energy expenditure during weight loss maintenance: randomized trial BMJ 2018; 363 :k4583
3. Kevin D. Hall, Thomas Bemis, Robert Brychta, Kong Y. Chen, et al. Calorie for Calorie, Dietary Fat Restriction Results in More Body Fat Loss than Carbohydrate Restriction in People with Obesity. Cell Metabolism, Volume 22, Issue 3, 1 September 2015, Pages 531
4. Feinman RD, Pogozelski WK, Astrup A, et al. Dietary carbohydrate restriction as the first approach in diabetes management: critical review and evidence base. *Nutrition*. 2015;31(1):1-13. doi:10.1016/j.nut.2014.06.011
5. Kelly T, Unwin D, Finucane F. Low-Carbohydrate Diets in the Management of Obesity and Type 2 Diabetes: A Review from Clinicians Using the Approach in Practice. *Int J Environ Res Public Health*. 2020;17(7):2557. Published 2020 Apr 8. doi:10.3390/ijerph17072557

A longitudinal investigation assessing self-reported changes in health-related behaviours and wellbeing of members of Slimming World: 3-month data

J Kent, J Toon, S E Bennett, et al.
Nutrition Research and Health Team, Slimming World Head Office, Alfreton, Derbyshire, DE55 4SW

Corresponding Author: Jennifer Kent

Background: Due to increasing rates of overweight and obesity, it's important to evaluate behaviour changes that facilitate successful long-term weight management. Slimming World, a UK-based programme, provides support to empower individuals to make sustainable diet and lifestyle behaviour changes. This study is tracking the changes that a subsample of Slimming World members make via a survey completed at regular intervals, over 12 months. The data presented here describes changes made during the first 3 months of membership.

Methods: New Slimming World members who joined between 03/10/19 and 07/11/19 were invited to the study and completed the first survey 0-4 weeks after joining (T1), and again at 3 months (T2). At T1, retrospective data on diet and alcohol intake were also collected to assess member's behaviours before joining Slimming World (T0). A comparator survey of a representative sample of non-members who were not actively managing their weight were completed at the same time points. The surveys collected data on diet, alcohol, eating behaviours, activity, weight, health and mood (questions adapted from SF-36). Continuous data were analysed using repeated measure ANOVA with Bonferroni correction and non-continuous data were analysed using Z-proportion tests. Ethical approval was gained (No: SB1819/36).

Results: A total of 545 Slimming World members responded to both T1 and T2 surveys (follow-up = 28.9%), of which 6.8% were male. At T1, mean BMI and age were 34.2$\pm$7.0kg/ m^2, and 51.0$\pm$13.2 years respectively. 1515 non-members completed a survey at T1 and 1392 at T2.

From T1 to T2, average weight loss of Slimming World members was 4.7%. In total, 48.2% of members lost a clinically significant amount of weight ($\geq$5% of their starting bodyweight).

In 3-months, 28.3% of members reported improvements in their general health. Greater weight loss was associated with greater improvements in health.

The mean number of portions of fruit and vegetables members were consuming increased ($p<0.001$) from before joining to very soon after joining Slimming World (T0: 4.3 vs T1: 6.6) and remained greater ($p<0.001$) than before joining intakes at 3-months (T2: 6.2).

The mean number of weekly units of alcohol consumed by members decreased ($p<0.01$) from T0 (14.3) to T1 (10.6), to T2 (9.4), and was lower than non-members at T1 and T2 ($p<0.05$).

Mean weekly sedentary time of members reduced by 9% in the 3-months between T1 and T2.

Members scored higher ($p<0.05$) on overall mood scores compared with non-members both soon after joining (T1: 27 vs 22.7) and at 3-months (T2: 28.8 vs 24.8).

Discussion: Behaviour change is key to successful weight management. Weight loss outcomes of Slimming World members were similar to those observed in previous research[1]. The initial findings of this longitudinal study highlight that members make many positive behaviour changes, which are associated with long-term success in weight management[2].

Conclusion: Data so far highlights how this sample of Slimming World members made a number of positive health-related behaviour changes early on in their membership, which were maintained over the first 3-months of their weight management journey. These changes supported not only successful weight loss but also member's general health and wellbeing.

References:

[1] Stubbs, J., Morris, L., Pallister, C. et al (2015). Weight outcomes audit in 1.3 million adults during their first 3 months' attendance in a commercial weight management programme. BMC Public Health 882:15.

[2] Champagne, C., Broyles, S., Moran, L. et al (2011). Dietary intakes associated with successful weight loss and maintenance: the weight loss maintenance trial. Journal of the American Dietetic Association 111:12.

Impact of the coronavirus (COVID-19) situation on self-reported health-related behaviours, wellbeing and the ability to manage weight

J Kent, S E Bennett, J Toon, et al.
Nutrition Research and Health Team, Slimming World Head Office, Alfreton, Derbyshire, DE55 4SW

Corresponding Author: Jennifer Kent

Introduction: Slimming World is conducting a series of surveys examining health-related behaviour changes made by a sample of members of their weight management programme over time. One survey coincided with coronavirus (COVID-19) lockdown restrictions in the UK. The impact of lockdown was likely to affect many areas of health and wellbeing but to an unknown degree, therefore questions were added with the aim of understanding the impact of this situation on weight management and health-related behaviours. This is of particular importance as obesity is associated with increased severity of COVID-19[1].

Methods: The survey (completed April-May 2020) used qualitative and quantitative questions to collect data on general health, wellbeing (adapted from SF-36; a higher score indicated a more positive wellbeing [min=7, max=42]), diet and eating behaviours, alcohol intake, physical activity, weight management and how these measures had been affected by the COVID-19 situation. The responses to the question 'Please, could you explain why you have found managing your weight easy or difficult during the COVID-19 lockdown period?' were thematically analysed by four different researchers with agreement on the final listing. Data, compared using one-way independent ANOVASs, from 222 new members who joined Slimming World between 03/10/19 and 07/11/19 and a representative sample of 637 non-Slimming World members recruited via Qualtrics, who were not actively managing their weight with a commercial organisation at the time, are reported here.

Results: Mean weight loss of Slimming World members, who completed the baseline survey 6 months previously, was 7.7%. Members reported higher wellbeing scores than non-members (27.8 vs 24.4; $p<0.01$) and fewer members said that the COVID-19 situation had negatively impacted their general health (13.8% vs 22.3%; $p<0.05$). Members were more likely to say that they increased their levels of activity (25.2% vs 17%; $p<0.05$) than non-members. Reported alcohol intake was similar between groups; however, members were now drinking significantly less than before joining Slimming World ($p<0.05$). Members reported eating significantly more portions of fruit and vegetables than non-members (6.2 vs 3.7; $p<0.05$).

59.3% of members and 64.5% of non-members reported finding it difficult to manage their weight during this time. 4 key themes for this emerged from qualitative data from both groups: difficulty getting to shops/accessing usual foods; boredom/change in routine leading to increased snacking; stress or anxiety meaning weight management is not the priority/leading to comfort eating; reduced physical activity/more sedentary time.

Discussion: A similar study[2] reported that 69.9% of participants found it difficult to achieve their weight loss goals during lockdown, similar to that reported here, due to reasons such as decreased exercise and increased anxiety.

Conclusion: The COVID-19 situation has created weight management challenges for some. Interestingly, Slimming World members were less likely to report a negative impact on several health-related behaviours and measures of wellbeing and continued to lose weight. These findings suggest the potential benefit of the support from Slimming World, to help people develop personal strategies to maintain healthy behaviours and help prevent weight gain, which is particularly important given that obesity is associated with increased risk of COVID-19 complications.

References:

[1]PHE- Excess weight and COVID-19: insights from new evidence. Available from: https://www.gov.uk/government/publications/excess-weight-and-covid-19-insights-from-new-evidence [Accessed 07.10.2020] [2]Almandoz JP, Xie L, Schellinger JN, Mathew MS, Gazda C, Ofori A, Kukreja S, Messiah SE. Impact of COVID-19 Stay-at-Home Orders on Weight-Related Behaviors Among Patients with Obesity. Clinical Obesity. 2020;10 (5)

A Systematic Review of Peer Support in Adult Weight Management

S Quirke, Weight Management Service, St Cadocs Hospital, Newport, NP18 3XQ
H Seage, School of Sport and Health Sciences, Cardiff Metropolitan University, CF5 2YB

Corresponding Author: Sioned Quirke

Background: Support is important for weight loss and is a predictor of success (1). Adult weight management services mainly utilise clinicians to provide support yet this is costly and unsustainable (2). Peer support may provide long-term sustainable support networks that are cost effective (3) to facilitate weight loss (4) however, it can be difficult to navigate the existing evidence around efficacy and delivery as interventions are diverse.
Methods: A systematic review was conducted to address the question: "does peer support facilitate weight loss in adults with overweight/obesity?" Ethical approval was not required. To be included, papers had to provide peer support, weight loss as the primary outcome, adult population, patients who have not undergone/preparing for bariatric surgery and published article. Comparisons included; no support, clinician support and online/email support. A systematic search was conducted using two databases; OvidSP as it includes literature from health science and psychology, and SCOPUS as the largest database of literature in health. The search terms were 'peer' 'support' 'weight'. A two part process was used to assess and classify the quality of the studies, each study was appraised using the most relevant standardised appraisal tool (5) and then classified as being at high, low or unclear risk of bias (6) by the reviewer.
Results: 6 papers were identified and all met the inclusion criteria. Two of the studies were cohort studies and the others were randomised control trials. Two of the studies utilised virtual peer support via a virtual discussion platform. The other studies provided face to face delivery either conducting interventions (n=2) or supporting clinician intervention via a self-help group (n=2). While all interventions delivered weight loss, the results between studies varied, the highest mean weight loss was 10.79kg after a 20-week intervention and the lowest 1.6kg after 12-week intervention. Three papers found significant differences in weight loss between the intervention groups that included peer support and control groups while the other papers found no significant difference. Few interventions collected data on long term weight loss; however all that did reported gradual weight gain in all groups.
Discussion: Despite using clearly defined inclusion criteria, there was heterogeneity in the designs of interventions reviewed and the evidence base was sparse. There was variability in the type of populations studied as well as the delivery and function of the peer support. Different models of delivering peer support were identified which presents the opportunity of applying locally suitable options. While all interventions delivered weight loss, 3 papers found significant differences in weight loss for the interventions that provided peer support, one of which was virtual and the other 2 face to face suggesting that peer support can facilitate weight loss.
Conclusion: This review highlighted that peer support can be delivered and utilised in a variety of ways and may facilitate weight loss providing a sustainable cost effective support network for adult weight management patients.

References:

(1) Thomas SL, Hyde J, Karunaratne A, et al. "They all work ….when you stick to them": A qualitative investigation of dieting, weight loss, and physical exercise, in obese individuals. Nutrition Journal. 2008:7:1-7
(2) Faw, M. H. (2014). Young Adults' Strategies for Managing Social Support During Weight-Loss Attempts. *Qualitative Health Research*, 24(2), pp. 267–278.
(3) Katula, J. A., Vitolins, M. Z., Rosenberger, E. L., Blackwell, C. S., Morgan, T. M., Lawlor, M. S., Goff, D. C. (2011). One-year results of a community-based translation of the Diabetes Prevention Program: Healthy-Living Partnerships to Prevent Diabetes (HELP PD) Project. *Diabetes Care*, 34, pp. 1451-1457.
(4) Cherrington, A. L., Willing, A. L., Agne, A, A., Fowler, C, C., Dutton, G. R., Scarinci, I. (2015). Development of a theory-based. Peer support intervention to promote weight loss among Latina immigrants. *BMC Obesity*, 2(19), pp. 1-9.
(5) Critical Appraisal Skills Programme (2017). CASP Qualitative Research Checklist. Available at: http://www.casp-uk.net/casp-tools-checklists. Date Accessed: March 2020.
(6) Higgins, J. P. T., Green, S. (2011). *Cochrane Handbook of Systematic Reviews of Intervention.* Version 5.1.0. Available from www.handbook.cochrane.org. Accessed March 2020.

The portrayal of the drivers of obesity in regional and local newspapers: a content analysis

A Ribenfors[1] & K Hennessy-Priest[1]
[1]Faculty of Health and Life Sciences, Coventry University, Priory Street, Coventry, CV1 5FB

Corresponding Author: Anna Ribenfors, anna.ribenfors@gmail.com

Background: The media plays a key role in influencing our attitudes and behaviour. With regard to obesity, the way the topic is framed can perpetuate weight bias and anti-fat attitudes(1) as well as influence support for obesity related policy.(2) Regional and local newspapers are widely read but little is known about how they communicate messages regarding obesity. The aim of this research was to investigate how the drivers of obesity are portrayed by regional and local newspapers in East Anglia.
Methods: A qualitative content analysis of four popular East Anglian daily newspapers was undertaken. The database LexisNexis was searched for relevant articles published from April 2019 to January 2020 and inclusion and exclusion criteria were applied. Following Schreier's(3) Steps in Qualitative Content Analysis, categories of the coding frame were created, trialled, then peer reviewed by the research supervisor before being applied to the full sample of articles. A supplementary quantitative analysis examined the distribution of categories across the newspapers to identify prominent subcategories. Ethical approval was granted by Coventry University Ethics Committee (P97264).
Results: The search of LexisNexis yielded 245 articles of which 23 met the inclusion and exclusion criteria and were analysed. Two main categories were created; environmental drivers, relating to social factors (subcategories: socioeconomic status, food environment, opportunity for physical activity, societal/community responsibility, school), and individual drivers, relating to behavioural factors (subcategories: food consumption, physical activity, willpower, parenting, lifestyle).The most frequently cited subcategory overall was societal/community responsibility (61% of articles). Physical activity was the most cited individual driver (39% of articles).
Discussion: In contrast with research conducted in national newspapers(4), the drivers of obesity were mainly portrayed as environmental. However, despite recognising the impact of an individual's social environment, the complexity of obesity(5) was not accurately portrayed; drivers within the control of the individual were frequently cited and similarly to previous research, the role of genetics was underreported(1,2).
Conclusion: The articles from the East Anglian newspapers analysed do not reflect the complexity of the drivers of obesity; this highlights an opportunity for organisations such as the British Dietetic Association, and individual dietitians, to proactively approach regional and local newspapers to pitch balanced and accurate articles.

References:

[1]McClure KJ, Puhl RM & Heuer CA. Obesity in the News: Do Photographic Images of Obese Persons Influence Antifat Attitudes?. J Health Commun. 2011;16:359-371.
[2]Barry CL, Brescoll VL & Gollust SE. Framing childhood obesity: how individualizing the problem affects public support for prevention. Political Psychology. 2013;34:327-349.
[3]Schreier M. Qualitative Content Analysis. In: The SAGE handbook of qualitative data analysis. pp 170-183 [Flick U, editor]. London: SAGE; 2014.
[4] Flint SW, Hudson J & Lavallee D. The Portrayal of Obesity in UK National Newspapers. Stigma and Health. 2016;1:16-28.
[5] Butland et al. (2007) Tackling Obesities: Future Choices – Project report. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/287937/07-1184x-tackling-obesities-future-choices-report.pdf (accessed March 2020)

Using process evaluation to assess fidelity level of a Tier 2 weight management program for children age 4-16

S Serber [1], M Little [1], H Crocker [2]
[1] Foodtalk, UK, 9 Fishermans Drive SE16 6SG
[2] Population, Policy & Practice Dept. Institute of Cild Health, University College London, UK

Corresponding Author: Shirley Serber, shirley@foodtalk.org.uk

Background: Majority of child weight interventions have seen little success and there is a lack of recognition to the reasons for the ineffectiveness since a process evaluation is rarely completed. Progressively recognised as an essential part of designing and testing complex public health interventions (1), the aim of this study is to assess the fidelity of the service to determine the degree to which the intervention is delivered as intended. Furthermore, the objectives are to a) analyse fidelity levels against participants' satisfaction and attrition rates; b) investigate staff's perceived barriers and facilitators to maintain fidelity.
Methods: 58% of the delivery staff (n=7) were randomly recruited and their sessions (n=5) were structurally observed at different days using a self-developed fidelity scale and FRAME (2) to determine adherence to essential elements of the programme. At a future date 66% of the staff (n=8) participated in a focus group to identify delivery barriers and facilitators which was recorded and transcribed; data was coded using thematic analysis methods. At the end of each session observed, all parents (n=22) attending completed a self-reported 5point Likert scale questionnaire to capture satisfaction and goals set. Quality of goals were judged using SMART principles. Families' retention rate was monitored from database. Small sample size deemed regression analysis inappropriate. Ethical approval was not required since it is a service evaluation.
Results: Overall the service was run with a low fidelity level at 44%. Fidelity was inconsistent across 18 (41%) of the modifications observed and the most inconsistent change was 'removing elements' (n=14, 77%) i.e. absence of goal settings. Whilst 82% of participants receiving the intervention (n=18) felt they left with a personal goal, only 33% (n=6) set SMART goals. 3 themes and 3 subthemes emerged from the focus group. Lack of experience with certain topics; following structure/time keeping and difficulty managing behaviour all influenced adherence. Internal Organisation i.e.leadership, staff consistency/working hours and internal communication all influenced perceived support. Facilitator's personal views i.e. relationship with families and setting parental expectations; belief and confidence in the programme; importance given to goal setting all influenced quality of delivery.
Discussion: With no standardised method to define fidelity, core elements of the intervention intrinsically related to behaviour change principles were ~~here~~ used i.e. goals settings, parents-only sessions, food exposure. No correlation was found between fidelity and participants' satisfaction, but low numbers impeded a more thorough statistical analysis. Despite low fidelity consistency, participants felt they learnt a lot; that objectives of sessions were met; left with personal goal and, whilst the closest collected data that has an impact on outcomes is quality of personal goals set by participants, sample size was small making it difficult to draw conclusions. The correlation between fidelity consistency and retention rate was 0.8 which is relatively high, but it cannot imply causation due to small sample size. In line with other studies (3), the focus group found barriers related to training (experience with topics, session flow, goal setting, belief in programme) and many institutional (payment, working hours, internal communication and policies) although for fidelity training was less of a confounding factor than level of education.
Conclusion: The low fidelity impacted quality but didn't impact participant satisfaction or retention whilst a need to review working standards, internal protocol, provide more training on difficult topics and create a "buy-in" culture was revealed.

Reference:

1. Moore G., Audrey S., Barker M., et al. Process evaluation of complex interventions: Medical Research Council guidance 2015; BMJ 350 :h1258.
2. Stirman S., Baumann W., Miller, C. The FRAME: an expanded framework for reporting adaptations and modifications to evidence-based interventions. Implementation Science, 2019. 14(1), p. 58.
3. Griffin, T., Clarke, J., Lancashire, E., et.al. Process evaluation results of a cluster-randomized controlled childhood obesity prevention trial: the WAVES study. BMC Public Health, 2017; 17(1). doi: 10.1186/s12889-017-4690-0.

Paediatric

Supported by BDA Paediatric Specialist Group

Return to contents page

A Review of the Outcomes of Dietitian Led Group Education Sessions for the management of Cow's Milk Protein Allergy

N Brennan, S Durrant, P J Barnard and L Vasiliauskaite,
Paediatric Dietetics department, Western Sussex Hospital Trust, Spitalfield Lane, Chichester PO19 6SE.

Corresponding Author: Noelle Brennan

Background: The prevalence of Cow's milk protein allergy (CMPA) in the developed world is approximately 2-3% with the highest prevalence in the first year of life (3).
CMPA is managed with one 1.5 hour group education session for parents led by a dietitian. This system has short waiting times and offers clinical advice in a peer supported group setting. It reduces contact time from ten half hour individual consultations to one 1.5 hour group education session. Several international and national standards exist for the management of CMPA; The British Society for Allergy and Clinical Immunology (BSACI)**,** National Institute for Health and Care Excellence (NICE) guideline and International milk allergy in primary care (iMAP) guideline. The aim of this service evaluation is to establish the efficacy of this service and to assess how closely local practice resembles national recommendations.
Methods: The service evaluation was conducted on a random sample of 100 patients which was generated using excel from 150 patients who attended from March 2017-June 2018.The sources of data were hospital computer systems and patient notes. Parents are telephoned by a dietitian to assess that it is a diagnosis of CMPA and then triaged into the group. Ten parents were invited to attend the monthly group. Ethical approval was not required because it was a service evaluation. The international and national standards were utilised to devise a data collection tool to gather information on the efficacy of the group sessions. Various outcome measures were studied including waiting times, number of contacts with dietitian, allergy management and timings of milk reintroduction.
Results: 88% (n = 88) were referred at 0-40 weeks and 12% (n=12) at >40 weeks of age.
30% (n=30) were breastfed, 67% (n=67) were an alternative milk's and 3% (n=3) were unknown.
41% (n=41)of patients waited 0-5 weeks, 47% (n=47) waited 6-10 weeks, 10% (n=10) waited 11-15 weeks and 2% (n=2) waited 16-20 weeks for an appointment at the education session. 90% (n=90) of patients had 1-5 contacts with the dietitian and 8% (n=8) had 6-8 contacts with the dietitian in addition to attendance at the CMPA education session. Two percent had no contact with the dietitian.
17% (n=17) were referred to allergy clinic following attendance at milk group. Of this 17%, 3%(n=3) had IgE mediated allergy, one to cow's milk protein, one to egg and one to cashew nut.
39% (n=39) commenced the milk ladder at 21-50 weeks, 24%(n=24) at 51-70 weeks, 7% (n=7) at 71-90 weeks, 4% (n=4)commenced at 91 weeks or more.13%(n=13) had not started milk reintroduction as under 36 weeks of age, 1% (n=1) not started at greater than 64 weeks of age and 12% (n=12) unknown.
Discussion: The BSACI guideline recommends that patients with CMPA have at least two contacts with the dietitian showing this service meets national recommendations. Referral to an acute allergy service is advised if there is a suspected IgE-mediated CMPA (1,2) showing this service resembles national recommendations. The iMAP 2017 guideline recommends milk reintroductions at 36-52 weeks which does not meet national recommendations as only 52% (39% +13%) met recommendations. Weaknesses of this data are that 4 patients did not have an actual CMPA diagnosis, unknown values for timings of milk reintroductions and 90% attendance rate at groups.
Conclusion: Providing group sessions for management of CMPA meets some of the national recommendations regarding the number of dietetic contacts and referral to allergy clinic but not the recommendations for milk reintroductions.

References:

1.Luyt D, Ball H, Makwana N et al. BSACI guideline for the diagnosis and management of cow's milk allergy. Clin & Exper Allergy. 2014; 44:642-672
2.National Institute for health and Care Excellence, 2015. Scenario: Suspected cows' milk protein allergy. Available at http://cks.nice.org.uk.
3.Venter C, Brown T & Fox A. A better recognition, diagnosis and management of non-IgE-mediated cow's milk allergy in infancy: iMAP- an international interpretation of the MAP (milk allergy in primary care) guideline. Clin and Trans Allergy. 2017; 7.

A retrospective study to determine if the development of Cow's Milk Protein Allergy is associated with infant gestation and neonatal milk intake.

1. University of Chester, Department of Clinical Sciences and Nutrition, Parkgate Rd, CH1 4BJ,
2. Imperial College Healthcare NHS Trust, The Bays, S Wharf Rd, Paddington, London W2 1NY
3. University of Central Lancashire, School of Sport and Health Sciences, Preston, PR1 2HE

Corresponding Author: Hazel Clarke, hazel.clarke4@nhs.net

Background: There is significant debate whether CMPA development is influenced by neonatal diet. Previous findings of pre-term gastrointestinal systems and microbiota indicate neonatal diet can influence CMPA development [1,2]. Pre-term infants could be at a greater risk due to an immature immune system and gastrointestinal system. This study's aim was to identify whether pre-term infants appeared more likely to develop CMPA and whether neonatal exclusive milk feeding (including enteral feed) was associated with CMPA development.

Methods: This was a retrospective study of 11026 infants from an outer London Hospital (2014-2015). Pre-term (≤35 weeks gestation (n=467)), and full-term (≥36 weeks (n=10559)) infants had their dietetic records scrutinised for CMPA and dietary information (n=229). CMPA diagnosis (both IgE or non-IgE) in records was diagnosed up to 18 months (age corrected) and based on clinical judgement of symptoms, exclusion diet, skin prick and IgE blood tests. CMPA diagnosed pre-term infants (n=19) and full-term infants (n=197) were identified. Statistical analyses used SPSS v.23. Descriptive frequencies were run for CMPA infants' neonatal diets prior to diagnosis on referral (breastfeeding/cow's milk formula/mixed). A Chi square test and Wilcoxon Signed Rank test were used to compare any difference between gestation group and CMPA development. Logistic regression analyses and a Chi-square X2 were run to determine the relationship between CMPA and neonatal diet and to determine if a cow's milk formula/mixed diet was associated with CMPA. University Ethical Approval was given (FREC: 1358/17/HC/CSN).

Results: Of 151 CMPA infants, 19/151 (12.6%) were pre-term and 132/151 (87.4%) were full-term. The Wilcoxon Signed Ranks test found there were significantly more pre-term infants that developed CMPA (mean rank=0.001, Z=-10.8, p=0.0001). The Chi-square result (X_2) found a significant association between pre-term infants and CMPA development (X2(11, n=467) = 26.7 p=0.005). The logistic regression analysis found there was no significant relationship between cow's milk formula (including mixed) and CMPA development (p=0.086).

Discussion: A significant association between pre-term infants and CMPA development was present but there was no association with term gestation. This contradicts other CMPA findings of no association between pre-term infants and CMPA[3] but does correspond with retrospective findings that infants with feeding intolerances had lower birth weights and gestational age[4]. No significant relationship was found between cow's milk formula intake and CMPA. This study's findings are limited by unknown factors including allergy family history and age of formula introduction. This study used retrospective data that was only from one site which also limits conclusions. Another limitation present is that any pre-term babies with gut symptoms given hydrolysed or amino acid formula without CMPA diagnosis would not have been referred to dietetics and this could have impacted the CMPA sample size.

Conclusions: This study found pre-term infants were significantly more likely to develop CMPA than full-term infants. No significant relationship was seen between neonatal diet and CMPA. Findings need confirmation with larger prospective studies that record breastfeeding duration, family allergy history and proportions of breastmilk to formula fed in mixed diets.

References:

1. Høst A. Importance of the first meal on the development of cow's milk allergy and intolerance. Allergy proceedings: the official journal of regional and state allergy societies. 1991 Jul 1;12(4):227-32.

2. Osborn DA, Sinn JK, Jones LJ. Infant formulas containing hydrolysed protein for prevention of allergic disease and food allergy. Cochrane Database of Systematic Reviews. 2017(3).

3. Monjaraz ET, Mayans JR, Bustamante RC, Morales EG, Rosales AM et al.. Perinatal factors associated with the development of cow's milk protein allergy. Revista de Gastroenterología de México (English Edition). 2015 Jan 1;80(1):27-31.

4. Moore TA, Pickler RH. Feeding intolerance, inflammation, and neurobehaviors in preterm infants. Journal of Neonatal Nursing. 2017 Jun 1;23(3):134-41.

A novel approach for dietetic students to deliver an education session ('Chew to Poo') to primary school children - a student placement case study

Lisa Cooke[1], Hannah Naylor[2], Diana Valant[2], Michael Backett[3], Louise Mole[2]
[1]Bristol Royal Hospital for children (BRHC), [2]University of Plymouth (UoP), [3]Frenchay Church of England Primary School (FPS)

Corresponding Author: Lisa Cooke

Background: Student placements require innovative developments to deliver learning opportunities for dietetic undergraduates. Bristol Royal Hospital for Children (BRHC) had secured a project for second year dietetic students to teach primary school pupils aged between 7 and 11 years, on the digestive system. Following the Covid-19 pandemic, the pre booked placement in a face-to-face capacity was not possible, therefore the session was delivered using a virtual platform ('Zoom'). Children of primary school age have been shown to learn equally well from interactive technology as in face-to-face lessons[1]. Preparation and feasibility was discussed; with placement lead and students (UoP), clinical placement supervisor (BRHC) and school teacher (FPS). The aim was to explore whether a virtual placement teaching activity was feasible as part of a dietetic student placement at BRHC.
Method: A brief on the digestive system using the year 5 curriculum was shared with the dietetic students, who were then asked to prepare: a teaching plan, PowerPoint presentation, and an equipment list in preparation for a pre-lesson brief with the clinical placement supervisor and school teacher. The dietetic students ran through the session at the brief and shared the equipment list with the teacher; who provided everything required for the session in the classroom. A blended style of active learning was provided using: formative lecture, bitesize age appropriate videos and practical exercises showing different functions of the digestive system. The lesson took place via 'Zoom' in 2 sessions, morning and afternoon, leaving the class pupils with a practical task to prepare and then feedback during the second session. The practical session in between the dietetic student led session was facilitated by the class teacher. The dietetic students led both the timed sessions and were supervised by the dietetic placement supervisor. Ethical approval was not required for this study.
Results: The pupils were positively engaged with the lesson which was very practical. All equipment and resources needed for the sessions were sourced and ready for use by the classroom teacher. The pupils had lots of questions which the dietetic students engaged with. Feedback indicated that the pupils were extremely positive and totally engaged with the learning, some saying it was 'the best day they had all year.' The class teacher had also learnt a lot about the digestive system, but also about running virtual sessions and taking an active learning approach.
Discussion: This was a new way of delivering student training; and anecdotal feedback indicated that the session went well. The learning opportunity gave multiple positive outcomes; for the pupils the delivery of the curriculum in a new way, that aligns with guidance from the Department for Education (2020). The dietetic students prepared and delivered the virtual lessons, developing leadership skills through a distance-learning activity[2].The school teacher was able to facilitate rather than teach the class, and the clinical placement supervisor was able to ascertain that new ways of working can offer an extended scope of placement opportunities.
Conclusions: Covid-19 has presented dietitians with a challenge in how to access adequate opportunities to continue to train undergraduate students. This case study demonstrates that virtual teaching activities may be a solution. There was more initial preparation, but by using an innovative approach to student placement training, positive outcomes were realised, which warrants further research in this area.

References:

1.Kwok,K et a l(2016)'Children Can Learn New facts Equally Well From Interactive Media Versus Face to Face Instruction', Frontiers in psychology,7,pp.1603-1603.
2.Beketova, E.et al (2020) 'Creating an optimal environment for distance learning in higher education: discovering leadership issues', Palgrave Communications, 6(1), pp. 66.Department for Education (2020) Adapting teaching practice for remote education: GOV.UK. Available at: https://www.gov.uk/guidance/adapting-teaching-practice-for-remote-education 2020).

How effective is the addition of prebiotics, probiotics and synbiotics in the treatment of cow's milk protein allergy in infants and children? A systematic review.

E. Evans and Z. L. Connor
Richard Crossman Building, Coventry University, Priory Street, Coventry, CV1 5FB
23 Manchester Lane, Hartshorne, Swadlincote, Derbyshire, DE11 7BE

Corresponding Author: Ellie Evans, ellmayevans@gmail.com

Background: Cow's Milk Protein Allergy (CMPA) is one of the most prevalent allergies in infancy ranging from 0.5% to 3% in the first year of life. Recent trials suggest the possible use of prebiotics, probiotics and synbiotics can help overcome gastrointestinal and dermatological symptoms through increasing the proportion of faecal bacteria (1)
Aim: This review aims to determine the effectiveness of prebiotics, probiotics and synbiotics when added to formula in alleviating allergy symptoms and increasing faecal bacteria in CMPA among infants and children up to the age of 3.
Methods: A comprehensive search of MEDLINE, CINAHL and Cochrane Library was conducted using a search strategy involving subject heading, keywords and Boolean operators (AND/OR) between January 1999 to November 2019. An investigator, who was not blinded, assessed the eligibility of the studies against an inclusion and exclusion criteria, established a priori which included any strain or dose of synbiotic, prebiotic or probiotic taken in any form alongside formula within infants and children. The same investigator extracted the data from a modified extraction form. The Cochrane risk of bias tool and Critical Appraisal Skills Programme checklist was conducted to assess quality and level of confidence of each review. Ethical approval was approved by Coventry University Ethics Committee.
Result: From 94 screened titles, eight randomised control trials involving 623 patients with CMPA met eligibility criteria with a mean age between 2.2 months and 9.5 months. Therefore, the studies did not focus on effects in children. The duration of the intervention ranged from 4 to 26 weeks and no studies reported prebiotics as their sole intervention. Five studies added the intervention to formula either to amino acid, casein or whey-based formula. However, the other three studies used liquid drops, a capsule or a freeze-dried powder to be added to formula. All trials used a control group with the same standard formula alone or with either a placebo capsule, drops or powder. The primary interest, relief of symptoms, was measured using eczema assessment or through assessor or parent reported outcomes. These pooled results showed mixed evidence around relief of diarrhoea in both probiotics and synbiotics but showed no significant improvement in respiratory, dermatological and other symptoms reported. For the secondary outcome of interest, results from five studies showed benefit of probiotics and synbiotics in increasing faecal *bifidobacteri*a and *E. rectale/C. coccoides* (ER/CC) strains which is of importance as low levels of bifidobacteria colonisation in particular has been linked to allergy development (2) and links between microbiota have found in development of asthma, inflammatory bowel disease and metabolic disorders (3)
Discussion: Five of the eight studies raised concerns over the risk of bias which limits the validity of these results. Furthermore, one study was stopped early due to adverse events, there is more likely to show extreme intervention effects. Also, there were differences in the type of intervention utilised (different strains or forms such as liquids and powders) and a difference in symptom which lead to difficulty making comparisons.
Conclusions: Overall, there is low certainty that the use of probiotics and synbiotics, when added to formula, can improve symptom relief and increase faecal bacteria in infants with CMPA due to low sample size and mixed bias from the studies included. No papers focused on prebiotics so there is no certainty of the effects on alleviating symptoms or changing faecal bacteria.

References:

1. Osborn D. & Sinn J. Prebiotics In Infants For Prevention Of Allergy". Cochrane Database Of Systematic Reviews. BMJ 2013;340:723-723
2. Björkstén B, Sepp E, Julge K et al. Allergy Development And The Intestinal Microflora During The First Year Of Life. Journal Of Allergy And Clinical Immunology. 2001;108: 516-520 108
3. Milani C, Duranti Sm Bottacini F et al. (2017) The First Microbial Colonizers Of The Human Gut: Composition, Activities, And Health Implications Of The Infant Gut Microbiota. Microbiology And Molecular Biology Reviews. 2017;81

Quasi-experimental study investigating the effectiveness of the nutrition training tool 'Foodtalk game' in improving knowledge and confidence in Early Years staff

S Serber[1], M Little[1], Z Andrews[2], E Charoni[2], M Dennis[2], C Merrill[2], R Slough[2], M Hickson[2].
[1]Foodtalk, UK, 2 Wilton road, Beaconsfield, HP92BS
[2]Institute of Health and Community, University of Plymouth, Plymouth, Devon, UK

Corresponding Author: Melissa Little**,** melissa@foodtalk.org.uk

Background: Childhood obesity is a major public health concern and early interventions are imperative to address this. The Foodtalk Game is an evidence-based training tool designed by paediatric dietitians to train early years practitioners on nutrition and health for children aged 1-5 years. The aim of this research is to explore the effectiveness of the game in improving knowledge and confidence of practitioners in facilitating health focussed discussions with families.
Methods: Quasi-experimental study used systematic random cluster sampling to recruit practitioners (n=46) across five early years settings in the South West. Likert-scale confidence questions and multiple-choice knowledge questions were completed at baseline and post-game play. A further follow-up questionnaire was completed two weeks post-intervention (n=14). Data were analysed to identify confidence and knowledge changes. Questionnaires responses were coded to enable analysis. Verification by two researchers occurred to ensure accuracy, with discrepancies being rectified before analysis. Data sets were paired and *Shapiro-Wilks Tests* for normality undertaken. For all data analysis p-values of ≤0.05, were regarded as significant. Difference tests were two sided as it was unknown whether confidence or knowledge would increase or decrease following the intervention. No ethics approval was needed.
Results: The study recruited 46 participants from five different early years settings. Median scores of all five knowledge questions combined increased from 1.0 (Interquartile Range (IQR): 0, 2.0) at baseline to 5.0 (IQR: 4:0, 5:0) (p = <0.001) post-intervention and median confidence scores (maximum of 5.0) changed from 3.0 (IQR: 3.0, 3:0) at baseline to 4.0 (IQR: 4.0, 5.0) (p = <0.001) post-intervention. When compared to baseline, both knowledge and confidence scores had increased at follow-up (n=14); knowledge from 1.0 (IQR: 0, 2.0) to 3.0 (IQR: 2.8, 4.0) and confidence from 3.0 (IQR: 3.0, 3.0) to 4.0 (IQR: 3.7, 4.4).
Discussion: The Foodtalk game improved confidence and knowledge in early years nutrition. This effect is consistent with other studies using board games within health and social settings[2,3]. Lifestyle behaviours can be sensitive topics for discussion, which can create barriers to communication, the Foodtalk game may help staff develop the confidence to undertake these conversations with parents.
Conclusion: The Foodtalk game shows promise as an effective training tool for increasing nutrition related knowledge and confidence of early years practitioners in this short-term study, however, longer-term follow-up is recommended to ascertain whether effects are lasting and influence practice.

References:

1. Public Health England. Childhood Obesity: applying All our Health. Updated May 2020
2. Blakely G, Skirton H, Cooper S, et al. Educational gaming in the health sciences: systematic review. Journal of Advanced Nursing. 2009;65(2):259-269.
3. Royse MA, Newton SE. How gaming is used as an innovative strategy for nursing education. Nurs Educ Perspect. 2007;28(5):263-267.

An analysis of squeezable pouch foods for infants and toddlers available in the UK.

I Williams[1] and K Maslin[1]. Faculty of Health, University of Plymouth, Drake Circus, PL4 8AA, Devon, UK.

Corresponding Author: Kate Maslin, kate.maslin@plymouth.ac.uk

Background: The availability of pureed complementary feeding products packed in squeezable pouches have increased in recent years. Pouches, with a spout and a screw cap, require minimal food preparation and are now the most common food packaging type for infant food in the UK[(1)]. There are concerns about high energy density and sugar content, the increased risk of imbalanced nutrient provision and dental caries, especially if fed directly from the spout[(2)]. The aim of this study is to identify and describe key nutritional aspects of squeezable infant pouch foods available in the UK, including their advised feeding technique.

Methods: A cross-sectional survey of all pureed, ready-to-serve foods, in squeezable pouches with a twist-off cap and spout aimed at children under 2 years were identified from the websites of the 8 main UK supermarkets between March-June 2020.To ensure thorough data collection, the dataset was cross referenced against the list of manufacturers from two recent publications[(1, 3)] to ensure all brands/products were identified. Where information was not available online, manufacturers were contacted or stores were visited in person where possible. For each product, data was collected from the food label on the following variables: product type, first listed ingredient, sugar, salt and energy content/100g, use of sweetener, recommended age range and feeding advice. Descriptive statistics and frequencies were calculated. Ethical approval was not required.

Results: 293 unique products were identified. Key features are displayed in the table below.

Variable	**Results**
Product type, *%(n)*	28.7% (84) fruit only 21.4% (63) savoury main meal – meat based 14.3% (42) main meal – vegetarian 10.9% (32) combined fruit and vegetable 9.8% (29) vegetable only 9.9% (29) breakfast fruit and cereal combined 4.8% (14) yoghurt/milk based.
First ingredient, *%(n)*	44.4% (130) fruit 30.7% (90) vegetable
Nutritional content, *median per 100g(IQR)*	Energy: 61kcal (19.5) Sugar: 6.2g (6.85) Salt: 0.04g (0.07)
Recommended age range, *%(n)*	68.3% (200) stage 1: 4+months 26.2% (77) stage 2: 7+months 5.5% (16) stage 3: 10+months
Presence of sweetening ingredient, *%(n)*	43.3% (127) yes
Feeding advice, *%(n)*	69.3% (203) Advised to feed onto a spoon 30.7% (90) No feeding advice on label

Discussion: Fruit only pouches were the most common product type, whereas less than 10% of products contained vegetables only. Over 2/3 of products were recommended from 4 months of age, nearly half contained a sweetening ingredient and nearly a third had no feeding advice on the label; all of which support concerns raised by previous studies and a current government consultation on commercial infant food[(1)].

Conclusion: Of the nearly 300 identified infant and toddler pouch products identified for sale in the UK, the majority are recommended from 4 months of age, with many being either entirely fruit-based or sweetened.

References:

1.Public Health England. Foods and drinks aimed at infants and young children: evidence and opportunities for action. 2019.

2.Koletzko B, Bührer C, Ensenauer R, et al. Complementary foods in baby food pouches: position statement from the Nutrition Commission of the German Society for Pediatrics and Adolescent Medicine (DGKJ, e.V.). Molecular and cellular pediatrics. 2019;6(1):2.

3.Westland S & Crawley H. Fruit and vegetable based purées in pouches for infants and young children. First Steps Nutrition Trust; 2018.

A secondary data analysis investigating the sociodemographic determinants of periconceptual folic acid supplement use amongst a Scottish cohort of women.

E Mc Coy, J Armstrong, C Abraham Y Brogan Department of Occupational Therapy and Human Nutrition and Dietetics, Glasgow Caledonian University, Cowcaddens Rd, Glasgow, G4 0BA ,

Corresponding Author: Eimear McCoy, eimear.10@hotmail.com

Background: In the UK food is fortified with folic acid (FA) on a voluntary basis. Pregnant women and those likely to become pregnant are advised to take a daily 400µg FA supplement prior to conception through to the 12th week of pregnancy [1]. Adequate FA intake during the periconceptual period is credited with a reduced incidence of neural tube defects [1]. Periconceptual FA supplement intake in the UK is however suboptimal [2]. Social and ethnic disparities concerning supplement use have consistently been demonstrated [3]. The aim of the present research was to identify the sociodemographic determinants of periconceptional FA supplement use and to assess how sources of preconception lifestyle advice influenced FA uptake. This is the first study to investigate the determinants of FA supplement use amongst Scottish women.

Methods: A secondary data analysis was conducted on data obtained from the Scottish Maternal and Infant Nutrition Survey (MINS) 2017 [4]. Three separate cohorts of women were involved in the MINS : an antenatal cohort, mothers whose babies were 8-12 weeks old and mothers whose babies were 8-12 months old. Data obtained from the antenatal cohort only (*n* = 2523), was used for the present analysis. Characteristics of the study population were reported using descriptive statistics. Differences between supplement users and non-users were examined using chi-squared test's. Multivariate binary logistic regression analysis was conducted to investigate the sociodemographic determinants of periconceptual FA supplement use and to explore how preconception information sources influenced FA uptake. Ethical approval from Glasgow Caledonian Ethics Committee was not required for the present study.

Results : 92% (*n*=2313) of respondents took FA supplements at some point during the periconceptional period. FA supplement intake was most frequent amongst older lower parity women (p =.00, p= .00), who planned their pregnancy (p= .00), lived in affluent areas of Scotland (p=.00) and were of Caucasian descent (p= .001).The strongest sociodemographic determinants of supplement non-use were unplanned pregnancy (AOR 5.07 95% CI ; 2.35, 10.97), younger age (AOR 2.87, 95% CI ; 1.35, 6.10) and higher parity (AOR 2.16 95% CI ; 1.31, 3.59). Healthcare professionals (20.6%) and internet based services (16.5%) were the most common sources from which women received preconception lifestyle advice. Previous pregnancy experience (AOR 2.62 95% CI ; 1.05 , 6.53) and internet based resources (AOR 4.55 95% CI ; 2.03, 10.20) were reported as the strongest determinants of FA supplement use.

Discussion : We found that those women least likely to take FA supplements are among the most vulnerable in society, a finding which substantiates previous UK literature [2,3]. Our results illustrate that the UK's current supplementation strategy alongside it's voluntary fortification policy are providing least protection to those who need it most. Women are not receiving sufficient FA advice prior to becoming pregnant, our findings suggest the potential to use internet based resources such as mobile apps as a way to communicate FA advice to women.

Conclusion: There are social disparities in the uptake of periconceptional FA supplements amongst Scottish women. The present findings lend weight to the need for a revised FA supplementation and fortification strategy and an improved set of education campaigns that target women of all social and ethnic backgrounds.

References:

Department of health. Folic acid and the prevention of neural tube defects, Report from an Expert Advisory Group. London : Department of Health ; 1992. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/743782/Folic_Acid_and_the_Prevention_of_Neural_Tube_Defects__1992_.pdf

Bestwick J, Huttly W, Morris J et al. Prevention of Neural Tube Defects: A Cross-Sectional Study of the Uptake of Folic Acid Supplementation in Nearly Half a Million Women. *PloS One.* 2014; **9** (2) : e89354. Available from: https://doi.org/10.1371/journal.pone.0089354

Brough L, Rees G, Crawford M, et al. Social and ethnic differences in folic acid use preconception and during early pregnancy in the UK: effect on maternal folate status. *Journal of Human Nutrition and Dietetics.* 2009; **22** (2) : 100–107. Available from: https://doi-org.gcu.idm.oclc.org/10.1111/j.1365-277X.2008.00936.x

The Scottish Government. Scottish Maternal and Infant Nutrition Survey 2017. Edinburgh: The Scottish Government ; 2018. Available from: http://www.gov.scot/Publications/2018/02/7135.

A comparison of food intake between night feeding and non-night feeding children aged 12-18 months; a secondary analysis of the Diet and Nutrition Survey of Infants and Young Children 2011 (DNSIYC).

J Taylor and Y Brogan, Department of Occupational Therapy and Human Nutrition and Dietetics, School of Health and Life Sciences, Glasgow Caledonian University, Glasgow, Scotland, G4 0BA.

Corresponding Author: Joanna Taylor, JTAYLO211@caledonian.ac.uk

Background: Excessive consumption of milk in infants can reduce the amount and diversity of foods consumed which can cause undernutrition and even failure to thrive (1). However, there is a lack of research with regards to night feeding and its impact on dietary intake in young children. The aim of this study was to compare the dietary intakes of children aged 12-18 months who do and do not feed during the night, using DNSIYC (2011).

Methods: Data from 1275 infants (12-18 months) who participated in the DNSIYC (2011) was analysed using the IBM software package SPSS to compare differences in food intake between infants who fed through the night (NF) during a 4-day recording period, compared to infants who did not feed through the night (non-NF). The intake of five main food groups was compared between NF and non-NF children. Mann-Whitney tests were used to compare the food intake between the two groups. Ethical approval was not required.

Results: Over one third of infants fed through the night. There was no significant difference in gender or weight of the infants between the two groups. Night feeders were more likely to consume greater than 500ml of milk per day compared to non-night feeders (P <0.01). Significant differences were seen in the intakes of the five food groups between the night feeders and non-night feeders. These findings are presented in the table below.

Table 1 Comparison of 4-day average food intakes between NF and non-NF infants (12-18 months).

Food groups	Non-NF (*n* 850)		NF (*n* 425)		*P*†
	Mean (SD)	Mdn (IQR)	Mean (SD)	Mdn (IQR)	
Total milk (g/day)	378 (185)	394 (228)	478 (232)	477 (276)	<0.01
Starchy carbohydrates g/day	131 (65)	121 (81)	118 (70)	108 (84)	<0.01
Fruit and vegetables (g/day)	124 (79)	111 (109)	100 (78)	85 (98)	<0.01
Dairy / alternatives (g/day)	75 (62)	62 (65)	72 (77)	56 (60)	0.01
Protein (g/day)	78 (52)	70 (61)	66 (52)	55 (60)	<0.01
Processed foods	51 (42)	44 (55)	47 (47)	35 (57)	0.01

†The Mann Whitney u test was applied

Discussion: The findings indicate that night feeding was associated with a significantly greater consumption of milk and lower consumption of solid food. No other studies were found investigating the impact of night feeding on the diet of infants. However, one study reported that, due to greater milk consumption, night feeding in 12-month infants was associated with greater overall energy, fat and protein intake (2).

Conclusion: Feeding during the night was associated with greater milk intake and lower food intake and warrants further study due to the potential for research to influence parental choices over the duration of night feeding.

Keywords: food intake; night feeding; breastmilk; formula; cow's milk; infants; children

References: (1)

BYRNE, R., MAGAREY, A. & DANIELS, L., 2014. Food and beverage intake in Australian children aged 12–16 months participating in the NOURISH and SAIDI studies. *Australian and New Zealand Journal of Public Health* [online]. **38**(4), pp. 326-331. Available from: https://doi.org/10.1111/1753-6405.12249

(2) WEE, P.H., LOY, S.L., TOH, J. Y., THAM, E. K. H., CHEUNG, Y. B., GODFREY, K. M., GLUCKMAN, P. D., SAW, S. M., CHONG, Y. S., LEK, N., CHAN, J. K. Y., GOH, D. Y. T., CHONG, M. F. F. & YAP, F., 2017. Circadian feeding patterns of 12-month-old infant. *British Journal of Nutrition* [online]. **117**(12), pp. 1702–1710. Available from: https://doi.org/10.1017/S0007114517001684

Public Health

Supported by BDA Public Health Specialist Group

Return to contents page

The attitudes and experience of workplace catering staff regarding food sustainability: a qualitative study

A Boulter and L Blanchard
School of Life and Medical Sciences, University of Hertfordshire, Hatfield AL10 9AB

Corresponding Author: Alice Boulter, alice_boulter@hotmail.com

Background: In the UK, the staff catering industry provides about 11% of meals eaten out and 53,300 tonnes of food and material waste each year [(1)]. Yet, most research on food sustainability (FS) focuses on other retail sectors and healthcare settings, e.g. [(2,3)]. To support workplace catering services, the aim of this study was to explore the attitudes and experience of their staff regarding the provision and promotion of sustainable food.

Methods: Staff from catering companies in South East England were recruited through convenience sampling. Food services had to be within a workplace or on a business site and mainly serve employees. Semi structured one-to-one interviews of 25-60 minutes were audio recorded and transcribed verbatim by AB. Data was analysed in NVivo 11 using the FS values [(4)] and principles [(5)] as frameworks to assess knowledge and practices. Barriers and motivations were explored with thematic analysis. Data about the application of principles and barriers were compiled by site since they related to the sites' environment and not the interviewees themselves. LB read all transcripts and verified the themes. Ethical approval: University of Hertfordshire LMS/UG/UH/03915.

Results: Seven employees and three managers from seven companies participated. Most felt that their site could play a role in FS. Environment was the most frequently cited value, followed by health. Social, economic and governance aspects were rarely mentioned. Reducing waste was the most reported principle actioned, mainly by providing compostable or reusable tableware and offering tap water. Few sites recycled. Very few offered sustainably sourced fish, organic or Fairtrade products. Four themes for barriers emerged among the seven sites: customer's demand, especially its unpredictability and the popularity of meat and plastic bottles: "A lot of people […] still want meat" (S3); material resources: "Go direct to the farm […] comes with a big price" (S2); lack of education: "We don't get training" (S3); and organisational structure: "We can only order the products that they have authorised" (S9). Three themes were identified as motivators among the 10 participants: profit: "It's really […] popular, so they have let me carry on" (S8) or to reduce food waste; to enhance reputation or inspire people: "Only [number] other companies globally that have got this accolade" (M1); and consumption trends: "there is a rise in vegetarian" (M7) (S=staff, M=manager).

Discussion: The findings show a positive awareness for FS, particularly the environment, but limited action and understanding of the broader concept. Knowledge of FS and how to integrate it was perceived as key by health professionals and hospital food service managers to implement it [(2)]. Like in our results, the latter also needed more institutional support and applied only a few aspects of FS. Lastly, customers' demand remains a priority [(2,3)]. It was seen as both a barrier and motivator, which might reflect different awareness levels and values of clients [(6)].

Conclusion: Support to staff catering services to implement FS practices is needed with a focus on education of both staff and the public, organisational processes, and customer attractiveness; but studies with larger and representative samples that directly measure practices are needed.

References:

1. Waste and Resource Action Programme (n.d.). Staff Catering: Taking Action on Waste. Presentation, slide 1. https://www.wrap.org.uk/sites/files/wrap/Staff%20catering.pdf (accessed October 2020).
2. Guillaumie L, Boiral O, Baghdadli A *et al.* (2020) Integrating sustainable nutrition into health-related institutions: a systematic review of the literature. Can Journal Public Health.
3. Menozzi D, Nguyen TT, Sogari G *et al*. (2020) Consumers' preferences and willingness to pay for fish products with health and environmental labels: evidence from five European countries. Nutrients **12** E2650
4. Sustainable Development Commission (2011) Looking back, looking forward: Sustainability and UK food policy 2000-2011. pp. 14
5. Sustain (2013) The Sustain Guide to Good Food. https://www.sustainweb.org/publications/the_sustain_guide_to_good_food/ (accessed October 2020).
6. Macdiarmid JI, Douglas F & Campbell J. (2016) Eating like there's no tomorrow: public awareness of the environmental impact of food and reluctance to eat less meat as part of a sustainable diet. Appetite **96**, 187-493

A cross sectional analysis exploring differences in self-served portion size of breakfast cereals based on BMI classification

L Boote[(1)], I Lewis[(1)] and T Butler[(1)]*
[(1)] Department of Clinical Sciences and Nutrition, University of Chester, Parkgate Road, Chester, UK.

Corresponding Author: Thomas Butler, t.butler@chester.ac.uk

Background: The rising prevalence of obesity has occurred simultaneously with that of larger food portion sizes (FPS)[(1,2)]. Previous studies have demonstrated a positive association between food portion size and BMI; however, findings are inconsistent and often limited to certain food categories and products [(3,4)]. The present study aims to compare the FPS of selected breakfast cereals (BCs) in addition to an individual's ability to estimate a recommended amount between BMI classifications.
Methods: Participants were recruited through random convenience sampling at the University of Chester and Chester city centre. Eligible participants were those aged 18+ years of age and regular consumers of BC (≥3 of 4 days). Exclusion criteria included the following: nutrition and dietetics students, individuals taking appetite suppressing medications, pregnant or lactating individuals, those intentionally trying to lose weight, having diagnosed eating disorder, and severe food allergies to known allergens such as gluten. Subjects were required to pour their typical portion size for each of 10 different breakfast cereals (standard pour [SP]). Each cereal was representative of an established method of manufacturing BC (flaked [F], gun puffed [GP], oven puffed [OP], extruded gun puffed [EGP], shredded wholegrain [SW], biscuit formed [BF], and granola). Cereals were presented to participants in clear labelled boxes in order to anonymise branding. Participants were then told the manufacturers recommended portion size (MRPS) for each of the cereals and asked to pour their estimation of this in order to determine their perception of a labelling serving size. Each serving poured by the participant was discretely weighed by a researcher. Participants were categorised according to BMI classification. Kruskal-Wallis test was conducted to examine differences between participants SP and their estimation of the MRPS between BMI categories, followed by post hoc analysis using Mann-Whitney U. Bonferroni adjustment was used to account for multiple comparisons with an adjusted P value of ≤0.017. All procedures were approved by the Department of Clinical Sciences and Nutrition Research Ethics Committee (REC reference: CSN/LB/TB/2019).
Results: A total of 169 participants completed the study. The number of participants belonging to normal-weight (21.7 ± 2kg/m^2), overweight (27 ± 1.4kg/m^2) and obese (33.6 ± 4.3kg/m^2) groups was 60.4%, 30.2% and 9.5% respectively. Median portion size of participants SP was greater in obese participants compared to normal weight across all cereal categories however significance was limited to 2 cereals, F2 (57.0g ± 12.5 vs 46.5g ± 22.0; p=0.006) and BF (56.4g ± 18.8 vs 37.6g ± 4.7; p=0.007). No significant difference was indicated in the ability of participants to estimate the MRPS between BMI categories.
Discussion: Despite being limited by the small proportion of obese participants included in the sample (n=16), these findings suggest those individuals with a higher BMI overserve all categories of breakfast cereals, especially F2 (corresponding to flaked cereal coated with sugar) and BF. This is consistent with previous research[(3,4)] but adds further information accounting for differences in type of cereal.
Conclusion: The present study highlights potential differences in typical portion sizes served between BMI categories demonstrating a trend towards obese individuals serving more. Further research incorporating a larger, more representative sample is required to establish why obese individuals present as serving larger typical portion sizes of certain cereals despite displaying no significant difference in ability when asked to estimate a reference amount comparatively to normal weight individuals.

References:

1. Smiciklas-Wright H, Mitchell DC, Mickle SJ et al. Foods commonly eaten in the United States, 1989-1991 and 1994-1996: Are portion sizes changing? J Am Diet Assoc. 2003;103: 41-47.
2. World Health Organisation (2020) Obesity and overweight. Retrieved from https://www.who.int/news-room/factsheets/detail/obesity-and-overweight (accessed 25th April 2020)
3. Burger KS, Kern M, & Coleman KJ. Characteristics of self-selected portion size in young adults J Am Diet Assoc.. 2007;107: 611-618.
4. Albar SA, Alwan NA, Evans CE, Cade JE. Is there an association between food portion size and BMI among British adolescents?. British Journal of Nutrition. 2014 Sep;112:841-51.

A double-blind crossover randomised control trial comparing the effects of consumption of a breakfast biscuit and a digestive biscuit on blood glucose and appetite

D Timmins[(1)] & T Butler[(1)]*.
[(1)] Department of Clinical Sciences and Nutrition, University of Chester, Parkgate Road, Chester, UK.

Corresponding Author: Thomas Butler, t.butler@chester.ac.uk

Background: In the UK, 31% of adults regularly skip breakfast which has led to increasing popularity of breakfast biscuits (BB), marketed as a convenient and healthy breakfast alternative[(1)]. Established evidence suggests BB containing a modified starch beneficially delay postprandial glucose excursions[(2)] however questions remain over their use as a suitable alternative to breakfast. Indeed recent media has drawn attention to similarities between BB and standard biscuits, proposing the question of whether BB are a healthy option[(3)]. The aim of the research was to compare a BB and a digestive biscuit (DGB), monitoring their effect on peak plasma glucose (PPG), area under curve (AUC) and perceived hunger using a validated visual analogue scale (VAS).
Methodology: A double-blind crossover randomised control trial was conducted at the University of Chester. Participants were recruited via advertisement posters (n=30). Exclusion criteria excluded people diagnosed with diabetes or coeliac disease. A BB or DGB product matched in total carbohydrate (30g) was randomly allocated to participants. Immediately after consuming the biscuit a two-hour oral glucose tolerance test was conducted, measuring blood glucose at 30-minute intervals. Perceived hunger, satiety and fullness was measured using a VAS. After two weeks participants repeated the study consuming the other biscuit. AUC was analysed using GraphPad Prism software using the trapezoid rule. Ethical approval was obtained from the Clinical Sciences and Nutrition Ethics Board (CSN/DT/TB/2019). Data were analysed using IBM SPSS v26 using two-way repeated measures ANOVAs and dependent t-tests.
Results: Of the group who completed both conditions (n= 30), 18 were female and 12 were male. The mean age was 23.5±8.3 years. There was no significant difference between BB and DGB measurements (mean ± SD) for PPG (5.6±0.8mmol/L vs. 5.9±0.7mmol/L, p=0.156), AUC (648.95 ± 59.8 mmol/L x 120 minutes vs. 638.65 ± 58.63 mmol/L x 120 minutes, p=0.235) and VAS for satiety and hunger (p=0.118). Over 120 minutes measurements (mean ± SD) for PPG (p<0.001) and VAS (p<0.001) changed significantly, however, there was no significant difference between PPG measurements depending on the biscuit consumed.
Discussion: Despite claims existing for modified starch improving appetite hormones and glycaemic response[(2)], when consumed as single food items in our study there appeared to be no discernible difference between on PPG, AUC and perceived hunger following a BB or a carbohydrate-matched comparator. These findings suggest that although BB are marketed as health products, when consumed without the advertised milk and fruit then they may not improve hunger, satiety or fullness differently to a DGB. Further research analysing hormones such as insulin, ghrelin, leptin and GLP-1 in response to consuming a BB would further substantiate the understanding of how consumption of a BB impacts satiety and glucose homeostasis, and whether such effects are influenced by other meal components.
Conclusion: Although BB are regarded as healthy breakfast products, we observed no significant difference between a BB and a DGB in how they affect PPG, AUC and perceived hunger. Examination of consumption patterns of BB (with or without additional food items such as dairy) may provide further mechanistic insight to help understand these findings and provide clarity on their use as an alternative to standard breakfast cereals.

References:

1. Gaal S, Kerr MA, Ward M, et al. Breakfast consumption in the UK: patterns, nutrient intake and diet quality. A study from the international breakfast research initiative group. Nutrients. 2018;10: 999.
2. Péronnet F, Meynier A, Sauvinet V, et al. Plasma glucose kinetics and response of insulin and GIP following a cereal breakfast in female subjects: effect of starch digestibility. Eur J Clin Nutr. 2015;69: 740-745.
3. Knapton S (2016) Breakfast biscuits contain unhealthy levels of sugar, nutritionists warn. Available at: https://www.telegraph.co.uk/science/2016/06/18/breakfast-biscuits-contain-unhealthy-levels-of-sugar-nutritionis/ (Accessed 25 Jun 2020).

Exploring sports coaches' education and beliefs about eating disorders: A mixed methods study

E Cook[1] & V Krawec[2]
[1]Department of Dietetics, Betsi Cadwaladr University Health Board, Ysbyty Gwynedd, Penrhosgarnedd, Bangor, LL57 2PW, UK and [2]School of Sport and Health Sciences, Cardiff Metropolitan University, Western Avenue, Cardiff, CF5 2YB, UK

Corresponding Author: Evie Cook, Evie.Cook@wales.nhs.uk

Background: Athletes have a higher risk of developing eating disorders (1). The coach has a role in identifying and preventing eating disorders in their athletes (2); however, there is concern about coaches with limited eating disorder education holding this position of responsibility (3). Formal training in eating disorders is not included in the standards needed to accredit UK coaching qualifications (4). The aim of this study was to investigate sports coaches' education and beliefs about eating disorders to identify potential training needs.
Methods: The cross-sectional study used an anonymous, self-administered questionnaire created by the researcher and piloted prior to distribution. Qualified sports coaches (n=35) who were actively coaching at the time of the study were recruited using convenience sampling from the researcher's extended sporting networks. Participants were asked to express their beliefs by rating statements using 5-point Likert scales, and additional comments boxes enabled further discussion. Quantitative data was analysed for statistical significance ($P = \leq 0.05$) using Chi-squared, Mann-Whitney and One-Way ANOVA tests, and qualitative data through thematic analysis. Key themes were identified from comments on each individual statement. Ethical approval was obtained from the Cardiff School of Health Sciences ethics panel.
Results: More than half of coaches agreed that *eating disorders are common in sport* (65.7%, n=23) and that *sports participation is a risk factor for eating disorder development* (59.9%, n=21). Furthermore, most coaches believed they have a *role in identifying eating disorders in their athletes* (74.3%, n=26); however, a substantial proportion (45.8%, n=16) did not believe they would be able *to spot the signs of an eating disorder in their athletes*. Less than half (48.6%, n=17) agreed that they know what *actions to take following an eating disorder disclosure by an athlete*. One key theme emerging from this statement was the need to signpost to a health professional; however, this was identified by a limited number of coaches (11.4%, n=4). The majority of coaches had no previous training in eating disorders (97.1%, n=34), and most wanted further training (82.9%, n=29). Thematic analysis identified that coaches wanted training to focus on recognising and supporting athletes with eating disorders. Coaches wanting further training were significantly more likely to believe that eating disorders are common in sport (Mann-Whitney, p=0.021).
Discussion: The range of beliefs obtained from coaches demonstrates that they are unequipped in identifying and supporting athletes with eating disorders. Findings also highlight that a lack of sufficiency, availability and access to education, and lack of engagement, are barriers preventing training completion; this is supported by previous literature(2). Furthermore, the statistically significant result suggests that if awareness about eating disorder prevalence in sport is raised, it may drive demand for further training.
Conclusion: There is a need for education in eating disorders to exist within coaching qualification pathways, focusing on how to identify, signpost and support athletes. Future research should address barriers preventing completion of training by coaches, such as lack of awareness about eating disorders in sport.

References:

1. Sundgot-Borgen J & Torstveit MK. Prevalence of Eating Disorders in Elite Athletes is Higher Than in the General Population. Clin J Sport Med. 2004;14: 25-32.
2. Plateau CR, McDermott HJ, Arcelus J et al. Identifying and preventing disordered eating among athletes: Perceptions of track and field coaches. Psychol Sport Exerc. 2014;15: 721-728.
3. Sherman RT & Thompson RA. Athletes and disordered eating: Four major issues for the professional psychologist. Prof Psychol Res Pr. 2001;32: 27-33.
4. UK Coaching (2013) Minimum Standards Guidance 2013. https://www.ukcoaching.org/getattachment/e5788542-c23e-4e2d-9762-26c49e614810/attachment.aspx (accessed July 2020).

Qualitative study investigating the approaches early years providers use to promote health to families on the Family Food First Programme.

E Cronly-Dillon, Nutrition & Dietetic Department, Bedfordshire Community Health Services, Dunstable Health Centre, Priory Gardens, Dunstable, LU6 3SU.
R Kabir, Senior Lecturer, School of Allied Health, Faculty of Health ,Education, Medicine and Social Care, Anglia Ruskin University, Chelmsford, Essex, UK.

Corresponding Author: Emma Cronly-Dillon, emma.cronly-dillon@nhs.net

Background: Almost a third of children are overweight or obese when they leave primary school in the United Kingdom (UK) [(1)]. The World Health Organisation recognises the importance of health promotion in the early years setting to combat obesity [(2)]. Involving parents is an effective intervention strategy, however few obesity prevention programmes use early years providers (EYPs) to promote health to families [(3)].
The Family Food First (FFF) programme, an early year's obesity prevention programme based in Luton, UK, encourages EYPs to work with families. This study aims to explore how EYPs in FFF settings currently engage with families to promote health and to assess whether EYPs are provided with the appropriate tools and resources to support this.
Method: This is a descriptive, cross-sectional study. A five question, qualitative survey was used to gather written data from EYPs on their experiences of promoting health to families. The sample consisted of 31 EYPs, representing 14 early years settings in Luton, UK. The participants were recruited during the accreditation process for the FFF programme. An inductive approach was taken to thematic analysis, where codes emerged from the written data and subsequent themes were peer reviewed by a second researcher to enhance rigour [(4)]. Ethical approval for this study was gained through Anglia Ruskin University FHEMS School Research Ethics Panel on the 10th of May 2019 (AH-SREP-18-097).
Results: Three overarching themes emerged: the health promoter, barriers to engagement and support strategies. EYPs recognise children's health needs and are raising health issues with parents and there was evidence of EYPs working together with parents to promote incremental changes over time. Parents were reportedly difficult to engage as they have a lack of awareness of children's health needs and prioritise managing behaviour over promoting healthy habits. Strategies employed by EYPs mostly aimed to improve parent knowledge by providing advice or using FFF printed resources and a greater variety of health education resources were requested. Strategies to improve self-efficacy such as goal setting had limited use. Positive changes to children and parent behaviour was found throughout the examples provided by EYPs.
Discussion: EYPs engaged through the FFF programme are actively raising health issues with parents which compares favourably with similar studies where EYPs were found to be reluctant to work with families [(5)]. A limited variety of strategies were employed to promote behaviour change in parents, which could be addressed by the FFF programme and may support EYPs in overcoming the barriers to parent engagement encountered.
The study highlights the valuable role EYPs play in family health promotion, particularly in forming supportive relationships to promote behaviour change, which is not widely recognised in the literature as most obesity prevention studies employ health professionals.
Conclusions: The FFF programme is supporting EYPs to promote health to families through provision of training and health education resources, more could be done to expand the range of materials available and to improve EYPs knowledge of behaviour change strategies.

References:

1. NHS Digital (2018) National Child Measurement Programme: England, school year 2017/8. https://files.digital.nhs.uk/9F/22AF4D/nati-chil-meas-prog-eng-2017-2018-rep.pdf (Accessed 8 June 2019)
2. World Health Organisation (2016) Report of the commission on Ending Childhood Obesity https://apps.who.int/iris/bitstream/handle/10665/204176/9789241510066_eng.pdf?sequence=1 (Accessed 8 June 2019)
3. Matwiejczyk L, Mehta L, Scott J et al. Characteristics of effective interventions promoting healthy eating for pre-schoolers in childcare settings: An umbrella review. *Nutrients*. 2018; 10:293-314.
4. Braun V & Clarke V. Successful Qualitative Research: A Practical Guide for Beginners. London: Sage Publications; 2013
5. McSweeney L, Araújo-Soares V, Rapley T et al. A feasibility study with process evaluation of a preschool intervention to improve child and family lifestyle behaviours. *BMC Public Health*. 2017; 17:248

An aetiological systematic review and meta-analysis on the association between prenatal multivitamins and Autism in children

By C Friel1, AH Leyland[1], J Anderson[2], M Shimonovich[1], T Borge[3] and R Dundas[1]
[1]MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, Glasgow, G2 3AX. [2]Public Health Research Group, University of Glasgow, Glasgow, G12 8RZ.
[3]Norwegian Institute of Public Health, P.O. Box 222 Skoyen, NO-0213 Oslo Norway.

Corresponding Author: Catherine Friel, c.friel.1@research.gla.ac.uk

Background: Autism Spectrum Disorder (ASD) is a significant and lifelong neurodevelopmental disorder that is estimated to cost 27 billion pounds annually in the UK[1]. An association between prenatal multivitamin supplement use and offspring Autism Spectrum Disorder (ASD) has been observed, and if causal, could be a potential intervention target[2]. Yet, this association stems from observational data which is prone to bias and confounding. Triangulation of alternative methods/approaches is increasing applied in epidemiological research to help distinguish causal and spurious associations[3]. Yet this information is unsystematically synthesised in previous reviews which may increase bias[4]. We aimed to; firstly, determine the association between prenatal multivitamins and offspring ASD; secondly, we formally synthesised evidence from alternative causal approaches.

Methods: We conducted a systematic review and meta-analysis. Medline, Embase, Web of Science, PsycINFO, Open Grey and BioRix were searched on June 8th, 2020. Search strings were based on 'Population, Exposure, Comparator, Outcome'. No date limitations were applied, but non-English language and secondary studies were excluded. The title and abstract screening, full text review and quality assessment using Newcastle-Ottawa were conducted by two reviewers. A random effects meta-analysis with Hartung-Knapp-Sidik-Jonkman estimator and Eggers test for publication bias were conducted in R. Additionally, we explored sources of heterogeneity through sub-group and 'leave-one-out' analysis. Alternative causal approaches applied within studies were narratively synthesised in table format.

Results: Five cohort studies and five case-control studies contributed 904,947 children (8159 cases) to the summary effect estimate. Prenatal multivitamins were not associated with offspring ASD in the main analysis (RR 0.74, 95% CI: 0.53 – 1.04, I^2 = 94.3%). However, an association was observed in high quality studies, and heterogeneity reduced (RR 0.74, 95% CI: 0.60 – 0.91, I^2 = 62.5%). There was no evidence of small study publication bias (eggers test p = 0.36). Alternative causal approaches applied were; one sibling analysis with null results; two negative controls with mixed results; one propensity score analysis produced similar results to the multivariate regression; and one genetic interaction study in which an association was only observed if individuals had the genotype for methylenetetrahydrofolate reductase (MTHFR), a less efficient enzyme.

Discussion: Gene-nutrient interaction indicated that folic acid supplements may be required, by some, to overcome inefficient enzymatic function. In the wider literature, the MTHFR genotype has been associated with an 86% increased risk of ASD[5]. Sibling analyses adjust for shared genetics[1] which may explain the null results. A strong negative control is difficult to identify[1] and may be reflected the mixed results. However, this is a small body of literature with infrequent application of alternative methods.

Conclusion: Our updated systematic review and meta-analysis confirmed there is an association between prenatal multivitamins and offspring ASD, however the nature of this relationship remains undetermined. Furthermore, the formal narrative synthesis of causal approaches provided transparent and reproducible evidence which enhanced interpretation of this association. Yet, these approaches are infrequently applied and replication in high quality studies is necessary.

References

1. Knapp M, Romeo R, Beecham J. Economic cost of autism in the UK. Autism. 2016;13: 317-336.
2. Li M, Francis E, Hinkle S, et al. Preconception and Prenatal Nutrition and Neurodevelopmental Disorders: A systematic review and meta-analysis. Nutrients. 2019;11.
3. Lawlor D, Tilling K, Smith GD. Triangulation in aetiological epidemiology. Int. J. Epidemiol. 2016;45: 1866-1886.
4. Higgins JPT, Thomas J, Chandler J, et al. Cochrane Handbook for Systematic Reviews of Interventions. Version 6.0 (updated July 2019), Cochrane 2019.
5. Pu D, Shen Y, Wu J Association between MTHFR Gene Polymorphisms and the Risk of Autism Spectrum Disorders: A Meta-Analysis. Autism Res. 2013;6: 384-392.

A study to identify vegan dietary patterns in the UK

C.Gallagher and K.E. Lane, School of Sport and Exercise Sciences, Liverpool John Moores University, United Kingdom L17 6BD.

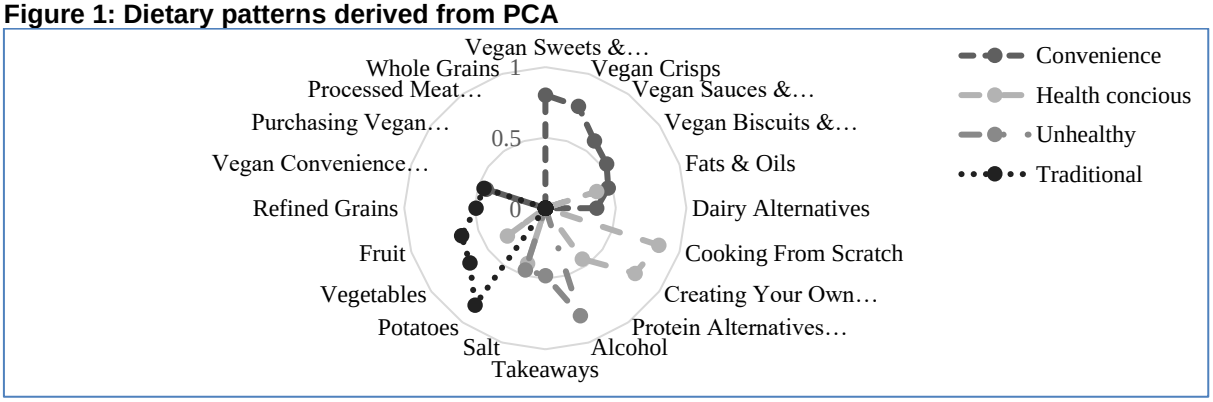
Corresponding Author: Catherine Gallagher, C.gallagher@2018.ljmu.ac.uk.

Background: Over half a million of the UK and European population, equating to more than 1%, are following a vegan diet where all animal food sources are replaced by plant substitutes [(1;)]. In response to this the food industry are producing more processed vegan alternative food products [(2)]; leading to concerns regarding the nutritional quality of some vegan diets [(3)]. The aim of this study is to provide an insight into how vegan diets are adapted to replace animal products and how this may affect vegans' nutrient status.

Methods: The study was approved by the Research Ethics Committee at Liverpool John Moores University. A modified version of the EPIC Norfolk food frequency questionnaire (FFQ) to include vegan alternatives was completed by 129 UK vegans recruited through social media. PCA was performed in SPSS, with the procedure 'dimension reduction' and 'FACTOR' on the food groups to identify the primary components, which accounted for variation in the vegan dietary intakes conveying the main dietary patterns.

Results: PCA identified four distinct dietary patterns (Fig.1) including; convenience, health conscious, unhealthy and traditional vegan. Vegans in the convenience pattern were consuming high quantities of vegan convenience meals and snacks. The second dietary pattern consisted of vegans who were mostly cooking from scratch, creating their own recipes and using non-processed protein alternatives such as soya and pulses. The unhealthy pattern reflected high intakes of alcohol, takeaways and salt in the diets of some vegans. The fourth pattern represents the more traditional vegans with a diet constituting plenty of plants, fruits and vegetables.

Figure 1: Dietary patterns derived from PCA



Discussion: Nutritional analysis of these vegan patterns could provide valuable insight into the quality of vegan diets with potential to inform future nutritional guidelines. The adapted version of the EPIC Norfolk FFQ was not validated; this would need to be considered in future studies. The participants were mostly young females and recruited through social media, therefore the results may not be fully representative of all vegans in the UK population.

Conclusion: This study fills a research gap by providing a comprehensive evaluation of current vegan dietary patterns with specific emphasis on dietary adaptation. Further vegan dietary pattern studies, particularly well powered multicentre studies in the UK and Europe are needed. To minimise bias a number of recruitment methods could be used to enhance the generalisability of theses findings.

References:

1.Statista (2019) Share of young adults who are vegetarian or vegan in selected European countries in 2017. https://www.statista.com/statistics/768475/vegetarianism-and-veganism-among-young-adults-in-selected-european-countries/ (accessed 09th November 2019

2. Mintel (2020) Veganuary supports growing trend towards veganism - 30th January 2020. https://reports.mintel.com/display/1000344/?fromSearch=%3Ffreetext%3DVeganuary%25202020 (accessed 27th June 2020

3. Ruby, M.B. (2012) Vegetarianism. A blossoming field of study. *Appetite*, 58 (1), 141-150.

Perceptions and awareness of artificial sweetener consumption, safety and use in Coventry University students: a cross-sectional survey in the UK

[1]G Hadjiloizou, [1]N Walker
[1] School of Health, Coventry University, Coventry, CV1 5FB. UK

Corresponding Author: Georgia Hadjiloizou, hadjilog@uni.coventry.ac.uk

Background: Current UK free sugar intakes far exceed recommendations according to national surveys; use of artificial sweeteners may help to reduce sugar intakes, assist with weight loss and diabetes management [(1)]. Little is known about the knowledge and perceptions of AS in the UK population; understanding these will help inform dietetic education, practice and public health actions [(2)]. This research aims to determine the awareness and perceptions about the safety and uses of AS in Coventry University students and if there are any significant differences in the responses of healthcare and non-healthcare students.

Method: A cross-sectional survey was undertaken. 29 healthcare and 28 non-healthcare students were recruited via systematic convenience sampling at Coventry University per Cohen (1992) recommendations. Participants completed a paper questionnaire containing 3 open-ended questions about their intake of AS and 10 statements about the safety and uses of AS to determine the students' knowledge and awareness using a Likert scale where 1= Strongly Disagree and 5= Strongly Agree. Chi-squared and Mann-Whitney U tests were used to identify any statistically significant differences in quantitative responses between the non-healthcare and healthcare group. Qualitative responses were categorised based on their context by the researcher via thematic analysis. Ethical approval was obtained from the Coventry University Ethics Committee.

Results: No significant differences were observed in the responses of the two groups ($p > 0.05$ for all questions), therefore the responses represent both student groups. Yes/No questions indicated that 90% of students were aware of AS, 42% reported to consume AS. Qualitative responses varied between consumers reporting an intake of AS for flavour preference (36%) and calorie intake reduction (29%) whilst 25% reported to not consume AS. Non-consumers avoided consumption due to adverse health effects (36%) and taste dislike (24%). There was a high prevalence of neutral responses to the statements about the safety of AS. Some statements included negative responses where a significant number of students believed AS can cause adverse health effects including tooth decay (60%), obesity (41%) & cancer (32%), with 32% believing AS are not safe to consume (10% believing they should be banned). 33% were unsure whether AS are safe to consume.

Discussion: Even though 90% of the students were aware of AS, the findings of the study suggest that the attitudes and perceptions of the students indicate uncertainty regarding the safety and uses of AS due to the high prevalence of the neutral response to most statements. A lack of knowledge is indicated in both student groups as they agreed that AS consumption can be associated with tooth decay, cancer and obesity even though scientific evidence and the Public Health of England marks AS consumption as safe for adults. Although the sample size and external validity are limited, the results are in line with existing literature which suggests that there is a lack of knowledge about AS in the general population despite government health regulations and statements [(3,4)]. Further education about the uses and safety of AS therefore appears to be indicated for the UK population.

Conclusion: The results of the study suggest further education is needed about the safety and uses of AS in healthcare and non-healthcare students which could be delivered by dietitians. Further research is recommended to give a deeper understanding of the perceptions and attitudes of AS in the UK population to help inform this area.

References:

1. Public Health of England (2015) Sugar reduction - The evidence For Action. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf (accessed July 2020)
2. Swift J, Strathearn L, Morris A et al. Public Health Strategies To Reduce Sugar Intake In The UK: An Exploration Of Public Perceptions Using Digital Spaces. Nutr Bull, 2018;43:238-247
3. Rusek A, Biazik E & Lesiów, T. Consumer Knowledge And Opinion On Selected Sweeteners Used In Food. Part 2". Engineering Sciences And Technologies 2017;1:62-73
4. Shim S, Seo S, Lee Y et al. Consumers' Knowledge And Safety Perceptions Of Food Additives: Evaluation On The Effectiveness Of Transmitting Information On Preservatives. J Food Control 2011;7:1054-1060

Inclusion of sleep promotion in dietary interventions targeting childhood obesity in the United Kingdom: A systematic review

M Hellyer, Department of Dietetics, Murrumbidgee Local Health District, Wagga Wagga, NSW, 2650, Australia; N Shebl, School of Life and Medical Sciences, University of Hertfordshire, Hatfield, Hertfordshire, United Kingdom

Corresponding Author: Miriam Hellyer, Miriam.hellyer@health.nsw.gov.au

Background: The United Kingdom (UK) has the highest rates of childhood obesity in Western Europe [(1)]. Evidence suggests that the promotion of sleep can have a beneficial effect on body weight in children [(2)]. Currently sleep promotion is not included in UK NICE and SIGN guidelines on the management of childhood obesity. Merit exists in exploring whether the promotion of sleep is being incorporated into dietary interventions targeting childhood obesity in the UK. This review will aim to evaluate to what extent sleep promotion is included in dietary interventions targeting childhood obesity, focusing on ≤17 years, within the UK.

Methods: A systematic review was utilised to deliver a summary of all available research to address the studies aim. Relevant health databases including CINHAL, PubMed, Cochrane Library, TRIP, Scopus and hand searching of reference lists was systematically searched by one researcher to identify relevant literature. Inclusion criteria comprised ≤17 years of age and those enrolled in a UK based study aimed at targeting obesity and using BMIz as a measure. Study quality was assessed using a CASP tool. Ethical approval was not required.

Results: 4575 articles were identified and screened for eligibility of inclusion in this review (figure 2). Out of 15 eligible dietary interventions to prevent childhood obesity, 2 (13%) promoted sleep. In contrast, 15 (100%) interventions targeted diet, 14 (94%) targeted physical activity, and 5 (33%) targeted media use in children (figure 1). Of the two interventions that promoted sleep both used sleep hygiene principles and education on recommendations around hours of sleep. Included studies were mainly randomised controlled trials.

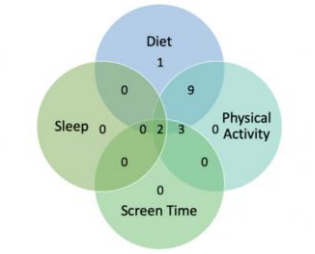


Figure 1: The proportion of UK childhood obesity interventions that include dietary advice, physical activity, screen time and sleep

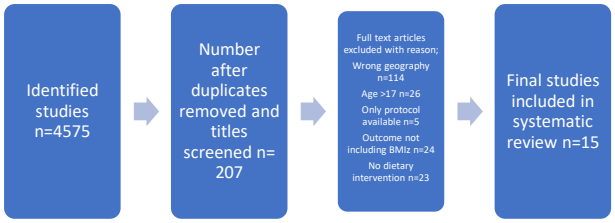


Figure 2: A flow diagram of information through the systematic review

Discussion: Results demonstrate that sleep promotion is an underreported strategy in addressing childhood obesity. However, further research is needed into the most effective strategy to promote adequate sleep in children.

Conclusion: This review indicates that the promotion of sleep lacks attention in UK based childhood obesity intervention when compared with other more established energy-balance behaviours such as physical activity and diet.

References:

1. NHS Digital. National Childhood Measurement Programme [Internet]. England; 2017/2018(cited 2020 Apr 17). Available from https://digital.nhs.uk/data-and-information/publications/statistical/national-child-measurement-programme/2017-18-school-year
2. Yoong S, Chai L, Williams C et al. Systematic review and meta-analysis of interventions targeting sleep and their impact on child body mass index, diet, and physical activity. Obesity (Silver Spring) 2016 May 24; 24(5): 1140–1147.

A systematic review exploring knowledge, awareness and attitudes on vitamin D and the National recommendations amongst adults in the UK and Ireland.

C Taylor, A Cartwright, Leeds Beckett University, Applied Clinical Sciences, City Campus, Leeds, LS1 3HE.

Corresponding Author: Cecile Taylor, ceciletaylor@rocketmail.com

Background: Vitamin D is essential for bone, teeth and muscle health[1]. Increasingly, its role within the immune, cardiovascular and neurological system is being recognised. As its synthesis from the sun is only possible from March till September and intake from food is insufficient to meet daily requirements[2], the UK and Ireland established guidelines advising individuals on how to achieve these[3, 4]. Nevertheless, deficiency is still widespread[4].

Aim: to explore awareness, knowledge of and attitudes to vitamin D and national recommendations (NRs) amongst UK and Irish adults in order to understand this avoidable public health concern and inform future practice and policy.

Methods: Literature searches of developed PICOS terms were conducted on Cochrane, PubMed, Discover, Scopus and CINAHL complete. Journal-published, peer reviewed papers relating to the awareness and/or knowledge and/or perceptions of vitamin D amongst adults over 18 in the UK or Ireland from the last 10 years were included. As a mixed method approach was taken, CASP, AXIS and the MMAT were used to assess paper quality. All were deemed either "Strong" or "Fair". Information was extracted and synthesised following Cochrane guidance. Ethical approval was received from Leeds Beckett University Ethics Committee.

Results: Of 3310 hits; six cross-sectional, observational studies were included in this review. Four were quantitative, one qualitative, and one mixed. Focus groups and questionnaires (paper and electronic) were used to assess 279 adults from the general population including parents, pregnant women and "at-risk" groups. The main themes were knowledge, awareness of NRs, sources of information and attitudes towards supplementation and food fortification. Despite most participants having heard of vitamin D, knowledge of its role and sources was poor with many participants in the qualitative studies correctly mentioning "the sunshine thing" yet incorrectly stating vegetables as a source. Only 14-28% of participants knew of NRs and 6-43.5% took a supplement. Further, only 17.73-26% of parents gave their child a supplement. Limited access to clear, "appealing" information from health care professionals was identified as a barrier as well as confusion around access to supplements, administration and doses. Attitudes towards food fortification varied.

Discussion: Studies with greater knowledge and supplement uptake were generally over representative of women with higher education in the general population. The primary information source mentioned by these was the media whilst studies investigating "at-risk" adults found healthcare professionals were. Worryingly, lowest supplement uptake was amongst these "at-risk" adults. Although conveniently sampled in clinical settings rather than in the community or online, this suggests current advice is not appropriately addressing cultural and social needs including religion, language, finances and literacy and further research is required to target these groups.

Conclusion: Despite a small sample size and some lack of external validity, this widespread, avoidable ignorance around vitamin D and its NRs indicates current public health information is inadequate. Dietitians have a crucial part to play in this area through the revision of guidelines, policies and the development of appropriate, inclusive public health strategies.

References:

(1) Pilz S, Zittermann A, Trummer C, et al. Vitamin D testing and treatment: a narrative review of current evidence. *Endocrine Connections* [Internet]. 2019 [cited 2020 Feb 18]; 8(2): 27-43. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6365669/#bib30

(2) Public Health England. *National Diet and Nutrition Survey.* [Internet] 2016 [cited 2020 Feb 19]. Available from:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/772434/NDNS_UK_Y1-9_report.pdf

(3) Scientific Advisory Committee on Nutrition. *Vitamin D and Health,* 2016. [Internet][cited 2020 Feb 17]Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/537616/SACN_Vitamin_D_and_Health_report.pdf

(4) Food Safety Authority of Ireland. *Healthy eating, food safety and food legislation,* 2011. [Internet] [cited 2020 Feb 22]. Available from: https://www.fsai.ie/science_and_health/healthy_eating.html

Extent of body image dissatisfaction and factors related to exercise among 45-64 year-old men who attend a gym: A cross-sectional study

C Wallek and L Blanchard
School of Life and Medical Sciences, University of Hertfordshire, College Lane, Hatfield, AL10 9AB

Corresponding Author: C Wallek, clairewallek@yahoo.co.uk

Background: Few studies have explored body image among adult men. In England, among men, the 45-65 year olds are those who have the highest prevalence of obesity [(1)]. While discussing health concerns can provide motivation to exercise and become more body aware, it may inadvertently lower body image satisfaction. This study aimed to investigate body image satisfaction and factors associated with exercise in men aged 45-64 who attend a gym.

Methods: Male regular gym users aged 45-64 were recruited in a gym. Data was collected using a cross-sectional questionnaire consisting of two 10-point Likert scales on body weight and shape satisfaction, the Appearance Anxiety Inventory (AAI) [(2)], the Exercise Addiction Inventory (EAI) [(3)], and questions about activities, people who initially influenced them to attend a gym, and reasons for exercising. EAI scores ≥ 24 indicated likely exercise addiction [(3)]. Reasons for exercising were grouped as relating to body image or not. The association between the three body image variables and the other factors was analysed in SPSS using the Spearman's rank test and Kruskal Wallis test. Ethical approval was granted by the University of Hertfordshire (LMS/UG/UH/03918).

Results: Forty-four men participated. One was excluded due to multiple extreme outlying responses. Appearance anxiety was very low (median [IQR]: 2.0 [1.0-4.0]). The participants felt somewhat satisfied with their weight (median [IQR]: 8.0 [4.0-8.0) and shape (median [IQR]: 7.0 [4.0-8.0]), although 18.6% and 16.3% respectively had very low scores (1-3). 9.3% were likely to be addicted to exercise (mean [SD]: 18.2 [3.4]). The main initial influencers included themselves only (65.1%), relatives (27.9%), health and sports professionals (4.7%), and "others" (2.3%). 55.8 % mentioned body image reasons for exercising. No statistically significant correlations were found between AAI, weight satisfaction, body shape satisfaction and EAI, except between weight and shape satisfaction (r_s=-0.85, p=0.000, n=43). There was no association between the initial influencers or reasons for exercising and the three body image variables, except between body shape satisfaction and the reasons for exercising (χ^2(1)=4.804, p=0.028).

Discussion: While appearance anxiety was very low, about one in six men were dissatisfied with their weight and/or shape. This is lower than dissatisfaction rates reported in women regarding thinness and muscularity [(4)], yet still potentially problematic. Programmes should promote health and fitness while being careful with references to body image. Since family and friends played a greater role in the decision to attend a gym than health professionals and trainers, collaborating with the former may be important to support gym attendance.

Conclusion: This population group has a low risk of excessive body image preoccupation when measured as appearance anxiety while body image satisfaction and exercise addiction should be explored on a greater scale.

References:

1. NHS Digital (2019) Health Survey for England, 2018: Overweight and obesity in adults and children data tables. https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/2018/health-survey-for-england-2018-data-tables (accessed July 2020).
2. Veale D, Eshkevari E, Kanakam N *et al.* (2014) The Appearance Anxiety Inventory: validation of a process measure in the treatment of body dysmorphic disorder. Behav Cogn Psychother **42**, 605-616.
3. Griffiths MD, Szabo A & Terry A (2005) The exercise addiction inventory: a quick and easy screening tool for health practitioners. Br J Sports Med **39**, e30.
4. Ralph-Nearman C & Filik R (2020) Development and validation of new figural scales for female body dissatisfaction assessment on two dimensions: thin-ideal and muscularity-ideal. BMP Public Health **20**, 1114.

Survey of student views on pre-registration training in communication skills for behaviour change.

K Whitehead[1] and T Parkin[2]

1. University of Nottingham, Division of Food, Nutrition and Dietetics, Sutton Bonington Campus, Loughborough, Leics. LE12 5RD
2. University of Plymouth, School of Health Professions, Plymouth, Pl6 8BH

Corresponding Author: Kirsten Whitehead, Kirsten.whitehead1@nottingham.ac.uk

Background: The importance of communication skills to support behaviour change (CSBC) and patient-centred care is well recognised. Pre-registration training in CSBC is essential for dietitians but how best to deliver that training is poorly understood. Student attitudes to learning these skills have been shown to decline as training progresses[1] but more recently students reflected positively about training using experiential learning with simulated patients[2]. The aim of this cross-sectional survey was to elicit students' views on the importance of CSBC and their training needs.

Methods: Student BDA members were sent information and a survey link by the BDA, via email in January 2018. The survey was based on one used previously[3], response formats included tick box, Likert scales and open text boxes. Quantitative data was analysed descriptively using SPSS, version 24. Due to missing data, pairwise deletion was applied and percentages in brackets apply to that specific question. Qualitative data was analysed using inductive thematic analysis. Ethical approval was obtained from the School of Sociology and Social Policy, University of Nottingham (BIO-1718-0001). Data relating to pre-registration training and graduate capabilities is reported.

Results: 95 students from across the UK completed the survey (10.6% response rate). The majority (n=55, 98.2%) rated CSBC as important. Most thought responsibility for teaching CSBC pre-registration should be 50:50 between university and placement (n=29, 50%). Common teaching methods at university were lectures (n=49, 98%), role-play (n=47, 94%) and observation of skills (n=42, 92%). On placement, consultations with real patients (n=38, 88.4%) and observation of skills (n=28, 65.1%) were the only frequently used teaching methods. Students felt that more variety of teaching methods could be used in both locations. Open responses to pre-registration training and what should be included to help achieve graduate abilities, resulted in four themes, see Table 1.

Table 1. Themes on what pre-registration training should include

Theme	Theme meaning	Quote
1	Demonstrating understanding of appropriate CSBC	"Actively listening to what the patient has to say - a patient centred approach *"(67)*.
2	Relating to behaviour change approaches, models and strategies,	*"… we need more* emphasis on motivation interviewing techniques and goal setting" (59).
3	Personal attributes	"compassion, understanding" (94), and *"…, professionalism… non-judgemental," (97).*
4	Outdated or 'traditional' dietetic practice, expert led approach.	*"…*convince the patient to change their diet. *"(65)*.

Discussion: Students had good awareness of CSBC in dietetics and graduate capabilities and were open to a range of teaching methods being used both at university and on placements. Some wanted more depth of skills and a wider range of teaching methods than they were experiencing. In contrast there were some with more traditional views who appeared to lack understanding of patient-centred approaches. Similar views have been found and may be influenced by the stage of training students are at.[1,2]. These results only represent the views of BDA student members who responded to the questionnaire rather than the whole student population.

Conclusion: Most student dietitians had good awareness of their training needs and an openness to learn but some favoured more traditional, less patient-centred approaches.

References:

1 Power BT & Lennie SC (2012) Pre-registration dietetic students' attitudes to learning communication skills. *J Hum Nutr Diet* **25**, 189-97. **2**. Knight A., Baldwin C., Reidlinger D.P. *et al*. (2020) Communication skills teaching for student dietitians using experiential learning and simulated patients. *J Hum Nutr Diet*. https@//doi.org/10.1111/jhn.12743 **3.** Whitehead K, Langley-Evans SC, Tischler V *et al.* (2009) Communication skills for behaviour change in dietetic consultations. *J Hum Nutr Diet* **22**, 493-500.

How acceptable is the Best Start programme to pregnant women with a BMI >30kg/m^2 within a South Wales Health Board?

S Wyer, Department of Nutrition and Dietetics, Keir Hardie University Health Park, Merthyr Tydfil, Wales. CF48 1BZ.

Corresponding Author: Shelley Wyer, Shelley.Wyer@wales.nhs.uk

Background: Obesity and maternal obesity is on an increasing trajectory, with a range of associated health consequences[1,2]. Maternal obesity and excessive gestational weight gain is also increasing and linked to a number of adverse health outcomes for both mother and child[1,3]. The 'Best Start' programme was offered to obese pregnant women within Cwm Taf University Health Board as part of a Randomised Control Trial (RCT), where 41 programmes were delivered to 53 women at 16 weeks gestation. Best Start includes the 7 week scripted Foodwise In Pregnancy group education programme, designed and quality assured by Public Health Dietitians in Wales. It provides pregnancy specific nutrition and physical activity information, practical cooking skills sessions and includes behaviour change components to support healthy weight gain in pregnancy. Best Start was delivered by two Support Worker's, trained and supervised by local Public Health Dietitians.

Aim: To investigate how acceptable is the Best Start programme is to pregnant women with a BMI >30kg/m^2 within Cwm Taf University Health Board.

Method: Qualitative research methodology was utilised by a single researcher, with a small purposive sample of 8 Best Start participants from 7 separate Best Start programmes, in the form of individual semi structured interviews. Dictaphone audio recordings were transcribed verbatim by a professional transcription company and subsequent thematic analysis took place using NVIVO (version 12). Ethical approval was also gained from Cardiff Metropolitan University prior to any data collection. Quantitative recruitment and attendance data was also available from the wider RCT.

Results: 20% (n = 53) of those randomised into the intervention group attended at least once.
70% (n = 37) retention rate of participants commencing the programme. The main themes included:

Theme	Quote
Positive feedback exceeding expectations	'supporting, reassuring, practical, encouraging', 'fun' 'empowering' 'informative' 'flexible' and 'enjoyable'.
A valued relationship with delivery staff	'because she's talked you through the benefits of everything, I've left here each week thinking, I can achieve that. And, it's not easy goals'
Group size, timing, duration and intensity	'it's a shame it was only eight weeks, but I think committing to something more than that is a bit of a big commitment'
Programme content and resources	'the information has been fantastic' and 'the biggest benefit, was the ideas of how to change the diet without being drastic about it'.
Open access for all pregnant women	'we all need to be mindful of what we're eating and just make sure you're not gaining too much weight'.
Programme information	'I'd definitely say, tell everyone it's not a massive group' … 'I wished they would have told me that because I was working myself up'

Discussion: The high retention rate in addition to self-reported behaviour change suggests a level of programme acceptability. It became evident that the knowledge and skills of the programme facilitators, as well as the resulting relationships formed were key components supporting programme satisfaction. The validation of this relationship on a weekly basis appeared to be a crucial factor in counteracting any initial reservations around attending. This could be further supported by open access to all pregnant women and improved programme information at the point of referral.

Conclusion: The women who attended the Best Start programme found it to be widely acceptable and reported it exceeding their expectations on many levels. Further data collection from participants who declined to attend the Best Start programme would provide a more robust insight into service acceptability, potentially improving attendance and improving service cost-effectiveness.

References:

1. CMACE. (2010). Maternal obesity in the UK: Findings from a national project. https://www.publichealth.hscni.net/sites/default/files/Maternal%20Obesity%20in%20the%20UK.pdf (accessed: 23 November 2019).
2. Welsh Government. (2019b). maternity-and-birth-statistics-2018-239 https://gov.wales/sites/default/files/statistics-and-research/2019-10/maternity-and-birth-statistics-2018-239.pdf (accessed: 8 April 2019).
3. Welsh Government. (2011). A Strategic Vision for Maternity Services in Wales. http://www.wales.nhs.uk/documents/A%20Strategic%20Vision%20for%20Maternity%20Services%20in%20Wales%20-%20September%202011.pdf (accessed: 4 February 2019).

Renal Nutrition

Supported by BDA Renal Nutrition Specialist Group

Return to contents page

Screening for malnutrition in renal inpatients: a service development project to evaluate the effectiveness of implementing Renal iNUT.

K James[a] L Jackson[a]
[a]Nutrition and Dietetics Department, Northern General Hospital, Sheffield S5 7AU

Corresponding Author: Katie James, Katie.james10@nhs.net

Background: Malnutrition affects half of the renal inpatient population in the United Kingdom(1) which has been associated with an increased mortality risk(2). Prompt and accurate nutritional screening on inpatient admission is essential in order that timely and effective nutritional intervention can be provided. Generic tools such as the 'Malnutrition Universal Screening Tool' (MUST) lack sensitivity for use in renal patients due to the multi-factorial nature of renal related malnutrition(1). The Renal Inpatient Nutrition Screening Tool (Renal iNUT) has been validated in a UK multi-centre research study. It has a higher sensitivity at detecting malnutrition in renal inpatients compared with MUST and positive questionnaire feedback from renal nursing staff(1). There has not yet been a study looking into the completion rate of this tool by renal nursing staff and the effect on suitability of dietetic referrals received on renal inpatient wards, which this current study aims to achieve.

Methods: Rostered nursing staff (n=35/37) on two renal inpatient wards were trained by two members of the renal dietetics team before the Renal iNUT tool was introduced and MUST was discontinued. An observational audit was performed on Renal iNUT tool completion using a cross-sectional sample of adult patients (aged >18 years) under a nephrology consultant. Exclusion criteria include patient's receiving end of life care and those admitted for less than 24 hours. A 'malnutrition related' dietetic referral audit was completed over one working week for both wards prior to and post Renal iNUT implementation. The project was registered and approved by the hospital trust clinical effectiveness unit panel.

Results: Prior to Renal iNUT implementation, 30% (n=3) of the patients referred with malnutrition related reasoning had a completed MUST score ≥2, indicative of needing a dietetic referral. Post Renal iNUT implementation, ⅔ (n=2) 'malnutrition related' referrals had a completed Renal iNUT score ≥2 indicative of a needing a dietetic referral. No MUST or Renal iNUT scores were used in any of the dietetic referrals. For the Renal iNUT completion audit, 10.5% (n=2) of inpatient notes audited had a Renal iNUT tool in situ and of these tools, 0% were completed correctly.

Discussion: The low compliance rate for completing Renal iNUT in this study is likely impacted on by several factors; the tool was in a paper format rather than integrated into the electronic patient record which could lead to it being overlooked(3); there has been limited dietetic cover to the renal wards due to staffing vacancies which has not helped regarding promotion of the tool and addressing further training needs(3); and nursing staff have had competing priorities and increased workload pressures associated with the COVID-19 pandemic. Regarding the dietetic referral audit, pre and post Renal iNUT implementation, the referrals received were deemed to be wholly based on nursing staff judgement rather than the patient's nutritional screening tool score. It was hoped that the introduction of a renal specific screening tool would reduce the risk of malnourished patients being missed due to more sensitive screening methods (1). However, due to poor completion rates, malnourished renal patients remain at risk of being 'missed'.

Conclusion: The implementation of a validated and sensitive renal specific nutritional screening tool following a dietetic led training programme, does not automatically translate into improved identification of patients at risk of malnutrition. Further research is warranted to explore the reasoning behind the poor compliance with this tool and to develop an effective strategy to improve nutritional screening rates in a renal ward environment.

References:

1. Jackson HS, MacLaughlin HL, Vidal-Diez A *et al.* (2019) A new renal inpatient nutrition screening tool (Renal iNUT): a multicenter validation study. *Clin Nutr* **38**(5), 2297-2303.
2. Netherlands Cooperative Study on the Adequacy of Dialysis-2 Study Group (2009) Subjective global assessment of nutritional status is strongly associated with mortality in chronic dialysis patients. *Am J Clin Nutr* **89**(3), 787-793.
3. Green SM & James EP (2013) Barriers and facilitators to undertaking nutritional screening of patients: a systematic review. *Journal of human nutrition and dietetics* **26**(3), 211-221.

The impact of nutritional status upon health-related quality of life in persons approaching dialysis

F C Willingham[1,2] B E Phillips[2] M W Taal[1,2]
1. University Hospitals of Derby and Burton NHS Foundation Trust; 2. University of Nottingham

Corresponding Author: Fiona Willingham

Introduction: End stage kidney disease (ESKD) and dialysis are associated with complications including reduced appetite, fatigue, and reduced physical function, which may result in reduced nutritional status and health-related quality of life (HRQoL). Exercise and nutritional interventions in pre-dialysis and dialysis patients have been found to prevent deterioration in nutritional status and HRQoL in persons with ESKD[1,2]. "PREHAB" (Pre-emptive rehabilitation in persons approaching dialysis) is a prospective randomised trial aiming to determine the effect of exercise and nutrition interventions upon clinical and HRQoL outcomes in persons approaching dialysis. The aim of this work was to assess the impact of nutritional status upon HRQoL in participants prior to starting dialysis.

Methods: Regulatory approval from Derby Research Ethics Committee and the Health Research Authority has been obtained. Patients with eGFR≤15ml/min/1.73m^2 who were able to exercise and anticipated to require dialysis within 6 months, were invited to participate in the "PREHAB" trial. Nutritional status was assessed using several validated methods, but for this work was determined by 7-point Subjective Global Assessment (SGA). Factors which may influence HRQoL were assessed using several validated methods detailed in Table 1. Data were analysed using IBM Statistics SPSS v24.0, using unpaired T-Test to compare differences between the groups.

Results: Data for 57 participants (35 male, 22 female, mean age 64.4 years) were analysed, with results summarised in Table 1. Overall, there were trends towards reduced appetite, perception of physical function, and cognitive function, and increased levels of fatigue and anxiety. When results were analysed according to nutritional status, participants with reduced nutritional status (SGA ≤5) were more likely to experience reduced appetite and physical activity, and increased fatigue, anxiety, and difficulties doing usual daily activities, in comparison to well-nourished participants (SGA 6-7). Unexpectedly, cognitive function (determined by MoCA) was better in those with reduced nutritional status.

Table 1: Nutritional Status and Health-Related Quality of Life

Variable	Total cohort (n=57)	Well nourished (n=42)	Mal-nourished (n=15)
Functional Assessment of Chronic Illness Fatigue Tool (FACIT-F)	21	18	30*
Duke Activity Status Index (DASI)	33.8	35.95	26.95*
Functional Assessment of Anorexia/Cachexia Therapy Appetite Scale (FAACT-A)	11	10	15*
Hospital Anxiety and Depression Scale (Anxiety) (HADS A)	7	6	10*
Hospital Anxiety and Depression Scale (Depression) (HADS D)	6	5	7
Montreal Cognitive Assessment (MoCA)	26	25	27*
Barthel Index (0 - 20)	19	19	19
EQ5D - Mobility	2	2	3
EQ5D - Self-care	1	1	2
EQ5D - Usual Activities	2	2	3*
EQ5D - Pain/Discomfort	2	2	3
EQ5D - Anxiety/Depression	2	2	4*

* = p≤0.05 vs well-nourished

Discussion: Several factors which may negatively influence HRQoL are prevalent in this cohort of patients approaching dialysis, including increased fatigue, and reduced appetite and physical activity. Malnutrition was associated with trends towards reduced appetite, lower physical activity, anxiety, increased difficulties undertaking usual daily activities, and greater perception of fatigue.

Conclusion: These findings are important for planning interventions to prevent deterioration in HRQoL, to ensure that they focus upon the relevant aspects most likely to be beneficial to patient care, and include nutritional interventions.

References:

1. Campbell KL, Ash S, and Bauer JD (2008). The impact of nutrition intervention on quality of life in pre-dialysis chronic kidney disease patients **Clinical Nutrition 27(4):537-44**
2. Greenwood S, Lindup H, Taylor K, et al (2012). Evaluation of a pragmatic exercise rehabilitation programme in chronic kidney disease. Nephrol Dial Transplant 27 (Suppl 3): iii126-iii134

Collecting Renal Dietetic Outcomes to Drive Service Improvement

F C Willingham, P Jurczak and J Wan.
University Hospitals of Derby and Burton NHS Foundation Trust

Corresponding Author: Fiona Willingham

Introduction: Measuring outcomes of dietetic interventions is important for evaluating the effectiveness and efficacy of dietetic care and driving service improvement. The British Dietetic Association Renal Nutrition Group introduced the Renal Dietetic Outcomes Toolkit (RDOT)[1] in 2016, with audit highlighting their value in demonstrating effectiveness of dietetic interventions for patients with later-stage chronic kidney disease (CKD). Our department introduced dietetic outcomes in 2017 using generic guidelines based on the RDOT, but until the introduction of electronic patient records for renal patients in 2019, measuring their use and effectiveness was limited. Following the introduction of electronic patient records, we aimed to assess recording and achievement of dietetic outcomes in our single-centre cohort of CKD outpatients.

Methods: Data for all dietetic contacts between 1st July – 30th November 2019 were extracted from electronic renal patient records (VitalData®). There were no exclusion criteria. Demographic data (age, gender, treatment modality, dialysis vintage), and data regarding reason for dietetic contact, outcome set, completion and achievement of outcomes, and barriers for non-achievement, was also collected. The audit was registered locally within the dietetic department.

Results: 1650 dietetic contacts were recorded (528 patients; mean age 65 years; 61% males). Patients attending low clearance clinic accounted for 17% contacts; in-centre haemodialysis 41.5%; peritoneal dialysis 11.0% and home haemodialysis 10.5%. The most common reasons for referral are summarised in Table 1. Dietetic outcomes were set for 80% of contacts overall (range 72.0-87.4% when analysed according to treatment modality and reason for referral – Table 1). The most common outcomes set were optimising biochemistry (47.8%), increasing oral nutritional intake (15.6%), maintaining biochemistry (10.3%), maintaining anthropometric measurements (5.8%) and improving fluid balance (4.3%). Outcomes were completed for only 27.7% of contacts (range 19.8 - 34.0% according to treatment modality and reason for referral) – due predominantly to patients still being under dietetic care. Where outcomes were set and completed, they were achieved for 62.9% consultations (range 37.5 - 78.6% according to reason for referral - Table 1). The main barriers for non-achievement of outcomes were low motivation to change (27.9%), poor adherence with supplements or medications (25.0%), inappropriate medication dose (10.3%), anorexia (8.8%) and delays in receiving supplements or medications (8.1%).

Table1: Number of outcomes set and achieved according to reason for referral

Reason for Referral	Number of contacts	% contacts where an outcome was set	Outcome achieved (%)
Poor appetite	368 (22.2%)	75.0	53.3
Hyperkalaemia	275 (17.4%)	76.0	78.6
Hyperphosphataemia (diet and phosphate binders	254 (15.4%)	87.4	59.4
CKD-MBD	248 (15.0%)	83.5	62.1
Salt and fluid	82 (6.3%)	84.2	37.5
Hyperphosphataemia (diet alone)	56 (4.3%)	83.9	60.0
Weight reduction	25 (1.9%)	72.0	66.7

Discussion: Where outcomes were completed, dietetic intervention was most effective in optimising potassium levels, and least effective in achieving salt and fluid balance, and managing malnutrition. Where outcomes were not achieved, low patient motivation and poor adherence to treatment accounted for over 50% of barriers to effective treatment, which may explain why dietetic interventions are less successful in these areas where patient engagement with treatment is paramount. Recording completed outcomes needs to improve in some areas, which will be aided by adapting departmental guidelines to support this.

Conclusion: We have demonstrated reasonable success and consistency when setting dietetic outcomes for the majority of our patients. There are similarities with our results and those reported in a previous multi-centre audit using the RDOT[1]. Further work comparing outcomes with changes in parameters used to measure nutritional status, biochemistry or clinical condition, will enable outcomes to be more useful in demonstrating dietetic effectiveness.

Reference:

1. Gardiner C, El-Sherbini N, Perry S et al (2019). The Renal Dietetic Outcome Tool (RDOT) in Clinical Practice. *Journal of Kidney Care* **4(3):** page 2-9

Service Evaluation

Return to contents page

A Service Evaluation to assess the effectiveness of dietitian-led group education sessions for parents/carers of infants with cow's milk protein allergy

S Baily[1] and C Raaff[1]. baily. [1]Division of Nutritional Sciences, School of Biosciences, University of Nottingham Sutton Bonington Campus, Nottingham, LE12 5RD.

Corresponding Author: Samantha Baily, samantha@hotmail.com

Background: Cow's milk protein allergy (CMPA) affects 2-3% of UK infants(1), with the most common presentation being mild-moderate non-IgE-mediated responses(1). To manage increasing referrals for this patient group, the Leicestershire Partnership NHS Trust Nutrition and Dietetic Service (LNDS) introduced group education sessions (GES) for the parents/carers of referred infants. There is currently limited evidence of GES effectiveness in CMPA management. This prospective service evaluation aimed to assess the effects of dietitian-led GES on parent/carer CMPA-related knowledge, confidence managing the condition and care satisfaction.

Inclusion and exclusion criteria were used to recruit appropriate patients.

Methods: LNDS staff used BDA Paediatric Specialist Group inclusion and exclusion criteria(2) to determine if referred infants were suitable for GES. Parents/carers of eligible infants were recruited using self-selected sampling from four (two-hour face-to-face) sessions running from July-October 2019. Paper surveys, validated using LNDS review and pilot testing, were administered pre- and post-sessions. At both timepoints, parents/carers answered 10 questions to assess CMPA-related knowledge and responded to three five-point Likert scale-related statements to measure confidence managing the condition. The post-session survey included further tick-box questions and five-point Likert scales to evaluate session structure/content and identify if a follow-up dietetic appointment was desired. Clinical details of corresponding infants were collected from electronic patient records. All data were anonymised prior to analysis. Infant details and care satisfaction data were analysed descriptively. Inferential statistical analysis was performed using the Wilcoxon Signed Rank test to explore differences between pre- and post-session mean knowledge scores and confidence ratings. Linear regression was used to identify associations between both outcomes. As a service evaluation, ethical approval was not required. Trust approval was gained through their clinical research group.

Results: From those invited (n=51), total GES attendance rate was 59.6% (n=31). The survey response rate was 83.9% (n=26). Following the GES, mean [SD] total correct answers increased from 2.48 [2.0] to 5.57 [1.80] (p<0.001) and median confidence rating increased for each statement by 1 point (p<0.05). Improvements in knowledge and in confidence were not strongly correlated (R^2=0.129, p=0.188). Each session element was rated "very helpful" as the majority response (58-84%). Crucially, 73.7% of parents/carers did not feel they required a follow-up dietetic appointment.

Discussion: This service evaluation found that GES can be successful in educating patents/carers on the safe management of infants with mild-moderate non-IgE-mediated CMPA. CMPA-related knowledge improved significantly, along with confidence in managing the condition. Most parents/carers rated the session elements highly and did not feel they required further dietetic input, indicating care satisfaction. CMPA management guidelines highlight that paediatric dietetic input is required in the primary care management of non-IgE-medicated CMPA, but do not mention GES(3). To date, no other studies have investigated whether dietitian-led GES for parents/carers of infants with CMPA are successful in improving both knowledge and confidence. Although this evaluation found value in GES, it should be recognised that the sample was self-selected and small. Furthermore, over half of the infants were presenting with session exclusion criteria such as IgE-mediated symptoms(2). Future investigation into the GES triaging process through an internal audit would benefit the service by ensuring infants receive the most appropriate care.

Conclusion: The newly introduced LNDS GES significantly improved the knowledge and confidence of parents/carers of infants with CMPA, making them a viable alternative to traditional dietetic interventions consisting of one-on-one appointments.

References:

1. Venter, C., Pereira, B., Voigt, K., *et al*. (2008) Prevalence and cumulative incidence of food hypersensitivity in the first 3 years of life. Allergy 63(3): pp.354-359.
2. Pope, L. on behalf of the BDA Paediatric Specialist Group (2018) Cow's Milk Protein Allergy: Setting up a Patient Group Education Session on Weaning. British Dietetic Association.
3. Venter, C., Brown, T., Shah, N., Walsh, J. and Fox, A.T. (2013) Diagnosis and management of non-IgE-mediated cow's milk allergy in infancy - a UK primary care practical guide. Clin Transl Allergy 3(23).

A Service Evaluation of the Demand of the Adult Dietetic seven-day Weekend and Bank Holiday Working Service at North Middlesex University Hospital NHS Trust (NMUH)

M Patel, H Beckett, and L Li
Nutrition and Dietetic Department, Sterling Way, North Middlesex University Hospital, Edmonton, N18 1QX

Corresponding Author: Hayley Beckett, Mandakini.patel@nhs.net

Background: The delivery of seven day services across England is a priority for National Health Service (NHS) England and the NHS Improving Quality partnership [(1)] and the delivery is to ensure that patients receive consistent high quality safe care every day of the week. Hence, NMUH introduced the first Nutrition and Dietetics seven-day service in London, by commencing a weekend and bank holiday service in 2013. The aim of the service is to provide early dietetic intervention, to help ensure patient flow across the Trust and is aimed at acute admissions wards, A voluntary rota is in place, with at least 1 dietitian working a minimum of 5 hours per weekend/bank holiday shift. All staff work within their scope of practice. The aim of this service evaluation is to explore the demand of the Service, by evaluating the number of referrals and types of dietary interventions required.

Methods: A spreadsheet with set parameters was devised, such as patient demographics, reason for referrals, medical diagnosis and more. Data is collected at the end of each shift by the dietitian. There is a Weekend Working Lead Dietitian to review the data for consistency. The parameters analysed included number of filled shifts, number of patients referred, average number of patients seen per shift, the type of dietetic intervention and refeeding risk. Data was analysed using Microsoft Excel. Ethics was not sought as the patient treatment plan was not altered by data collection.

Results: Data collected and analysed between October 2013 and October 2018

Table 1: Number of Shifts and Patients Assessed

Available shifts	Filled shifts	Percentage of filled shifts	Number of patients assessed	Average patients assessed per shift
556	511	92%	2333	4.6

Table 2: Type of Dietetic Interventions

Oral Nutrition Supplements (ONS)	49%
Enteral Tube Feeding (ENS)	40%
Dietetic Education	5%
Food First Approach	2%
Parenteral Nutrition	2%
Limited treatment plan at time of assessment	2%

Table 3: Percentage of Patients Deemed at Risk of Refeeding Syndrome over the 5-Year Period

Yes	43%
No	57%

Discussion: Table 1 demonstrates that an average fill rate of 92% was achieved. The fill rate of shifts is dependent on staffing; therefore this fill rate reflects staffing levels (vacancies, sick or emergency leave) and that this service is based on a voluntary rota. Table 2 demonstrates that many of the referrals required treatment plans which included ONS and ENS, with table 3 demonstrating that 43% of patients were deemed at risk of re-feeding syndrome. This indicates the complexity of the dietary intervention required for the patients, which may also reflect on the average 4.6 patents seen per 5-hour shift, as shown in table 1. These types of dietary interventions will require individualised dietetic treatments plans which only a dietitian can provide safely. Hence the need for a dietitian over the weekend and bank holidays. Additionally, if there was no weekend/bank holiday service, those referrals would be carried over to the next working day. This may increase pressure on staff during weekdays due to increased caseload and delayed individualised dietetic treatment plans for the patients, which does not reflect the NHS England priority for equal patient care across 7 days. To our knowledge there is limited information on 7 day working in dietetics. Further research is needed from other Dietetic Departments who deliver a similar service.

Conclusion: Our data demonstrates there is a demand for a seven-day dietetic service at NMUH based on the number of referrals we have received and the requirement for individualised treatment plans from a dietitian.

References:

1. NHS England. Equality for All: Delivering Safe Care - Seven Days a Week. Leicester: NHS England; 2012.

Weight Gain in a High-Secure Mental Health Environment: A Service Evaluation

A Charlton, E Holmes. School of Biosciences and Medicine, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, GU2 7HX.

Corresponding Author: Aimee Charlton, aimeecharlton4@hotmail.com

Background: People with severe mental illnesses have a shorter life expectancy than the general population, with a higher prevalence of obesity and co-morbidities(1). High-secure hospitals are obesogenic environments due to restrictions on movement, diet(2), side effects from medication and low motivation levels(3). The aim of this service evaluation was to investigate inpatient weight gain in a high-secure hospital to determine the effect of dietetic consultations focused on educating and supporting patients to make small, sustainable changes to diet and physical activity.

Methods: The service evaluation was approved by the Trust clinical governance department. Data collection was undertaken on site by the student dietitian. Forty-two current male inpatients from 2 high dependency wards (n=24) and 1 rehabilitation ward (n=18) were selected from the dietetic caseload list. Anthropometric and clinical information were obtained retrospectively from digital clinical records. For analysis, the sample was grouped into patients that attended dietetic appointments (n=15) or not (n=22).

Results: Of the patients seen by the dietitian (n=15), 73% (n=11) reported consuming high-calorie snacks; 20% (n=3) reported having supper in addition to regular meals, and 60% (n=9) visited the canteen. Twenty percent (n=3) of patients reported not undertaking any physical activity.

Table 1. BMI and weight data for adults in a high secure setting (n=42)

	Whole sample	Those attending dietetic appointment (n= 15)
Baseline BMI kg/m^2 [1]	32.29 [5.54]	30.62 [5.4]**
BMI at first appointment	/	34.61 [4.9]**
Last recorded BMI	/	34.17 [4.6]
Weight gain since admission		
- Yes % (n)	62 (26)	/
- No	38 (16)	/
Weight change since admission[1]	+11.16 [19.71]	/

[1] Mean [SD], ** significantly different according to t test p<0.01

The mean BMI for the overall sample was in the obese category (see Table 1) and two thirds of patients had gained weight since admission. Attendance at dietetic appointments was variable with 25% (n=5) of patients not attending. Patients that attended three dietetic appointments had a mean weight change of -0.62% (SEM 1.85). A significant difference was found between the mean BMI on admission and the first dietetic consultation but not between the mean BMI at the initial dietetic consultation and the most recent BMI.

Discussion: The number of dietetic consultations could make a difference to weight gain in secure settings, as patients that attended three or more consultations lost weight. However, due to the current obesogenic environment, dietetic input may be more effective in preventing further weight gain than achieving weight loss. The obesogenic environment in high-secure settings could be the focus of future interventions to help patients manage their weight.

Conclusion: Patients in secure settings are at high risk of obesity due to high energy intakes, lack of physical activity and medication side effects. Dietetic input is integral for holistic weight management interventions, to educate, support and motivate patients.

References:

(1) NICE. Overview | Psychosis and schizophrenia in adults | Quality standards | NICE. 2015; Available at: https://www.nice.org.uk/guidance/qs80. Accessed Jul 22, 2020.

(2) Dipasquale S, Pariante CM, Dazzan P, et al. J Psychol Theol 2012 Jun 22,;40(2):64.

(3) Haw C, Stubbs. The British Journal of Forensic Practice 2011 Aug 16,;13(3):183-190.

An investigation into the impact of the use of blended diets on symptom management of children requiring enteral feeds. A Service Evaluation Study

R Coles, Department of Nutrition and Dietetics, Aneurin Bevan University Health Board Headquarters, St Cadocs Hospital, Lodge Road, Caerleon, Newport, NP18 3XQ Paediatric Dietetic Service Manager
K Gallimore, Centre for Nutrition and Dietetics, Cardiff Metropolitan University, Cardiff. CF5 2YB

Corresponding Author: Rebecca Coles, Rebecca.Coles@Wales.nhs.uk

Background: Over recent years enteral feeding liquids have become highly specialised sterilised products. There is interest in utilising more traditional preparation methods involving home liquidised versions of the family meal. Benefits appear to include improved gastrointestinal symptoms and associated reductions in the medications required,[(i)] as well as the wider social impact of improving relationship between child and parent.[(ii)] This study aimed to scope experience and to quantify the improvement in symptoms and the associated changes to medications via a service evaluation.

Methods: The service evaluation used a mixed method approach. Participants were dietitians recruited using selective sampling. The primary research tool was employed within the health board, and gathered quantitative audit data about specific cases, as well as qualitative data on experiences relating to the use of blended diets. Symptoms of reflux, vomiting and constipation were rated before and after commencing blended diet. The secondary research tool was used to gather quantitative and qualitative data from across the rest of Wales. Study inclusion criteria comprised of obtaining data from dietitians working in Wales, from children aged 0-18 years receiving blended diet for a minimum of 6 months Blended diet could be the exclusive source of nutrition or be given in conjunction with a commercial enteral feed or oral diet/fluids. Data were prepared using statistical and thematic analysis as appropriate. Ethical approval was obtained from Cardiff Metropolitan University and the health board's research and development department.

Results: A total of 11 responses indicated 51 children were receiving blended diet across Wales. There were 28 patients on a full blended diet and 23 on a partial blended diet. Prior to commencing blended diet, 75% patients experienced reflux/vomiting and 35% experienced constipation. No participants reported a deterioration in symptoms after commencing blended diet and both regimens were associated with improved GI symptom scores. An improvement in symptom scores was not found to be significant with the use of a full blended diet. 7/51 children stopped all medications prescribed for reflux, vomiting and constipation. There was a statistical significance found for the association between symptom scores for constipation and stopping laxatives. ($p < 0.01$, t -3.02, df 8)

Discussion: The service evaluation revealed reflux/vomiting was a more common symptom than constipation. In some cases the introduction of blended diet resulted in a decreased use or a complete discontinuation of medications and commercial feeds. A limitation of the study was that prescription details and costs were difficult to obtain and accurately calculate because of the need for additional information. It is likely that transient use of medications and commercial feeds will be required given the health conditions of this population. Social aspects related to the use of blended diet were identified. The study did not identify any areas for concern in practice or to a child's health and wellbeing.

Conclusion: This study suggests that blended diets are associated with improved symptom control for reflux, vomiting and constipation. Further research is required to validate these findings. The study appears to support dietetic practice and self-efficacy in this area.

References:

i. Bobo, E. (2016) Re-emergence of Blenderized Tube Feedings: Exploring the Evidence. Nutrition in Clinical Practice: *Official Publication of the American Society for Parental and Enteral Nutrition* 31 (6) 730-73a5

ii Gallagher, K., Flint, A., Mousaki, M., et al (2018) Blenderized Feeds through a Gastric Tube in Medically Complex Pediatric Population. JPEN. *Journal of Parental and Enteral Nutrition*. 42 (6) 1046- 1060

An observational study on nutritional risk and the corresponding nutritional management in dementia patients in long term care.

N. Edmead [1], A. Gilson [2] and S.J.Illingworth[1]
London Metropolitan University, School of Human sciences[1], Holloway, UK and Newham University Hospital, Star Lodge, Cherry Tree way, UK [2].

Corresponding Author: Nancy Edmead

Introduction: Malnutrition is an established problem within the elderly population and consequently there is a known risk of malnutrition in residential homes[1]. It is essential that malnutrition is identified, and correct nutritional management is implemented. The aims of this study were to identify nutritional status using validated tools in older adults with a neurodegenerative condition living in long-term care. To observe whether this is accurately assessed by care-givers and whether appropriate action is carried out on identification of risk by implementation of a mealtime initiative such as by use of a red tray system which indicates that assistance is needed at mealtimes.

Methodology: An observational study was conducted on 35 residents in a nursing home in London that had a diagnosis of dementia. MNA (Mini Nutritional Assessment), MUST (Malnutrition Universal Screening Tool) and MUAC (Mid Upper Arm Circumference) were completed by a single trained researcher. Both MUAC and MUST were used in the nursing home prior to the study and the MNA was used as the standard of comparison for both. Fischer's exact test was used to assess MNA, MUST and MUAC. It was also used to assess whether residents who were provided with a red tray were at nutritional risk as per MUST screening done by the nursing home. The MUST screening audit between the nursing home staff and the trained researcher was assessed for reliability by the Kappa test and assessed for correlation between MUST results by Spearman's rank test. Ethical approval was granted by the London Metropolitan University Ethics Committee.

Results: There were significant associations between MNA and MUST as assessed by Fisher's exact test, p=0.00. However, the associations between MNA and MUAC and also MUST and MUAC showed no statistically significant associations, p=0.56 and p=0.09 respectively. There were no significant associations between nutritional risk score by MUST and red tray provision as p=1.0. In the MUST audit the Kappa test showed that there was an agreement between BMI scores with p=0.01 but no other agreement between all other categories. Spearman's rank showed that there were no significant correlations found between the MUST scores of the trained researcher and the nursing home for any MUST category.

Discussion: Nutritional risk was not accurately assessed in the nursing home and this subsequently affected the nutritional management received by residents. To identify nutritional risk MNA was found to be the most sensitive measure whilst MUAC was shown to be the least.

Conclusion: To properly assess nutritional status in the elderly population a multifaceted evaluation is needed. There is also a need for frequent and thorough training to ensure that nutritional risk is assessed properly in the nursing home so that accurate interventions can be put in place. Further research is needed on specific cut offs for MUAC population groups and currently MUAC should not be used as a single indicator of nutritional status [2].

References:

1. Russell C, Elia M (2015) Nutrition Screening Surveys in Care Homes in the UK. BAPEN, Redditch.
2. Tang, A.M., Chung, M., Dong, K.R., et al. (2017). Determining a Global Mid-Upper Arm Circumference Cutoff to Assess Underweight in Adults (Men and Nonpregnant Women). Washington, DC: FHI 360/FANTA.

A service evaluation to assess the dietary management of hospitalised patients with diabetes receiving enteral nutrition

C. Gallagher, E.Langan, S.Blakeman, J.Love.
St Helens and Knowsley Teaching Hospitals, St Helens, WA9 3DA.

Corresponding Author: Catherine Gallagher, Catherine.gallagher2@sthk.nhs.uk

Background: Hospitalised patients with diabetes receiving enteral nutrition (EN), require a management plan from an established multidisciplinary team, including dietitians and diabetes specialist nurses [(1)]. Optimizing glucose control in these patients is associated with better outcomes [(2)]. However, EN may increase the risk of complications such as hyper/hypoglycaemia events [(2)]. There is limited local and national evidence to guide dietetic practice in the area of EN in this patient group; therefore, the aim is to review dietetic practice for patients with diabetes also receiving EN in secondary care. The following variables were investigated: enteral feeding regime, diabetes specialist nurse (DSN) input, diabetes treatments and EN rationale; to inform dietetic practice.

Methods: A retrospective service evaluation was carried out on the wards and patients were identified via the Trust's scanning and documentation system. The inclusion criteria for patients included; all types of established diabetes (Type 1, 2 and 3c diabetes), seen by a dietitian within 12 months, enterally fed (bolus or continuous). The exclusion criteria included patients prediabetes or patients on oral nutritional supplements. A total of 13 subjects met the criteria and the following variables were analysed; enteral feeding regime (including rate, time, volume and pump vs bolus), DSN, diabetes treatment and rationale for EN. The project was approved by the Trust's Quality Improvement and Clinical Audit (QICA) team. Ethics was considered, however was deemed unnecessary for this service evaluation.

Results: Different results were found across all the variables analysed. Results showed that each of the participants received different feeding plans from the dietitian. Some patient's diabetes medication was altered during hospital stay. For example, changes in dietary controlled treatments during hospital admission (39% and 16% patients before and during hospital admission respectively) and more insulin therapies during admission (0% and 15% patients before and during hospital admission respectively). In addition, there were a variety of rationales for commencing patients on EN; 'Nill by mouth' (46.2%), 'swallowing difficulties' (23.1%), 'inadequate oral intake' (15.4%), 'poor wound healing' (7.7%) and 'ICU stepdown' (7.7%).The majority of patients (77%) received EN via a pump and (23%) were bolus fed. It was also identified that 38% of the sample did not have input from a DSN during their admission.

Discussion: The above results indicate that ward dietitians are currently using a variety of feeding regimes for this patient group. This may create complications for the DSNs, as they will need to prescribe a variety of insulin regimes for different patients. Subsequently, inconsistencies and potential miscommunication in prescribing insulin regimes could lead to hypoglycaemic or hyperglycaemic events. This suggests that there is a need for the dietetic service to be more consistent when implementing care plans for patients with diabetes receiving EN. To encourage consistent EN feeding regimes, the team created a 'Diabetes and Enteral Feeding Flow Chart' for dietetic team to use on the wards.

Conclusion: There are inconsistencies in the types of EN feeding regimes used for patients with diabetes in the Trust. This indicates a need to educate the dietetic team and to encourage consistent feeding plans on the wards. We will assess the use off 'Diabetes and Enteral Feeding Flow Chart' to see if it has improved dietetic practice in this patient group.

References:

1. American Diabetes Association (2008) Nutrition Recommendations and Interventions for Diabetes. https://care.diabetesjournals.org/content/31/Supplement_1/S61 (accessed September 2020)
2. Joint British Diabetes Societies (2012) Glycaemic management during the inpatient enteral feeding of stroke patients with diabetes. http://www.diabetologists-abcd.org.uk/JBDS/JBDS_IP_Enteral_Feeding_Stroke.pdf (accessed June 2020)

A retrospective audit to investigate adherence to dietetic guidelines for stroke patients requiring a gastrostomy, and post-gastrostomy outcomes.

A Hutchinson. Department of Nutrition and Dietetics, South Tyneside and Sunderland NHS Trust, Sunderland Royal Hospital, Kayll Road, Sunderland, Tyne and Wear, SR47TP.

Corresponding Author: Alice Hutchinson, amhutch@hotmail.com.

Background: Stroke patients at risk of malnutrition are more likely to have swallowing difficulties, and an association exists between malnutrition and mortality, hospital length of stay and cost at six months post-stroke (Gomes et al. 2016). For stroke patients requiring enteral feeding, nasogastric (NG) and gastrostomy feeding are viable options. The Royal College of Physicians (2016) guideline advises that patients with stroke who are unable to maintain adequate nutrition and fluids orally should be considered for NG feeding within 24 hours of admission, and if patients are unable to swallow adequate food and fluids orally by four weeks, they should be considered for gastrostomy feeding. The aim of this service evaluation was to audit adherence to the RCP (2016) guidance regarding appropriate referral to dietetics and timings of enteral feeding tube placement, and evaluate outcomes post-gastrostomy placement including: length of stay, discharge destination and removal rates of gastrostomies.

Methods: This retrospective audit considered all patients aged over 16 years who had an acute stroke (including ischaemic and haemorrhagic strokes) and subsequent gastrostomy inserted at a single centre between February 2017 and February 2020. A patient list was provided by Trust Information Services and cross-referenced with a list kept by the Trust PEG nurse. Retrospective data were manually extracted from medical notes relating to the consideration and placement of feeding tubes, and nursing notes regarding completion of MUST, referral to dietetics and discharge destination. An audit tool was created for this specific study and data were analysed using Microsoft Excel. Simple, descriptive statistics were used, and results were presented as a median or percentage. Ethical approval was not required for this audit but support from the Trust Clinical Governance team was obtained.

Results: 35 patients had a gastrostomy placed between February 2017 and February 2020 after an acute stroke. Most patients were male (65.6%). MUST was completed within 24 hours of admission for 68.6% of patients. 45.7% patients were not referred to the dietitian when they were NBM, on oral trials or not meeting their nutritional requirements orally. Consideration of NGTs within 24 hours of admission occurred for 37.5% patients, and consideration of gastrostomies by 4 weeks post-stroke occurred for 60.0% patients. The median day of admission when the gastrostomy was inserted was 53 days and the median length of stay for patients following gastrostomy insertion was 96 days. The majority of patients were discharged to a nursing care placement (67.6%). By 30th April 2020, 85.7% of patients still had their gastrostomy in situ and mortality post-gastrostomy was 0% on insertion, 5.7% at 1 month (n=2), 40.0% at 1 year (n=14).

Discussion: There is poor evidence that documented consideration of feeding tubes is occurring within the times outlined in the RCP guidance in this audit. Though dietitians are unable make final decisions regarding the placement of feeding tubes, our involvement is vital to be an advocate for nutrition and highlight dietetic related guidance to the MDT. Delayed provision of enteral feeding may exacerbate malnutrition in this vulnerable patient population where physical, social and psychological barriers to good nutrition may also exist. This audit provides baseline data on the numbers of gastrostomies being placed at a single site, and suggests that patients who require gastrostomy feeding are likely to be discharged to a nursing care placement and unlikely to have their gastrostomy removed.

Conclusion: There is scope for medics to improve their documentation regarding feeding tubes to better adhere to recommendations outlined, and training regarding the importance of early referral to a dietitian may help support this.

References:

1. Gomes, F., Emery, P.W. and Weekes, C.E., 2016. Risk of malnutrition is an independent predictor of mortality, length of hospital stay, and hospitalization costs in stroke patients. *Journal of Stroke and Cerebrovascular Diseases.* April, vol. 25, no. 4, pp. 799-806.
2. Royal College of Physicians., 2016. National clinical guideline for stroke [online]. 5th ed. Intercollegiate Stroke Working Party. Available from: https://www.rcplondon.ac.uk/guidelines-policy/stroke-guidelines [accessed 16/07/20].

An evaluation of personalised goals of individuals with Type 2 Diabetes after attending a two-week structured education session

Emma Langan, Diabetes Specialist Dietitian. St Helens and Knowsley NHS Trust. St Helens Hospital, Marshalls Cross Road St Helens, WA9 3DA

Corresponding Author: Emma Langan, Emma.Langan@sthk.nhs.uk

Background: Type 2 diabetes (T2DM) is a progressive condition that many individuals can self-manage. Improving blood sugars (BMs) can reduce the risk of long-term medical complications [(1)]. Structured education programmes can empower individuals with the knowledge, skills and motivation to manage their diabetes, independently or with support [(1)]. The aim of this project was to assess if patients with T2DM meet their personalised lifestyle goals after attending dietetic led diabetes education sessions and to identify areas of improvements.

Methods: A retrospective study was carried out with 46 participants who were recruited after completing an education session with the diabetes specialist dietitian in the Trust. Participants completed non-validated, goal setting questionnaires and had the option of completing "Goal 1" and/or "Goal 2". Examples of goals were "to lose weight" and "to cut down on sugar". A total of 73 personalised goals were completed. The dietitian contacted the participants via telephone 3 – 4 months after attending the education session. The number of goals "achieved, partially achieved or not achieved" was analysed. Participants were also asked to complete a non-validated questionnaire about their experience; this included "yes/partially/no" responses. The study was approved by the Quality Improvement & Clinical Audit (QICA) team and participants signed a consent form. No ethical approval was required.

Results: 70% of the sample fully achieved their goals. 12% and 18% of the sample partially achieved and did not achieve their goals respectively. See the Figures below for results of three key goals achieved. Feedback indicated that 100% of the participants found the sessions useful, 80% remembered the advice and 87% used the dietary leaflets provided.

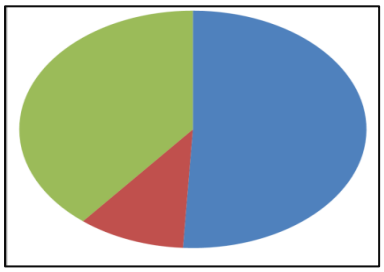


Figure 1. Reduce BMs. 56% fully achieved, 11% partially achieved and 33% not achieved.

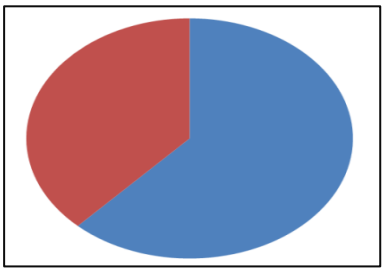


Figure 2. Increase exercise levels. 62% fully achieved, 38% partially achieved and 0% not achieved.

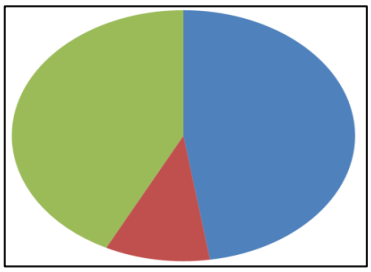


Figure 3. Lose weight. 48% fully achieved, 10% partially achieved and 43% not achieved.

Discussion: Focussing on empowerment and self-management during education sessions can improve individual attitudes and a greater likelihood to achieve long-term lifestyle goals [(2)]. These results indicate that dietitian led education sessions can motivate patients to meet their personalised goals. Education sessions should take into account lifestyle goals, in particular; lowering blood sugars, increasing exercise levels and losing weight.

Conclusion: Individuals who attended the diabetes education sessions found the dietetic sessions useful and utilised the material provided. Therefore it is evident that offering structured education sessions to people living with T2DM is beneficial.

References:

1. Chrvala CA et al. Diabetes Self-Management Education for adults with type 2 diabetes mellitus: a systematic review of the effect of glycaemic control. Patient Educ Couns. 2016;99:926-943.
2. Chatterjee S et al. Diabetes structured self-management education programme: a narrative review and current innovation. Lancet Diabetes Endocrinol. 2018;6:130-142.

Evaluation of 12 Month Dietetic Follow-Up Post Curative Dose Radiotherapy in Patients with Head & Neck Cancer

B Malik[1] , H Harrison[2], P Kainth[1], KD Glen[2]
[1]London Metropolitan University|166-220 Holloway Road|London|N7 8DB; [2] 250 Euston Road|London|NW1 2PG

Corresponding Author: Benish Malik, bem0481@my.londonmet.ac.uk

Background: Currently, there is no international consensus on dietetic follow-up (FU) post-radiotherapy (RT) in head and neck cancer (HNC). The Clinical Oncology Society of Australia (COSA) recommends reviewing patients fortnightly for 6 weeks post-RT and as required henceforth (1). United Kingdom National Multidisciplinary (UKNM) guidelines recommend reviewing patients for up to 3 months without mentioning frequency (2). Past studies support fortnightly reviews for 6 to 8 weeks post-RT for better nutritional outcomes, but these results combined increased dietetic input during and after RT (3,4). Therefore, dietetic FU post-RT at a large London teaching hospital is not standardised. The aim was to assess the frequency of specialist HNC dietetic FU for 12 months post-RT.
Methods: A service evaluation, by retrospective case note review, of dietetic FU for 12 months post curative dose RT in all adult HNC patients treated in 2017. Data collected included diagnosis, BMI, feeding tube presence, number of dietetic FU in 12 months and time until discharge. Frequency and duration of specialist HNC dietetic FU were analysed using counts and means. Spearman's correlation assessed the relationship between BMI at pre-treatment and duration spent under dietetic care. No hospital ethics was required as this was a service evaluation. University ethics was granted.
Results: Seventy patients had curative RT in 2017. The average dietetic FU in the first 6 weeks was 1.3 times (95% CI: 1.0-1.5). All oropharynx (n=18, (100%)), hypopharynx (n=2, (100%)) and nasopharynx (n=3, (100%)) tumour groups remained under dietetic care at 6 months, whereas the larynx tumour group had patients discharged from 3 months post-RT. Patients with a feeding tube not discharged within 12-months post-RT were oropharynx (n=9 (50%)), oral cavity (n=5 (38.5%)), larynx (n=3 (18.8%)), hypopharynx (n=1 (50%)), nasopharynx (n=1 (33.3%)) and other (n=1 (11.1%)). In the oropharynx, hypopharynx, nasopharynx and larynx groups, FU frequency increased with increasing stage. There was a negative association between BMI at pre-treatment and time spent under dietetic care ($rs(98) = -.346$, $p = .004$).

Table 1. Dietetic FU for up to 12 months post-RT completion.

	All patients ((n=70) 100%))	Tube dependent ((n=32 (45.7%))
Average reviews (frequency)	7.1 (95% CI: 6.4-7.8)	8.9 (95% CI: 7.9-9.0)
Average time to DC (months)	9.2 months (95% CI: 8.5-1.0)	10.4 (95% CI: 9.6-11.3)
Not DC within 12 Months (n)	(n=31)	(n=20)

Discussion: This service evaluation shows that HNC patients are not followed up fortnightly for the first 6 weeks as recommended by COSA guidelines (1). However, on average, patients are reviewed beyond 3 months as per UKNM guidelines (2). Large tumour stage, tumour sites; oropharynx; hypopharynx; nasopharynx and the presence of a feeding tube increase duration and frequency of dietetic follow up. The cause of earlier discharge for patients with higher BMIs is unknown due to the nature of a service evaluation. However, no validated malnutrition assessment tool is used by this trust which could be leading to a higher BMI disguising malnutrition due to unconscious bias.
Conclusion: A large variation in dietetic FU practices for HNC patients post-RT has been observed. Standardising FU based on tumour site and stage may assist service planning, ensuring patients receive recommended FU, potentially improving nutritional outcomes regardless of pre-treatment BMI

References:

1. Clinical Oncology Society of Australia (2015) Evidence-based practice guidelines for the nutritional management of adult patients with head and neck cancer.
https://wiki.cancer.org.au/australia/COSA:Head_and_neck_cancer_nutrition_guidelines [accessed 20 July 2020].
2. Talwar B, Donnelly R, Skelly R, et al. Nutritional management in head and neck cancer: United Kingdom National Multidisciplinary Guidelines. J Laryngol Otol. 2016;130:S32-S40.
3. Kiss N, Krishnasamy M, Loeliger J, et al. A dietitian-led clinic for patients receiving (chemo)radiotherapy for head and neck cancer. Support Care Cancer. 2012;20:2111-2120.
4. van den Berg M, Rasmussen-Conrad E, Wei K, et al. Comparison of the effect of individual dietary counselling and of standard nutritional care on weight loss in patients with head and neck cancer undergoing radiotherapy. Br J Nutr. 2010;104:872-877.

Effectiveness of a novel 4 week low FODMAP diet group education treatment pathway

H Choudhury[1], Rachel Patterson[2], Kumud Budhia[3] Rizwana Zaman[3], Nicola Vernon[4] L Martin[5]
[1]University College London, London, UK, [2]Northwick Park Hospital, Nutrition & Dietetics, London, UK, [3]Central Middlesex Hospital, Nutrition & Dietetics, London, UK, [4]St Mark's Hospital, Nutrition & Dietetics, London, UK, [5]University College London Hospital, Nutrition & Dietetics, London, UK

Corresponding Author: Lee Martin, lee.martin1@nhs.net

Background: Best practice guidelines recommend the low FODMAP diet Restriction Phase is followed for a 4 week period (1). Low FODMAP dietary education for IBS patients can be delivered by specialist dietitians via group education or one to one sessions with similar efficacy of these delivery methods highlighted in one study, where the length of FODMAP Restriction was up to 12 weeks(2). This study aimed to evaluate the effectiveness of a 4 week low FODMAP diet restriction phase in a group education setting.
Methods: An observational, prospective study of patients with IBS (n=68) who completed two dietetic led low FODMAP group education sessions (FODMAP Restriction and FODMAP Reintroduction advice) administered 4 weeks apart. Data was collected from validated questionnaires completed by patients as part of standard clinical practice. The study was registered with UCLH Clinical Effectiveness & Audit Team as a service evaluation and therefore ethics was not required. Primary outcome was assessed as a significant reduction in the IBS-Severity Scoring System (IBS-SSS)(3). Secondary outcomes assessed individual gastrointestinal (GI) symptoms (Gastrointestinal Symptom Rating Scale), stool frequency and consistency (Bristol Stool Chart), general anxiety (GAD-7), depression (PHQ-9) and compared baseline symptoms to follow-up symptoms (post-intervention) using McNemar's test.
Results: Total IBS-SSS scores were reduced from baseline (300) to 4 week follow up (221) p=0.001, with 60% (39/65) achieving a clinically significant response as indicated by a reduction of ≥50 points. The proportion of patients who reported the presence of moderate/severe individual GI symptoms at follow up (FU) vs baseline (BL); decreased for bloating (BL 78%; FU 43%), flatulence (BL 69%; FU 40%), abdominal pain (BL 61%; FU 41%), lethargy (BL 52%; FU 35%), incomplete evacuation (BL 59%; FU 38%), urgency (BL 49%; FU 23%), nausea (BL 22%; FU 8%) and borborygmi (BL 68%; FU 32%), P<0.005 for all. No effect was seen in symptoms of heartburn or acid regurgitation. Total scores of anxiety (BL 7.30, FU 6.27; P=0.012) and depression (BL 6.99, FU 5.75; P=0.022) were reduced. However using a threshold score of ≥10 which indicates clinical depression (BL 16%, FU 12%; P=0.26) or general anxiety (BL 31%, FU 28%; P=0.93), severity levels did not change significantly. There was no improvement in the proportion of patients who described 'normal stool frequency' (baseline 81%, follow up 83%, P=0.81) or 'normal stool consistency' (baseline 47%, follow up 48%; P=0.87). The majority of patients 49/61 (80%) reported adherence to the diet at least 75% of the time with the majority of patients 21/29 (72%) experiencing symptom response within 1-2 weeks.
Discussion: Dietetic NHS settings delivering best practice low FODMAP dietary advice for patients with IBS constantly need to find new and improved ways to meet the needs of service capacity. This study introduces a novel 4 week treatment pathway utilised in two secondary care hospitals and finds efficacy in this approach. A reduction in IBS severity and individual symptoms but not psychological co-morbidities or stool frequency and consistency was observed. Results are comparable to one other study with similar study design which found symptom improvement in 54% of patients (2). A study with robust design is warranted to further explore this delivery method.
Conclusion: This study provides provisional evidence that a recommended 4 week low FODMAP diet is effective at reducing IBS symptoms when delivered via dietetic led group education session.

References:

(1) McKenzie YA, Bowyer RK, Leach H *et al*. (2016) British Dietetic Association systematic review and evidence-based practice guidelines for the dietary management of irritable bowel syndrome in adults (2016 update) *J Hum Nutr Diet.* **29**, 549–575.
(2) Whigham L, Joyce T, Harper *et al*. (2015) Clinical effectiveness and economic costs of group versus one-to-one education for short-chain fermentable carbohydrate restriction (low FODMAP diet) in the management of irritable bowel syndrome. *J Hum Nutr Diet*. **28**, 687–696.
(3) Francis CY, Morris J & Whorwell PJ (1997) The irritable bowel severity scoring system: a simple method of monitoring irritable bowel syndrome and its progress. *Aliment Pharmacol Ther.* **11**, 395–402.

A service evaluation investigating the long-term nutritional interventions required following pancreatic surgery

LM Mulford[1], E Holmes[1] & ME Phillips[2]
[1]University of Surrey, Guildford, UK [2]Dietetic Department, Royal Surrey Hospital, Guildford, UK

Corresponding Author: Laura Mulford

Background: Pancreatic resection is associated with pancreatic exocrine insufficiency, bile acid malabsorption, small intestinal bacterial overgrowth and pancreatogenic diabetes. At present, no specific guidelines exist to support healthcare professionals with the long-term nutritional management following a pancreatic resection. The aim of this service evaluation was to determine the nutritional interventions required up to twelve years post resection to inform the development of long-term management protocols.
Methods: Retrospective data analysis of dietetic records from Royal Surrey Hospital Dietetic Department. Patients who had received dietetic care and had undergone a total pancreatectomy (TP), pancreaticoduodenectomy (PD) or pylorus preserving pancreaticoduodenectomy (PPPD) between 2007-2014 were included (n=51). Data on pancreatic enzyme (PE) optimisation, prevalence of small intestinal bacterial overgrowth, bile acid malabsorption, pancreatogenic diabetes and micronutrient deficiency were collected from the notes and pathology results. A Mann Whitney U Test was used to identify gender differences in PE replacement therapy. Clinical audit approval was granted by the Royal Surrey Hospital but ethical approval was not required.
Results: A median of thirteen months was required to reach an optimal PE dose, however, males required significantly more dietetic clinic appointments and lipase units (see Table 1) to reach an optimal PE dose. Over ninety percent of patients (n=40) achieved an optimal PE dose, however, forty five percent of patients with follow up data (n=15) reported reoccurrence of malabsorptive symptoms at their most recent dietetic contact.

Table 1. Summary of the number of months, clinic appointments and lipase units with meals required to reach an optimal pancreatic enzyme dose in adults following pancreatic resection[1]

	All patients (n=40)	Males (n=20)	Females (n=20)	*P* value[2]
Months	13 (0-84)	21 (1-84)	11 (0-33)	0.068
Appointments	1.5 (0-7)	2 (0-7)	1 (0-5)	0.046
Lipase units	80,000 (35,000-240,000)	80,000 (40,000-240,000)	62,500 (35,000-175,000)	0.036

[1] All data displayed as median (minimum-maximum) [2]Mann Whitney U test, males versus females

Four percent of patients (n=2) presented with small intestinal bacterial overgrowth and zero patients presented with bile acid malabsorption. Thirteen percent of PD and PPPD patients (n=6) were diagnosed with diabetes post resection and just under half of those classified as non-diabetic (n=15) had a HBA1c result within the prediabetic category at their latest dietetic appointment. Zinc and selenium were the most prevalent micronutrient deficiencies across the 12 year study period.
Discussion: Existing research primarily focuses on short term management but the risk factors including micronutrient deficiencies[(1,2)] malabsorptive symptoms[(3)] and diabetes[(3)] are consistent with the findings of present study and indicate the need for long term nutritional management. The prevalence of bile acid malabsorption was lower than anticipated and could be attributed to limited investigation of alternative causes of malabsorption in PE non-responders.
Conclusion: All pancreatic resection patients should have lifelong access to a dietitian who should complete annual HBA1c and micronutrient deficiency screening for all patients, consider an individualised dose of pancreatic enzymes and prompt investigation of small intestinal bacterial overgrowth and bile acid malabsorption in pancreatic enzyme non-responders.

References:

[1]Armstrong T, Walters E, Varshneya, S et al. Deficiencies of Micronutrients, Altered Bowel Function, and Quality of Life during Late Follow-Up after Pancreaticoduodenectomy for Malignancy. *Pancreatology.* 2002;2: 528-534.
[2]Armstrong T, Strommer L, Ruiz-Jasbon F et al. Pancreaticoduodenectomy for Peri-Ampullary Neoplasia Leads to Specific Micronutrient Deficiencies. *Pancreatology*. 2007;7:37-44.
[3]Kusakabe J, Anderson B, Liu J, et al. Long Term Endocrine and Exocrine Insufficiency after Pancreatectomy. *J Gastrointest Surg*. 23:1604-1613.

Prevalence of malnutrition and outcome of dietetic intervention in patients with a new diagnosis of an upper gastrointestinal malignancy – a service evaluation

A. Petrova,
Nutrition and Dietetic Department, North Middlesex University Hospital NHS Trust, Sterling Way, N18 1QX,

Corresponding Author: Andriana Petrova, andriana.petrova@nhs.net

Background: Patients with cancer diagnosis are at high risk of malnutrition due to reduced dietary intake in combination with altered metabolism [(1)]. Studies show up to 80% prevalence of malnutrition in gastro-oesophageal and pancreatic cancers [(2)] as tumour location can lead to dysphagia and vomiting, abdominal pain and steatorrhea as well as anorexia and muscle loss. The aim of this project is to assess the presence of malnutrition on diagnosis of an upper gastrointestinal (UGI) malignancy and the outcome of a dietetic intervention.

Methods: Data was collected and analysed retrospectively for all patients with a diagnosis of an UGI malignancy at North Middlesex University Hospitals, seen by the Macmillan Specialist dietitian between August 2019 and February 2020. Patients were automatically referred to the dietitian at time of diagnosis and were included in the analysis if they received at least 2 appointments. Patients were reviewed by the dietitian minimum at every consultant appointment and maximum weekly. Collected data included demographics, cancer site, treatment type and intent and initial anthropometry (weight, BMI and % weight loss). Weight and % weight change was recorded at each dietetic appointment and the mean % weight change between consultations was estimated. Secondary outcome was the prevalence of malnutrition on initial dietetic assessment as per NICE criteria. Formal ethical approval was not sought for this service evaluation as the normal clinical management of the patients was not altered.

Results: 23 patients were included and the average number of consultations was 5, (min. 2 and max. 13). The population was a mixture of males and females; different UGI cancer sites – oesophagus, stomach and pancreas; different treatments (chemotherapy, chemo-radiotherapy and radiotherapy; adjuvant and neo-adjuvant) and treatment intent (curative and palliative). The dietetic intervention outcome was to minimise nutritional losses during treatment through food fortification, oral nutritional support, advice on use of pancreatic enzyme replacement therapy and in curative patients - artificial nutrition. Our analysis showed the mean weight between each consultation remained within +/- 1% of the previous weight. There was high standard deviation likely due to low number of patients, diverse diagnosis and different treatments. Based on their initial anthropometry and % weight loss, 17 patients (74%) were found to be malnourished at the initial dietetic appointment and further four (17%) presented with weight loss of 5-10% but a BMI of >20kg/m2.

Discussion: Malnutrition is common on initial cancer diagnosis due to cancer related increase in metabolic needs, reduced appetite, and increased muscle protein catabolism [(1, 2)]. Our results confirm previous evidence that in patients with UGI cancer this can be even more prevalent [(2)] due to dysphagia, altered digestion and impaired nutrient utilization. This highlights the importance of dietetic input for each patient soon after being diagnosed with an UGI cancer. The minimal % weight change between consultations suggests that early input can help minimise weight loss during cancer treatment.

Conclusion: Our service evaluation confirms previous findings that patients with UGI cancers often present malnourished at diagnosis. It also shows that with dietetic support patients can stabilise their weight, thus indicating the need for early dietetic input in order to prevent malnutrition exacerbation.

References:

1. Arends J, Bachmann P, Baracos V, Barthelemy N, Bertz H, Bozzetti F et al. ESPEN guidelines on nutrition in cancer patients. 2020.

2. Muscaritoli M, Lucia S, Farcomeni A, Lorusso V, Saracino V, Barone C et al. Prevalence of malnutrition in patients at first medical oncology visit: the PreMiO study. Oncotarget. 2017;8(45):79884-79896.

Closing the Gap – baseline data for a quality improvement project

M Romanidou[1], AM West[2], C Kartik[3], S Sprackling[4]
[1]Specialist Mental Health Dietitian, EPUT Mental Health Dietetics, The Linden Centre, Puddings Wood Drive, Chelmsford, Essex, CM1 7LF
[2] Diabetes Specialist Practitioner, West Essex Specialist Diabetes Community Team , 2nd Floor Epping Forest Unit, St Margaret's Hospital, The Plain, Epping, Essex, CM16 6TN
[3]Nutrition and Dietetic Advisor CMHT, Holmer Court, Essex Partnership University NHS Foundation Trust, Colchester, Essex, CO33BT
[4]Allied Health Professions Lead for Mental Health and Learning Disabilities, Essex Street, Colchester, CO3 3BT

Corresponding Author: Maria Romanidou

Background: It is well evidenced that antipsychotic medications can contribute to multiple physical health problems such as weight gain, cardiovascular diseases (CVD), pre diabetes and diabetes and other comorbidities which lead to poor quality of life and reduced lifespan[1]. Amongst other Allied Health Professionals (AHPs) who support a person centred approach, dietitians play an important role in prevention and improvement of these conditions[2–4]. The aim of this project is to identify people with severe mental illness (SMI) and provide education and support to improve their nutritional status and well-being.
Method: From a cohort of patients on Mental Health Units who enrolled into Closing the Gap project, nine male service users with SMI on antipsychotic medications engaged in the project activities and education sessions from March to November 2019. Ethics approval wasn't required as the data which collected was for service evaluation. The participants engaged in dietetic interventions ranging from one to one sessions, cooking groups and educational groups in collaboration with the Occupational Therapists (OTs). At the same time, the service users worked with the gym instructor and the physiotherapists to increase awareness and motivation of physical health improvements through exercise and activities.
Results: The mean (SD) participants' age was 35.3 (9.1) years. The mean (SD) weight and BMI were 98.3 (25.3) kg and 30.3 (9.1) kg/m^2 respectively. 77.8% of the participants were smokers and only 11.1% of them continued to exercise regularly on the ward. From the remaining participants, half of them did not engage in any exercise activities while the other half followed light exercise such as stretching and walking groups.
Discussion: Current data suggests that the inpatient service users who were prescribed antipsychotic medications present with an increased BMI and body weight. Alongside with smoking, unwise food decisions and low levels of exercise, these factors increase the risk of obesity and comorbidities such as CVD, pre-diabetes and diabetes. So far, the service users are enthusiastic to engage with this project. One of the key identified limitations is the lack of mental health dietitians' input for close monitoring, more regular 1:1 sessions and groups on the ward due to time constraints and covering different teams. The team will continue with recruitment, project and data collection as planned following the COVID-19 pandemic.
Conclusion: There is a need for education and adaptation of a healthier eating pattern and lifestyle for the service users who are on antipsychotic medications as it limits adverse effects of antipsychotic medications on physical health and helps improve quality of life which in return reduces overall cost to National Health Service. The role of dietitians in mental health is crucial to provide this education, support service users and also to close the physical health gap between service users with serious mental illness and the general public.

References:

1. Ismail K. Physical health in schizophrenia and related disorders. Psychiatry. 2008;7(11):472-476. doi:10.1016/j.mppsy.2008.08.001
2. Teasdale SB, Samaras K, Wade T, Jarman R, Ward PB. A review of the nutritional challenges experienced by people living with severe mental illness: a role for dietitians in addressing physical health gaps. J Hum Nutr Diet. 2017;30(5):545-553. doi:10.1111/jhn.12473
3. Teasdale S, Harris S, Rosenbaum S, et al. Individual Dietetic Consultations in First Episode Psychosis: A Novel Intervention to Reduce Cardiometabolic Risk. Community Ment Health J. 2014;51(2):211-214. doi:10.1007/s10597-014-9787-7
4. Ehrlich C, Dannapfel P. Shared decision making: People with severe mental illness experiences of involvement in the care of their physical health. Ment Heal Prev. 2017;5(November 2016):21-26. doi:10.1016/j.mhp.2016.12.002

An exploratory study into student dietitians' perceptions of being valued by their clinical educators whilst on placement

E Rose [1](1 Millington Drive, Nuneaton, CV11 6WS) Co-author: A Green [2]
[1] Dietetic Department, Birmingham Heartlands Hospital, Birmingham, UK
[2] Dietetic Department, Coventry University, Coventry, UK

Corresponding Author: Ellie Rose

Background: Student dietitians are required to complete practice placements as part of their training to apply their knowledge and develop practical skills (1). Feeling valued has been shown to positively impact NHS staff motivation and morale, subsequently influencing patient care and outcomes (2). There is currently a gap in the literature with limited research that focuses on students' perceptions of feeling valued on placement, particularly regarding experiences of student dietitians. The aim of this research was to explore the experiences of student dietitians whilst on clinical placement, focusing on their perceptions of being valued by their clinical educators.
Methods: Using a qualitative design, 5 student dietitians who had completed their B or B and C placements participated in semi-structured interviews discussing their experiences of being valued on placement by their clinical educators. Following approval from CU Ethics (P94471) and permission from the gatekeeper, participants were recruited using purposive sampling. A pilot study took place prior to interviews to assess the timings of interviews and check the topic guide. Data was transcribed verbatim and thematic analysis used to derive themes which were peer reviewed with the co-author.
Results: Four main themes were derived from the data: students' experiences of being valued, educators' actions that influenced students' sense of being valued, students' feelings and impact of being valued. Sub-themes included: student's experiences of being valued and devalued; actions that made students feel valued and devalued and what students wanted educators to do; positive and negative feelings; and impact on students' attitude to placement, future career decisions, practice, learning and relationship with their educators.
Discussion: Students felt valued if included as a team member and appreciated as an individual or if their educators were flexible, supportive and dedicated time to students. Feeling valued positively impacted students' feelings and vice versa. Additionally, being valued positively impacted students' learning, practice and relationship with their educators, whereas feeling devalued negatively impacted students' attitudes towards placement and future career decisions. These findings reflect results from current literature exploring experiences of student nurses on placements.
Conclusion: Additional training for clinical educators or further support for students to raise issues may be beneficial to ensure student dietitians feel valued, however, further research with a larger sample size is required.

References:

(1) British Dietetic Association (2020) *How to become a dietitian*. https://www.bda.uk.com/about-dietetics/how-become-a-dietitian.html [Accessed 22nd January 2020]
(2) The Kings Fund (2002) *Counting the Smiles: Morale and Motivation in the NHS*. https://www.kingsfund.org.uk/sites/default/files/field/field_publication_file/counting-smiles-morale-motivation-nhs-belinda-finlayson-kings-fund-1-march-2002.pdf [Accessed 5th May 2020]

A service evaluation on the uses of nasogastric feeding and parenteral nutrition in paediatric patients with Burkitt's Non-Hodgkin's Lymphoma and mucositis.

L.Taylor[1], B. Gardiner[2], G. Renshaw[2], S.J. Illingworth[1] and G. O'Connor[2]
London Metropolitan University, 166-220 Holloway Road, London, N7 8DB. [1] Great Ormond Street Hospital Foundation Trust, Great Ormond St, London, WC1N 3JN[2]

Corresponding Author: Louise Taylor, lst0025@my.londonmet.ac.uk

Background: Mucositis is a severe side-effect of chemotherapy and can increase the risk of malnutrition in paediatric oncology patients. Feeding and nutrition is an integral part of supportive care during chemotherapy, as mucositis can cause a reduction in oral intake, poor tolerance of enteral feeding and potentially malabsorption of nutrients contributing to an increased risk of malnutrition (Hyams, 1982; DeKoning, 2007). There are no evidence-based guidelines for the optimal nutritional management for children who develop mucositis. The aim of this service evaluation was to determine and compare any associations between days on naso-gastric (NG) tube feeding, days on parenteral nutrition (PN) and weight z-scores in children who experience chemotherapy induced mucositis.

Method: Retrospective data was collected from medical records at Great Ormond Street Hospital (GOSH). Data included anthropometric measures, length of hospital admission, feeding method and length and rational of administration and the number of patients who developed mucositis during their admission. Children <16 years of age who received two initial stages of Cyclophosphamide, Vincristine, Prednisone, Doxorubicin and Methotrexate (COPADM) chemotherapy for Burkitt's Non-Hodgkin's Lymphoma (BNHL) between May 2015 and August 2019 were included. Data was coded and recorded using an excel spreadsheet and analysed through SPSS using Pearson's correlation. Ethical approval was obtained from London Metropolitan University and permission was given from GOSH.

Results: Participants included 18 males and 4 females with an average age of 6 years. During COPADM 1, 90% of patients developed mucositis (n20) and 100% during COPAMD 2 (n22). Including both COPADM cycles, 20% (n9) of patients received only NG feeds, 29% (n13) received only PN, 29% (n13) received a combination of NG feeds and PN and 20% (n9) had oral intake and oral nutrition support. The average weight loss from admission to discharge was 1.67kg. Weight loss appeared to be less in patients who received NG feeds in combination with PN (-0.38kg), compared to those receiving NG (-1.93kg) or PN (-0.98kg) separately. No significant correlation was found between days spent on NG feeds and days on PN during COPADM 1 (r = 0.63; p = >0.05) or COPADM 2 (r = 0.86; p = >0.05). The primary reasons to initiate NG feeding was poor oral intake (27% (n16)) and for PN, worsening mucositis (45% (n10)).

Discussion: NG feeding appears not to influence days on PN in this patient group. However, PN may be required if intestinal failure or malabsorption occurs secondary to mucositis, therefore prolonging gut integrity through the use of NG feeding my reduce time spent on PN (McGrath, Evans and Yap, 2019). Additionally, where PN use is necessary, using complementary NG feeds may reduce weight loss in BNHL paediatric patients.

Conclusion: A well-planned, intervention study is needed comparing EN and PN use in children being treated with chemotherapy induced mucositis, and the impact feeding methods may have on patient outcomes.

References:

DeKoning, B., Philipsen-Geerling, B., Hoijer, M., Hahlen, K., Buller,H. and Pieters, R. (2007) 'Protection against chemotherapy induced mucositis TGF-ß$_2$ in childhood cancer patients: Results from a randomized cross-over study', *Paediatric Blood and Cancer*, 48(5), pp. 532-539

Hyams, J., Batrus, C., Grand, R. and Sallan, S. (1982) 'Cancer chemotherapy-induced lactose malabsorption in children', *Cancer,* 49(4), pp. 646-650

McGrath, K., Evans, V. and Yap, J. (2019) 'Indications and Patterns of use for Parenteral Nutrition in Paediatric Oncology', *Journal of Parenteral and Enteral Nutrition,* 00(0), pp. 1-7

Service evaluation of JIGSAW (Juggling Insulin for Goal Success and Well-being); a Structured Education Program for people with Type 1 Diabetes

L White[1], L Walker[1] and S Beaden[2]
[1]University of Surrey, Guildford, UK. [2]Dietetic Department, Queen Alexandra Hospital, Portsmouth, UK.

Corresponding Author: Lauren White

Background: Type 1 diabetes (T1DM) is associated with physical and emotional issues such as microvascular complications, hypoglycaemic episodes due to poor hypoglycaemic awareness; and reduced quality of life[1,2]. Structured education teaches patients to manage their condition and can improve biomedical and psychological outcomes. Reduced hypoglycaemic episodes improve quality of life and reduce pressure on the NHS[2]. The purpose of this study was to review biomedical and psychological outcomes of JIGSAW at 12-months post attendance to assess improvements.

Methods: This retrospective service evaluation was registered on the Portsmouth Hospitals NHS Trust Clinical Audit Database; ID: 4578. Baseline, immediately post and 12-month post education data were collected for participants who attended JIGSAW in 2017 and 2018. Data included changes in HbA1c, hypoglycaemic episodes and awareness, Problem Areas in Diabetes (PAID) Scale and Centre for Epidemiologic Studies Depression (CES-D) Scale. The Friedman test was used to analyse changes in HbA1c and psychological outcomes over time followed by post-hoc Wilcoxon signed-rank tests. Changes in hypoglycaemic awareness and hypoglycaemic episodes were analysed using Wilcoxon signed-rank test.

Results: Data on 67 participants were analysed. No significant change in overall HbA1c (X^2=0.72, p=0.995) however, the difference between baseline and 12-months was approaching significance (post-hoc testing with Bonferroni correction p=0.04). There was a significant improvement in hypoglycaemic awareness (p<0.001) and a trend towards significance for the reduction in hypoglycaemic episodes (p=0.075). PAID score fell significantly overall (X^2=23.85, p<0.01) with a significant reduction immediately post course (p<0.01) which was sustained at 12-months (p<0.01). There was no overall significant reduction in CES-D score, although the reduction between baseline and 12-months was approaching significance (post-hoc analysis with Bonferroni correction p=0.03).

Discussion: NICE guidelines recommend individuals with a diagnosis of T1DM attend structured education within 12-months of diagnosis to allow them to self-manage their condition[3]. This study shows that the JIGSAW education programme is effective at helping individuals to improve hypoglycaemic awareness, which in turn may help reduce severe hypoglycaemic episodes. JIGSAW is also effective at moderating the impact of diabetes on quality of life and may improve general mood. These findings are supported by similar studies on alternative education programmes[4,5].

Conclusion: Attendance of JIGSAW significantly improves hypoglycaemic awareness and diabetes related impact on quality of life in individuals with T1DM.

References:

1. Kilpatrick ES, Rigby AS, Atkin SL. *Diabetes care*. 2008 Nov 1;31(11):2198-202.
2. Alvarez-Guisasola F, Yin DD, Nocea G, Qiu Y, Mavros P. *Health and quality of life outcomes*. 2010 Dec;8(1):86.
3. NICE. Type 1 diabetes in adults: diagnosis and management. NICE (NG17). 2015:1-87.
4. Hopkins D, Lawrence I, Mansell P, Thompson G, Amiel S, Campbell M, Heller S. *Diabetes care*. 2012 Aug 1;35(8):1638-42.
5. DAFNE Study Group. *BMJ*. 2002 Oct 5;325(7367):746.

Community based management of lower limb osteoarthritis in obese adults: An evaluation of the Cwm Taf Joint Care Programme

S Wyer, Department of Nutrition and Dietetics, Keir Hardie University Health Park, Merthyr Tydfil, Wales. CF48 1BZ.

Corresponding Author: Shelley Wyer, Shelley.Wyer@wales.nhs.uk

Background: Not only does obesity exacerbate symptoms of osteoarthritis, it's also a major causative factor. A combination of weight loss and exercise are identified as essential in the management of lower limb osteoarthritis[1-2]. The Joint Care Programme (JCP) is a bespoke 12 week, group based lifestyle intervention; combining nutrition education, exercise and practical cooking skills.
Aim: To reduce body weight and improve overall knee and hip health; specifically reducing pain, improving mobility, strength and functional fitness.
Method: Participant anthropometric data was collected pre and post intervention using standardised dietetic methodology and calibrated scales. National Exercise on Referral Scheme staff carried out functional fitness and pain scores in accordance with British Association of Cardiovascular Prevention and Rehabilitation[3] pre and post intervention. All patient outcome data was utilised for this service evaluation and ethical approval was therefore not required. The study had a non-controlled pre-test post-test design with the effect of the intervention determined using paired-samples t-tests and effect sizes (ES). Statistical significance was set at P=0.05.
Results: Raw data pre and post intervention is currently held by Cwm Taf University Health Board and the table below shows the mean change in outcome measures across the 12 week duration of the intervention.

Table 1. Mean change in outcome measures from baseline to post 12 week intervention

Variable	n	Baseline		Post-intervention		Difference	95% CI	Effect size (ES)	95% CI	p-value
		Mean	95% CI	Mean	95% CI					
Weight (kg)	485	107.0	104.9, 109.1	103.9	101.8, 105.9	-3.1	-3.4,-2.9	-0.13	-2.60, -0.01	<0.001
BMI (kg/m²)	484	39.1	38.4, 39.7	37.9	37.2, 38.5	-1.2	-1.3, -1.1	-0.16	-0.29, -0.03	<0.001
Waist (cm)	480	118.5	117.0, 119.9	113.8	112.3, 115.3	-4.7	-5.2, -4.1	-0.28	-0.41, -0.15	<0.001
OHS	284	25.3	23.9, 26.6	30.8	29.4, 32.3	5.5	4.7, 6.3	0.46	0.29, 0.63	<0.001
OKS	442	21.8	20.8, 22.7	28.4	27.4, 29.4	6.6	6.0, 7.2	0.63	0.50, 0.77	<0.001
30 Sec SST	477	8.4	8.1, 8.7	11.8	11.4, 12.1	3.4	3.1, 3.6	0.90	0.77, 1.04	<0.001
6 MWT (m)	480	304.1	292.6, 315.6	393.5	382.0, 405.1	89.4	81.4, 94.4	0.70	0.57, 0.83	<0.001
WEMWBS	300	45.3	44.0, 46.6	53.0	51.8, 54.1	7.6	6.8, 8.4	0.71	0.55, 0.88	<0.001

Discussion: The mean changes in outcome measures were clinically significant for OHS, OKS, 6MWT, STS and WEBWBS tests. Although the mean reduction in body weight (3.1kg) was not statistically significant at week 12, where a small sample of patients (n=14) were followed up at one year post intervention an average weight loss of 12kg was recorded. This suggests the self-management element of the programme was successful in this early cohort and statistical significance was achieved over time[4].
Conclusion: The JCP appears effective in achieving weight loss, improving pain and function measures, aerobic capacity and endurance. It also supports improved mental wellbeing and social interactions among overweight and obese adults diagnosed with lower limb osteoarthritis. A further review of all physical parameters is needed at 6-12 months post intervention and any further research in this area should also include randomisation and explore the potential for the JCP reducing the need for surgery, improving recovery times and reducing perioperative complications.

References:

4. NICE (2014) Osteoarthritis: care and management. Clinical guideline. https://www.nice.org.uk/guidance/cg177/chapter/1-recommendations (accessed June 2020)
5. NICE (2015) NICE Quality standards: Osteoarthritis.https://www.nice.org.uk/guidance/qs87/chapter/quality-statement-4-exercise (accessed June 2020)
6. BACPR (2018). Phase IV Exercise Instructor Training Manual.
7. Christensen, R. et al. (2007) 'Effect of weight reduction in obese patients diagnosed with knee osteoarthritis: A systematic review and meta-analysis', Annals of the Rheumatic Diseases, 66(4), pp. 433–439. doi: 10.1136/ard.2006.065904.