

Editor: **Simon Langley-Evans**

Journal of **Human Nutrition** and **Dietetics**

VOLUME 31 • SUPPLEMENT 1 • SPRING 2018

ABSTRACTS FROM THE 2017 BDA RESEARCH
SYMPOSIUM
6 DECEMBER 2017
BIRMINGHAM, UK

Journal of Human Nutrition and Dietetics

The Official Journal of the British Dietetic Association

Editor-in-Chief

Professor Simon Langley-Evans
Deputy Head of School of Biosciences
University of Nottingham,
UK.
E-mail: simon.langley-evans@nottingham.ac.uk

Associate Editors

S Burden, University of Manchester, UK
C Green, Nutricia, The Netherlands

Editorial Board

A. Anderson, *Centre for Public Health Nutrition Research, University of Dundee, UK*
T. Baranowski, *Baylor College of Medicine, USA*
J. Bauer, *School of Human Movement Studies, University of Queensland, Australia*
T. Burrows, *University of Newcastle, Australia*
J. Coad, *Massey University, New Zealand*
C. Collins, *University of Newcastle, Australia*
P. Collins, *Faculty of Health, Queensland University of Technology, Australia*
K. Davison, *Simon Fraser University, Canada*
J. Harvey, *University of Vermont, USA*
M. Hickson, *Faculty of Medicine, Imperial College London, UK*
J. Hodgson, *University of Western Australia, Australia*
M. Kiely, *County College Cork, Ireland*
F. Kolahdooz, *University of Alberta, Canada*
I. Lemieux, *Quebec Heart Institute, Laval University, Canada*
S. Lennie, *School of Pharmacy and Life Sciences, Robert Gordon University, UK*
A. Madden, *School of Health and Emergency Professions, University of Hertfordshire, UK*
M. McInley, *Queens University Belfast, UK*
D. Mellor, *University of Canberra, Australia*
C. Nowson, *Deakin University, Australia*
T. Ong, *Sao Paulo University, Brazil*
A. O'Sullivan, *Institute of Food and Health, University College Dublin, Ireland*
M. Pakseresh, *University of Alberta, Canada*
Y. Probst, *University of Wollongong, Australia*
A. Roefs, *Faculty of Psychology, Maastricht University, The Netherlands*
J. Swift, *School of Biosciences, University of Nottingham, UK*
M. Taylor, *School of Biomedical Sciences, University of Nottingham, UK*
K. Whelan, *Kings College London, UK*
L. Williams, *Department of Oncology, University of Sheffield, UK*
L. Wood, *University of Newcastle, Australia*

Aims and editorial policy

Journal of Human Nutrition and Dietetics is an international peer reviewed journal publishing papers in applied nutrition and dietetics. Papers are therefore welcomed on:

- Clinical nutrition and the practice of therapeutic dietetics
- Public health nutrition and nutritional epidemiology
- Health promotion and intervention studies and their effectiveness
- Food choice and the psychology of eating behaviour
- Food intake and nutritional status
- Sociology of food intake

Further information on this journal can be accessed at wileyonlinelibrary.com/journal/jhn

The Publisher, British Dietetic Association and

Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher, British Dietetic Association and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher, British Dietetic Association and Editors of the products advertised.

Journal of Human Nutrition and Dietetics © 2018 The British Dietetic Association. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the prior permission in writing from the copyright holder. Authorization to photocopy items for internal and personal use is granted by the copyright holder for libraries and other users registered with their local Reproduction Rights Organisation (RRO), e.g. Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923,

USA (www.copyright.com), provided the appropriate fee is paid directly to the RRO. This consent does not extend to other kinds of copying such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale. Permissions for such reuse can be obtained using the RightsLink "Request Permissions" link on Wiley Online Library. Special requests should be addressed to: permissions@wiley.com

The *Journal of Human Nutrition and Dietetics* is published by Blackwell Publishing Ltd: 9600 Garsington Road, Oxford OX4 2DQ, UK. Tel: +44 1865 776868; Fax: +44 (0)1865 714591. Blackwell Publishing was acquired by John Wiley & Sons in February 2007. Blackwell's programme has been merged with Wiley's global Scientific, Technical and Medical business to form Wiley Blackwell.

Production Editor: Patricia Joyce Tulayan (email: jhn@wiley.com)

Journal of Human Nutrition and Dietetics

VOLUME 31 • SUPPLEMENT 1 • SPRING 2018

Abstracts from the 2017 BDA Research Symposium

6 December 2017
Birmingham, UK

Publication of this supplement has been supported
by the British Dietetic Association.

DISCLAIMER: This abstract book has been produced using author-supplied copy. Editing has been restricted to some corrections of spelling and style where appropriate. No responsibility is assumed for any claims, instructions, methods or drug dosages contained in the abstracts: it is recommended that these are verified independently.

WILEY
Blackwell

Journal of Human Nutrition and Dietetics

VOLUME 31 • SUPPLEMENT 1 • SPRING 2018

Contents

Foreword	5
Clinical Nutrition	6
New to Research	17
Paediatric	34
Public Health	46
Service Evaluation	52

Foreword

Judy Lawrence, British Dietetic Association Research Officer

The British Dietetic Association research symposium is rapidly becoming the highlight of the BDA events calendar. The 2017 symposium was held as usual in Birmingham at the beginning of December, welcoming over 60 abstract presenters.

Professor Gary Frost, Head of the Nutrition and Dietetic Research Group from the department of Medicine at Imperial College, London and National Institute of Health Research (NIHR) dietetic advocate, gave the plenary lecture with a presentation encouraging dietitians to apply for research funding and PhD training fellowships. Professor Frost was followed by Dr Claire Pettinger who presented her award-winning research uncovering the complexity of workplace wellbeing using a cross-case analysis approach which she completed as part of a recent research fellowship position. This research won Clare the prestigious CAHPR Public Health Research award in June 2017.

The symposium abstracts in this supplement are arranged according to the five streams; clinical nutrition, new to research, which includes final year projects by student dietitians on preregistration courses, paediatric, public health and finally the service evaluation stream.

The clinical nutrition abstracts cover a wide variety of dietetic interventions for diseases including diabetes, irritable bowel syndrome and chronic kidney disease. The prize for best clinical nutrition abstract was awarded to Katherine Markwell, University of Chester & Griffin University 'The implementation and evaluation of a novel postplacement clinical debrief for final year undergraduate dietetic students', some students reported that the debrief improved their confidence or clinical reasoning ability.

The new to research stream continues to be the largest, showing a number of different research methodologies, subjects and settings. Student research is, as always, constrained by lack of time and money but these abstracts show that it can be well done. The cross-sectional, observational study collecting BMI, weight and girth measurements before and after paracentesis, a procedure which removes ascitic fluid via abdominal drain done by Lamarti, supervised by Mary Hickson, being an example. The new to research abstract prize, supported by Yakult was won by Hannah Lea, University of Surrey Graduate for her abstract; 'A retrospective study to measure anthropometric, co-morbidity and micro-nutrient changes two years after Roux-en-Y gastric bypass'.

The paediatric stream was again, supported by BDA Paediatric Specialist Group, who continue to encourage their members to be research active. Among the abstracts of particular note is the work of Martin whose aim was to evaluate an early intervention clinic for diagnosis and management of cows milk allergy in primary care. The project was facilitated by a Health Foundation Innovating for Improvement award and included 240 newly referred infants. The winner of the paediatric stream abstract award was Alina Bidgood, a London Metropolitan University Graduate whose work was titled; 'A cross-sectional study assessing the use of restricted diets in children with Autism Spectrum Disorder (ASD)'.

The public health stream abstract winner was Stacey Portbury a graduate from Coventry University who did 'A cross-sectional survey comparing the online price of healthier pre-packaged food products with less healthy alternatives using the Food Standard Agency's traffic-light rating' and found that foods identified as being healthier when categorised using the FSA⁽¹⁾ traffic-light rating and fibre content were more expensive than their less healthy counterparts. Porter *et al.* present an interesting analysis of B vitamin status in older adults with diabetes taking metformin, which suggests that they have a significantly higher risk of deficiency than other adults.

The service evaluation abstracts include reports of innovative work on a telemedicine clinic offering a consultation with a gastrointestinal specialist dietitian that improved service accessibility and Hunter's report on management of adult eosinophilic oesophagitis: a retrospective analysis of medical and dietary outcomes in a UK centre. The stream winner was Jessica Parkin, a dietitian from City Healthcare Partnership CIC who reported her work on; 'Impact of an Eating Disorder Day Service on Quality of Life, Body Mass Index and patient and staff experiences: A multi-method evaluation'.

The abstracts presented in this supplement represent a snap shot of dietetic work which I hope you will enjoy reading and maybe consider contributing to next year.

References

1. FSA (2016) Guide to creating a front of package nutrition label for pre-packaged products sold through retail outlets. <https://www.food.gov.uk/sites/default/files/multimedia/pdfs/pdf-ni/fop-guidance.pdf> (accessed July 17th 2017).

Clinical Nutrition

Service evaluation of dietetic group education for women with gestational diabetes within a multidisciplinary diabetes antenatal clinic

C Dowell,¹ L Walker¹ & J Head²

¹Department of Nutritional Sciences, Faculty of Health and Medical sciences, University of Surrey, Guildford, Surrey, UK and ²Department of Nutrition & Dietetics, Queen Alexandra Hospital, Portsmouth, Hampshire, UK

Background: Gestational diabetes mellitus (GDM) is a transitory form of diabetes that is first diagnosed during pregnancy. GDM affects about 5% of pregnancies in the United Kingdom⁽¹⁾ and worldwide prevalence is increasing. GDM increases the risk of pregnancy and birth complications and can have long term health consequences for both mother and child⁽²⁾. Dietary and lifestyle changes to achieve glycaemic control are effective in reducing adverse pregnancy outcomes⁽³⁾. Postpartum screening and continued lifestyle modifications can help manage long-term maternal disease risks. Group clinics have been shown to be a cost-effective approach in management of conditions with increasing patient numbers⁽⁴⁾. The aim of this study was to conduct a service evaluation of the dietitian led group clinic for women diagnosed with GDM; measuring satisfaction, changes in knowledge and confidence and use of other sources of information.

Method: A pair of non-validated self-administered pre and post-clinic questionnaires were completed by all women (n = 30) attending the dietitian led GDM group clinic over a four-month period. Wilcoxon signed-rank tests were used to analyse pre and post-clinic knowledge about GDM and confidence in ability to manage dietary modification. Chi-squared goodness of fit was used to examine satisfaction with the group clinic, use of other sources of information and the impact of socioeconomic status. The service evaluation did not require ethical approval.

Results: Attending the group clinic resulted in significant increases in knowledge about GDM (n = 26 positive change, p < 0.001) and confidence to manage dietary changes (n = 28 positive change, p < 0.001). There was a significant decrease in knowledge about long-term risk of developing Type 2 diabetes (T2DM) (n = 10 negative change, p = 0.017). A significant number of women were very satisfied with the clinic (n = 19, p = 0.02) and 80% (n = 24) reported that it was beneficial hearing about other women's experiences. Women were equally distributed across different socioeconomic classes. Prior to the clinic 83% (n = 25) sought information about GDM with 70% (n = 21) reporting that they would following the clinic. The internet and health care professionals were the principal sources of information used.

Discussion: The results are consistent with published studies which found that referral to a dietitian or other diabetes educators improved women's perceptions of their knowledge and confidence to manage changes following GDM diagnosis⁽⁵⁾. It is concerning that the results indicated a reduced knowledge about the future risk of T2DM. It is possible that the need to reassure women and help them adjust to their diagnosis may result in the long-term risks of GDM being down-played. However, as knowledge of T2DM risk was assessed by just one question and the questionnaires were not validated, further investigation is required.

Conclusion: Providing information about GDM in a group environment, combined with individually tailored dietetic advice based around blood glucose levels and diet history, was effective in increasing knowledge and confidence to effect lifestyle changes for most women. As postpartum dietetic follow up and lifestyle advice are not currently offered to women attending the group clinic the opportunity to manage the longer-term risks associated with GDM is not being optimised.

References

1. National Institute for Health and Care Excellence. NG3 Diabetes in pregnancy: management from preconception to the postnatal period. 2015.
2. Metzger B E and The HAPO Study Cooperative Research Group. Hyperglycemia and Adverse Pregnancy Outcomes. *N Engl J. Med.* 2008;358: 1991–2002.
3. Crowther CA, Hiller JE, Moss JR, et al. Effect of Treatment of Gestational Diabetes Mellitus on Pregnancy Outcomes, *N Engl J Med.* 2005;352:2477–2486.
4. Hwee J, Cauch-Dudek K, Victor JC, et al. Diabetes education through group classes leads to better care and outcomes than individual counselling in adults: A population-based cohort study. *Can. J. Public Health.* 2014;105:192–197.
5. Carolan M. Women's experiences of gestational diabetes self-management: A qualitative study. *Midwifery.* 2013;29:637–645.

Long term symptom review of IBS patients given a low FODMAP diet

K Glen

Darent Valley Hospital, Dartford, UK

Background: The low FODMAP diet, prescribed for 6–8 weeks with a follow-up dietetic consultation reviewing symptom relief & satisfaction, with a phased reintroduction of high FODMAP foods for satisfied patients, is recommended by NICE as second-line advice for patients with Irritable Bowel Syndrome (IBS)⁽¹⁾. The British Dietetic Association systematic review recommends further research in long term symptoms control, patient acceptability & diet adequacy⁽²⁾. The primary aim of this research was to determine if patients continue to be satisfied with their IBS

symptoms & quality of life 12 months after commencing a low FODMAP diet. The secondary aim was to collect data on long-term usage of the low FODMAP diet.

Method: This longitudinal cohort study measured IBS patients' symptoms immediately before commencing a low FODMAP diet, 6–8 weeks post commencing a low FODMAP diet & 12 months after a dietitian first prescribed a low FODMAP diet. As all participants received NICE recommended treatment, no ethical considerations were required beyond the anonymization of patient identifiable information. The validated IBS severity scoring questionnaire (SSQ, out of 500) alongside the question 'Are you satisfied with your current level of symptoms?' was used to measure symptoms⁽²⁾. A 50 point decrease in score is considered a clinically significant reduction⁽²⁾. The questionnaire was sent to 191 patients 12 months after commencing the low FODMAP diet, with responses analysed using frequency & percentages.

Results: 68 patients (36%) returned the survey. However, 16 of these patients did not attend a 6–8 week follow-up, resulting in a cohort of 52 (27%), for 6–8 week analysis. At 6–8 weeks, 34 (65%) were satisfied with their current level of symptoms, but of these patients only 24 (71%) were still satisfied at 12 months (see table 1). Slightly fewer maintained SSQ significant reductions, with 36 (69%) improved at 6–8 weeks, dropping to 22 (61%) of these at 12 months (see table 2). At 12 months, 18 of the 68 respondents (26%) were unsatisfied with their symptoms but still partially or fully following the low FODMAP diet (see table 3). However, 59 patients (87%) report they would recommend the low FODMAP diet to someone that has similar symptoms.

Discussion: Drops in patient satisfaction & clinically significant SSQ score reductions at 12 months versus 6–8 weeks, combined with high full or partial use of a low FODMAP diet at 12 months, suggests low FODMAP symptom relief was underwhelming for patients, but provides enough perceived symptom relief (unknown whether real or placebo) to continue with the diet & recommend it to others. Low return rates, possibly skewed towards unsatisfied patients (80% of non-responders satisfied at 6–8 week follow-up versus 65% amongst responders) was a limitation. The effect on microbiota & dietary deficiency of extensive long-term usage of low FODMAP (as shown in this study) is also unknown & recommended for future research⁽³⁾.

Conclusion: Low FODMAP has limited long-term efficacy for patients with IBS, but the same patients recommend low FODMAP highly, with many continuing to use low FODMAP diets long-term.

Table 1 6–8 weeks versus 12 m satisfaction

Satisfied at 6–8 weeks?		Satisfied at 12 months?	
Yes	34 (65%)	Yes	24 (46%)
		No	8 (15%)
		*	2 (4%)
No	18 (35%)	Yes	6 (12%)
		No	11 (21%)
		*	1 (2%)

*= No answer on survey

Table 2 6–8 weeks versus 12 m SSQ

≥ 50 point decrease original to 6–8 weeks?		≥ 50 point decrease original to 12 months?	
Yes	36 (69%)	Yes	22 (42%)
		No	14 (27%)
No	16 (31%)	Yes	5 (10%)
		No	11 (21%)

Table 3 Low FODMAP use at 12 months

Satisfied at 12 months?		Still following low FODMAP at 12 mo.?	
Yes	36 (53%)	Yes	14 (21%)
		Partially	20 (29%)
		No	2 (3%)
No	29 (43%)	Yes	2 (3%)
		Partially	16 (24%)
		No	11 (16%)
No Answer	3 (4%)	Yes	0 (0%)
		Partially	3 (4%)
		No	0 (0%)

References

- National Institute for Health and Care Excellence. Irritable bowel syndrome in adults: diagnosis and management. *Clinical Guidance*. Latest update 2017; CG61:1–22
- Francis C, Morris J and Whorwell P. Irritable bowel severity scoring system: a simple method of monitoring irritable bowel syndrome and its progress. *Alimentary Pharmacology and Therapeutics*. 1996; 11(2):395–402
- McKenzie Y, Bowyer R, Leach H, et al. British Dietetic Association systematic review and evidence-based practice guidelines for the dietary management of irritable bowel syndrome in adults. *Journal of Human Nutrition and Dietetics*. 2016; 29(5):549–75

Re-audit of breakfast consumption on an acute older person's hospital ward following introduction of service improvement measures

D Gray,¹ A Wolfe,² D Romero³ & J Domingo³

¹Nutrition and Dietetics, St Thomas' Hospital, London, UK; ²Essentia, College House, St Thomas' Hospital, London, UK and ³Ageing and Health, St Thomas' Hospital, London, UK

Background: A previous food record chart audit of 107 breakfast meals over 7 days across 3 28-bedded wards on an acute older person's unit (OPU) showed consumption against day-parts guidance for target calorie consumption in the nutritionally vulnerable¹ was significantly lower than recommended. With this service where orders were taken verbally the night before and served centrally from the ward kitchen the next

morning, 35% of all inpatients received only 1 food item with a maximum content of 200 kcal and 42% consumed half of their meals or less.

A new service model was therefore trialled on one pilot ward in the OPU. Phase 1 implemented a nurse-led service taking food and beverage trolleys displaying items to the bedside with orders taken and served in real-time. Additional hot food items were provided alongside a basic picture menu for those with dementia/delirium. Phase 2 involved providing an enhanced picture menu for all inpatients with coded target calorie recommendations. The aim of this re-audit was to evaluate changes in breakfast consumption.

Methods: For each audit cycle data on number of items served and proportion eaten was collected from food charts over 7 days on a 28-bedded ward. Incomplete records and patients nil-by-mouth were excluded. Approval was sought and granted from clinical governance. Statistical significance was explored using a chi-square test.

Results: The percentage of patients served more than 1 breakfast item increased from a baseline of 35% (37/107) to 60% (92/154) after phase 1 ($p < 0.001$) and 53% (73/138) after phase 2 ($p < 0.05$). The total number eating more than half their meals increased from a baseline of 53% (37/70) to 68% (104/154) after phase 1 ($p < 0.05$) and 85% (117/138) after phase 2 ($p < 0.001$).

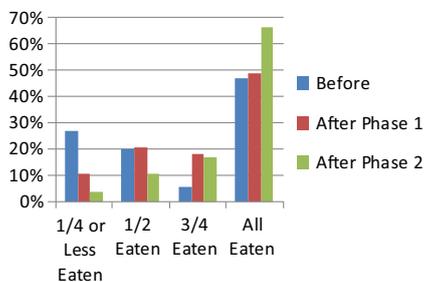


Figure 1 Change in percentage consumption of breakfast meals served.

Discussion: Consumption increased with the new service style and offering, showing the importance of real-time choices being made by patients at their bedside with more enhanced hot options, reflecting recent research where increased food provision led to increased consumption². This was further enhanced with a picture menu as standard containing target calorie guidance which helped inform both nursing staff and patients of what they should be aiming for. That the percentage of patients receiving more than 1 breakfast item fell after phase 2 may reflect that one choice (cooked breakfast) met the full calorie target by itself and was coded as one item.

Conclusion: There is little published research beyond anecdotal evidence as to the efficacy of picture menus in older adult hospital inpatients. This quality improvement project shows the benefits of optimal service delivery and an informative picture menu on patient consumption.

References

1. British Dietetic Association (2012). The nutrition and hydration digest: improving outcomes through food and beverage services. <https://www.bda.uk.com/publications/professional/NutritionHydrationDigest.pdf> (accessed July 2017).
2. Bannerman, E, Cantwell L, Gaff, L et al. Dietary intakes in geriatric orthopaedic rehabilitation patients: Need to look at food consumption not just provision. *Clin Nutr.* 2016;35 (4):892-899.

Blood glucose control and the effects of intermittent fasting: a systematic review

E. Hunter & D. Robertson

Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, UK

Background: Insulin resistance (IR) is a key factor in metabolic syndrome and in the development of Type 2 diabetes, and is affected by body weight (specifically abdominal visceral adiposity).¹ Current guidelines for improving glucose control focus on weight loss through diet and lifestyle changes. Despite a growing list of diets, weight change has proven difficult to achieve and to maintain.² Intermittent Fasting (IF) describes a pattern of eating - a cycle of fasting days (severe calorie restriction (CR) between 50–100% of energy requirements) and non-restrictive or less restrictive days.³ Animal studies of IF have shown improvements to glucose and insulin levels independent of total energy intake and weight change,⁴ but this has yet to be shown in humans. The aim of this research was to carry out a systematic review of all IF intervention trials in humans with a measure of blood glucose and/ or insulin response (HbA1c, fasting plasma glucose (FPG), insulin and insulin resistance (IR)).

Methods: Pubmed and Embase electronic databases were used to perform the searches plus hand searching of reference lists from IF reviews. Inclusion criteria were human intervention trials, with calorie restriction of $\geq 50\%$ of estimated energy requirements on >1 day and a measure of blood glucose and/ or insulin response. Search terms were: IF OR intermittent energy restriction OR alternate day fasting OR routine periodic fasting OR total energy restriction, AND glucose OR insulin. The initial searches resulted in 159 studies. After animal trials, reviews, protocols, and observational studies were excluded, 35 studies were assessed for inclusion by a single reviewer. Selected studies were checked for quality using the CASP tool for RCTs and the Quality assessment tool for before-after (pre-post) studies with no control group.

Results: Seventeen studies were judged to match the criteria (11 RCTs and 6 intervention trials). Of the eight RCTs with a standard diet (CR or ad libitum) control group, one showed no change to outcomes, three showed significant and similar improvements in both IF and control groups, and four showed differential changes between IF and control. Of the nine studies from lower levels of evidence, 3 resulted in no change to primary outcomes and 6 resulted in significant improvements.

Discussion: The 4 RCTs with variations in results between IF and control groups are of particular interest. In one study, IF showed improved outcomes compared to the control ad libitum fed group. In another, the IF group had a small but significant increase to blood glucose (with no significant difference between the groups at the end of the study), so changes were minimal. The other two studies showed better results with IF than with CR. However, there were co-interventions in both studies: 5:2 diet with 70% CR and carbohydrate restriction on fasting days, Mediterranean isocaloric diet on non-restrictive days and an increase in physical activity and improvements cannot be attributed to IF versus CR. Most studies include too few participants and use a variety of measures, which limits comparisons. Further research is needed to determine if IF diets vary from CR in the rate of weight loss, body composition changes or mechanisms of improvements. IF diets are a safe alternative to traditional diets in most individuals. Individuals with diabetes who take hypoglycaemic medications should consult a physician before undertaking an IF regimen as evidenced by Carter et al, 2016.⁵

Conclusion: Evidence has shown that IF can produce significant improvements to blood glucose metabolism in all outcomes considered: HbA1c, FPG, insulin, and IR. In each trial that resulted in improvements, changes occurred alongside reductions in body weight and body composition measures, with the largest improvements in participants with elevated outcome levels at baseline.

References

1. McLaughlin T, Lamendola C, Liu A, et al. Preferential fat deposition in subcutaneous versus visceral depots is associated with insulin sensitivity. *J Clin Endocrinol Metab* 2011.
2. Miller WC. How effective are traditional dietary and exercise interventions for weight loss?. *Med Sci Sports Exerc* 1999; 31: 1129–1134.
3. Gunnars K. What is Intermittent Fasting? Explained in Human Terms 2015.
4. Anson RM, Guo Z, De Cabo R, et al. Intermittent Fasting Dissociates Beneficial Effects of Dietary Restriction on Glucose Metabolism and Neuronal Resistance to Injury from Calorie Intake. *Proc Natl Acad Sci U S A* 2003; 100: 6216–6220.
5. Carter S, Clifton PM and Keogh JB. The effects of intermittent compared to continuous energy restriction on glycaemic control in type 2 diabetes; a pilot trial. *Diabetes Research and Clinical Practice* 2016.

The influence of nutrition and gastrointestinal function in children with Autism Spectrum Disorder: A systematic review

S Layton & B Engel

Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, UK

Background: Autism spectrum disorder (ASD) is a global burden affecting approximately 700,000 people in the UK¹. In

addition to the recognised behavioural and social issues, a variety of intestinal problems have been hypothesised to be involved as both a cause and/ or effect of the symptoms. A lack of available treatment options may be driving parents/carers to seek alternative dietary therapies. This systematic review aims to assess the effectiveness of gluten and/or casein-free diets or probiotics for ASD symptom management and to summarise the evidence for the association of intestinal dysfunction and/ or coeliac disease with ASD.

Methods: A comprehensive literature search of EMBASE, PubMed and Cochrane Library electronic databases was undertaken between November 2016 and March 2017 to obtain literature examining the potential associations (in infants to adolescents) between ASD and i) intestinal function, ii) gluten and/or casein-free diets, iii) probiotics and iv) coeliac disease. The JADAD score, CASP tool and Bradford Hill's criteria were used to assess trial quality and to formulate conclusions^{2,3}.

Results: *Intestinal function:* Eleven studies were found examining intestinal function (1147 participants, 2–13 years old), including trials investigating gut microbiota, intestinal permeability, intestinal inflammation, the absorption of food components and subsequent gastrointestinal symptoms in relation to ASD. Although individual studies found some differences in the microbiota e.g. higher abundance of genus *Faecalibacterium* and differences in markers of intestinal permeability, inflammation and carbohydrate digestion; overall results were inconclusive due to limited, low quality studies assessing many different areas. *Gluten and/or casein-free diets:* eleven studies were identified (total 385 participants, 2–16 years old), including 6 RCTs. Studies trialled a range of different dietary interventions including gluten and casein-free (GF/CF, n = 5), gluten-free (GF, n = 2) and an elimination diet with supplements (n = 1). Three GF/CF trials and two GF trials showed improvements in behavioural symptoms but there remains inadequate evidence to support definitive conclusions. *Probiotics:* Three studies examined the efficacy of probiotics in children with ASD (73 children, 2–17 years). Two found a significant effect of probiotics for gastrointestinal and behavioural symptoms, although different outcomes were being assessed. *Lactobacillus acidophilus* (5×10^9 CFU/g) twice daily was used in one study whilst another provided a capsule three times daily including three strains of *Lactobacillus*, two of *Bifidumbacteria* and one of *Streptococcus*. Conversely, another, more robust RCT, found no significant associations between probiotic supplementation (daily *Lactobacillus plantarum* (4.5×10^{10} CFU/capsule) and gastrointestinal/behavioural symptoms. *Association between coeliac disease and ASD:* Two case-control studies were identified (391 participants, 1–35 years old). Neither study found evidence for an association between coeliac disease and ASD.

Discussion: ASD is immensely heterogeneous in nature (in symptom manifestation, severity and associated comorbidities) presenting challenges for conducting and interpreting trials compounded by a lack of quality studies, heterogeneous interventions and outcome measures. Overall, the controlled or

case-control trials examined do not yet provide conclusive evidence for a link between impaired intestinal function and ASD and there was insufficient evidence to conclude that GF/CF dietary interventions effect behavioural symptoms. Concurrently, whilst probiotics may have an influence on ASD symptoms, there are presently an inadequate number of studies indicating a benefit to recommend their use. However, no adverse side effects of probiotic supplementation were identified in this review.

Conclusion: There is a lack of evidence for hypothesised associations between intestinal function and ASD or the subsequent use of dietary therapies to manage ASD. Studies are heterogeneous and often of poor quality, limiting the conclusions that can currently be drawn. Despite this these approaches are commonly adopted by families and so dietitians must be aware of the options available, the evidence base and their potential risks in order to support families affected by ASD.

References

1. NAS (2017) *The National Autistic Society*. Available at: <http://www.autism.org.uk/> (Accessed: 12/2/17).
2. Halpern, S.H. and Douglas, M.J. (2007) 'Appendix: Jadad Scale for Reporting Randomized Controlled Trials' *Evidence-based Obstetric Anesthesia* Oxford, UK: Blackwell Publishing Ltd, pp. 237–238.
3. Science-Based Medicine (2010) 'Causation and Hill's Criteria' Available at: <https://sciencebasedmedicine.org/causation-and-hills-criteria/> (Accessed: Apr 15, 2017).

The implementation and evaluation of a novel postplacement clinical debrief for final year undergraduate dietetic students

K Markwell,^{1,2} L Ross,^{1,2} L Mitchell^{1,2} & L Williams^{1,2}

¹Department of Clinical Sciences and Nutrition, Parkgate Road, University of Chester, Chester, Cheshire, UK and

²School of Allied Health Sciences, Parklands Drive, Griffith University, Gold Coast, Qld, Australia

Background: Reflection is a core component of developing critical and clinical reasoning¹ necessary for dietetic practice. Students may have intensive experiences while on clinical placements (e.g. patient death)² and bioethical issues especially around enteral feeding³. A formal reflective postplacement debrief session was developed in 2016 for Nutrition and Dietetics students (in an Australian University) to process these experiences and develop collegial debriefing skills. This study evaluated the reflective debrief and its findings.

Methods: A single intensive debrief of two stages was conducted with 31 students following their acute care final placement. The debrief was developed based a model implemented with physiotherapy students⁴ which was based around critical incidents. Facilitators were trained in the debrief protocol. Stage 1 consisted of facilitated small group discussions (5–7

students) around critical incidents. Stage 2 was a single large group facilitated discussion of key themes that students identified in stage one linked to professionalism. Confidentiality was highlighted and recordings were not made although notes were made by students in the small group debrief and on a whiteboard for the large group debrief. Students completed a reflective questions and facilitators completed process and outcome evaluation qualitative surveys. Key themes were analysed using thematic analysis. University Ethics: 2014/826.

Results: The large group's debrief revealed key debrief themes to include: the supervisory feedback relationship; communication, cues and rapport; development in expertise; trust development and confrontation; and attitude affecting experience. The small group themes included: emotions; accepting feedback; self-care; motivation; professional identity; working in a team; learning; communication; hospital environment; and patient negotiation. Facilitators identified key student learnings as: developing group understanding and empathy; reflection to include both positive and negative incidents; improved communication; and how to deal with stress and anxiety. Facilitators considered the clinical debrief to be of value to learning and future career path with one describing it as "Learning how to take[a] move into the workforce, feeling empowered if something happens to do something about it". Student reflections (21/31 completed) on the session identified many students found commonality with their peers in terms of their experiences, however the debrief could also change their perceptions negatively. Some students reported the debrief improving their confidence or clinical reasoning and some reported no effect.

Discussion: The large group debrief elicited themes about graduate dietetic attributes and dietetic student learning. Aspects of Australian dietetic competencies e.g. communication, rapport were present alongside themes directly associated with the placement experience e.g. the supervisory relationship, accepting feedback, self-care, and learning. The shift to having a professional identity and to the workforce was noted in student themes and by facilitators in their reflection on the clinical debrief. Identification of commonality with student peers appears to indicate clinical debriefing could be described as occurring. Facilitators considered the clinical debrief to present key learning for students and to be of value for students.

Conclusion: The new clinical debrief provided a reflective opportunity after dietetic students post the final acute care placement. Its inclusion may assist students to develop collegial debriefing skills, reflect critically on their learning and consolidate on their placement learning. The clinical debrief needs further piloting and investigation to confirm these findings and to determine if there is a longitudinal effect.

References

1. Wetmore AOK, Boyd LD, Bowen DM, Pattillo RE. Reflective blogs in clinical education to promote critical thinking in dental hygiene students. *Journal of dental education*. 2010;74(12):1337–50.

- Macdonald J, Tighe B. Student Dietitians' Experiences of Patient Death Whilst on Placement. 2014.
- Tighe B, Mainwaring J. The bioethical experiences of student dietitians on their final clinical placement. *Journal of human nutrition and dietetics*. 2013;26(2):198–203.
- Delany C, Watkin D. A study of critical reflection in health professional education: 'learning where others are coming from'. *Advances in health sciences education*. 2009;14(3):411–29.

Identifying barriers and enablers in the dietary management of chronic kidney disease using the PEN-3 cultural model

A Morris,¹ D Biggerstaff,² N Krishnan¹ & D Lycett³

¹University Hospital, Coventry, UK; ²Department of Health Sciences, Warwick Medical School, University of Warwick, Coventry, UK and ³Faculty of Health and Life Sciences, Coventry University, Coventry, UK

Background: Non-compliance with renal dietary restrictions increases morbidity and mortality⁽¹⁾ and has been attributed to an individual's poor motivation to change behaviour.⁽²⁾ However the social and cultural environment within which people follow this dietetic advice is not well understood⁽³⁾. The aim of this research was to identify the social and cultural barriers to self-management of a renal diet to better understand renal dietary compliance in chronic kidney disease (CKD).

Method: Participants underwent individual semi-structured interviews. Interviews explored the barriers and enablers to following dietary advice and lasted between 38–94 minutes. All were recorded and transcribed verbatim. Data was explored until saturation and findings interpreted using the PEN-3 cultural model.⁽⁴⁾ This model situates culture at the centre of determinants of health behaviour. It consists of three areas each under the acronym PEN: Person, Extended family,

Neighbourhood (cultural Identity domain); Perceptions, Enablers, and Nurturers (relationship and expectation domain); Positive, Existential and Negative (cultural Empowerment domain). Thematic analysis identified emergent themes. UHCW NHS Trust gave ethical approval.

Results: 18 adults with CKD stage 5 (12 Caucasian men, 2 Asian men, 2 Asian women and 8 Caucasian women) took part. Themes in the table below reflected ways that society and culture affected adherence to individualised dietary advice. Enablers reflected how participants dealt with these perceived barriers.

Discussion: The medical perspective of compliance due to poor intrinsic motivation⁽²⁾ may not offer accurate explanations to why patients find it challenging to follow dietary advice. The findings from this study suggest complex cultural influences on renal dietary adherence as reported in coeliac disease self-management⁽⁵⁾. Certain patients' perceptions of living with renal disease made them feel stigmatised in society. Underlying this perception was conflict with people in society around their dietary requirements. This data reflects experiences of people living with coeliac disease⁽⁵⁾ and eating outside the home where conflict has arisen with food business staff. People overcame these barriers by individual coping strategies using reverse and positive psychological techniques. These coping strategies were developed over time to suit individual circumstances. Some rationalisations for dietary management, for example self-talk which emphasises the negative include "cheating on certain foods" and "living with the consequences" was reported.

Conclusion: Sociocultural, psychological and environmental factors enabled and prevented dietary adherence. The findings that educating family, friends, restaurant owners and chefs on renal dietary management may be an effective intervention alongside individual education to the patient.

PEN 3-model	Barriers	Verbatim quotes	Enablers	Verbatim quotes
Cultural identity	Conflicting advice with public health messages	<i>'it's the opposite of healthy eating'</i>	Dietary knowledge	<i>'you need to know the diet inside out'</i>
	Societal stigma/denial	<i>'needs a celebrity to get renal failure'</i>	Positive psychology	<i>'you need to look to the positive in everything'</i>
Relationships and expectation	Food establishment staffs' knowledge and attitude	<i>'I argued with the chef at the holiday resort'</i>	Peer /family support	<i>'I found another patient who talked sense about diet'</i>
	Renal diet affects interpersonal relations (friends, family, dietitians)	<i>'friends criticise my diet all the time'</i>	Unconscious knowing	<i>'my body knows when I have too much salt or potassium'</i>
Culture empowerment	Social comparison to peers/ non-peers	<i>'they tell me I can eat it when I can't'</i>	Medical knowledge	<i>'understanding the whole treatment helps'</i>
	Inappropriate support from friends/ family Eating in social situations	<i>'I pretend to eat the food and then hide it'</i>	Reverse psychology	<i>'I tell myself I can have it, but I decide not to choose it'</i>

References

1. Wright M, Jones CH. Nutrition in Chronic Kidney Disease. The Renal Association. London. 2010.
2. Meuleman Y, Brinke TL, Kwakernaak AJ et al. Perceived Barriers and Support Strategies for Reducing Sodium Intake in Patients with Chronic Kidney Disease: a Qualitative Study. *Int. J. Behav. Med.* 2015; 22: 530–539.
3. Morris A, Love H, van Aar et al. The problematic world of following a renal diet outside the home. *J. Ren. Care.* 2015; 41: 253–259.
4. Airhihenbuwa CO. Health and Culture: Beyond the Western Paradigm. Thousand Oaks, CA: Sage. 1995. White LE, Bannerman E, Gillett PM. Coeliac disease and the gluten-free diet: a review of the burdens; factors associated with adherence and impact on health-related quality of life, with specific focus on adolescence. *J Hum Nutr Diet.* 2016; 29: 593–606

Informal peer-support to self-manage dietary recommendations in chronic kidney disease: a social comparison model approach

A Morris,¹ D Biggerstaff,² N Krishnan¹ & D Lycett³

¹University Hospital, Coventry, UK; ²Department of Health Sciences, Warwick Medical School, University of Warwick, Coventry, UK and ³Faculty of Health and Life Sciences, Coventry University, Coventry, UK

Background: Patients compare and discuss their treatment regimens with other patients to obtain informal peer support. ⁽¹⁾ A social comparison model ⁽²⁾ suggests these behaviours involve making comparisons to other patient's dietary behaviours to obtain feedback on the success of their own dietary behaviours. The result of this comparison can either enhance or lower self-esteem, depending on how the person perceives their situation. A self-enhancement comparison i.e. discounting the other person's behaviour helps maintain positive self-esteem through positive self-talk. A negative comparison will make them feel inferior to the person they have compared themselves to. Social comparison has been studied in obesity and eating disorders. ⁽³⁾ But little exists in renal. It is important to understand how people deal with social interactions around diet as inappropriate renal peer support and dietary advice giving may be detrimental to dietary adherence. Therefore it is important that patients can maintain self-esteem around following their own dietary advice. The aim of this study was to explore informal peer support experiences on self-management of individual dietary recommendations in chronic kidney disease.

Methods: Qualitative semi-structured interviews using a free response narrative approach were undertaken with patients with end-stage renal failure on haemodialysis. An interview topic guide, informed by current literature, was used to guide the data collection. Interview questions covered experiences of informal peer support and the affect these had on participants own behaviour around following renal dietary advice.

Interviews were transcribed verbatim and underwent interpretative phenomenological analysis ⁽⁴⁾ within the framework of social comparison theory. ⁽²⁾ Internal peer review, member checking and reflexivity were undertaken to increase rigour. UHCW NHS Trust gave ethical approval.

Results: 12 caucasian adults took part (6 male, 6 female). Themes represented social comparison between patients within the dialysis unit. Patients gradually entered the social more of the "renal family" (Participant 3) when starting hemodialysis. Within this social more; self-enhancement comparisons protected the self by discounting peers incongruent "unsafe" (P6) dietary advice, describing patients who were non-compliant to low potassium advice as being "on rocky ground" (P4). This helped maintain positive self-esteem by "feeling good about my own choices" (P10), identity around food, and food literacy. Peers who undertook positive self-talk were more likely to offer appropriate support to others. These coping strategies and "decent" (P1) peer support maintained defense against well-meant informal peer support by lessening the comparison to "those patients who don't know what they're doing with their diet" (P16).

Discussion: Positive upwards comparisons helped patients make dietary changes and self-manage their diet as reported in self-restrained eaters. ⁽⁴⁾ This led to high levels of self-efficacy to cope with renal restrictions and maintained patients' food literacy. These individuals were more likely to offer appropriate support to others. Downward comparison resulted in individuals feeling their self-efficacy was threatened by negative influences of peers. Limitations to this study include that self-efficacy was not measured, but implied through in-depth descriptions.

Conclusion: The findings suggest that a formal peer support programme should be explored for renal dietetics. A formal peer support programme may help lessen the anxiety around informal and inappropriate nutritional peer support.

References

1. Sadler E, Sarre S, Tinker A et al. Developing a novel peer support intervention to promote resilience after stroke. *Health Social Care Community.* 2017; 25: 1590–1600
2. Festinger L. A Theory of Social Comparison Processes. *Human Relations.* 1954; 7: 117–140.
3. Polivy J. What's that you're eating? Social comparison and eating behaviour. *Journal of Eating Disorders.* 2017; 5: 18
4. Biggerstaff DL, Thompson AR. Interpretative phenomenological analysis (IPA): a qualitative methodology of choice in healthcare research. *Qualitative Research in Psychology.* 2008; 5: 214–224

A review of the impact of anthropometry on hospital readmissions and length of stay

L Nash

Department of Nutrition & Dietetics, Airedale NHS Foundation Trust, Keighley, UK

Background: The Frail Elderly Pathway (FEP) Team aims to reduce admissions, readmissions and length of stay (LOS) among their patients. FEP patients are identified on admission based on age, comorbidities and reason for admission. Dietetic intervention typically focusses on supporting malnourished and sarcopenic patients at home after discharge. This review aimed to explore whether weight change, BMI and strength have an impact on hospital readmissions and LOS. This review was identified as a service evaluation and ethical approval was not required

Methods: Retrospective analysis of data for patients who received dietetic intervention from the FEP team dietitian between May 2015 and July 2016 was undertaken. Data from patient records were reviewed to compare the number of hospital admissions and LOS per patient during the six months before and after dietetic intervention began. Statistical analysis was not performed.

Results: 24 patients met the dietitian's inclusion criteria: 14 female, 10 male, mean age 85 years. The main results are displayed in the table below.

	Number of patients	Mean difference* in number of hospital admissions per patient	Mean difference* in inpatient days (LOS)** per patient
1. What was the impact of weight change?			
Weight decreased	5	-0.6	+6.0
Stable weight (difference <1%)	6	-1.3	+8.0
Gained weight	13	-1.3	-1.3
2. What was the impact of Body Mass Index (BMI)?			
BMI <18.5 kg/m ²	3	0.0	+1.7
BMI 18.5–19.9 kg/m ²	6	-1.2	-2.8
BMI 20.0–24.9 kg/m ²	12	-1.6	-5.6
BMI >25 kg/m ²	2	-1.0	-6.5
3. What was the impact of handgrip strength?			
Decrease in strength	1	-1.0	-13.0
0–30% increase in strength	6	-1.7	-1.7
>30% increase in strength	7	-1.0	-6.5
For patients who gained strength	13	-1.3	-4.2

*The difference between data for the 6 months pre dietetic intervention compared to six months after dietetic intervention began.

**LOS post intervention data for the weight change analysis is distorted by 2 outliers with long admissions (36 and 46 days) due to unavailability of care home placements. For the BMI and handgrip strength analysis there was 1 outlier (36 days).

Discussion: Patients who maintained or gained weight experienced a greater reduction in hospital admissions compared to those whose weight decreased. The relationship between LOS and weight change was unclear and was distorted by two outliers. Mean hospital admissions per patient decreased only for patients with BMI >18.5 kg/m² at the start of dietetic

intervention. There was no decrease for patients with BMI <18.5 kg/m². Average LOS decreased as BMI increased. These results are consistent with previous findings that malnourished people experience more frequent hospital admissions and longer LOS and that reversing malnutrition can reduce the risk for hospital admissions^(1,2). The impact of handgrip strength on admissions and LOS is less clear and is limited due to smaller numbers.

Conclusions: Weight loss and BMI <18.5 kg/m² are risk factors for hospital admissions and readmissions in frail elderly patients. There is a negative association between BMI and LOS. The impact of gains in handgrip strength on hospital readmissions and LOS requires further investigation.

References

1. Tappenden, KA; Quatrara, B; Parkhurst et al (2013), Critical Role of Nutrition in Improving Quality of Care: An Interdisciplinary Call to Action to Address Adult Hospital Malnutrition, *Journal of the Academy of Nutrition and Dietetics*. 2013; 113(9):1219–1237
2. Stratton RJ, Green CJ, Elia M. (2003) *Disease-related malnutrition: an evidence-based approach*. Oxford: CABI Publishing

Can dietitians contribute to reducing inpatient days among frail elderly people? A retrospective review of hospital readmissions and length of stay

L Nash

Department of Nutrition & Dietetics, Airedale NHS Foundation Trust, Skipton Road, Keighley, UK

Background: The Frail Elderly Pathway (FEP) Team aims to reduce admissions, readmissions and length of stay (LOS) among their patients. FEP patients are identified on admission based on age, comorbidities and reason for admission. Dietetic intervention typically focusses on supporting malnourished and sarcopenic patients during admission and at home after discharge. This review aimed to assess whether dietetic intervention was contributing to reducing hospital readmissions and LOS. This review was designed as a service evaluation and ethical approval was not required

Methods: A retrospective analysis of data for patients who had received dietetic intervention from the FEP team dietitian between May 2015 and July 2016 was undertaken. Data from patient records were reviewed to compare the number of hospital admissions and LOS per patient during the six months before and after dietetic intervention began. Paired t-tests using SPSS 16.0 for Windows were performed to analyse readmission data.

Results: 24 patients met the dietitian's inclusion criteria: 14 female, 10 male, mean age 85 years, mean length of dietetic intervention 17 weeks. There was a 67% decrease in the total number of admissions during the six months after FEP dietitian intervention began compared to the previous six months (Table 1). Using the paired t-test, the difference between admissions pre and post

intervention is 1.17 (± 1.4). This is statistically significant at the 5% level ($t = 4.164$, $df = 23$, $p < 0.05$.)

Table 1: Admissions	Six months pre intervention	Six months after start of intervention
Total admissions (n = 24)	42	14
Total patients with admissions	24	12
Mean number of admissions per patient (n = 24)	1.75	0.58

Table 2 compares the LOS by comparing the total number of inpatient days and the average number of inpatient days per patient before and after the commencement of dietetic intervention. Total inpatient days decreased by 121 days (61%). Average inpatient days per patient reduced by 1.2 days before and after dietetic intervention. In addition, two thirds of patients gained weight during dietetic intervention. Mean weight gain was +2.9% (range -15.5 to $+17.6\%$). * 2 outliers were removed due to experiencing long hospital admissions (36 and 46 days) following dietetic intervention due to the unavailability of care home placements.

Table 2: Length of stay (LOS)	Six months pre intervention	Six months after start of intervention
Total inpatient days (n = 22) *	200	79
Number of patients	22	10
Average inpatient days per patient	9.1	7.9

Discussion: These results demonstrate a decrease in hospital admissions and LOS following FEP dietetic intervention. The results are consistent with Stratton et al (2003)¹ who identified that reversing malnutrition can reduce the risk of hospital admissions. It is important to highlight that the FEP team refers patients for community support from a wide range of multidisciplinary health and social care professionals. Therefore the improvements identified in reducing hospital admissions and LOS might not be associated with dietetic intervention alone. In addition, many of these older adults are frail with multiple comorbidities. Therefore not all hospital admissions are preventable.

Conclusions: The FEP team has contributed towards a 67% reduction in hospital readmissions and reduced LOS. This has potential implications for patient experience, cost efficiencies and hospital flow. The dietitian can contribute to reducing hospital admissions and LOS.

Reference

1. Stratton RJ, Green CJ, Elia M. (2003) *Disease-related malnutrition: an evidence-based approach*. Oxford: CABI Publishing

The importance of early enteral feeding in the recovery of dysphagic stroke patients. A systematic review

S Sethi & C Wolfendale

Dept of Clinical Sciences and Nutrition, University of Chester, Chester, UK

Background: Dysphagia is a swallowing impairment affecting 40–78% of stroke patients in the UK. Current guidelines recommend providing enteral nutrition (EN) for patients unable to consume sufficient nutrition and fluid via nasogastric (NG) or percutaneous endoscopic gastrostomy (PEG) tubes⁽¹⁾. A variation in timing of EN administration has been reported; some clinicians delay tube feeding for two weeks or more⁽²⁾. Providing nutritional support will prevent malnutrition and aid the recovery of stroke patients. The aim of this study was to determine potential benefits or complications associated with providing these patient types with early enteral nutrition (within 7 days).

Method: Search databases include CINAHL, Cochrane Library, PsycINFO, PubMed, Science Direct and Web of Science. Inclusion criteria consisted of stroke as the primary cause of dysphagia, early EN provided by NG or PEG tubes and all studies published in English over the past 10 years (2006–2017). Search terms include stroke, cerebrovascular accident (CVA), dysphagia, enteral nutrition, NG tube, PEG tube, early EN, late/delayed EN, recovery of function, and complication. Nutritional status indicators used to determine malnutrition risks were anthropometric data and biochemistry including albumin, total protein, and triglyceride (TG). The Downs and Black Checklist⁽³⁾ was used to assess study quality.

Results: Four studies were identified with a quality score of 82–96%, based in the UK, Australia, South Korea and China. These include two retrospective cohort studies, one systematic review and meta-analysis, and one prospective randomised controlled study. Dysphagia was diagnosed in 67–100% participants. Sample sizes ranged from 146–6779 participants and the average age of participants was 70 years. Providing EN significantly increased nutritional status compared to the control group as evidenced at day 7 by the MUAC measurements ($p = 0.027$) and at day 21 by a further significant improvement of MUAC, Albumin and TG ($p = 0.002$, 0.012 and 0.025 respectively) whilst also improving short term neurological functions⁽⁴⁾. In comparison, another study found that providing EN showed a greater rate of malnutrition than the control group, as levels in BMI, albumin and total protein were significantly lower ($p < 0.03$, $p = 0.011$, and $p = 0.031$, respectively)⁽⁵⁾. Complications associated with EN was also investigated; the rate of aspiration pneumonia was the most prevalent complication recurring in most of the papers⁽⁶⁾.

Discussion: This review highlighted that there is a high rate of malnutrition associated with this patient group, even with nutritional support. A daily reassessment of requirements may be necessary to ensure patients are receiving sufficient nutrition. Risk of aspiration pneumonia is commonly associated

with EN, however this rate can be significantly reduced by focusing on patient management, by rotating the position of immobile patients, and maintaining oral hygiene⁽⁶⁾. The review identified conflicting findings regarding benefits or complications associated with providing early EN that may not be representative to the UK population, which may be due to low study sample sizes of EN patients alongside the fact that the studies were conducted in a range of countries.

Conclusion: This systematic review discovered that providing EN within 72 hours of admission significantly improves the patients' short-term neurological functions, compared to a general diet. Daily adjustments of nutritional requirements may be necessary to ensure that sufficient nutrition is provided. Focusing on the management of patients has been shown to be important in preventing aspiration pneumonia. Further research is essential to confirm improved outcomes with early EN, as it may significantly reduce the morbidity and mortality rates of dysphagic stroke patients.

References

1. NICE (2008). Stroke and Transient Ischaemic Attack in Over 16s: Diagnosis and Initial Management. <https://www.nice.org.uk/guidance/cg68/resources/stroke-and-transient-ischaemic-attack-in-over-16s-diagnosis-and-initial-management-975574675141>
2. The Food Trial Collaboration (2005). Effect of Timing and Method of Enteral Tube Feeding for Dysphagic Stroke Patients (FOOD): A Multicentre Randomised Controlled Trial. *The Lancet*, 365(9461), 764–772. [https://doi.org/10.1016/s0140-6736\(05\)17983-5](https://doi.org/10.1016/s0140-6736(05)17983-5)
3. Downs, S., & Black, N. (1998). *Journal of Epidemiology & Community Health*, 52(6), 377–384. <https://doi.org/10.1136/jech.52.6.377>
4. Zheng, T., et al., (2015). Impact of Early Enteral Nutrition on Short Term Prognosis After Acute Stroke. *Journal of Clinical Neuroscience*, 22(9), 1473–1476. <https://doi.org/10.1016/j.jocn.2015.03.028>
5. Kim, S., & Byeon, Y. (2014). Comparison of Nutritional Status Indicators According to Feeding Methods in Patients with Acute Stroke. *Nutritional Neuroscience*, 17(3), 138–144. <https://doi.org/10.1179/1476830513y.0000000078>
6. Brogan, E., et al., (2014). Respiratory Infections in Acute Stroke: Nasogastric Tubes and Immobility Are Stronger Predictors than Dysphagia. 29(3), 340–345. <https://doi.org/10.1007/s00455-013-9514-5>

Diet and physical activity advice after liver transplant: a qualitative study of patients' experiences

L Spillman,¹ A Mason,¹ N Fernandez,¹ G Gatiss¹ & AM Madden²

¹Department of Nutrition and Dietetics, Cambridge University Hospitals NHS Trust, Cambridge, UK and

²University of Hertfordshire, Hatfield, Hertfordshire, UK

Background: Liver transplant (LT) recipients have good long-term survival but higher risk of poor quality of life and metabolic syndrome than healthy individuals^{1,2}. To address this, LT recipients are given diet advice by dietitians, and physical activity advice by physiotherapists as inpatients and dietitians as outpatients. Advice is adapted as recovery progresses: high energy and protein diet and gentle activity such as walking immediately post-LT, changing to healthy eating and moderate to vigorous activity around 6 to 12 months post-LT. Understanding LT recipients' experiences of receiving and implementing this advice may help improve care. The aim of this study was to explore patients' experiences of receiving and implementing diet and physical activity advice following LT, to identify facilitators and barriers to behaviour change.

Methods: LT recipients were invited, using purposive sampling, to participate in semi-structured interviews 1, 6 and ≥12 months post-transplant. Interviews were undertaken by three specialist liver dietitians, audio-recorded, transcribed and analysed by of the dietitians, using thematic framework analysis. Ethical permission was obtained via NRES and participants gave written informed consent (REC reference: 17/LO/0244).

Results: Four female and three male LT recipients participated, mean age 57 (20–71) years and median time since LT of 245 (47–720) days. Four main themes were identified, shown in the table.

Themes	Supporting quotes
Beliefs about behaviour and consequences	<p>"Knowing why you need the advice is important, it's the reason that makes it memorable"</p> <p>"Given a second chance and I'm not going to mess it up"</p> <p>"I don't want diabetes...so, it's just moderating what I eat."</p>
The influence of others	<p>"She [dietitian] had as much power and sway and expertise as my hepatology doctors...that really was fundamental in how it shaped my relationship [with nutrition]"</p> <p>"The fact that I had somebody. I mean I just made my dad go with me [to walk]"</p>
External influences on behaviour	<p>"Quite a lot of pain...a lot of drugs and you really don't feel like eating"</p> <p>"It [hospital food] was fairly poor quality, wasn't very appetising quite often it was cold or even over-cooked"</p> <p>"When you get home you can do all sorts of things [physical activity], but in hospitals it's a bit limited really"</p>
Personal ability to control behaviour	<p>"I didn't need them [physiotherapists] that much because I was so determined"</p> <p>"It's been difficult because I'm lazy and can't commit to anything"</p> <p>"I can control diet, exercise, you know all these other things so I should, I should try to"</p>

Discussion: Only one previous study has investigated barriers and facilitators to physical activity after LT³, with similar results. No previous studies have investigated experiences of

dietary advice and behaviours after LT. Addressing external influences on behaviour, such as hospital food and dietitians' status within the team, may enable adherence to advice and could be investigated in future studies. It is also essential to explore factors influencing behaviours at an individual level, such as beliefs and ability to control behaviours, to tailor care. Themes fit with the theory of planned behaviour⁴, which may help to develop methods to promote behaviour change.

Conclusion: Common themes emerged regarding LT recipients' experiences of receiving and implementing diet and physical activity advice after LT. Addressing barriers to behaviour change has the potential to improve care.

References

1. Åberg F, Rissanen AM, Sintonen H, Roine RP, Höckerstedt K, Isoniemi H. Health-related quality of life and employment status of liver transplant patients. *Liver Transplantation*. 2009;15(1):64–72.
2. Madhwal S, Atreja A, Albeldawi M, Lopez R, Post A, Costa MA. Is liver transplantation a risk factor for cardiovascular disease? A meta-analysis of observational studies. *Liver transplantation : official publication of the American Association for the Study of Liver Diseases and the International Liver Transplantation Society*. 2012;18(10):1140–6.
3. van Adrichem EJ, van de Zande SC, Dekker R, Verschuuren EA, Dijkstra PU, van der Schans CP. Perceived Barriers to and Facilitators of Physical Activity in Recipients of Solid Organ Transplantation, a Qualitative Study. *PLoS One*. 2016;11(9):e0162725.
4. Ajzen I. The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*. 1991;50(2):179–211.

New to Research

The importance of calorie content and the source of sweetness on perceived 'healthiness' of food and drink using conjoint analysis

A Ahad, R Bates, J Lockley, R Ford & JA Swift

Division of Nutritional Sciences, Department of Biosciences, School of Bioscience, University of Nottingham, Leicestershire, UK

Background: Perceptions of food 'healthiness' can influence food choices⁽¹⁾ but there is a lack of literature assessing these. Food perceptions can also provide an indication as to how individuals interpret public health nutritional messages, a key area of dietetic practice. Three experiments were developed testing three hypothesis with the overall aim of investigating the impact of nutritional characteristics on the perceived 'healthiness' of food items. The following hypotheses were tested: (1) Low sugar content is significantly more important than low calorie when considering 'healthiness', (2) Low calorie content is significantly more important than high nutrient content when considering 'healthiness', (3) White sugar will have a significantly lower utility compared to maple syrup and honey, but higher utility than artificial sweeteners.

Methods: Participants completed an online survey (created using Sawtooth Software) via remote links or through face to face recruitment (n = 210 Survey 1, n = 212 Survey 2 and n = 236 Survey 3). Choice-based conjoint analysis allowed participants to rate several attributes on their desirability for health and is used to study product purchase decisions when a product has several attributes⁽²⁾. Utility, which identifies preference of attributes, and importance, which ranks the attributes, were considered. Discrete choice modelling using Empirical Bayes, with *post-hoc* Friedman Test, was conducted. Ethical approval was granted from the School of Biosciences research ethics committee.

Results: Survey 1 found that the amount of sugar was significantly the most important attribute (mean = 44.1%, SD = 16.75) compared to calorie content and nutritional information when selecting food items in terms of health ($X_{(2)} = 154.50$; $p < 0.001$). Survey 2 found that nutritional information had the greatest influence on preference (mean = 69.25%, SD = 53.31) compared to calorie content and type of food item ($X_{(2)} = 52.21$; $p < 0.001$). The presence of artificial sweeteners was considered the most important attribute for health in Survey 3 (mean = 40.35%, SD = 0.24), followed by source of sweetness and then calorie content ($X_{(2)} = 38.70$; $p < 0.001$). For the source of sweetness, honey was perceived to have the greatest utility (43.7, SD = 41.97, CI 38.3–49.1), whilst maple syrup (−6.2, SD = 37.44, CI −10.99

to −1.39) and white sugar (−37.54, SD = 44.24, CI −43.22 to −31.87) were considered to be unhealthy.

Discussion: Participants in this study ranked sugar content, nutritional information and the presence of artificial sweeteners in food items as more important characteristics than calorie content in terms of perceived 'healthiness' and preference. This contradicts previous findings in research which advocate a low calorie message for perceived 'healthiness'⁽³⁾. Research implies that providing consumers with calorific information skews product choice⁽¹⁾; suggesting there may be a shift in perception of what is considered 'healthy'.

Conclusion: The results of this study provide an insight into the nutritional characteristics which have a greater influence on perceptions of food 'healthiness'. Future research could investigate the gap between perceived 'healthiness' and choice of food items, as this could impact public health. Future public health campaigns might need to focus on the overall content of the diet, without such emphasis on specific nutrients.

References

1. Chandon, P. and Wansink, B. The Biasing Health Halos of Fast Food Restaurant Health Claims: Lower Calorie Estimates and Higher Side-Dish Consumption Intentions. *JCR*, 2007; 34(3), pp. 301–314.
2. Kuhfeld, W.F. (1997) Sawtooth Software. Research Paper Series. Efficient Experimental Designs Using Computerised Searches <http://homepage.divms.uiowa.edu/~gwoodwor/AdvancedDesign/KuhfeldTobiasGarratt.pdf> (accessed July 2017).
3. Carels, R.A., Harper, J. and Konrad, K. (2006) 'Qualitative perceptions and caloric estimations of healthy and unhealthy foods by behavioral weight loss participants', *Appetite*, 46(2), pp. 199–206.

A qualitative exploration of the experiences of intensive care patients after transition to a ward as expressed in online discussion forums

L Albrich, JM Latour & M Hickson

School of Health Professions, Plymouth University, Peninsula Allied Health Centre, Plymouth, UK

Background: Critical illness may leave survivors with an altered quality of life. This includes weakness, cognitive impairment, anxiety, depression and post-traumatic stress disorder⁽¹⁾. There is a need for a true insight into the experience of recovery, level of care including any nutritional aspects, and any difficulties of surviving critical illness^(2, 3).

Aim: To explore the experience of intensive care patients after transferred from the intensive care unit to the ward in online discussion forums.

Methods: Internet searches using terms 'discussion forums' and 'critical care' revealed the healthunlocked.com website

with a sub-section supported by the charity ICUSteps. This forum was searched using the terms: transfer, support, prepared, discharge, follow-up, and limitations of listed posts <2 yr and >15 replies. This revealed 25 discussion threads. The thread named 'how people felt when they were transferred from ICU, why and what affected it' was chosen, which had 17 contributors with 47 posts. Text fragments were reviewed by identifying phrases of meaning, assigning codes and descriptors, then grouping these into subthemes and themes. This Thematic Analysis was facilitated using NVivo v23 software programme. Ethical approval was not required as this data is in the public domain, anonymity was maintained.

Results: Two main themes were identified: Vulnerability and Support, with two subthemes each, and an overarching theme of Empowerment (figure 1).

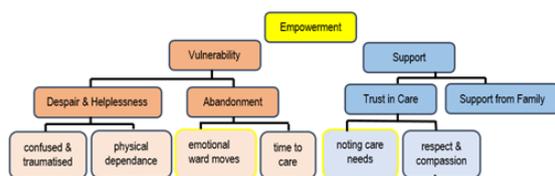


Figure 1 Main themes identified (orange and blue) and overarching theme (yellow) linking in where outlined in yellow.

Vulnerability has a subtheme of Despair and Helplessness, where patients expressed being confused and traumatised as well as experiencing unexpected after-effects and it is also compounded by their physical dependence (horrified to discover I was unable to even pull myself up in bed). Vulnerability's sub-theme, Abandonment, was evident through emotional ward moves and lack of time to care (leaving me laid in bed wondering how I'd get over to the table to eat). Support was the other main theme formed through sub-themes of Support from Family being impinged on by ward routines, and the lack of Trust in Care. Trust is diminished through lack of noting special care needs (I was met with blank stares and a 'so what' attitude), but even more pertinently, through patients realising staff's lack of compassion (told me I was faking it). This seemed to be also underpinned by a lack of knowledge and insight pointing back to the overarching theme of Empowerment which is a thread through most sub-themes for both patients and staff.

Discussion: Negative experiences of ICU after effects are evident and correspond with significant disempowerment, as in other studies⁽³⁾. Although not overly evident here, lack of help or concern about nutrition is noted in this already nutritionally compromised group as described elsewhere⁽⁴⁾. There is a strong call for empathetic listening from someone with a true understanding, which is something the ICU forum offers in light of the absence of this from healthcare or even family.

Conclusion: Exploration of how the physical and psychological effects of critical illness, and its subsequent care needs, balance with what patients experience, give healthcare a valuable

insight into how best to support patients and help them thrive rather than suffer.

References

1. Needham DM, Davidson J, Cohen H, Hopkins RO, Weinert C, Wunsch H, et al. Improving long-term outcomes after discharge from intensive care unit: report from a stakeholders' conference. *Crit Care Med.* 2012;40(2):502–9.
2. NICE. Rehabilitation after critical illness in adults. Clinical guideline 83. Manchester: National Institute for Health and Clinical Excellence; 2009. <https://www.nice.org.uk/guidance/cg83>
3. Deacon KS. Re-building life after ICU: A qualitative study of the patients' perspective. *Intensive and Critical Care Nursing.* 2012;28(2):114–22.
4. Peterson SJ, Tsai AA, Scala CM, Sowa DC, Shean PM, Braunschweig CL. Adequacy of Oral Intake in Critically Ill Patients 1 Week after Extubation. *J of American Dietetic Association.* 2010;110(3):427–433.

Initial development of a novel iodine deficiency screening tool for UK women

AE Alvarez Goel & SC Bath

Department of Nutritional Sciences, University of Surrey, Guildford, Surrey, UK

Background: Iodine is essential for the synthesis of thyroid hormones, which are vital for neurological development of the brain in gestation and early life. In fact, iodine deficiency is the largest preventable cause of brain damage worldwide. The latest Iodine Global Network data illustrated that on the whole, pregnant women in the UK have an insufficient iodine intake⁽¹⁾. This is further supported by various studies across the UK, which have found mild-to-moderate iodine deficiency in pregnant women. The biomarkers (e.g. urine iodine concentration) that are currently used to assess iodine status are only appropriate for use in population studies. The iodine-to-creatinine ratio can be used to account for intra-individual variation in urine dilution, but not the day-to-day variability in iodine excretion. Therefore, at present there is no accurate method to measure iodine status in pregnant women or women of child-bearing age. Measurement of dietary intake of iodine would require a full diet assessment, which would be onerous for both researchers and individuals. The aim of this project was to explore the main sources of iodine for UK women and to create a screening questionnaire for women who are pregnant or breastfeeding, for risk of iodine deficiency.

Methods: Common methods of dietary assessment for individuals were reviewed to determine a format for the screening tool. The methods reviewed were: single 24-hour recall, diet diaries and food frequency questionnaires (FFQ). Data from the National Diet and Nutrition Survey Years 5 and 6 were examined to determine the foods and beverages that contribute to greater than 2% of iodine intake in adult women⁽²⁾.

The iodine concentration per typical portion for each of the foods and beverages were calculated using UK portion size data from the Food Standards Agency and iodine concentrations from the UK food tables. This information was used to design an algorithm based Iodine Deficiency Screening Tool (IDST) in Microsoft Excel.

Results: A short FFQ was the most appropriate method for the basis of the screening tool, as it can gather data on infrequently consumed foods and it generates a low patient burden to complete. The foods and beverages that contributed most to the iodine intake in UK women were cow's milk (23%), fish (10%), eggs (8%), yoghurt (6%), cheese (3%), bread (3%), pasta (3%), chicken and turkey (3%), and other milks and cream (3%)⁽²⁾. The algorithm was based on whether an individual is either (i) planning a pregnancy, (ii) pregnant or (iii) lactating. The algorithm used frequency of consumption of the foods and beverages with six options: (i) twice a day or more, (ii) once a day, (iii) four times a week, (iv) twice a week, (v) once a week and (vi) less than once a week. The algorithm calculates the total iodine intake and compares it against the European Food Safety Authority recommendations for iodine (i.e. 150 µg/day in pre-pregnancy and 200 µg/day in pregnancy and lactation). The screening tool can then inform the user whether they are at-risk of iodine deficiency. The IDST takes less than five minutes to complete.

Discussion: Our study has determined the main sources of iodine in the UK diet and used this to create a screening tool. While an iodine-specific FFQ for UK women of childbearing age has previously been developed⁽³⁾, it did not include all key UK iodine sources, such as eggs, and the study concluded that it was not suitable for individual use⁽³⁾. Therefore, this tool is the first evidenced-based iodine-specific FFQ designed for use by individual UK women who are planning a pregnancy, pregnant or breastfeeding. It is based on an algorithm that can be used across multiple platforms (e.g. as an app and a website). Future work is required to validate this screening tool for use in research and clinical settings.

Conclusion: Subject to validation, the IDST has the potential to help address the public health issue of iodine deficiency in pregnancy and could be used as part of a prevention scheme to minimise its negative health, social and economic implications at an individual and at a population level.

References

1. Iodine Global Network (2016) *Global scorecard of iodine nutrition*. www.ign.org/scorecard.htm [accessed April 2017].
2. Public Health England (2016) *National Diet and Nutrition Survey: results from Years 5 and 6 (combined)*. www.gov.uk/government/statistics/ndns-results-from-years-5-and-6-combined [accessed April 2017].
3. Combet E. & Lean MEJ. (2014) Validation of a short food frequency questionnaire specific for iodine in UK females of childbearing age. *J Hum Nutr Diet*. 27: 599–605.

A qualitative investigation into public perceptions, expectations and preferences regarding the role of Dietitians

S Beech & H Wickett

School of Health Sciences, Cardiff Metropolitan University, Cardiff, UK

Background: There is currently limited qualitative research into the public's perceptions and expectations of the dietetic role. Much of the background research observed self-perception of healthcare roles, where insight into public perceptions and expectations is not observed, or has studied specific population samples rather than the general public (1).

The aim is gain insight into the public's perceptions, expectations and preferences regarding the role of dietitians.

Methods: Qualitative investigation is appropriate for this research as it is generally explorative in character and enables the researcher to gain an understanding of underlying reasons, opinions and motivations (2). The cross-sectional design used researcher-administered questionnaires to gather qualitative data and gain insight into current public perceptions, expectations and preferences regarding the role of dietitians. Fifty participants were recruited opportunistically, and thematic analysis was used to analyse the data collected. This study was approved by the Cardiff School of Health Sciences panel of Cardiff Metropolitan University prior to data collection, (ethical approval reference number 8591).

Results: Participants primarily cited overweight, obese or fat as people they would expect to be referred to see a dietitian (60%), compared to very few participants citing need for building up or MUST score (8%). Also, when asked about what they would expect to be discussed during a consultation, only 8% mentioned patients own attitudes or goals.

Results showed an expectation of seeing dietitians in a hospital environment (84%), however, the most popular place for the public to consult with a dietitian was a GP or health centre (42%). There was a clear preference seen for individual consultation (78%); mainly attributed to social discomfort (50%) and desire for individuality or one to one contact (45%).

Conclusions: There is an expectation that dietitians mainly work in a hospital environment, and that dietitians primarily address weight management in their role. Results suggest that there is a lack of knowledge surrounding the broad dietetic role in nutrition support, as well as the patient-centred nature of the role.

The public preference is to have a consultation in their GP practise or health centre rather than in the hospital environment, despite the expectation of seeing them in hospital. Public prefer individual consultation. Information-giving by the referer on group consultations may change attitudes towards these.

References

1. Blake, J., Ludd, L., Lenders, C., Ireland, K., Milch, H., Lim-Miller, A. and Levine, S. Dietetic Interns Educating Future

Physicians about the Role of Registered Dietitians and Nutritionists and Medical Nutrition Therapy in Patient Care. *Journal of the Academy of Nutrition and Dietetics*, [pdf] 2014;114(9).

- Wyce, S. What is the Difference between Qualitative Research and Quantitative Research? *Snap Surveys* [blog] September 16th 2011.

A content analysis of the proportion of food groups advertised on television compared to those recommended in the Eatwell Guide

F Chipperfield & J Tamnam

Nutrition and Dietetics, University of Hertfordshire, Hertfordshire, UK

Background: 28% of children in England between 2 and 15 yr are overweight or obese⁽¹⁾. TV adverts significantly influence children's food choice⁽²⁾. Food and drink products high in fat salt and sugar (HFSS) are subject to TV scheduling and advertising restrictions. However, this does not apply to family programmes which also have a high number of child viewers. This study aims to identify whether the proportions of food groups advertised on peak-time family television meet recommendations for a healthy balanced diet portrayed in the Eatwell guide.

Methods: Food and drink adverts were recorded between 17:00 and 20:00 on channel 4 for seven consecutive days in December 2016. Portion sizes of products from 70 adverts were estimated using carbs and calcs. Then organised into food groups represented by the Eatwell Guide plus HFSS and alcohol. One-sample Wilcoxon test was used to compare food groups from individual adverts with those presented in the Eatwell Guide. An 'EatAsAdvertised' model was created from the proportion of food groups from all adverts.

Results: Three from five food groups from individual adverts were significantly different from the recommended Eatwell Guide proportions. Carbohydrates and fruit & vegetables were 22% lower ($p = 0.0005$, $p = 0.003$, respectively), Protein was 7% higher ($p = 0.0005$), oils and spreads were 0.85% lower (NS) and Dairy was 7% lower (NS) than in the Eatwell Guide. HFSS foods and alcohol represented 39% and 7%, respectively,

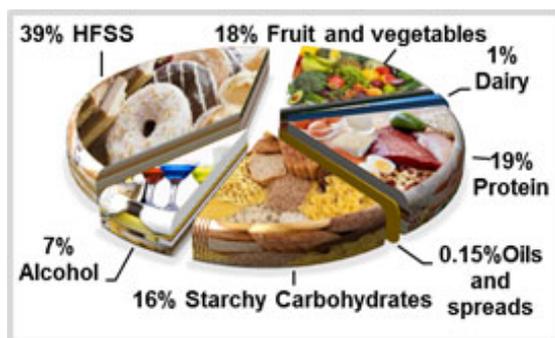


Figure 2 EatAsAdvertised Model



Figure 3 Eatwell Guide

however, comparisons are impossible as they are not accounted for in the Eatwell Guide.

Discussion: HFSS featured the most in EatAsAdvertised. Which, concurs with previous data⁽³⁾. Fast food companies ($n = 25$, 36%), contributed substantially to this figure suggesting that regulation of HFSS food advertising is insufficient to prevent exposure to children. This may contribute to the £19.2 billion cost of diseases associated with obesity⁽⁴⁾.

Conclusion: The proportions of Starchy Carbohydrates, Protein, Fruit and Vegetables, HFSS and alcohol present in TV adverts did not correspond with the dietary guidelines represented in the Eatwell Guide. Suggesting that children are being exposed to messages via television that run contrary to public health guidance.

References

- Health and Social Care Information Centre (2016) Health survey for England 2015 children's body mass index, overweight and obesity. <http://www.content.digital.nhs.uk> (accessed March 2017)
- Arnas YA. The effects of television food advertisement on children's food purchasing requests. *Pediatrics International*. 2006;48: 138–145.
- Ball Y & Tamnam J. An analysis of the food composition of TV advertising and its comparison with the Eatwell Guide. *J Hum Nut Diet* 2017;30 (Sup 1); 47.
- Mcpherson K, Marsh T, Brown M. Foresight: future choices- modeling future trends in obesity & their impact on health. pp 35. United Kingdom: Government Office for Science. 2007.

The effect of dietary antioxidants on levels of DNA damage in humans: A systematic review

SE Davies, YS Lee & RM Elliott

Department of Nutritional Sciences, School of Biosciences and Medicine, University of Surrey, Guildford, UK

Background: Oxidative stress caused by an excess of reactive oxygen species (ROS) is associated with numerous chronic diseases, such as cardiovascular disease and cancer¹. The

antioxidant hypothesis suggests that dietary antioxidants help protect tissue integrity by reducing cellular damage, including damage to DNA caused by ROS. Although protective findings are apparent in epidemiological studies which associate an increased amount of antioxidant-rich fruit and vegetables intake with a lower incidence of mortality², the strength of evidence from intervention studies is weak and inconsistent³. The aim of the study was to analyse the effect of antioxidant supplementation on levels of DNA damage by conducting a systematic review of human randomised controlled trials (RCT), which to our knowledge, is the first to do so.

Method: Two researchers independently searched the PubMed database and selected studies using standardised criteria. Of the 283 studies initially identified, 75 met the selection criteria and were included. The researchers cross-checked included studies and when in doubt, sought a third opinion. Studies were considered eligible if they were RCT using dietary antioxidants (as supplements, not whole foods) in human subjects, in which DNA damage was one of the outcome measures. In addition, included studies were graded for quality using the validated score of Jadad and coworkers⁴ on the extent to which its design, data collection and statistical analysis minimised or avoided bias. Pooling of data for meta-analysis was inappropriate due to study heterogeneity and therefore results were summarised qualitatively.

Results: The 75 RCT included 4,775 participants in total. The antioxidants investigated differed across studies and were grouped into the categories of vitamin E, vitamin C, vitamin C & E, selenium, zinc, polyphenols, thiols, carotenoids, a mixture of antioxidants and other. Studies varied in duration, design and intervention protocol. Our results showed that whilst 36 studies reported no beneficial effects, 39 studies demonstrated a significant protective effect, with the most convincing evidence for zinc and selenium. It may also be noted that 2 studies demonstrated a prooxidant effect.

Discussion: Our results do not provide compelling evidence that the protective effects of antioxidant-rich diets observed in epidemiological studies can be explained by direct antioxidant protection of cellular DNA⁵. Several theories may explain this discrepancy, such as the possible contribution of the food matrix, in addition to mechanisms other than direct antioxidant protection which may be important in the beneficial effects of antioxidant diets.

Conclusion: This systematic review supports previous literature in the field, suggesting that the effect of antioxidants on levels of DNA damage remains weak and inconsistent. Although evidence from the review is most convincing for selenium and zinc, robust conclusions cannot be drawn due to several limitations which may have impacted on outcome.

References

1. Waris G, Ahsan H. Reactive oxygen species: role in the development of cancer and various chronic conditions. *J Carcinog* 2006 May 11;5:14
2. Hercberg S, Galan P, Preziosi P, Alfarez MJ, Vazquez C. The potential role of antioxidant vitamins in preventing cardiovascular diseases and cancer. *Nutrition* 1998 Jun;14(6):513–520
3. Bjelakovic G, Nikolova D, Gluud LL, Simonetti RG, Gluud C. Antioxidant supplements for prevention of mortality in healthy participants and patients with various diseases. *Cochrane Database Syst Rev* 2012 Mar 14;(3):CD007176
4. Jadad AR, Moore RA, Carroll D, Jenkinson C, Reynolds DJ, Gavaghan DJ, et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary? *Control Clin Trials* 1996 Feb;17(1):1–12
5. Vazquez Martinez C, Galan P, Preziosi P, Ribas L, Serra LL, Hercberg S. The SUVIMAX study: the role of antioxidants in the prevention of cancer and cardiovascular disorders. *Rev Esp Salud Publica* 1998 May-Jun;72(3):173–183. (107)

Descriptive dietary profile of poor responders to bariatric surgery

J Griffin, R Gibson, B Pérez-Pevida, S Scholtz, E Rose, A Ahmed, S Purkayastha, H Chahal, G Frost, S Bloom, A Miras & T Tan

Division of Diabetes, Endocrinology and Metabolism, Imperial College London, London, UK

Background: Weight regain and deterioration of blood glucose control has been observed in a subset of patients post bariatric surgery⁽¹⁾. The GLP1 Receptor Agonist interVentIon for poor responders after bariatric surgery trial (GRAVITAS) provides a unique cohort to investigate the dietary intakes of this under-researched patient group. The aim of this study is to describe the dietary intake of poor responders to bariatric surgery (weight loss <25%) and compare long-term UK nutritional guidelines available for post bariatric surgery patients.

Methodology: The initial 20 participants (women = 14) enrolled in the GRAVITAS trial (rec: 15/LO/0780) were selected for cross-sectional analyses of baseline dietary and demographic data. Dietary data were collected via 3-day food diaries completed prior to attending the initial trial appointment. Calculation of nutritional intake was conducted using Dietplan7 (*Forestfield Software Ltd*). A literature review was conducted to identify UK nutritional guidelines for patients >1 yr post bariatric surgery.

Results: The mean age of participants was 57.5 ± 7.8 (S.D) yrs. From the group, 80% had undergone gastric bypass surgery and the remainder sleeve gastrectomy. The mean time since surgery was 4.4 ± 2.3 yr. The mean maximal weight loss was 28.4 ± 10.1% with a mean weight regain from post-surgery nadir of 12.3 ± 10.0%. Mean BMI pre-surgery was 44.9 ± 8.6 kg/m² and 35.4 ± 6.2 kg/m² at study enrolment. The mean time since last dietetic appointment was 3.5 ± 2.6 yr.

Discussion: Guidelines for bariatric patients >1 yr post surgery recommend a balanced diet based on UK healthy eating guidelines and a minimum protein intake. Although protein and

Table 1 Baseline mean daily dietary intake of GRAVITAS participants (n = 20)

Dietary intake profile (daily)	Mean	SD	CV %	Guideline	Source of guideline
Energy intake, kcal	1734.5	846.9	48.8	Personalised:weight management	
% Energy intake protein	17.9	3.1	17.3	15	General UK population guidelines
% Energy intake carbohydrate	45.2	5.9	13.1	50	
% Energy intake total fat	38.9	6.6	17.0	<35	
% Energy intake saturated fatty acids	13.3	3.5	26.3	<11	
Calcium, mg/day food	779.4	442.6	56.8	≥700	
Dietary fibre grams(AOAC)	16.3	8.2	50.3	≥30	
Protein, grams	76.4	38.5	50.3	≥60	BOMSS 2014
Fruit, grams (including 100% juices)	178.4	160.8	90.1	≥400 combined	General UK population guidelines
Vegetables, grams (inc. legumes, exc. potato)	153.1	98.0	64.0		

Abbreviation: AOAC, Association of Official Analytical Chemists; BOMSS, British Obesity Metabolic & Surgery Society (BOMSS) Guidelines 2014 www.bomss.org.uk/wp-content/uploads/2014/09/BOMSS-guidelines-Final-version1Oct14

calcium intakes were on a par with recommendations, diet quality was characterised by high saturated fat, low fibre, fruit and vegetable intakes – all established dietary factors for increased cardiometabolic risk. The reason for weight regain is complex and multifactorial⁽²⁾. We observed that the majority of patients had limited dietetic follow up post-surgery. Additionally, our observations support existing research that has identified nutritional non-adherence as a key contributing factor⁽²⁾. A limitation of this study is failure to collate average number of dietetic appointments following surgery.

Conclusion: Non-adherence to a healthy eating diet may be a potential contributing factor in weight regain post-bariatric surgery.

References

1. Mingrone G, Panunzi S, De Gaetano A *et al.* Bariatric–metabolic surgery versus conventional medical treatment in obese patients with type 2 diabetes: 5 year follow-up of an open-label, single-centre, randomised controlled trial. *Lancet.* 2015;386(9997): 964–73.
2. Karmali S, Brar B, Shi X, *et al.* Weight recidivism post-bariatric surgery: a systematic review. *Obes Surg.* 2013;23(11):1922.

Cross-sectional study investigating factors associated with phosphate binder non-compliance in end-stage renal disease haemodialysis patients

D Griffith, J Mainwaring & M Barrett

Faculty of Health & Life Sciences, School of Health, Coventry University, Priory St, Coventry CV1 5FB

Background: Hyperphosphataemia is associated with significant pathophysiology in end-stage renal disease (ESRD)⁽¹⁾ and

regulation of serum phosphate to controlled levels is a documented challenge, particularly over the past 10 yr⁽¹⁾. Non-compliance to phosphate binders (PB's) has been identified as a major contributor to hyperphosphataemia⁽¹⁾. This challenge has been apparent at an English NHS Trust where clinicians and dietitians have been working to reduce hyperphosphataemia among ESRD patients undergoing haemodialysis. This study aimed to explore factors that affect ESRD patients taking PB's.

Methods: This was a quantitative, multi-centre, cross-sectional study, using a self-reported questionnaire to explore use of PB's, alongside individual perceptions of health related to PB usage. The questionnaire was piloted and changes made based on feedback. Questionnaire development was guided using themes on PB compliance extrapolated from previous research. Stratified sampling was used to recruit 26 haemodialysis patients from 3 renal units at an English NHS Trust. Questionnaires were distributed to participants and completed during dialysis. Mann-Whitney tests compared differences in understanding what snacks PB's can be taken with, the health consequences of not taking PB's, and concern about future health outcomes, between compliant and non-compliant groups. Chi-square tests analysed associations between subject demographics and factors related to compliance Coventry University Ethics Committee granted ethical approval.

Results: Forgetting to take PB's was the most prevalent reason for not taking PB's as prescribed (73%, $n = 19$). There was a significant association between smoking status and non-compliance ($p = 0.022$) but no other demographics were associated with compliance. No significant association was found between compliance and understanding which snacks PB's should be taken with ($r = 0.3$; $p = 0.128$). A strongly significant association was found between compliance and understanding the health consequences of not

taking PB's ($r = 0.5$; $p = 0.011$). Aligned to this, there was a significant association between compliance and concern about the health consequences of not taking PB's ($r = 0.4$; $p = 0.031$).

Discussion: Smoking status has been associated with poor compliance in other chronic conditions i.e. COPD⁽²⁾ and HIV⁽³⁾, but this is the first to show an association in ESRD patients. Understanding the health consequences of not taking PB's was associated with compliance and is similar to previous research⁽⁴⁾. A unique finding in this study was the association found between the ESRD patients concern about future health consequences of not taking PB's and their compliance with this medication. It is important to acknowledge that this study revolves around self-reported data and objective measures would improve the validity of findings.

Conclusion: Future research should investigate if the findings of this study can be repeated using objective measures of compliance. Based on current findings, it is suggested that education and empowerment intervention programs be implemented to help improve patients understanding of health consequences related to hypophosphatemia and offer these patients council in relation to concern about health concerns to improve compliance with PB's.

References

1. Van Camp Y, Vrijens B, Abraham I, Van Rompaey B, Elseviers M. Adherence to phosphate binders in hemodialysis patients: prevalence and determinants. *Journal of Nephrology* 2014;27(6):673–9
2. Khdour M, Hawwa A, Kidney J, Smyth B, McElnay J. Potential risk factors for medication non-adherence in patients with chronic obstructive pulmonary disease (COPD). *European Journal of Clinical Pharmacology* 2012;68(10):1365–73.
3. Moreno J, Catley D, Lee H, Goggin K. The relationship between ART adherence and smoking status among HIV+ individuals. *AIDS and Behaviour* 2015;19(4):619–625.
4. Arenas D, Malek T, Gil M, Moledous A, Alvarez-Ude F, Reig-Ferrer A. Challenge of phosphorus control in hemodialysis patients: a problem of adherence? *Journal of Nephrology* 2010;23(5):525–34.

A quantitative study to discover university students' perceptions of the role of a dietitian

C Irlam¹ & B Tighe²

¹Lancashire House, Warrington Hospital, Lovely Lane, Warrington, UK and ²RC115, Jordan Well, Coventry, UK

Background: Increased competition for providers of nutritional advice can lead to the role of a dietitian becoming increasingly unclear to the public^(1,2). For nutritional advice to be effectively followed by the public, service users and the multi-disciplinary team, it is vital that the role of a dietitian is widely understood. The aim of this study was to find out what

Coventry University students' ideas about the role of a dietitian were, using the students as a proxy for the general public.

Methods: This study used a descriptive quantitative approach. Likert scales were used in a questionnaire to assess students' perceptions on the settings dietitians work within, what conditions they can advise on and how trustworthy various sources of nutritional advice are. 36 students were recruited by convenience sampling.

Results: Most students rated their own knowledge of the role of a dietitian at three out of five. Students mostly agreed that dietitians work in a variety of settings, aside from catering. The majority recognised that dietitians can advise on weight loss, weight gain, diabetes care, eating disorders and food allergies. However, the sample was more split on whether dietitians could advise those who cannot take food orally. Students trusted nutritionists, dietitians and nutritional therapists the most for advice.

Discussion: The results from this study show that the difference between different nutritional professionals was not well known amongst Coventry University students, and this appeared to impact upon how trustworthy they found these sources of nutritional advice. Students were mostly aware of the settings and areas that dietitians work within although most of the students did not feel confident in their own knowledge of the dietitian's role.

Conclusion: This is an area of very limited literature, with many opportunities for further research and promotion of the role of dietitians, to ensure that the difference between them and other nutritionists is fully understood.

References

1. Semans D Academy of Nutrition and Dietetics Registered Dietitian Brand Evaluation Research Results. *Journal of the Academy of Nutrition and Dietetics*. 2014;114:417–421. www.sciencedirect.com/science/article/pii/S2212267214012325 (accessed June 2016)
2. Crocker J A1. The Public Perception of the Role of Dietitians Compared with Physiotherapists and Radiographers. *Journal of Human Nutrition and Dietetics*. 2000; 13: 363. www.onlinelibrary.wiley.com/doi/10.1046/j.1365-277x.2000.00001-2.x/pdf (accessed June 2016)

An analysis of the dietary intake of a cohort of women with gestational diabetes

E Jaynes, J Killips & H White

Leeds Teaching Hospitals Trust, Leeds Beckett University, Leeds, UK

Background: Gestational diabetes, characterised by progressive insulin resistance affects 2–6% of all pregnant women in the UK⁽¹⁾, with black and ethnic minorities being at greater risk⁽²⁾, and is usually diagnosed with an Oral Glucose Tolerance Test between weeks 24–28 of pregnancy. Successful management incorporates healthy eating guidance, and low glycaemic index

foods. Studies examining actual dietary intake and adherence to these principles are lacking. Leeds has a diverse patient population, with approximately 550 women being treated for gestational diabetes at the time of the study. Food diaries are utilised to form a basis to discuss dietary practice and change. The aim of this study was to measure dietary intake, using completed food diaries of women with gestational diabetes to allow calculation of key nutrients, which could be compared to current UK guidelines⁽³⁾.

Methods: Approximately 450 food diaries completed by different individuals at similar stages in pregnancy were held by the Trust. Of these, 60 completed diaries were selected at random for analysis in this cohort study. The sample was taken from a selection of diaries completed between June and December 2016, women of all ages, ethnicities, and levels of deprivation. Demographic data including age (years), ethnicity (South Asian, Black, Caucasian) BMI (kg/m²) and postcode (a proxy for deprivation), were noted. Food diaries were analysed using NetWisp and energy, macro and micronutrient intake were measured and calculated as an average over a 3-day period, which was then compared to the UK standard. Descriptive statistics were used to present demographic data and ANOVA was used to assess differences between ethnic/socioeconomic groups. Data was analysed using SPSS 23 (Chicago, Illinois). Ethical approval for the study was granted by the Leeds Beckett University Ethics board, and approval to undertake the study given by the Trust.

Results: Participants (n = 60) had a mean age of 32.2 (±5.8) years, BMI of 31.7(±5.3) kg/m² and ethnicity 52.2% Caucasian, 35% Asian, and 12.8% black. Most lived in the most deprived quintiles.

	Mean	Recommended
Energy (kcal)	1454 (±410.7)	2000
Carbohydrate (g)	152 (±46.8)	160–260
Fat (% of total calories)	40.9% (±8.6)	35%
Saturated Fat (% of total calories)	13.6% (±4)	<11%
Sugar (% of total calories)	14.7% (±10.6)	<11%
Mean portions of fruit and veg	2.8 (±1.5)	>5
Iron (mg)	8.6 (±2.7)	14.8
Magnesium (mg)	204 (±64)	271
Calcium (mg)	670 mg (±295)	700

Significantly different intakes of iron (p = 0.026) were found between ethnic groups (mean intake of Asian women 9.8 mg, Black women 6.9 mg and Caucasian women 8.3 mg) and significantly different intakes of iron (p = 0.020), calcium (p = 0.012) and magnesium (p = 0.046) were found between deprivation quintiles, with women in most deprived quintiles consuming the lowest amounts.

Discussion: Demographic data for this cohort corroborated with the evidence-base; age and BMI measurements were both higher than the UK national average, as expected. Similarly,

this study found that higher percentages of women were black or Asian than the UK population, or the Leeds population, indicating that these groups are indeed at greater risk, in agreement with the evidence base. Within the sample, 47.46% of women lived in the most deprived quintile in Leeds, indicating that social deprivation is a major factor to be considered in gestational diabetes, which has also been indicated by previous research. Women in deprived quintiles also had reduced intakes of magnesium, which current literature indicates is associated with diabetes. Much of the current research in the management of gestational diabetes has focused on testing specific interventions, such as manipulation of macronutrients, introduction of low GI foods, or specific micronutrients. The results of this study indicate that macronutrients, low GI and specific micronutrients are compromised in this patient group; potentially due to social deprivation.

Conclusion: Women with gestational diabetes require support to improve the overall quality of their diets to ensure adequate intake of complex carbohydrates, and sufficient micronutrients, while being sensitive to affordability, availability and cultural acceptability of foods. The results of this study suggest that changing one aspect of maternal diet is not sufficient, but a combination of dietary factors require improvement to manage gestational diabetes.

References

1. Diabetes UK. 2015. Children six times more likely to develop Type 2 diabetes if mother has gestational diabetes. [Online]. Available at: <https://www.diabetes.org.uk> Accessed on 20/11/2016.
2. Centre for Maternal and Child Enquiries. Maternal obesity in the UK: Findings from a national project. London: CMACE, 2010.
3. COMA. Department of Health. 1991. Dietary reference values for food energy and nutrients for the United Kingdom. 3rd ed. London: HMSO.

Dietary behaviours of shift-working nursing staff: a mixed methods pilot study

G Kent¹ & P Smith²

¹Nutrition and Dietetics Department, Wycombe Hospital, High Wycombe, UK and ²Nutrition and Dietetics Department, School of Health & Life Sciences, Glasgow Caledonian University, Glasgow, UK

Background: Shift work is essential for delivering patient care in hospitals. Shift workers are more likely to gain weight and may be at increased risk of obesity, type 2 diabetes and cardiovascular disease. Unhealthy dietary and lifestyle behaviours may be important contributing factors in the increased risk⁽¹⁾. Hospital nursing staff represent a significant proportion of the shift-working workforce⁽²⁾. There are a limited number of studies which investigate the dietary behaviours of shift workers⁽³⁾. Furthermore, there is a significant lack of dietary

guidance for shift workers⁽⁴⁾. The aim of this study was to assess dietary behaviours of shift-working, ward-based nursing staff; perceptions of barriers to healthy dietary behaviours and recommendations to overcome these.

Methods: A sequential explanatory mixed methods design was used. Nursing staff from 8 wards across 3 hospital sites in Buckinghamshire NHS Trust were recruited using purposive, quota and snowball sampling to take part in a questionnaire and a focus group. A 23-item questionnaire informed by findings from the literature was conducted. Questions investigated weight change, meal pattern and dietary quality, dietary guidance and facilities available. Data was analysed using descriptive statistics. The results of the questionnaire directed a focus group which used 7 semi-structured questions to assess barriers to healthy dietary behaviours and recommendations to overcome these. The focus group was audio-recorded and transcribed, and thematic analysis was conducted on the transcription. Barriers and recommendations were identified using inductive coding. Ethical approval was granted by Glasgow Caledonian University and the Trust.

		Questionnaire n = 40	Focus Group n = 7
Age	Median age in years (IQR)	41 (24)	33 (20)
BMI	Median BMI, kg/m ² (IQR)	26.3 (7.8)	28.1 (6.2)
Gender	% Male (n)	15 (6)	14 (1)
	% Female (n)	82.5 (33)	86 (6)
Job role	% (n) Registered nurses	57.5 (23)	57 (4)
	% (n) Healthcare assistants	35 (14)	29 (2)
	% (n) Advanced care practitioner	2.5 (1)	14 (1)
	% (n) Student nurses	5 (2)	0

Results and Findings: Results showed 50% ($n = 20$) of questionnaire respondents were overweight or obese. Almost 58% ($n = 23$) reported weight gain since starting shift work. Almost 63% ($n = 25$) reported not eating regular meals while working shift and 80% ($n = 32$) reported missing meals during shift work. There was an increase in other undesirable dietary behaviours compared to when not shift working. The potential barriers to healthy dietary behaviours which emerged from the focus group were grouped into four main themes: knowledge of healthy dietary behaviours in shift work, the shift-working environment, lack of time, and lifestyle choice. Participants proposed recommendations for each of these themes.

Discussion: This study showed that shift-working nursing staff within the Trust may have poorer dietary behaviours during shift work. The reasons for this are multifactorial, and include a lack of knowledge of implementation of healthy dietary behaviours into shift work; an obesogenic working environment; lack of time to prepare and eat meals, and unhealthy

lifestyle choices. Dietitians can help to promote the health of their nursing colleagues.

Conclusion: Nursing staff have an insight into the barriers to healthy dietary behaviours in shift work and can help to inform recommendations to overcome barriers to healthy dietary behaviours in shift-working nursing staff. There are opportunities to improve knowledge of healthy dietary behaviours among nursing staff and to modify the work environment to promote health.

References

1. Kecklund, G & Axelsson, J. Health consequences of shift work and insufficient sleep. *BMJ*. 2016;355:i5210
2. Royal College of Nursing. *A Shift in the Right Direction; RCN guidance on the occupational health and safety of shift work in the nursing workforce*. Available from: https://www2.rcn.org.uk/_data/assets/pdf_file/0004/479434/004285.pdf [Accessed 1 March 2017]
3. Bonnell, E.K., Huggins, C.E., Huggins, C.T., et al. Influences on Dietary Choices during Day versus Night Shift in Shift Workers: A Mixed Methods Study. *Nutrients*. 2017;9:193
4. Lowden, A., Moreno, C., Holmback, U. et al. Eating and shift work – effects on habits, metabolism and performance. *Scandinavian Journal Work, Environment & Health*. 2010;36(2):150–162.

Weight, girth and BMI pre-and post-paracentesis: an observational study

E Lamarti¹ & M Hickson²

¹Therapy Department, Royal Cornwall Hospital, Truro, UK and ²Plymouth University, Peninsula Allied Health Centre, Plymouth, UK

Background: There is a high prevalence of malnutrition among people with decompensated liver disease¹. Reasons for this include malabsorption, poor dietary intake and increased nutritional requirements². Standard nutritional screening tools use weight and Body Mass Index (BMI) to identify risk, which can be problematic for those with ascites (accumulation of abdominal fluid), often secondary to liver cirrhosis. Dietetic guidance³ suggests reducing ascitic weight by 2.2–14 kg but there is a lack of evidence to substantiate this.

Aim: To improve the accuracy of dry weight estimation for people with ascites, secondary to liver disease.

Objectives: Provide evidence that ascitic weight can be greater than guidance suggests and investigate if girth circumference can be used to estimate ascitic weight.

Methods and analysis: A cross-sectional, observational study was conducted over a 13-week period at an English NHS hospital Trust. Consenting participants attending for paracentesis (procedure which removes ascitic fluid via abdominal drain) were weighed, their girths measured and BMI calculated pre- and post-paracentesis. Fluid removed via paracentesis was

recorded, along with further exploratory data. Ethical approval was received (IRAS project ID: 218747).

Results: 47 participant visits were included. 24 of these were unique, individual participants of whom 18 were drained. For unique participants, range of ascitic fluid drained was 3.8–19 l, mean = 8.7, standard deviation (SD)=3.7. Weight difference range pre-and post-paracentesis = 4.5–20 kg, mean = 8.7 (SD:3.9). 11% (n = 2) of participants' ascitic weight difference was over 14 kg. BMI difference was clinically significant in 56% (n = 10) of cases. A strong and statistically significant relationship ($\rho=0.7$, $p<0.01$) between ascitic weight and pre-paracentesis girth was found. An equation was formulated to enable the estimation of ascitic fluid from pre-paracentesis girth.

Discussion: Current dietetic guidance should be re-evaluated to reflect the greater weight differences identified. Clinically significant differences between BMI pre-and post-paracentesis highlight the importance of accurate dry weight estimation for people with ascites. Measuring girth pre-paracentesis may help to inform dry weight estimation.

Conclusion: Further research is required to verify the accuracy of estimating ascitic weight from pre-paracentesis girth.

References

- Cheung K, Lee SS, Raman M. Prevalence and mechanisms of malnutrition in patients with advanced liver disease, and nutrition management strategies. *Clinical Gastroenterology and Hepatology*. 2012;10(2):117–25.
- Rossi RE, Conte D, Massironi S. Diagnosis and treatment of nutritional deficiencies in alcoholic liver disease: Overview of available evidence and open issues. *Digestive Liver Disease*. 2015;47(10):819–25.
- British Dietetic Association, Wicks C, Madden A. A practical guide to nutrition in liver disease. London: Liver Interest Group of the British Dietetic Association; 1994.

A retrospective study to measure anthropometric, co-morbidity and micro-nutrient changes two years after Roux-en-Y gastric bypass

H Lea,¹ C Jones,¹ B Engel¹ & E Murphy²

¹Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, UK and ²Nutrition and Dietetics Department, St Richard's Hospital, Chichester, UK

Background: Obesity and related co-morbidities are significant problems in the United Kingdom¹. Multiple weight loss strategies exist, including bariatric surgery. The focus of this study is the Roux-en-Y gastric bypass (RYGB), a restrictive and malabsorptive procedure. It is associated with anthropometric improvements and reduced co-morbidities, including type two diabetes (T2DM), but can detrimentally affect micro-nutrient status². The aim of this study was to assess anthropometric, co-morbidity (including T2DM), and micro-nutrient status outcomes 24 months following RYGB.

Methods: Data were retrospectively collected for all patients, with available medical records, who had a RYGB primary procedure between February and December 2014. Data were collected from hospital records and the National Bariatric Surgery Registry (NBSR) 'Baseline' and Follow-up' forms. Anthropometric and co-morbidity data (including for hypertension, dyslipidaemia and sleep apnoea) were collected at baseline, 6 weeks, 3, 6, 12, 18 and 24 months; biochemistry data at 12 and 24 months for haemoglobin, ferritin, vitamin B12, vitamin D (25(OH)D), folate and calcium and at 24 months for copper, zinc and parathyroid hormone. Age and gender group anthropometric outcomes were compared using the independent samples T-test. The prevalence of co-morbidities was compared at baseline, 12 and 24 months using the McNemar test; differences in characteristics of those who improved their T2DM status or for whom T2DM resolved was assessed using the Fishers exact test; levels of biochemical markers were compared at 12 and 24 months using the matched pairs T-test or Wilcoxon matched pairs test, as appropriate, and the prevalence of biochemical abnormalities was compared at 12 and 24 months using the McNemar test. No ethical approval was required.

Results: Mean maximum percentage excess body weight loss (PEBWL) over 24 months and mean 24 month PEBWL were $84.3 \pm 21.0\%$ and $80.9 \pm 22.7\%$ respectively. Weight re-gain occurred for 33.3% patients, between 18 and 24 months. Prevalence of all co-morbidities reduced post-surgery ($p < 0.005$). Only one of fourteen patients saw no improvement in T2DM status. There were no statistically significant affects of gender, age, BMI or body mass index (BMI) category, time from diagnosis or treatment, maximum PEBWL or 6 week PEBWL on occurrence of T2DM remission. There were significant reductions in mean haemoglobin (-2.40 g/L, $p = 0.03$), 25(OH)D (-11.8 nmol/L, $p = 0.016$) and median calcium levels (-0.08 mmol/L, $p = 0.024$) from 12 to 24 months. Post-surgery, abnormalities were observed for all biochemical markers except copper. Abnormality prevalence increased from 12 to 24 months, with deranged levels at 12 months significantly associated with abnormalities at 24 months for haemoglobin ($P = 0.011$), ferritin ($p = 0.002$), and vitamin D ($p = 0.007$).

Discussion: Anthropometric changes³ and co-morbidity^{3,4} resolution reported here concur with findings from other studies. However, PEBWL at 12 and 24 months was approximately 10% greater in this study than reported nationally by the NBSR⁴. Previous work⁵ has found an effect of a number of the characteristics assessed here on occurrence of T2DM remission. Micronutrient abnormalities are frequently reported in research² but the degree of deficiency and the prevalence greatly varies. These abnormalities can have significant effects on health and quality of life making, the increase in prevalence and low levels of resolution from 12 to 24 months concerning.

Conclusion: Weight loss at two years exceeded the national average and co-morbidity resolution was significant, which may explain the inability of the current study to identify

facilitators of T2DM resolution. However, these findings suggest the causes and persistence of micro-nutrient and biochemical abnormalities require further investigation, including assessment of compliance with supplementation and dietary intake. Changes to supplementation practice may be required.

References

1. Moody A. Health Survey for England 2015: Adult overweight and obesity. Health and Social Care Information Centre 2016. Available at: <http://www.content.digital.nhs.uk/catalogue/PUB22610/HSE2015-Adult-obe.pdf>. Accessed 12 March 2017.
2. Worm D, Madsbad S, Kristiansen VB, Naver L, Hansen DL. Changes in Hematology and Calcium Metabolism After Gastric Bypass Surgery: a 2-Year Follow-Up Study. *Obes Surg* 2015;25(9):1647–1652.
3. Costa RC, Yamaguchi N, Santo MA, Riccioppo D, Pinto-Junior PE. Outcomes on quality of life, weight loss, and comorbidities after Roux-en-Y gastric bypass. *Arq Gastroenterol* 2014; 51(3):165170.
4. Welbourn R, Small P, Finlay I, Sareela A, Somers S, Maharwar K. The United Kingdom National Bariatric Surgery Registry. The NBSR second registry report. Oxfordshire, UK: Dendrite Clinical Systems; 2014.
5. Ramos-Levi AM, Matia P, Cabrerizo L, Barabash A, Sanchez-Pernaute A, Calle-Pascual AL, et al. Statistical models to predict type 2 diabetes remission after bariatric surgery. *J Diabetes* 2014;6(5):472.

The prevalence of impaired glucose tolerance and diabetes in women with PCOS of lean body weight: a systematic review

MA McGurran & C Wolfendale

Department of Clinical Sciences and Nutrition, University of Chester, Chester, UK

Background: Polycystic ovary syndrome (PCOS) is a common endocrine condition in women of reproductive age. It is associated with impaired glucose tolerance (IGT) and type two diabetes mellitus (T2DM) which are risk factors for cardiovascular disease. It is established that IGT and T2DM prevalence levels in overweight/obese women with PCOS are significantly higher than in healthy controls⁽¹⁾. The research for IGT and T2DM prevalence in women with PCOS of lean BMI is conflicting but may be relevant to the estimated 36–42% of UK women with PCOS who have a healthy BMI^(2,4) and may not be screened for IGT and T2DM. The aim of the review is to assess for the first time the prevalence of IGT and T2DM in women with PCOS of lean body weight.

Methods: A literature search for studies reporting on prevalence of IGT and T2DM in lean women with PCOS identified 503 studies conducted between 01/04/2009 and 17/03/2017. Thirty-seven full-text articles were assessed for eligibility. Criteria included post-menarche and pre-menopausal women with

PCOS of lean BMI as defined by WHO⁽³⁾ who underwent an oral glucose tolerance test. Diagnosis was by clinically recognised criteria including Rotterdam and NIH. Five studies were selected for review and quality assessed using Downs and Black and Newcastle-Ottawa.

Results: IGT was consistently found in women with PCOS of lean body weight while T2DM prevalence was less consistent. The two studies conducted in South Asia had higher rates of IGT and T2DM prevalence in lean women with PCOS compared with studies from the US, Austria and Japan. Except for one study, IGT prevalence was higher in overweight and/or obese women with PCOS than those of lean body weight. The Austrian study tested for statistical significance ($p = 0.0426$) in IGT prevalence between lean and overweight women. Other relevant findings showed that OGTT may improve detection of IGT compared with HbA1C and fasting glucose.

Table 1 IGT and T2DM prevalence in women with PCOS of lean and non-lean body weight

Country of study	Lean: IGT prevalence %	Overweight: IGT prevalence %	Lean: T2DM prevalence %	Overweight: T2DM prevalence %
Sri Lanka (n = 168)	31.6	20.8	2.6	12.3
North India (1,746)	25.5	32.1	4.9	7.5
Austria (n = 603)	9	15.5	0	2.7
US (n = 78)	3	21	0	Not recorded
Japan (n = 98)	1.4	4.1	Not recorded	Not recorded

Discussion: In contrast to earlier research⁽¹⁾, IGT was consistently found in women with PCOS of lean BMI, possibly due to the global rise in T2DM. The difference in IGT and T2DM prevalence between South Asian and non-South Asian populations may be explained by the confounding factor of race, which is supported by some but not all studies with lean subgroups. Studies with overweight/obese subgroups show a similar variance between these ethnic groups. Two findings are consistent with previous research; T2DM prevalence was lower than IGT prevalence in all subgroups and overweight/obese women had higher prevalence of both conditions, with one exception. Women with PCOS of lean BMI may not be offered adequate screening nor referred to a dietitian for tailored advice^(2,4) which itself is limited.

Conclusions: IGT is consistently prevalent in women with PCOS of lean BMI with levels markedly different between South Asian and non-South Asian populations. T2DM is less consistently prevalent and at lower levels. Further research is required to better inform screening practices for improved detection of IGT and T2DM in women with PCOS of lean BMI and dietary advice given.

References

1. Moran LJ, Misso ML, Wild RA et al. Impaired glucose tolerance, type 2 diabetes and metabolic syndrome in polycystic ovary syndrome: a systematic review and meta-analysis. *Hum Reprod Update*. 2010;16:347–363.
2. Jeanes YM, Barr S, Smith K et al. Dietary management of women with polycystic ovary syndrome in the United Kingdom: the role of dietitians. *J Hum Nutr Diet*. 2009;22:551–558.
3. Barba C, Cavalli-Sforza T, Cutter J et al. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. WHO Expert Consultation. *Lancet*. 2004;363:157–163.
4. Humphreys L & Costarelli V. Implementation of dietary and general lifestyle advice among women with polycystic ovarian syndrome. *J R Soc Promot Health*. 2008;128:190–195.

Audit of protein provision in critically ill adults requiring enteral feeding

A Mitchell,^{1,2} A Collinson¹ & S Taylor²

¹School of Health Professions, Plymouth University, Peninsula Allied Health Centre, Plymouth, UK and

²Department of Nutrition & Dietetics, Southmead Hospital, Westbury-on-Trym, Bristol, UK

Background: Evidence-based guidelines recommend 1.2–2.5 g/kg body weight/day of protein in critically ill adults⁽¹⁾. An audit of intensive care unit (ICU) enteral nutrition (EN) prescriptions in 2015 found that, when avoiding overfeeding energy and without protein supplements, prescriptions usually failed to meet local protein guidelines⁽²⁾. In response, a protein supplement and a very high protein feed (non-protein energy to nitrogen ratio 51:1) were introduced. Also, protein prescribing changed to account for displacement of enteral feed by non-nutritional energy (NNE) sources. Aims of a follow-up audit were: 1) to find out if guidelines for protein provision are being met in critically ill adults requiring enteral feeding at a tertiary hospital in the South West of England; 2) to provide a comparison with the 2015 audit of protein prescriptions.

Methods: A prospective audit comparing protein prescription and actual delivery of protein to guidelines was conducted. Consecutive patients requiring full EN ≥ 3 days following ICU admission between 22/4/17 and 12/7/17 were audited. Protein target (1.25 g/kg/day, 1.5 g/kg/day, or 2.0 g/kg/day, based on local guidelines), prescription, and delivery were recorded for one day between days 1–3, 5–7, 8–10, and 18–20 of ICU admission. Percent of protein target met by prescription and delivery were compared using Wilcoxon's Signed Rank Test. The proportion of protein prescriptions meeting targets were compared to the 2015 audit using Fisher's Exact Test.

Results: Mean age was 58 ± 17 years, median BMI was 25.4 kg/m² (interquartile range, 22.5–28.7), and 51% (n = 54) of the 106 patients included were male. Protein targets based

on local guidelines were met by 69% (n = 73) of protein prescriptions on day 1–3, but by delivery only for 22% (n = 23) of patients. Median percent of protein target met by prescription on day 1–3 was 103% versus 79% by delivery (p < 0.0005, r = 0.53). The percent of protein prescriptions meeting protein targets was similar for days 1–3, 5–7, and 8–10 (69%, 71%, and 68%, respectively) but increased by day 18–20 (78%). The percent of patients for which delivery met protein targets increased with number of days post ICU admission (22%, 26%, 37%, and 56% for day 1–3, 5–7, 8–10, and 18–20, respectively). On day 1–3, the proportion of protein prescriptions meeting protein targets based on local guidelines increased from 19% (n = 27) in 2015, to 69% (n = 73) in 2017 (p < 0.0005, phi=0.50).

Discussion: The samples audited in 2015 and 2017 were comparable in size (n = 139 v 106) and characteristics. Although EN delivery met protein targets for only 22% of patients on day 1–3, median percent of target met by delivery was 79%, higher than previously published figures for protein adequacy (percent of prescription met by delivery) in critically ill adults. The 2013 International Nutrition Survey reports 57.6% protein adequacy for all countries, and 69.8% for Europe and South Africa⁽³⁾.

Conclusion: The proportion of protein prescriptions meeting guidelines for protein provision was significantly higher when an enteral feed with a non-protein energy to nitrogen ratio of 51:1 and protein supplements were available, and protein prescriptions accounted for NNE sources displacing enteral feed. This audit provides a benchmark for ICUs regarding protein provision in enterally fed critically ill adults.

References

1. McClave SA, Taylor BE, Martindale RG et al. Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). *JPEN*. 2016;40(2):159–211.
2. Taylor S, Dumont N, Clemente R et al. Critical care: Meeting protein requirements without overfeeding energy. *Clin Nutr ESPEN*. 2016;11:e55–e62.
3. Heyland DK, Dhaliwal R, Wang M et al. The prevalence of iatrogenic underfeeding in the nutritionally 'at-risk' critically ill patient: Results of an international, multicenter, prospective study. *Clin Nutr*. 2015;34(4):659–66.

A qualitative study investigating women's acceptability of integrating a guidance for postpartum weight management into the Personal Child Health Record

S Serber, K Whitehead & A Avery

School of Biosciences, Division of Nutritional Sciences, Loughborough, UK

Background: Pregnancy increases vulnerability to weight gain and the postpartum period presents a 'window of opportunity'

for weight management but there is currently a lack of effective postnatal interventions⁽¹⁾. This qualitative study investigated views of women about: 1. how a weight management section incorporated into the Parent Child Health Record (PCHR) could be received and 2. this being an acceptable tool for 'Making Every Contact Count'.

Methods: Healthy postpartum women aged ≥ 18 , of children ≤ 2 years old, and able to communicate in English were recruited through a Children's Centre to take part in focus groups. Participants received an information sheet and provided written consent. Focus groups were audio recorded and transcribed verbatim. Open-ended questions used in the focus group related to acceptability, content, language, barriers, drivers and motivators of change. Transcripts were compared with raw data for further accuracy and thematic analysis. Data was anonymised and identifiers generated for participants. The researcher approached the study with a relativist ontological position, epistemological in nature embracing subjectivity and applying the conceptual framework of inductive reasoning. Ethical approval was obtained through University of Nottingham Medical School Ethics Committee.

Results: Saturation was reached after 3 focus groups. In total 19 women participated (17 of which with babies 4–12 months old). After a process of refining and renaming, 2 core themes were evident with 2 subthemes under each. Theme 1: Valuing section in the PCHR with subthemes 'characteristics of content and language' and 'tailored to mothers'. Women were generally in favour of seeing guidance on weight management in the PCHR and they perceived the section as a potential reminder for self-care '*it's weird how you neglect yourself but if there was a focus on the mother in the book, that'd remind you almost to think actually don't get yourself lost here*' (Ca, F01). They requested a health and wellbeing focus using supportive and empathic language, but there were concerns of it being introduced too early. Personal circumstances, emotional state and readiness were raised as concerns '*I think it's good to talk about it earlier...when you're ready, you know, if you want to do something over and above what you do anyway, it'd be really good*' (S, F03). Theme 2: linking section to further support with subthemes 'healthcare professionals' and 'children centres' Women valued support that help them cope with everyday life and that have positive impact on babies. Sign-posting to practical information on nutrition (e.g. meal-planning for the family, diet whilst breastfeeding) and physical activity with links to NHS information were mentioned as desirable. The need for more net-working opportunities for mothers at children centres was raised '*We all come to places like this ... but there's no focus on women when you come here. It's all about the babies ... but this would be a good environment in which women... like one of the sessions a week could be about wellbeing and health...we could sit around talking to each other about I'm doing this or whatever or... it would be more helpful*' (S, F01).

Discussion: The postpartum period offers an opportunity for weight management and return to a healthy BMI before any subsequent pregnancies. Consistent with other studies, it was

reported a desire for weight management support⁽²⁾ and a lack of help with weight management since the focus is entirely on the baby⁽²⁾; in addition, women attributed personal circumstances to readiness whilst praising having the option to participate or not in weight management services⁽³⁾. Some findings from this study i.e. optimum readiness 5 to 12 months after birth, were not found in the literature, thus characterising this study as unique.

Conclusion: This study confirms that postpartum is a neglected period where support on health and wellbeing is strongly desired. Women perceive the PCHR as an opportunistic tool to raise the importance of weight management and to provide some sensitive guidance and sign-posting to mothers of other resources which may be easily accessible. As such the PCHR provides an excellent example of a brief intervention and fits the ethos of Making Every Contact Count.

References

- Heslehurst N, Rankin J, Wilkinson JR, et al. A nationally representative study of maternal obesity in England, UK: trends in incidence demographic inequalities in 619323 births. *Int J Obes.* 2010; 34:420–428.
- Nikolopoulos H, Mayan M, MacIsaac J, et al. Women's perceptions of discussions about gestational *weight* gain with healthcare providers during pregnancy and postpartum. *BMC Pregnancy Childbirth.* 2017; 17:97.
- Ohlendorf J, Weiss M, Oswald D. Predictors of engagement in postpartum weight self-management behaviours in the first 12 weeks after birth. *J Adv Nurs.* 2015 71: 1833–1846.

Christian beliefs and views on type 2 diabetes prevention and management among UK Black African-Caribbean adults

E Simpson & M Maynard

School of Clinical and Applied Sciences, Leeds Beckett University, Leeds, UK

Background: In the UK, Black African-Caribbean adults are three times more likely to develop type 2 diabetes mellitus (T2DM) compared to the majority population⁽¹⁾. Sixty-nine percent of Black African-Caribbean adults identified as Christian in the 2011 Census⁽²⁾. Various perspectives are required to address inequity in diabetes prevalence, including people's own views on the relationship between their faith and health⁽³⁾; however, there is a lack of UK studies. The aim of this qualitative study was therefore to explore views on Christian faith beliefs in relation to the prevention and management of T2DM among Black African-Caribbean adults living in Birmingham, UK.

Methods: A purposive, convenience sample of Black African-Caribbean adults of Christian faith was recruited. Snowball sampling via a gatekeeper with Caribbean community links aided the recruitment process. Seven participants (six women and one man) took part in two focus groups (n = 3, all female; and n = 4). Focus groups were facilitated by one

researcher (ES) and conducted in January and February 2017. A semi-structured topic guide of open-ended questions and prompts on lifestyle, nutrition and T2DM knowledge were used to facilitate dialogue, developed with input from a church leader and specialist diabetes nurse. Focus groups took place in the gatekeeper's home and were digitally recorded, with permission. Recordings were transcribed verbatim, transcripts manually coded and thematic analysis conducted. Participants also completed a short questionnaire confirming ethnic and faith identity and reporting diabetes status. Ethical approval was granted by the School of Clinical and Applied Sciences, Leeds Beckett University.

Results: Participants were aged 30–75 years and four reported being diagnosed with T2DM or pre-diabetes. Emergent themes suggested that participants felt the prevention and management of T2DM should be addressed with the use of both medical interventions and faith because “God gave man knowledge to create medicine to alleviate our suffering” [Focus Group 1], and that according to the bible there was personal responsibility to take ownership of health. There was reported interest in the use of herbal remedies for a range of conditions, but not in relation to diabetes. Participants related that they could “pray to God for the knowledge, the wisdom and the understanding” [Focus Group 2] with which to make diabetes-related lifestyle changes. However, participants described high intake of Western convenience foods and takeaways, and little inclusion of traditional Caribbean foods in their diets due to their cost and low availability of good quality produce. Compared with the Caribbean setting, it was felt that lifestyles in the UK were less physically active and that these changes were contributing factors in the prevalence of T2DM among their ethnic group.

Discussion: The findings are consistent with research among African Americans, which showed faith belief could coincide with acceptability of diabetes-related advice⁽³⁾. The interaction of beliefs with other cultural and social factors, such as dietary acculturation, could have important implications for tackling T2DM among Black-African Caribbeans. Depth of data was achieved, however the small sample size, and therefore potentially narrow range of voices, may impact on the theoretical generalisability of the findings.

Conclusion: Faith can support conventional approaches to addressing T2DM among UK Black-African Caribbeans with Christian beliefs, in the context of other social and cultural factors.

References

1. Public Health England (2014). Adult obesity and type 2 diabetes. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/338934/Adult_obesity_and_type_2_diabetes_.pdf (accessed 14/7/17).
2. Office for National Statistics (2012). Religion in England and Wales 2011. <https://www.ons.gov.uk/peoplepopulationandcommunity/culturalidentity/religion/articles/religioninenglandandwales2011/2012-12-11> (accessed 14/7/17).

3. Polzer R & Miles MS. Spirituality and self-management of diabetes in African Americans. *Journal of Holistic Nursing*. 2005;23:230–250.

A comparison of the cost of a gluten-free diet with a standard diet in the UK

C Sutton-Smith & N Walker

School of Health, Coventry University, Coventry, UK

Background: The gluten-free (GF) diet is used to treat Coeliac disease and non-Coeliac gluten sensitivity. Cost has been identified as a major barrier to compliance with a GF diet⁽¹⁾; non-compliance can lead to significant clinical consequences particularly for those with Coeliac disease⁽²⁾. Although previous studies have assessed cost of individual GF products, the cost of the complete GF diet is unknown, thus the aim of this study was to investigate cost of a whole day's GF diet in comparison to a standard diet.

Method: A quantitative, quasi-experimental, cross-sectional survey design was conducted. A typical day's diet for a UK adult was constructed using information from the National Diet and Nutrition Survey⁽³⁾ and Family Food Report⁽⁴⁾ to ensure the diet was constructed of typical foods consumed, was nutritionally representative of the typical UK diet and in line with typical UK food expenditure. All food and drink products were itemised, a GF equivalent diet was then produced. Costs of food items for the standard and GF day's diets were identified using the five most popular online supermarkets. Cost analysis was carried out for the standard and GF diets using Mann Whitney and Kruskal-Wallis statistical tests; descriptive statistics were also used in the analysis. Ethical approval was obtained from Coventry University.

Results: The GF diet was 50% more expensive than the standard diet (GF diet cost £4.94, standard diet £3.30; p 0.028); when alcohol was included, the GF diet cost 70% more (GF diet £6.38, standard diet £3.75; p 0.009). The mean cost of GF staple products was significantly more than the standard gluten-containing staples with a mean cost difference of 220% (range 125–413%, p < 0.001) whilst GF snacks were also significantly more expensive than gluten-containing snacks (mean difference 138%, range 86–225%, p 0.004). There was no significant cost variance between different meals or supermarkets.

Table of mean costs of the standard and gluten free diet

Mean cost/day (SD)	Total food & drink - no alcohol	Total food & drink - with alcohol	Staple foods	Snack foods
Standard diet	£3.30 (0.78)	£3.75 (0.93)	£0.10 (0.08)	£0.18 (0.13)
GF diet	£4.94 (1.07)	£6.38 (1.55)	£0.32 (0.20)	£0.43 (0.26)
p value	0.028	0.009	0.001	0.004

Discussion: This research has demonstrated the cost of a GF diet to be significantly more expensive than a standard diet; this could reduce dietary compliance leading to health complications and reduced quality of life for those requiring a GF diet, whilst increasing the healthcare costs associated with non-compliance. The findings are in line with previous research identifying cost as a barrier to compliance with a GF diet⁽¹⁾ and reinforce the importance of the availability of gluten-free foods on prescription to aid compliance with the GF diet in Coeliac disease, particularly in those on low incomes. Future research should investigate more than a single day's diet inclusive of vegetarian meals, meals eaten out and a range of GF alcohol; as only one type of alcoholic beverage was included the internal validity of this finding is poor.

Conclusion: The significantly increased cost of the GF diet compared to a standard diet indicates dietitians should encourage patients requiring a GF diet to use naturally GF staples and to fully utilise prescribed GF staples for those with Coeliac disease in order to reduce the economic burden of the diet and support compliance; this is especially important for those on a low income.

References

1. Dowd A, Jung M, Chen M et al. Prediction of adherence to a gluten-free diet using protection motivation theory among adults with coeliac disease *J Hum Nutr Diet.* 2015;29:391–8.
2. NICE (2015) 'Coeliac disease: recognition, assessment and management' <https://www.nice.org.uk/> (accessed October 2015)
3. PHE and FSA (2014) National Diet and Nutrition Survey: results from Years 1 to 4 (combined) of the rolling programme for 2008 and 2009 to 2011 and 2012. London: Public Health England.
4. DEFRA (2015) Family Food 2014. <https://www.gov.uk/government/statistics/family-food-2014> (accessed February 2016)

Iodine requirements and how to meet them through diet by creating a cookbook of iodine-rich recipes

JK Tattersall, MP Rayman & SC Bath

Department of Nutritional Science, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, UK

Background: Iodine is essential for thyroid hormone synthesis, and is required for growth and neurological development⁽¹⁾; deficiency during pregnancy can lead to impaired brain development and poorer cognitive function in children⁽¹⁾. According to the 2016 Global Iodine Scorecard, the median urinary iodine concentration (UIC) of pregnant women in the UK between 2002 and 2011 was 99 µg/l, with a UIC of <150 µg/l indicating insufficient iodine intake in this cohort⁽²⁾. The general public knows relatively little about the importance of iodine, especially during pregnancy⁽³⁾. The aim of this project

was to develop twelve recipes that could be used as a means of improving iodine intake, particularly in pregnant women. Furthermore, it aimed to create the basis for an iodine-rich cookbook which could be used as a resource for countries participating in the Horizon 2020 project "EUthyroid", which aims to improve iodine intake across Europe.

Method: Data from the UK food table were utilised to compile a table of iodine concentration in foods, from which iodine-rich foods were identified that could be used as main ingredients. These were defined as foods that had an iodine concentration greater than 20 µg/100 g. Key food contributors of iodine to the UK diet were obtained from the National Diet and Nutrition Survey, identifying foods that contributed greater than 5% to total iodine intake. This resulted in a list of key ingredients for recipes: (i) milk, (ii) milk products, (iii) fish, and (iv) eggs. Existing recipes were adapted and new recipes created forming twelve easy-to-make dishes, including main meals and a dessert, which could appeal to all ages and cater for a variety of dietary requirements. Recipes that were suitable for pregnant women and for those following a gluten-free or vegetarian diet were included. Each recipe was analysed using Nutritics, online nutrient analysis software, to provide a nutritional breakdown for iodine, as well as other nutrients that are required for thyroid hormone production (selenium and iron). The estimated values of iodine, iron and selenium per portion were compared to their respective daily recommendations from the European Food Safety Authority (EFSA) for adults and pregnant women.

Results: Each dish was cooked and re-formulated following taste-testing and nutritional analysis to improve both palatability and specific nutrient content where possible. The recipe analysis showed that a portion provided 18–125% of a non-pregnant adult iodine requirements (150 µg) and between 14 and 94% of the iodine requirement in pregnancy (200 µg). Furthermore, the recipes provided 8–161% of the selenium requirements (70 µg) for pregnant and non-pregnant adults, and 2–24% of the female iron requirements (16 mg).

Discussion: The main sources of iodine were not suitable for vegans and therefore iodine-fortified milk-alternative drinks were used in recipes where possible to optimise iodine intake in individuals excluding key sources. Further developments of the cookbook would include making country-specific adaptations to reflect the differing food supply in EUthyroid member countries, e.g. bread is an important iodine source in the Netherlands. The recipe design is limited by the utilisation of food-table values⁽⁴⁾ for nutritional content which may not be accurate for iodine.

Conclusion: Twelve recipes that met criteria for taste, specific dietary needs and nutritional content were developed; expansion of the recipe series could be compiled to create a cookbook and form a resource for countries participating in EUthyroid.

References

1. Zimmermann MB Iodine deficiency. *Endocrine Reviews* 2009; 30: 376–408.

- Iodine Global Network. Global Scorecard of Iodine Nutrition 2016. http://www.ign.org/cm_data/Scorecard_2016_SAC_PW.pdf. [Accessed: December 2016].
- Combet E, Bouga M, Pan B et al. Iodine and pregnancy - a UK cross-sectional survey of dietary intake, knowledge and awareness. *British Journal of Nutrition* 2015; 114: 108–117.
- Public Health England. McCance and Widdowson's The Composition of Foods Integrated Dataset 2015. London; 2015. Available from: <https://www.gov.uk/government/publications/composition-of-foods-integrated-dataset-cofid> [Accessed: October 20, 2016]

The EUthyroid project has received funding from the European Union's Horizon 2020 Research and Innovation programme, under grant agreement number 634453.

A qualitative study exploring the eating habits of adults with Multiple Sclerosis

RL Whitehall & J Jackson

School of Health & Life Sciences, Glasgow Caledonian University, Glasgow, UK

Background: The role of diet and nutrition is of increasing interest in Multiple Sclerosis (MS) research, however at present there is a lack of knowledge surrounding how adults with MS engage in dietary behaviours. Studies suggest that adults with MS may experience barriers to engagement in healthy eating habits due to symptoms such as fatigue, sensory disturbances and physical impairments⁽¹⁾. The aim of this study was to explore understanding of the dietary behaviours of adults with MS, and establish how they seek and receive nutritional information.

Methods: The study followed a qualitative thematic approach, which examined the experiences and attitudes of adults with MS regarding their dietary behaviours. Nine women, aged over fifty years and living with mobility impairments were recruited through convenience sampling at a MS charity. A semi-structured focus group was conducted at the charity's premises, which was audio-recorded and transcribed post-verbatim. The transcript was analysed using an Interpretative Phenomenological Approach and coded for emerging themes. Ethics approval was obtained from Glasgow Caledonian University Ethics committee.

Results: Five broad themes emerged from the data

'Attitudes and beliefs towards diet': Most of the participants highlighted diet as an important tool for managing MS-related symptoms such as fatigue, constipation and preventing tremors. 'If I don't eat regularly then I get the shakes...that affects my mobility and I've got to just sit down and eat.'

'Impact of MS on eating habits': Several participants reported altering their eating habits since diagnosis of MS such as reducing portion sizes, eliminating specific foods and commencing

dietary supplements in an attempt to halt disease progression, boost immune function and optimise health. Loss of dexterity was frequently described as influencing food choice, 'I can't open a packet of crisps or a paper bag...you just can't get a grip.'

'Social support': Family and friends were frequently described as vital for assisting with cooking and grocery shopping, as progressive disability impacted participants' ability to engage.

'Overcoming barriers': Several participants had adopted strategies to support them in maintaining nutritional autonomy such as batch cooking, Internet shopping and opting for convenience meals.

'Seeking nutritional advice': Many of the participants reported seeking nutritional advice through the media and through recommendations from other adults with MS or friends. Only one participant noted receiving advice from a health professional.

Discussion: In line with previous findings⁽¹⁾, fatigue and physical impairments associated with MS were frequently described as influencing eating habits. The findings suggest that adults with MS may be susceptible to acting upon nutritional advice that lacks credibility. Most of the participants were not receiving nutritional information from a health professional and dietary supplements were commonly used despite a lack of evidence, which supports previous research⁽²⁾.

Conclusion: The study suggests that MS-related symptoms influence dietary behaviours such as meal selection, frequency and food preparation, which may affect nutritional status. Promoting effective symptom management strategies and education on sourcing reliable nutritional information may assist individuals in coping with the disease and enhance quality of life.

References

- Plow M & Finlayson M. A qualitative study of nutritional behaviors in adults with multiple sclerosis, *The Journal of neuroscience nursing: Journal of the American Association of Neuroscience Nurses*. 2012; 44:337–350
- Masullo L, Papas MA, Cotugna N, Baker S et al. Complementary and alternative medicine use and nutrient intake among individuals with multiple sclerosis in the United States *Journal of community health*. 2015;40: 153–160.

Observational study of the dietary intake and sleep patterns of airline cabin crew

K Wood & A Collins

Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, UK

Background: Cabin crew are exposed to irregular working hours, changing shift patterns and trans-meridian travel. As a

consequence, the role is inherently associated with disruption of the sleep/wake cycle as governed by the suprachiasmatic nucleus. The desynchronising of circadian rhythms through changes in sleep patterns and timing of eating i.e. time spent in a fed or fasted state, can have adverse metabolic effects on health such as obesity, increased cardiovascular risk and type 2 diabetes^(1,2). Therefore it is possible that both food choice and timing could be modifiable factors that could minimise circadian misalignment in this population group. In this context, this study aimed to investigate and compare the sleep and dietary intake of airline cabin crew on flight days compared to non-flight days, with a special focus on sleep duration, types of food and eating window. I.e. the time between first and last food consumed each day.

Methods: Self-selected cabin crew with long-haul flight duties elected to participate ($n = 22$, mean age: 43.2 ± 11.0 years) Estimated food and sleep diaries were completed over a consecutive 4-day period (2 pre-flight days to establish an average baseline routine, 1 flight day and 1 day post-flight). Self-reported times of sleep and food consumption provided basis for analysis of both the sleep duration and eating window. Changes in food composition (energy and macronutrients), timing of eating and sleep duration were analysed across pre, peri-and post flight days using One-Way Repeated Measures ANOVA. This study received a favourable ethical opinion from the Faculty of Health and Medical Sciences Ethics Committee REF: 1242-FHMS-16.

Results: Sleep duration (hours:minutes) of cabin crew significantly decreased on flight days, compared to pre and post-flight days ($5:54 \pm 2:40$, $8:32 \pm 4:11$ and $6:00 \pm 3:30$ respectively $p = 0.017$). No significant increases in energy intake (kcal) were observed (1729 ± 528 , 1793 ± 759 and 1699 ± 813 respectively $p = 0.849$) however percentage carbohydrate intake increased (46 ± 10.3 , 42.9 ± 8 and 37 ± 13

respectively $p = 0.017$). The eating window of the flight day was extended when compared to pre- and post-flight days (mean increase ~ 4 hr 30 min, $p < 0.001$), which reduced the period of fasting.

Discussion: The results of this study support previous observations in suggesting that the “shift” work of cabin crew impacts sleep patterns (3). A reduction in sleep duration was not accompanied by changes in self-reported energy intake, however macronutrient intake was observed to be significantly different, this has been reflected in other studies (4).

Conclusion: This study found an extension of the time spent eating on flight days and highlights the likely importance of food intake and timing as a modifiable risk factor in minimising adverse metabolic outcomes in this population group.

References

1. Gangwisch JE, Heymsfield SB, Boden-Albala B, Buijs RM, Kreier F, Pickering TG, et al. Short sleep duration as a risk factor for hypertension: analyses of the first National Health and Nutrition Examination Survey. *Hypertension* (Dallas, Tex.: 1979) 2006;47(5):833.
2. Gangwisch JE, Malaspina D, Boden-Albala B, Heymsfield SB. Inadequate sleep as a risk factor for obesity: analyses of the NHANES I. *Sleep* 2005;28(10):1289.
3. Federal Aviation Administration. Flight attendant fatigue recommendation II; Flight Attendant Work/Rest Patterns, Alertness, and Performance Assessment. DOT/FAA/AM-10/22 2010.
4. Nedeltcheva AV, Kilkus JM, Imperial J, Kasza K, Schoeller DA, Penev PD. Sleep curtailment is accompanied by increased intake of calories from snacks. 2009;89(1):126–133.

Paediatric

A cross-sectional study assessing the use of restricted diets in children with Autism Spectrum Disorder

A Bidgood,¹ D Radia² & ZL Connor³

¹London Metropolitan University, London, UK; ²London Metropolitan University, London, UK and ³Department of Nutrition and Dietetics, Lewisham Hospital, Lewisham, UK

Background: Currently there is a paucity of quality evidence to support the use of restricted diets in Autism Spectrum Disorder (ASD) and NICE guidelines do not recommend the use of restricted diets to treat ASD⁽¹⁾ although there are considerable positive anecdotal reports on the efficacy of the Gluten Free Casein Free diet (GFCF). Moreover, since there is a lack of medical treatment available for autism, parents often turn to various complementary and alternative therapies including restrictive diets as a means of treating their children⁽²⁾. The aim of this study was to evaluate the use of four different types of restricted diet – the (GFCF), the Specific Carbohydrate Diet (SCD), the Gut and Psychology Syndrome (GAPS) and the Ketogenic Diet (KD) as a means of treating children with ASD.

Methods: An unvalidated online questionnaire, with both open and closed questions, exploring aspects of diet in children with ASD was developed for this study by a paediatric dietitian and posted on the “Research Autism” website. Participants were also recruited via social media over two months in early 2016, following ethical approval by the Research Ethics Committee of London Metropolitan University. This study analysed a subset of this data, limiting inclusion to children based in the UK aged 19 years and under and to computer literate respondents.

Results: Despite inviting respondents from across the UK, there were only 162 respondents representing approximately 0.023% of the total UK autism population. The mean age of children 11.2 years \pm 4.0 years and 82.7% (n = 134) were male and 17.3% (n = 28) female reflecting the recognized male to female ratio of prevalence for ASD of 4:1. 30.8%, (n = 50) respondents had previously tried the GFCF diet and the 3% (n = 5) that had tried the SCD and GAPS diet had also tried the GFCF diet. No respondents had tried the KD. 58% (n = 29) parents for GFCF and 80% (n = 4) parents for SCD and GAPS diet hoped for ‘improvements in general health and wellbeing’ when commencing restriction diets. 46% (n = 23) and 50% (n = 25) of parents reported improvements in ‘overall health and wellbeing’ and ‘participation in daily activities’ on the GFCF diet respectively. 20% (n = 10) reported that

‘range of food eaten’ was negatively affected following GFCF diet. 60% (n = 3) of parents reported improvements on the SCD and GAPS diet in respect of ‘participation in daily activities’ and ‘overall health and wellbeing’.

Discussion: The results suggest that parental use of the GFCF diet (30.8%) is similar to that reported in a US parental internet survey (32.4%)⁽³⁾. This study is the first to evaluate parents views on the GAPS diet and one of the first to evaluate SCD although the small sample cannot be representative of the current ASD population. Following restrictive diets can risk nutritional adequacy, be costly and affect mealtime interactions and therefore it is vital that parents have appropriate support when considering commencing these diets.

Conclusion: These findings add to the evidence that use of the GFCF diet is prevalent amongst children with ASD, despite this not being a recommended treatment parents reported improvement in their children. It is vital to have increased funding for specialist dietitians to ensure restrictive diet risks are explained, monitored and nutritional deficiencies avoided in children with ASD. Further research concerning the efficacy and safety of restrictive diets including the less researched SCD and GAPS diets would be beneficial.

References

1. National Institute for Health and Care Excellence (NICE), *Autism spectrum disorder in under 19's: support and management [CG170]*. 2013.
2. Senel, HG. Parents views and experiences about complementary and alternative medicine treatments for their children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 2010; 40(4): 494–503.
3. Green VA, Pituch KA, Itchon J, Choi A, O'Reilly M, Sigafoos J. Internet survey of treatments used by parents of children with autism. *Research in developmental disabilities*, 2006; 27(1): 70–84.

Nutritional intervention in the clinical management of cystic fibrosis-related diabetes: a systematic review

J Brown,¹ S Jones² & A Payne³

¹Nutrition & Dietetics, Whiston Hospital, Prescot, UK; ²Nutrition & Dietetics Department, New Cross Hospital, Wolverhampton, UK and ³SF13, Peninsula Allied Health Centre, Plymouth, Devon, UK

Background: As survival of people with cystic fibrosis (CF) increases, so does the prevalence of CF-related diabetes (CFRD). Data indicates almost 34% of adults and 12% of 10–15 year olds with CF are on treatment for CFRD¹. It is well established that poor nutritional status is associated with

poorer pulmonary function². There are evidence-based nutritional guidelines for the management of CF³. The same recommendations are applied to those with CFRD. However, much of the data informing these recommendations are not based on studies on those with CFRD.

Aim: to identify the effect of nutritional intervention on: Nutritional status, respiratory function and glycaemic control in patients with CFRD.

Methods: Systematic searches of AMED, CINAHL, Cochrane Central Register of Controlled Trials, EMBASE, MEDLINE and PUBMED were conducted. Additional studies were identified by checking bibliographies of included studies and forward citation searching. Search terms included: Cystic fibrosis AND Diabet* AND Diet*, Nutrition* Feed*, Gastrostomy, Carbohydrate. Any quantitative study, published 2006–2016, measuring clinically relevant outcomes relating to: nutritional status, pulmonary function and/or glycaemic control, in any age group, were included. A data extraction form was developed and data extraction was checked by a second independent investigator. Quality assessment was conducted by two independent investigators for which the EPHPP Quality Assessment Tool for Quantitative Studies was utilised.

Results: A total of seven studies met inclusion criteria: Four retrospective, observational studies, two case reports and one prospective pilot study. In quality assessment, one study was graded moderate⁴ and six were graded weak. **Dietary Advice:** Only the two studies involving dietary intervention considered glycaemic outcomes. The pilot study looked at the effect of low glycaemic index (GI) and avoidance of simple sugars on those with impaired glucose tolerance. It found reduced incidence of the development of CFRD compared to those that received no advice. One case report found that advice to increase energy intake in combination with carbohydrate counting improved weight and glycaemic control. **Enteral Feeding (EF):** Four observational studies considered the effect of EF on nutritional and pulmonary outcomes, including some participants with CFRD. One found that the nutritional status of those with CFRD did not deteriorate more than those without diabetes, with four times higher rates of EF in the CFRD group. However, pulmonary function significantly declined in the year prior to diagnosis of CFRD, despite greater EF rates. The other three studies found increased weight and BMI measures at six months-one year. Improvements were maintained in follow up but did not significantly increase further. Pulmonary function significantly declined at one year in one study, significantly increased in another, with no significant differences in the third study. Only one of these studies considered those with CFRD separately to those without, and found no differences in response to EF. Glycaemic outcomes were not reported other than five cases of development of CFRD after commencement of EF in two the studies. **Parental Nutrition** One case report involved a combination of parental and EF. It found improvement in weight and BMI but not pulmonary function.

Discussion: The effect nutritional intervention has on clinical outcomes in CFRD cannot fully be established as studies were limited in number, low quality and heterogeneous. Additionally, there was a lack of focus specifically on those with CFRD. Low GI and carbohydrate counting are recommended in type 1 diabetes⁵ and showed promising results in this review, but its effectiveness in CFRD requires further research. Parental nutrition had a positive effect on the case included however, this would not be used in practice unless EF was not possible. EF is widely used to improve nutritional status in those with CF. The studies included in this review indicated a positive association with nutritional status in both those with and without CFRD, but not consistently in pulmonary function.

Conclusion: Nutritional intervention demonstrated improvements to nutritional status and dietary advice improved glycaemic outcomes in CFRD in studies within this review. However larger studies, focusing specifically on CFRD, are required to make well-founded conclusions regarding the effectiveness of dietary advice and EF on clinical outcomes in CFRD.

References

1. Cystic Fibrosis Trust. (2017). UK Cystic Fibrosis Registry 2016 Annual Data Report. Available at: file:///C:/Users/jennie/Downloads/2016%20Registry%20Annual%20Data%20Report.pdf [Accessed 18 October 2017]
2. Mauch, R. M., et al. (2016) 'Association of growth and nutritional parameters with pulmonary function in cystic fibrosis: a literature review'.
3. Cystic Fibrosis Trust. (2016). *Nutritional Management of Cystic Fibrosis, Second Edition*. Available from: file:///C:/Users/jennie/Downloads/Nutritional%20Management%20of%20cystic%20fibrosis%20Sep%2016.pdf [Accessed 12 July 2017].
4. White, H., Pollard, K., Etherington, C., Clifton, I., Morton, A. M., Owen, D., Conway, S. P. & Peckham, D. G. (2009) 'Nutritional decline in cystic fibrosis related diabetes: the effect of intensive nutritional intervention'. *Journal of Cystic Fibrosis*, 8 (3), pp. 179–185.
5. NICE. (2015). Diagnosis and management of type 1 diabetes in children, young people and adults.

Long term requirement for Ketogenic Diet Therapy (KDT) in a Paediatric Population

H Champion, N Mills, Z Dowd, A Maw, M Chitre & APJ Parker

Nutrition and Dietetic Department, Addenbrooke's Hospital, Cambridge, UK

Background: The ketogenic diet therapy (KDT) is an appropriate therapy for children with complex epilepsy¹; applied as an intervention for duration of two years. Literature suggests that 50% of patients will experience a greater than 50% reduction in seizure activity after three months on KDT therapy²,

Table 1 Duration of KDT in cohort of paediatric patients

Time period	Came off diet	Percentage of patients off KD	Percentage of patients remaining on KD	Percentage of patients still on two year pathway
0–3 months	44/147	30%	70%	
0–12 months	75/147	51%	49%	
0–24 months	90/147	61%	39% (57/147)	
24 months+	120/147	81%	19 %	6%
Weaned off diet	30/57	52%		9/57 awaiting weaning trial
Returning to diet post two year period			18/57 30% of two year cohort	

with good seizure control being maintained by 36% of patients at one year³. Of those who maintain benefit at two years, 20% will require longer term use of KDT therapy to maintain the improved seizure management⁴. There is limited data on the safety of long term KDT therapy

Aim: We set out to review the need for children to continue beyond 2 years on KDT.

Method: We performed a retrospective service evaluation of all children (230) referred for KDT between April 2009 and October 2015. Information on referral was supplied from trust data bases and patient journeys on KDT extracted from patients clinical notes. Ethics approval for this project was not required.

Results: 147 patients proceeded from KDT assessment to commencing therapy. 70% of children continued on KD after three months, 49 % past one year and 39% completed the two year course of therapy. 30% of children who completed the two year course of therapy requested to continue KDT therapy beyond 2 years.

Discussion: Our service evaluation demonstrates that KDT in children can be maintained for two years and may be more successful in delivering clinical benefit than described in the literature. A requirement for sustained KDT beyond two years is demonstrated above the level previously reported

Conclusion: The increase in requests to remain on KDT therapy for greater than two years requires more consideration to be given to the safety of KDT in the longer term; the need to restructure dietetic services to accommodate increased numbers of patients with complex needs on therapy and consideration for on-going management within adult services.

References

1. The National Health Service Commissioning Board and Clinical Commissioning Groups (Responsibilities and Standing Rules) Regulations 2012
2. Kossoff EH et al. Optimal clinical management of children receiving the ketogenic diet: Recommendations of the International Ketogenic Diet Study Group. *Epilepsia*. February 2009; 50(2):304–317.
3. Florianne O.L.Vehmeijer, Can we predict efficacy of the Ketogenic diet in children with refractory epilepsy.

European Journal of Paediatric Neurology. 2015;19 (6) (pp 701–705),

4. Groesbeck DK, (2006). Long-term use of the ketogenic diet in the treatment of epilepsy. *Developmental Medicine and Child Neurology*.2006; 48 (12) (pp 978–981).

A qualitative investigation of parental experience of eating problems in children and young people with Autism Spectrum Disorder and the professional support they have received and desire

ZL Connor,¹ S Cooke,² K Hennessy-Priest,¹ R Kneafsey¹ & D Lycett¹

¹School of Health and Life Sciences, Coventry University, Coventry, UK and ²Department of Nutrition and Dietetics, Lewisham Hospital, Lewisham, UK

Background: Autism spectrum disorder (ASD) is a complex neurodevelopmental condition affecting 1% of children (1). 60–90% of children with ASD experience feeding problems such as extremely fussy eating (2). The setting for this study was a south-east London borough in which parents of children with ASD and feeding problems can access support from various professionals but only a very limited dietetic service is commissioned, and no multi-disciplinary pathway exists. The aim of this study was to examine the experience of parents of children with ASD who have eating problems; any support they have received; and the additional support they would like.

Methods: A pragmatic qualitative research approach with an element of participatory photography was adopted. Ethical approval was granted via the Coventry University Research Ethics Committee. Six participants were recruited using purposive and snowball sampling via NHS dietetic clinic lists, schools, support groups, fliers and social media. All were mothers in their 40s and lived in the south-east London borough. They had seven children with ASD aged six- to thirteen-years-old, two girls and five boys. Data was collected between November 2016 and January 2017 via semi-structured interviews (phone or face-to-face). All participants additionally submitted photographs with captions that illustrated their child's eating problems and the effect on them and their family. Interviews were transcribed and the transcripts, photos and

captions organised using the computer package NVivo, and analysed using inductive thematic analysis (3). Rigour was ensured via member checking, peer review of themes and reflexive journaling.

Results: Five themes were identified: 1. Difficult mealtimes (subthemes 1a. unusual eating habits; 1b. trying new food is challenging; 1c. eating problems affect children's health, behaviour, learning and mood; 1d. eating problems impact on parents and families); 2. Unsure when or whether to pursue help; 3. Lowered expectations of parents and professionals; 4. Feeling let down by a lack of support; 5. Services must be easily accessible and supportive (subthemes 5a. the role of school; 5b. a 'super-nanny service; 5c. group sessions; 5d. online help).

Discussion: This research has provided the first UK exploration of parental experience of feeding problems in children with ASD. Although the sample was small and relatively homogenous, saturation of data was achieved, and the findings echo those from other studies that these problems have a negative impact on the child, parent and family wellbeing (4,5). There were mixed experiences of services, some positive but most negative, feeling let down by the lack of services offered and frequent professional dismissal of feeding problems being normal in ASD and therefore not something to seek help for. Various avenues for improved support were identified including online support and group sessions.

Conclusion: In-depth exploration of the experiences of six parents of children with ASD and feeding problems has been carried out. The study findings will be used to plan multi-disciplinary pathways with the overriding aim of improving the wellbeing of children with ASD their families in south-east London.

References

1. NICE: National Institute for Health and Care Excellence. Guideline CG128: Autism in under 19s: recognition, referral and diagnosis [Internet]. London, UK: NICE; 2011 [cited 2016 Jul 5]. Available from: <https://www.nice.org.uk/Guidance/CG128>
2. Emond A, Emmett P, Steer C, Golding J. Feeding Symptoms, Dietary Patterns, and Growth in Young Children With Autism Spectrum Disorders. *Pediatrics* [Internet]. 2010 Aug 1;126(2):e337–42. Available from: <http://pediatrics.aappublications.org/cgi/doi/10.1542/peds.2009{00ENDSH00}2391>
3. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* [Internet]. 2006;3(May 2015):77–101. Available from: <https://doi.org/10.1191/1478088706qp063oa>
4. Rogers LG, Magill-Evans J, Rempel GR. Mothers' Challenges in Feeding their Children with Autism Spectrum Disorder—Managing More Than Just Picky Eating. *J Dev Phys Disabil*. 2012;24(1):19–33.
5. Suarez MA, Atchison BJ, Lagerwey M. Phenomenological examination of the mealtime experience for mothers of children with autism and food selectivity. *Am J Occup Ther*. 2014;68(1):102–7.

A systematic review of growth measurements used in children with Cerebral Palsy

L Constable & J Urwin

Paediatric Dietetics, Royal Devon and Exeter NHS Foundation Trust, UK

Background: Cerebral Palsy (CP) defines a group of conditions, arising from an injury to the developing brain (1). Growth and nutrition disorders are common in children with CP (2). The transition from the NCHS growth reference to the WHO growth standards, 2006, prompted the revision of indicators of severe acute malnutrition. A 2009 joint United Nations statement noted the programmatic advantage of using a single mid-upper arm circumference cut-off value to identify children with severe acute malnutrition in 6–59 months old children (3). Comparison of the sensitivity–specificity curves in community studies shows that mid-upper arm circumference is better at identifying children with a high risk of death (4) therefore MUAC is recommended by WHO as an independent criterion for screening children, 6–59 months old. There has yet to be further data to see if this conclusion can be extrapolated to specific paediatric conditions and children above 5 years of age.

Aim: To investigate if the inclusion of MUAC measurements helps to identify malnutrition/sub-optimal growth in children with CP

Method: This was a systematic review using: CINAHL, Cochrane Library, EMBASE, Google Scholar and MEDLINE. The database search took place on the 31/7/2017. Keywords used include: children, Cerebral Palsy, growth, nutritional status, anthropometrics, mid-upper arm circumference, segmental measures, height and calculated height. To ensure this was a current review the exclusion criteria stated studies must be published from 2007 onwards.

Results: This search allowed the comparison of 25 studies, most of which were prospective, longitudinal and population-based. Results revealed that 100% of studies used anthropometric parameters to measure growth in children with CP. The majority of studies (56%) opted to measure weight. However, horizontal length/heights were often reported as unreliable especially in children who have high tone/scoliosis (5). Ulnar lengths were measured in a small proportion of studies (8%) and these measurements monitored linear growth using the growth curves which were published in 2004 (6). In addition, 2% of studies used segmented measures such as knee height and tibial length. However, there was limited evidence in the use of MUAC measurements for this patient group.

Discussion: The general consensus shows that weight and height are currently used to measure growth within this patient group, but there are various concerns around the validity and reliability of height/calculated heights (5) and making them generalised to fit one growth curve without considering GMFCS (2). These limitations are in addition to being difficult to accurately attain in certain environments. The use of segmental measures to calculate a height is also limited as it

requires consistent technique (7). The derived equations to calculate height also include a degree of error, this means it cannot be used to assess body mass index, as the error is magnified when squared and assessing growth velocity may also be unreliable. Consequences of poor growth measurements include unrealistic/unknown growth trajectories, inaccurate nutritional requirements and poor provision of nutrition for the children who are reliant on tube feeding.

Conclusion: More research is needed to determine if MUAC measurements help to identify malnutrition / sub-optimal growth in children with CP.

References

1. Winter, S., Autry, A., Boyle, B., Yeargin-Allsop, M., (2002) Trends in the prevalence of Cerebral Palsy in a population based study. *Pediatrics*. 110 (6): 1220–1225. <<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0049320>> (Accessed 10/08/17)
2. Wang, F., Qianyun, C, Wei, S., Huayin, J., Na, Li., Dan, M., (2016) A Cross-sectional Survey of Growth and Nutritional Status in Children With Cerebral Palsy in West China. *Pediatric Neurology*: 58, pp90–97
3. WHO child growth standards and the identification of severe acute malnutrition in infants and children (2009). *A joint statement by the World Health Organization and the United Nations Children's Fund*. Geneva: World Health Organization.
4. Briend, A, Maire, B, Fontaine, O, Garenne, M. (2012) Mid-upper arm circumference and weight-for-height to identify high-risk malnourished under-five children. *Maternal Child and Nutrition*. 8:pp130–133.
5. Samson-Fang, L., Bell, K.L., (2013) Assessment of growth and nutrition in children with Cerebral Palsy. *European Journal of Clinical Nutrition*. 67, S5–S8
6. Gauld, L.M, Kappers J., Carlin, J.B, Robertson, C.F, (2004) Height prediction from ulna length. *Developmental Medicine & Child Neurology*. 46: pp475–480.
7. Oefinger, D., Conaway, M., Stevenson, R., Hall, J., Shapiro, R., Tylkowski, C., (2010) Tibial length growth curves for ambulatory children and adolescents with Cerebral Palsy. *Developmental medicine & child Neurology*. pp195 – 201

Influences on post discharge nutrition in premature infants – a cross-sectional study

H Gane,¹ C Koulouglioti² & S Floyd²

¹Western Sussex Hospitals NHS Foundation Trust (WSHFT), The Lodge, Chichester, UK and ²Research Department, St Richard's Hospital, Chichester, UK

Background: Evidence to establish what nutrition premature infants receive post discharge is lacking, the effects of early metabolic and nutritional programming persist across a lifetime (1). Milton & King, (2) found that vitamins were not given as advised post discharge. West Sussex Hospitals feeding

guideline (4) includes guidance on vitamins and iron post discharge.

Aim/Objectives: These were to: a) elucidate parental nutritional practices, specifically the use of prescribed vitamins, iron and milks (breast & formula) among premature infants post discharge compared to hospital (5) and national guidelines (3,7,8); and b) highlight potential educational needs for parents & healthcare professionals (HCPs).

Methods: A bespoke, focus group reviewed stand-alone anonymous parent/carer postal questionnaire was developed for this descriptive study. Patients were selected from two neonatal unit discharge books 01.10.2013 – 31.10.2014. Eligible patients being born at ≤ 35 weeks gestation, who were 6 to 18 months uncorrected age in 2014/2015. From a potential participant pool of 462, there were 129 eligible families, 45 (35%) returned completed questionnaires.

Ethics: Liverpool Central NHS Research Ethics Sub Committee approval (March 2015), with Governance approval from Sussex NHS Research Consortium (May 2015).

Results:

Data	Result
Background	
Mean gestational birth age & birth weight	31 weeks, 595–2722 g (9–25 th to 91 st centile) (mean 1.8 kg)
Parent place of birth & Educational Level	UK (95.6%), 40% - degree or above
Vitamins, Prescribed Milks & Iron at Discharge	All correctly prescribed, according to unit guidelines (4)
Milks post discharge	
Breastfeeding rates/use of expressed breast milk \pm breast milk fortifier	77.3% at discharge
Length of time breast feeding	2 weeks to 13 months
Breast Milk Fortifier (BMF) use	11%
Neonatal Post Discharge Formula use	Nutriprem 2 (17.8%), SMA Gold Prem 2 (15.6%)
Vitamins, Iron & Food Post Discharge	
Neonatal Vitamins Duration	44.4% stopped by 18 months of age
Difficulties obtaining Vitamins & Iron	4.4% reported this
Neonatal Iron Duration	89% stopped iron by 1 year of age
Complementary (weaning) foods introduction	mean age of 6.3 months
BLISS Weaning leaflet	66.7% recalled receiving

Discussion: Breast milk use post discharge was high compared to the neonatal network (67%) (5), and comparable nationally (89%) (6). Breast milk fortifier (BMF) use was relatively high post discharge, this being a short term measure whilst establishing breast feeding. Initially parents followed unit advice regarding continuing iron, vitamins, breast milk fortifier and prescribed formula, only stopping them early due to tolerance issues. Those parents who stopped vitamins after one year

were in line with unit guidelines (4) for premature infants, but at odds with unit (4) & UK Department of Health & SACN guidance for Vitamin D supplements for children 1–5 years (7 & 8). Only 22% of parents were reportedly aware of this advice. Lower birthweight and infants born more prematurely were more likely to still be on vitamins ($p < 0.005$). Influences on stopping vitamins and iron when the infant was older included primary and secondary HCP advice. Parents also made informed choice to stop these supplements if they felt their child was eating well. Age of introduction of complementary (weaning) foods was in line with BLISS/British Association of Perinatal Medicine (BAPM) guidelines (9). There was a statistically negative medium correlation between infant gestation at birth and the age parents had commenced weaning ($r = -0.403$, $p = 0.009$), indicating that parents of more premature babies tended to start weaning at an older age.

Conclusion: This research reflects the need, importance and presence of clear neonatal unit policy on nutrition/formulary and education for community HCPs and parents so that these groups better understand the post discharge nutritional needs of premature infants, and vitamin D recommendations for older children.

References

1. SACN (2011). The Influence of Maternal, Foetal and Child Nutrition on the Development of Chronic Disease in Later Life. Scientific Advisory Committee on Nutrition (SACN), 2011, TSO, London.
2. Milton J & King C (2012). Cup introduction, Drink type and Vitamin Supplementation in preterm infants at 11–25 months. *J Hum Nutr Diet.* 25, 148–154.
3. ESPGHAN (2006). Feeding Preterm Infants after Hospital Discharge. Medical Position Paper. A Commentary by the European Society of Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) Committee on Nutrition. Aggett PJ, Agostoni C, Axelsson I, et al. *Journal of Paed Gastroenterology & Nutrition.* May 2006 Volume 42, 596–603.
4. Western Sussex Hospitals NHS Trust (2013a) Neonatal Nutrition Policy & Neonatal Formulary (2013b), WSHT, 2013.
5. Thames Valley & Wessex Operational Delivery Neonatal Network. 2013/14 Network Comparison.
6. Health & Social Care Information Centre. Infant Feeding Survey 2010. Health and Social Care Information Centre, 2012. 20 November 2012; Report No.: 1.
7. Department of Health (2012) Vitamin D – Guidance on Supplements for At Risk Groups, Chief Medical Officers Letter 02.02.2012. 8 SACN (2016). Vitamin D and Health. 9 NDIG/Speech and Language Paediatric Dysphagia Group (2011). Joint Consensus Statement on Weaning Premature Infants.

Does earlier feeding post PEG insertion reduce length of hospital stay in paediatric patients: A prospective study

S Giga, H Dagash, R Fox & N Patwardhan

University Hospitals of Leicester NHS Trust, Leicester Royal Infirmary, Nutrition and Dietetic Service, UK

Background: Delayed feeding post PEG procedure prolongs length of hospital stay¹ and may lead to inadequate nutrition support². Early initiation of feeding and thus discharge home contributes to a reduction in healthcare costs and can improve incoming patient flow^{3, 4}. There is currently insufficient data on the safety of early feeding amongst children post PEG placement with only one RCT study performed in this area¹. The aim of this study was to determine whether reducing the number of hours fasting time from 12 hours to 4 hours amongst paediatric inpatients who have undergone PEG insertion results in earlier discharge home from hospital, and does not cause complications such as leakage around gastrostomy site or peritonitis.

Methods: From November 2016 to July 2017, 8 consecutive paediatric patients (male to female ratio of 6:2, aged 1 to 6 years old) admitted to Leicester Royal Infirmary for a laparoscopic-assisted PEG insertion were placed on an early feeding protocol to commence feeding 4 hours post PEG placement. Verbal consent was obtained from parents and the paediatric surgeon prior to commencing gastrostomy feeds. Patients were placed on a continuous feeding protocol to meet their target feeding volume based on calorie requirements, within 12 hours after starting feeds. The feed rate was increased by 2 ml per kg every three hours. To assess for feed tolerance, outcome measures were recorded, including vomiting, pain medication usage, bowel motion type and frequency, site of gastrostomy for leakage and abdominal distension. Patients were reviewed by the Dietitian and surgical team the following morning and discharged home if gastrostomy feeds were well tolerated.

Results: Overall, the average length of hospital stay was reduced from 82 hours on the late feeding protocol (12 hours) to 38 hours on the early feeding protocol (4 hours). Information on length of hospital stay for the late feeding group was obtained from an electronic patient database. Out of 8 patients from the early feeding group, 3 had vomiting episodes, 1 developed abdominal distension and 5 required additional pain medication however; these did not delay progression with gastrostomy feeds. There were no complications related to leakage from the gastrostomy site or peritonitis.

Discussion: The results of this trial support previous findings^{1, 5} that starting feeds 4 hours post PEG placement amongst paediatric patients is well tolerated and leads to a reduction in the length of hospital stay. Due to the small sample size it is unclear whether these results can be generalised to a larger population. A retrospective chart review of patient medical records from the late feeding group will aim to compare complications rates to the early feeding group.

Conclusion: This trial suggests we may be unnecessarily delaying enteral feeding by waiting 12 hours post gastrostomy placement. Early feeding following PEG is safe amongst paediatric patients and leads to early discharge home and reduced length of hospital admissions however, this result must be supported by larger prospective RCTs.

References

1. Islek A, Sayar E, Yilmaz A. Percutaneous Endoscopic Gastrostomy in children; Is early feeding safe? *J Pediatr Gastroenterol Nutr* 2013; 57(5): 659–662.
2. Werlin S, Glicklich M, Cohen R. Early feeding after Percutaneous Endoscopic Gastrostomy is safe in children. *Gastrointest Endosc* 1994; 40(6): 692–693.
3. Paul F, Perkins J, Jiang H, McCabe M. Impact of the early initiation of feedings on hospital length of stay in children post-PEG tube placement. *Gastroenterol Nurs* 2014; 37(5): 344–349.
4. Jensen AR, Renaud E, Drucker NA, Staszak J, Senay A, Umesh V et al. Why wait: early enteral feeding after pediatric gastrostomy. *J Pediatr Surg* 2017; 0(0): 1–5
5. Corkins, MR, Fitzgerald JF, Gupta SK. Feeding after Percutaneous Endoscopic Gastrostomy in children: early feeding trial. *J Pediatr Gastroenterol Nutr* 2010; 50(6): 625–627.

A necessary evil: a meta-ethnography of parents' experiences of tube-feeding their child

H Kuter¹ & S Kirk²

¹Manchester Community Paediatric Home Enteral Feeding Service, Gorton, Manchester, UK and ²Division of Nursing, Midwifery and Social Work, University of Manchester, Manchester, UK

Background: Parents of long-term tube-fed children are typically given the main responsibility of tube-feeding at home.¹ To support this model of care, it is important that the experience of tube-feeding at home is fully understood by healthcare professionals. The aim of this review was to improve the understanding of parents' experiences of tube-feeding their child through the synthesis of existing qualitative research.

Methods: Meta-ethnography was used as the approach for the qualitative evidence synthesis. A systematic review of the literature was conducted from January to June 2016 using ten electronic databases and pre-defined search criteria: original published studies in English, studies focusing on parents of children aged 0–18 years with a feeding tube, in a non-acute setting, qualitative research. Included studies were appraised using a quality appraisal tool. Key themes were extracted and translated following Noblit and Hare's established approach to meta-ethnography.²

Results: Twelve primary qualitative studies met the inclusion criteria and were included in the synthesis. The studies covered a time span of 17 years (1995–2012), with a total of 220 parents across five countries. Six themes were identified: decisions,

time, permanency, stigma, roles and responsibilities, and positive experiences. Two third-order constructs emerged: loss of freedom and loss of expectations. The line-of-argument presented is that tube-feeding is 'a necessary evil' and is experienced by parents as an overwhelming feeling of loss on many levels.

Discussion: The results of this meta-ethnography highlight the practical, social and moral difficulties that parents experience in having child who is tube-fed. Negotiating the medical and health needs of their child, with pressures from family and society, and finding a sense of self within this is a challenging journey. Many parents adopt coping strategies to support them through their journey and this resonates with other research.³ Although 'loss' emerged as the third-order construct, wider literature on disability theory shows that health professionals who draw their interpretations of disability from negatively-focused theory can have a demoralising effect on parents³

Conclusion: This synthesis has relevance for professionals supporting parents of tube-fed children and highlights gaps in qualitative research – particularly around coping strategies and positive outcomes. Researchers are encouraged to consider the literature on the positive and enriching aspects of parenting a child with special needs, and direct research towards appreciating how the 'highs and lows' of the situation are experienced as a whole. Until this is achieved, quantitative research will continue to show how a child fed via a tube can achieve optimum nutritional status, whilst qualitative research paints a pessimistic picture of the experience for parents.

References

1. Braegger C, Decsi T, Dias JA, Hartman C, Kolacek S, Koletzko B, Koletzko S, Mihatsch W, Moreno L, Puntis J, Shamir R, Szajewska H, Turck D, van Goudoever J. Practical approach to paediatric enteral nutrition: a commentary by the ESPGHAN committee on nutrition. *JPGN* 2010; 51(1): 110–22.
2. Noblit G, Hare R. *Meta-Ethnography: Synthesizing Qualitative Studies*. California: Sage Publications; 1988.
3. Kearney PM, Griffin T. Between joy and sorrow: being a parent of a child with developmental disability. *J Adv Nurs*. 2001 Jun; 34(5):582–92.

Evaluation of an early intervention clinic for infants with suspected Cow's Milk Allergy

RD Martin, P Mulholland, B O'Connor & S Beattie
South Eastern HSC Trust, Ulster Hospital, Upper Newtownards Road, UK

Background: Cow's milk allergy (CMA) is prevalent among 2–6% of infants in the first year of life with Parents attending multiple GP consultations¹ before diagnosis. The psychological stresses of CMA are exacerbated by delayed or inappropriate treatment² with milk free diet. In 2013, the introduction of

guidelines for diagnosis and management of delayed non-IgE CMA^{3, 4} led to increased referrals to Paediatric Allergy Consultant and Dietetic Services with waiting times for medical and dietetic assessments increasing from 6 to 28 and 52 weeks respectively. The aim of this project was to evaluate an early intervention clinic for diagnosis and management of CMA in primary care.

Method: This project was facilitated by a Health Foundation Innovating for Improvement award and included 240 newly referred infants <1 year of age being redirected from paediatric allergy and dietetic services between April and October 2016. The quality improvement clinic model, 'MOO', was developed involving group education and 1:1 clinical assessment in 4 community locations. Facilitated education included advice on milk free diet and re-challenge, appropriate weaning and re-introduction using the milk ladder. A Consultant Paediatrician trained Specialist Paediatric Dietitians in the use of a clinical assessment tool to identify high risk infants with symptoms of acute/multiple moderate-severe allergy for referral to acute allergy services. Dietetic telephone reviews supported confirmation of milk re-challenge and milk free weaning practices. The BDA Model and Process for Nutrition and Dietetic Practice was used to establish nutritional diagnosis, set goals and measure dietetic outcomes. Waiting times were monitored and Carer feedback collected. This service evaluation did not require ethical approval.

Results: 175 infants attended for assessment over a 9 month period.

Waiting times reduced from 52 and 28 weeks to a mean of 11.4 weeks by month 9.

30% of infants were assessed as high risk and referred directly to Paediatric Allergy Consultant.

Milk re-challenge to confirm CMA diagnosis increased from 40 to 90%.

90% of Infants met 100% of their Dietetic Clinical Outcomes including:-

- Established on appropriate milk free breastfeeds or formula feeds.
- Relief of Symptoms including pain, mucus in stools, back arching, wind.
- Established appropriate milk free weaning.

99% of Carers rated the group clinic as good or excellent.

Discussion: This project successfully delivered early diagnosis and appropriate management of CMA. Carers were uniformly positive about the group education experience, with many commenting on the value of meeting other families in the same situation. Telephone reviews ensured a high uptake of re-challenge to confirm the CMA diagnosis as per guidelines^{3, 4}. The Dietetic review supported effective milk free weaning practices, discouraged unnecessary food restriction and confirmed dietetic outcomes achieved. Evaluation of the project throughout using quality improvement cycles led to improvements in selection criteria, referral systems, assessment sheets and follow up protocols.

Conclusion: This early intervention CMA clinic has allowed the development of a responsive service for parents and children with CMA. It provides a more streamlined, efficient use of clinical time and reduced referrals to hospital clinics. During the evaluation the model moved to a Specialist Paediatric Allergy Dietitian led service for the diagnosis and management of mild-moderate CMA within a wider system of peer support from acute Children's Allergy Service.

References

1. Resource implications and budget impact of managing cow milk allergy in the UK. Sladkevicius, E.; Nagy, E.; Lack, G.; Guest, J.F. *J. Med. Econ.* 2010, 13, 119–128.
2. Cow's Milk Protein Allergy from Diagnosis to Management: A Very Different Journey for General Practitioners and Parents. Lozinsky, A.C 1; Meyer, R 1; Anagnostou, K 2, Dziubak, et al. *Children* 2015, 2(3), 317–329; <https://doi.org/10.3390/children2030317>
3. Primary Care Infant Feeding Guidelines 2013. *niformulary.hscni.net/Formulary/pdf*.
4. Diagnosis and management of non-IgE-mediated cow's milk allergy in infancy - a UK primary care practical guide. Venter, C; Brown, T; Shah, N; Walsh, J and Fox, A.T. *Clinical and Translational Allergy* 2013;23 <https://doi.org/10.1186/2045-7022-3-23>

A service evaluation of a regional UK paediatric ketogenic diet centre (2002–2015)

RJ Meskell¹ & L King²

¹Dietetic Department, A Floor Paediatric Offices, Brotherton Wing, Leeds Children's Hospital, Leeds, UK and ²School of Clinical & Applied Sciences, Leeds Beckett University, Leeds, UK

Background: The ketogenic diet (KD) is a treatment option for the 20–30% of children with drug resistant epilepsy (¹) and the first line treatment for certain metabolic disorders (²). Waiting lists are long and it is commonly acknowledged that access to this therapeutic diet is restricted by demand on limited dietetic (RD) resource (³). Existing literature does not appear to take account of the complete remit of dietetic activity involved, reporting numbers of referrals and numbers starting KD, but not those weaning off the diet or those receiving input who do not commence KD. The aim of this work was to define a regional UK ketogenic diet service in a quantitative manner, in order to benefit those who provide and use the service in the future. It attempts to ascertain the level of need and aid planning of service provision and resource allocation to reduce waiting times for patients, enabling earlier intervention in this increasingly required service.

Methods: A retrospective, longitudinal trend study using secondary data from a database of all referrals into the service. This study quantifies referrals, outcomes (diet initiation or not) and duration of treatment; analysing these in light of RD

resource (based on staff recall) using Pearson's correlation; and practice changes, using an independent t-test. A comparison is made between current service provision and potential service need (extrapolating for the region from an estimate of numbers of children who could benefit from KD⁽³⁾; and quantifying the regional paediatric population, the prevalence of epilepsy, then the 20–30% who are refractory to medication, thus potential candidates for KD). Ethics approval was gained from the NHS Trust and Leeds Beckett University.

Results: There were 213 referrals in 209 patients. 100 KD starts were included in 96 patients with a mean of 5.31 months (SD 3.41) from referral to start. Mean KD duration was 18.77 months (SD 22.078). Total dietetic activity (including KD starts, non-starts with dietetic input, and those intentionally weaning off KD) ranged from 2–37 episodes per year. There was a strong positive correlation between total activity and dietetic resource ($r = 0.78$, $p = 0.001$). No statistically significant differences were found in total activity or number of KD starts since 2012 (when those over 5 years old were able to start KD at home) or in KD duration following 2009 guidelines to wean at 2 years. Reassuringly similar figures of 1024 and 1040 children who could benefit from KD within this service were reported using the methods described.

Discussion: The focus of recent literature has been the evidence base relating to its efficacy, with no robust evidence regarding the level of RD resource required or recommended for a KD service. Practice changes introduced here to increase capacity were not shown to achieve this, confounding factors need to be considered. Surveys^(3,4,5) report on dietetic resource and patient numbers on diet and there is some published work on treatment duration^(2,6) but little in terms of referral numbers or waiting times. The relationship between waiting times and staffing was not examined in this retrospective study as the data was not consistently recorded; this could be investigated in a prospective study. There are no standards regarding waiting times for initiation of KD other than the recommended NHS 18-week referral to treatment pathway.

Conclusions: This work reports a comprehensive, more inclusive picture of dietetic activity than is currently available, by incorporating information on those weaning off KD and those not starting. It confirms that increasing staffing is a valid way of increasing total dietetic activity and that there is a very real 'gap' between service need and that currently available here.

References

1. Vehmeijer, F., van der Louw, E., Arts, W., et al. Can we predict efficacy of the ketogenic diet in children with refractory epilepsy? *Eur J Paediatr Neurol.*, 2015;701–705.
2. Fitzsimmons, G. & Sewell, M. Ketogenic Diets. In: Shaw, V. ed. *Clinical Paediatric Dietetics*, 4th ed. 2015 Chichester: John Wiley & Sons Ltd., Chapter 16 p 354–379.
3. Lord, K. & Magrath, G. Use of the ketogenic diet and dietary practices in the UK. *J Hum Nutr Dietet.* 2010;23:126–132.
4. Ward, F. & O'Riordan, J. A review of staffing levels and activity in paediatric dietetics. *J Hum Nutr Dietet.* 2014; 28:95–106.
5. Swiderska, N., Williams, E., Cross, HJ., Eltze, C. & Kneen, R. Provision of ketogenic dietary therapy across the UK. *Dev Med Child Neurol.* 2015;57 (Suppl. 1):28.
6. Keene, DL. A Systematic Review of the Use of the Ketogenic Diet in Childhood Epilepsy. *Pediatr Neurol.* 2006;35:1–5.

A review of the growth pattern of children following a ketogenic diet

N Mills, H Champion, M Chitre, A Maw & A Parker
Nutrition and Dietetics Department, Addenbrooke's Hospital, Cambridge University Hospital NHS Trust, Cambridge, UK

Introduction: Ketogenic diet therapy (KDT) is an effective antiepileptic therapy for children with complex epilepsy, and is applied for two years. The diet is a very high fat regimen with restricted carbohydrate enabling the body to be in a constant state of ketosis. There is limited published data suggesting linear growth falters while on a KDT¹, with protein to energy ratio being pivotal in supporting linear growth². We aimed to ascertain the growth velocity changes whilst on KDT one year after stopping therapy.

Methods: We performed a retrospective service evaluation of all children who were commenced and supported on KD therapy for two years (January 2009 to June 2017). The hospital electronic medical records allow growth data to be plotted on electronic growth charts which automatically generate Z scores for weight and length. Children <0.4th centile in weight and those with a difference in weight / height of >2 centiles were excluded as their growth velocity may have been influenced by dietary intervention to adjust for malnutrition. Weight and height changes were expressed as changes in Z score. This service evaluation did not require ethical review.

Results: 52 children's records were available for analysis (29 male, 3 female). Median age starting diet was 4 years 9 months (range = 8 months–16 years, 0 months).

- Weight No significant change in weight centiles were seen during the 2 year therapy period.
- Length Mean growth velocity reduced by 0.4 of a Z score during the first year of KD therapy, growth velocity then stabilised during the second year on diet. The data suggests that reduced growth velocity did not increase in the year after returning to a normal diet, however our data for this period was not complete for all children
- Reduced growth velocity across age groups: Children aged 0–5 years showed the most prominent reduction in growth velocity (2/3rd of a Z score reduction over the two year therapy), with children aged 5–11 years showing a lesser reduction in growth velocity (1/3 of a Z score reduction). Children aged over 11 years did not show a change in growth

velocity. The observed reduction in Z score was greater in the first year on KD therapy.

- Consideration for protein energy ratio: Protein levels in all the prescribed Ketogenic Diets met WHO guidelines for children. The Modified KD (MKD) has no restriction on protein intake with the classical diet posing the greatest restriction. Children completing two years on the Classical diet and Medium chain triglyceride (MCT) diet fell on average 0.4 and 0.35 of a Z score for height respectively. Our cohort of patients on MKDs with a complete data set was small.

- Limitations: Small size in some of the sub sets of data; age distribution and comparing growth velocity for children on different KD regimens.

Discussion: An insignificant Z score change for weight was expected as we monitor weight and adjust energy intake to achieve appropriate weight gain. Our study supports current evidence that children can experience a reduction in height velocity over the two year therapy; however, our study suggests this is most prominent in the first year on KDT. This finding was more prominent in younger children where dietary protein to energy ratio is at its highest. We had expected some difference in height velocity between the types of diet as the protein provision differs (all diets met protein requirements); however this was not reflected in our data (potentially due to the small sample size).

Summary: We saw no significant changes in weight Z score for children on therapy. The data showed reduction in height velocity, which was greatest amongst children aged 0–5 years, and exhibited in the first year on therapy. Height centile changes between the MCT and Classical diets were similar. Therapies with less protein restriction appear to mitigate loss of growth velocity.

References

1. Vining et al (2002) investigated growth trends in children on the KD; they noted a small decrease in height Z scores over the first 3 months on the diet amongst all age groups, which was most prominent amongst very young children (less than one year of age).
2. Nation et al, 2013 concluded that poor linear growth within their cohort was associated with a protein or calorie intake of <80% of the daily recommended intake.

An exploration of children's body-esteem in a weight loss programme in the East of England

L O'Donovan & R Fallaize

School of Life and Medical Sciences, University of Hertfordshire, Hatfield, Hertfordshire, UK

Background: There is a strong association between overweight and obese children and poor body-esteem⁽¹⁾. Most studies indicate that body-esteem issues become apparent in older children and adolescents with differences existing among genders⁽²⁾. Weight loss programmes can improve body-esteem⁽³⁾.

Children's weight loss programmes in Leeds, England and the United States have demonstrated a reduction in body dissatisfaction as a result of the children's weight loss and camp attendance^(3,4). The aim of this study was to explore the impact of a weight loss intervention programme on 12-15-year-old children's body esteem, identifying the influencing factors and examining whether this differs according to gender.

Methods: A total of ninety-two children (52 male, 40 female), with a mean age of 13 years and mean BMI of 30 kg/m², who participated in the weight loss programme, were included in the analysis. The programme involved the young person and their family, incorporating healthy eating, physical activity and behavioural change into the programme's sessions which lasted a duration of 17 weeks. The data analysed was provided by the programme using a written questionnaire. Children were asked to identify their own body size (perceived body image) in addition to their preferred body figure (ideal body image) before and after the weight loss programme, using the Children's Body Image Scale (CBIS)⁽⁵⁾. The difference between the perceived and ideal body size indicated the degree of body dissatisfaction. Further, the children were asked to make a comment on how they perceived their current body image and ideal body image before and after the programme. Analysis of the data was undertaken using inductive thematic analysis. Ethical approval was not required for this research.

Results: There were no gender differences identified in the issues that impacted on their body-esteem. Participants described the issues associated with their body-dissatisfaction according to health worries 'reduce my risk of cancer and heart problems'; concerns regarding physical activity levels 'I'd like to be more active and fitter than I am now'; social rejection and desired social acceptance 'I get called names like porky, fat grizzly bear and pig' 'feel comfortable, fit in'; and reduced well-being and wanting to improve self-confidence '...I would like to be more confident with my body and being slightly slimmer would help that'. The qualitative comments made by the children did not reflect an improvement in body-esteem post programme, however the children's perceived body image improved after the programme, as they chose smaller perceived body sizes, indicating improved body-esteem. Moreover, most of the children had lost weight after the programme.

Discussion: Although the results did not indicate improvements to body-esteem in the qualitative comments, the findings obtained showed the issues impacting on the body-esteem of children, elucidating the reasons for body-dissatisfaction and the driving factors to make changes to their body sizes which is mirrored in previous research. While gender differences in body-esteem have been observed in previous research, there were none identified in this study⁽⁵⁾.

Conclusions: The present study highlights the issues impacting on overweight and obese children's body-esteem which adds to the existing body of evidence highlighting the factors influencing negative body-esteem.

References

1. Goldfield GS, Moore C, Henderson K et al. Body dissatisfaction, dietary restraint, depression, and weight status in adolescents. *Journal of School Health*. 2010;80(4):186–92.
2. Williams NA, Fournier J, Coday M et al. Body esteem, peer difficulties and perceptions of physical health in overweight and obese urban children aged 5 to 7 years. *Child: care, health and development*. 2013;39(6):825–34.
3. Walker LL, Gately PJ, Bewick BM et al. Children's weight-loss camps: psychological benefit or jeopardy?. *International journal of obesity*. 2003;27(6):748–54.
4. Quinlan NP, Kolotkin RL, Fuemmeler BF et al. Psychosocial outcomes in a weight loss camp for overweight youth. *International Journal of Pediatric Obesity*. 2009;4(3):134–142.
5. Truby H & Paxton SJ. Development of the children's body image scale. *British Journal of Clinical Psychology*. 2002; 41 (2): 185–203.
6. Rees R, Oliver K, Woodman J et al. The views of young children in the UK about obesity, body size, shape and weight: A systematic review. *BMC Public Health*. 2011; 11 (1); 188.

Cross sectional analysis of online information on the Gluten Free Casein Free Diet for Autism Spectrum Disorder

J Spiers & H Wickett

Centre of Nutrition and Dietetics, Cardiff, Metropolitan University, Cardiff, UK

Background: The gluten and casein free (GFCF) diet is a commonly used intervention for children with Autism Spectrum Disorder (ASD) ⁽¹⁾. However the evidence behind it is limited and it is not currently recommended by guidelines ⁽²⁾. The internet is frequently used by parents and caregivers of children with ASD to access information about interventions ⁽³⁾. It is therefore important that websites contain accurate, evidence based information that is easy to read. Previous studies looking at the quality of ASD related health information on the internet found the websites were of variable quality and above the average reading level ⁽⁴⁾. This study aimed to evaluate the quality of information on a sample of publicly available consumer websites about the GFCF diet as an intervention for ASD.

Methods: Consumer websites providing information on the GFCF diet for ASD were identified using search engines. 280 websites were assessed for eligibility. Sites were excluded if they were duplicates, not aimed at consumers, not relevant, books or message boards. The sites were then evaluated using a tool designed to assess their quality, based on current BDA ASD guidelines ⁽²⁾ and the DISCERN tool ⁽⁵⁾. Readability was assessed using the Fleisch Reading Ease score. Ethical approval

was not required as the information was all in the public domain.

Results: 33 websites were analysed. The information given on the websites was generally accurate and fair quality. The mean score of all the websites was 61%, with only 3 sites giving incorrect information. However, websites were often lacking in practical information, how the treatment may affect quality of life, supporting references, and were not updated regularly. Health information sites and those written by health professionals were found provide the highest quality information. The mean readability of the websites was 47.2, significantly harder than the recommended level of 60 ⁽⁶⁾.

Discussion: Although mostly good quality, some websites did not provide sufficient information for parents to make informed decisions about choosing the GFCF diet as an intervention for ASD. This is similar previous research looking at online information on ASD ⁽⁴⁾. In particular websites were lacking in supporting references, practical issues and how the treatment may affect daily life. This may result in parents choosing an intervention that is expensive, puts their child at risk of nutritional deficiencies and may not be effective. Health professionals need to be aware of the information available on the internet, and could provide a list of good quality websites, or direct parents to types of websites known to be consistently high quality, such as health information sites with a government domain name. Parents should also be encouraged to check the date and authorship of the information.

Conclusion: the quality of information on the internet about the use of the GFCF for ASD is generally accurate, but often incomplete. Health Professionals should be aware of this and be able to direct parents to appropriate, good quality websites.

References

1. Winburn, E., Charlton, J., McConachie, H., et al. (2014) Parents' and Child Health Professionals' Attitudes towards Dietary Interventions for Children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 44, p747–757
2. British Dietetics Association (BDA) (2015) *Food Fact Sheet: Autism*.
3. Grant, N., Roger, S., Hoffman, T. (2016) Intervention decision-making processes and information preferences of parents of children with autism spectrum disorders. *Child: Care, Health and Development*, 42 (1): 125–134.
4. Grant, N., Rodger, S. and Hoffmann, T. (2015), Evaluation of Autism-Related Health Information on the Web. *Journal of Applied Research in Intellectual Disabilities*, 28, p276–282.
5. Charnock, D. (1998) *The DISCERN Handbook: Quality criteria for consumer health information on treatment choices*. Radcliffe Medical Press: Oxford.
6. Style.ONS (2017) *How We Read on the Web*.

Using blogs to explore the experiences of parents with a tube-fed child; a qualitative study

SL Trace¹ & JM Latour²

¹Department of Paediatric Dietetics, University Hospitals Bristol NHS Foundation Trust, London, UK and ²School of Nursing and Midwifery, Faculty of Health & Human Sciences, University of Plymouth, Plymouth, UK

Introduction: Quantitative literature discusses the risks and benefits for children with feeding tubes^{1,2}, but a relatively small amount of literature exists which describes parents experiences³.

Aim: To explore parent's life experiences with a tube-fed child, as expressed in blogs, with a focus on how parents cope and their interactions with healthcare professionals

Methods: Blogs were identified by searching Google, BING and Safari, and blog search engines 'Ice Rocket' and Wordpress.com. Keywords 'child', 'parent' and 'tube feed' were combined with 'experiences', 'life' and 'blog' or closely related words. Resulting blogs between 2007–2017 were screened against inclusion criteria: entries chronologically dated, written in English by the parent and related to tube feeding experiences of over 12 months. Blogs published with commercial interest or on password protected sites were excluded. A thematic approach⁴ was applied for the qualitative analysis. The blogs were read several times to gain an understanding and 'feel' for the data and relevant statements or 'codes' were highlighted by hand. NVivo software (QSR International) supported organisation of further coding. Taking the stance that internet blogs are in the public domain and that there was no direct interaction with anonymous bloggers, ethical approval was not deemed necessary⁵.

Results: Nine parent blogs (seven mothers, two fathers) were included in the analysis. Six blogs were of USA origin, two were from the UK and one from Australia. Children were aged between 2–12 years and had been tube fed for 1.2–5.5 years, some with oral intake. Indications for tube feeding varied. Following reduction of the initial coding, 48 codes emerged and were clustered into eight common themes. Description rose out of the data, both texturally (what was experienced) and structurally (how). The eight identified themes were loss, fear, disempowerment and external negativity, external positivity, acceptance, empowerment and thankfulness / internal positivity.

Discussion: Overall experiences can be described as initial destruction; expressed as 'a kind of grieving process' and 'loss

of having control over how I nourished my child'. This was followed by a period of restoration; 'Learning that every kind of meal, whether intravenous or tube-fed, hung or pushed or pumped, eaten by mouth from the breast or the hand or the spoon... is a blessing'. Recognition of their child's improved wellbeing and development facilitated coping; 'They are skin and bones. Shadows of the children they used to be... then they get feeding tubes and life is restored to them'. Negativity from peers/family and inconsistencies between healthcare professionals increased emotional stress. Regaining choice over the type of feed, such as expressed breastmilk, or blended family food, was empowering. Strength was gained from opportunities to support other parents in similar situations. 'I wish I could help every other parent facing that decision, to see that the most important thing is that their child is receiving adequate nutrition'.

Conclusions: The blogs described a transformative emotional path for parents, from negative destruction to positive restoration. Parents cope better when they recognise improved child wellbeing, when allowed some choice over feeding and when receiving consistent, positive messages.

References

1. Mehta, P. & Acerini, C. (2015) 'G62(P) A critical appraisal of the literature on the benefits of gastrostomy feeding, compared to oral feeding, in children with cerebral palsy'. *Arch Dis Child*, 100 (Suppl 3), pp. A25–A26.
2. Sullivan, P. B., Juszczak, E., Bachlet, A. M., Thomas, A. G., Lambert, B., Vernon-Roberts, A., Grant, H. W., Eltumi, M., Alder, N. & Jenkinson, C. (2004) 'Impact of gastrostomy tube feeding on the quality of life of carers of children with cerebral palsy'. *Developmental Medicine and Child Neurology*, 46 (12), pp. 796.
3. Hewetson, R. & Singh, S. (2009) 'The lived experience of mothers of children with chronic feeding and/or swallowing difficulties'. *Dysphagia*, 24 (3), pp. 322–332.
4. Braun, V. & Clarke, V. (2006) 'Using thematic analysis in psychology'. *Qualitative Research in Psychology*, 3 (2), pp. 77–101.
5. Markham, A & Buchanan, E. *Ethical Decision-Making and Internet Research: Recommendations from the AoIR Ethics Working Committee (Version 2.0)*. Available at: <https://aoir.org/reports/ethics2.pdf> [accessed 19.07.2017]

Public Health

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

I Saeid,¹ L O'Connor¹ & TJ Butler^{1,2}

¹Department of Health Professions, Manchester Metropolitan University, Manchester, UK and

²Department of Clinical Sciences and Nutrition, University of Chester, Chester, UK

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

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

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

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

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

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

References

1. Hussain SM, Oldenburg B, Wang Y et al. *Int J Vasc Med.* 2013;2013:786801–786810
2. Forouhi NG, Sattar N, Tillin T et al. *Diabetologia* 2006; 49: 2580–258.
3. Gerber M & Hoffman R. *Br J Nutr* 2015;113: S14–S10.
4. Panagiotakos DB, Pitsavos C, Arvaniti F et al. *Preventive medicine* 2007;44: 335–340.

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

P Dhir & N Walker

School of Health, Coventry University, Coventry, UK

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

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

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

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

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

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

References

- Public Health England (2015) Sugar reduction the evidence for action. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf (accessed January 2017)
- Scientific Advisory Committee on Nutrition (2015) Carbohydrates and Health. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/445503/SACN_Carbohydrates_and_Health.pdf (accessed January 2017)
- National Diet and Nutrition Survey (2014) National Diet and Nutrition Survey: results from Years 1 to 4 (combined) of the rolling programme for 2008 and 2009 to 2011 and 2012 (accessed May 2016)
- BBC (2015) Aldi and Lidl double market share in three years. <http://www.bbc.co.uk/news/business-34842198> (accessed January 2017)
- Schwartz MB, Vartanian LR, Wharton CM et al. Examining the Nutritional Quality of Breakfast Cereals Marketed to Children. *J Am Diet Assoc* 2008; 108:702–705.
- Darmon N, Caillavet F, Joly C et al. Low-cost foods: How do they compare with their brand name equivalents? A French study. *Public Health Nutr* 2009;12:808–815.
- NHS Choices (2017) How does sugar in our diet affect our health. <http://www.nhs.uk/Livewell/Goodfood/Pages/sugars.aspx> (accessed January 2017)

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

SG Moore,¹ JK Donnelly,¹ S Jones¹ & JE Cade²

¹School of Social and Health Sciences, Leeds Trinity University, Leeds, UK and ²Nutritional Epidemiology Group, School of Food Science and Nutrition, University of Leeds, Leeds, UK

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

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

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

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

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

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

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

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

References

1. Higginson C, Rayner M, Draper S, *et al.* How do consumers use nutrition label information? *Nut & Food Sci.*2002;32:145–152.
2. Benn Y, Webb T, Chang B. *et al.* How do consumers search for online shopping and what information do they use? *Appetite* 2015;89:265–273.
3. Food Standard Agency (FSA). Understanding NI Consumer Needs Around Food Labelling. 2016. Available at <https://www.food.gov.uk/>.

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

C Pettinger,¹ E Atherton² & W Miller³

¹School of Health Professions, University of Plymouth, Plymouth, UK; ²Hospitals Advisor, Food for Life, Soil association, South Plaza, Bristol, UK and ³School of Geography, University of Plymouth, Plymouth, UK

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

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

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

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

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

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

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

References

1. Holdsworth M (2010) Sustainability should be integral to nutrition and dietetics. *Journal of Human Nutrition and Dietetics*, 23(5), 467–468.
2. Atherton E (2016) Shifting Towards Sustainable Diets – how dietitians can help. *Medact Blog*, 25.7.16 <https://www.medact.org/2016/blogs/role-dietitians-helping-change-unsustainable-food-systems/>
3. British Dietetic Association (2013) Policy on Sustainable Food. British Dietetic Association Professional Leadership Policy Statement https://www.bda.uk.com/improvinghealth/healthprofessionals/sustainable_diet (Accessed: 17.7.17).
4. Elo S and Kyngas H (2008) The qualitative content analysis process. *Journal of Advanced Nursing*, 62(1):107–15.
5. Cotton DRE & Alcock I (2013) Commitment to environmental sustainability in the UK student population, *Studies in Higher Education*, 38:10, 1457–1471, <https://doi.org/10.1080/03075079.2011.627423>.
6. Goodman B and East L The ‘sustainability lens’: A framework for nurse education that is ‘fit for the future’. *Nurse Education Today*, 34, 1, 100–103.

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

S Portbury & K Hennessy-Priest

Faculty of Health & Life Sciences, School of Health, Coventry University, Coventry, UK

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

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

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

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

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

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

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

References

1. Haws, KL, Reczek, RW and Sample, KL. Healthy Diets Make Empty Wallets: The Healthy = Expensive Intuition. *J Consumer Research*. 2017; 43 (6): 992–1007.
2. Jones NRV, Conklin AI, Suhrcke M et al. The growing price gap between more and less healthy foods: analysis of a novel longitudinal UK dataset. *PLoS One*. 2014; 9 (10):1–7.
3. Snowdon C. (2017) Cheap as chips: a healthy diet affordable? <https://iea.org.uk/wp-content/uploads/2017/03/Cheap-as-Chips-PDF.pdf> (July 2017).
4. Jones NRV and Monsivais P. Comparing prices for food and diet research: the metric matters. *J Hunger Environ Nutr*. 2016; 11(3): 370–381.
5. FSA (2016) Guide to creating a front of package nutrition label for pre-packaged products sold through retail outlets <https://www.food.gov.uk/sites/default/files/multimedia/pdfs/pdf-ni/fop-guidance.pdf> (July 2017)
6. Department for Environmental, Food and Rural Affairs (2014) Family food 2014: UK household purchases. <https://www.gov.uk/government/statistics/family-food-2014> (July 2017)

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

K Porter,¹ CF Hughes,¹ L Hoey,¹ M Ward,¹ A Molloy,² C Cunningham,³ MC Casey,³ JJ Strain,¹ M O’Kane,⁴ F Tracey,⁵ K McCarroll,³ A McCann¹ & H McNulty¹

¹Northern Ireland Centre for Food and Health, Ulster University, Coleraine, UK; ²Institute of Molecular Medicine, School of Medicine, Trinity College, Dublin 2, Ireland; ³Mercers Institute for Research on Ageing, St James’s Hospital, Dublin, Ireland; ⁴Clinical Chemistry Laboratory, Western Health and Social Care Trust, Altnagelvin Hospital, Londonderry, Northern Ireland and ⁵Causeway Hospital, Northern Health and Social Care Trust, Coleraine, Northern Ireland

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

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

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

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

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

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

References

1. Guariguata L, Whiting DR, Hambleton I et al. Global estimates of diabetes prevalence for 2013 and projections for 2035. *Diabetes Res Clin Pract*. 2014;103(2):137–49.
2. Smith DA, Refsum H. Homocysteine, B Vitamins, and Cognitive Impairment. *Annu Rev Nutr*. 2016;36:211–39.
3. Biessels GJ, Staekenborg S, Brunner E et al. Risk of dementia in diabetes mellitus: a systematic review. *Lancet Neurol*. 2006;5(1):64–74.

4. McCarroll K, Beirne A, Casey M et al. Determinants of 25-hydroxyvitamin D in older Irish adults. *Age Ageing*. 2015;44(5):847–53.
5. Randolph C, Tierney MC, Mohr E et al. The repeatable battery for the assessment of neuropsychological status (RBANS): Preliminary clinical validity. *J Clin Exp Neuropsychol*. 1998; 20(3):310–319.
6. Coen RF, McCarroll K, Casey M et al. The Frontal Assessment Battery: Normative Performance in a Large Sample of Older Community-Dwelling Hospital Outpatient or General Practitioner Attenders. *J Geriatr Psychiatry Neurol*. 2016;29(6):338–43.

Service Evaluation

Service evaluation: assessing the nutritional adequacy of the diets of patients with coeliac disease who attended a dietitian-led group education session

C Devereux,¹ A Avery¹ & S Fenn²

¹University of Nottingham, School of Biosciences, College Road, UK and ²PCT Building, Melton Mowbray Hospital, Leicestershire, UK

Background: Lifelong adherence to a gluten-free diet (GFD) is the only treatment for coeliac disease (CD). Nutritional inadequacies have been identified with a GFD⁽¹⁾. NICE call for increased research to assess whether supplementation should be given to all patients following diagnosis⁽²⁾. Group education sessions (GES) are becoming increasingly popular in the NHS due to savings in time and cost. This service evaluation aims to determine the nutritional adequacy of the diets of patients with CD, who attended a single dietitian-led GES. Patients included those newly diagnosed and pre-existing patients who were unsuccessful at adhering to a GFD. The GES discussed the importance of fibre, calcium, iron, vitamin D, vitamin B12 and folic acid while adhering to a GFD.

Methods: 7 day estimated food diaries (EFD) were collected pre and post GES. These were posted to patients due to attend a Leicestershire GES between April–November 2016. Dietary information was inputted into dietary analysis software to obtain mean daily nutrient intakes pre and post GES. Data was inputted into statistical analysis software. Descriptive statistics were used to assess the results and paired t tests used to test for statistical significance. Pre and post GES mean nutrient intakes were compared to UK guidelines. It was

hypothesised that nutrient intakes would increase after the GES to meet requirements. As this is a service evaluation no ethics are required.

Results: 80 patients attended the GES between April and November 2016 and were given food diaries to complete. 5 participants completed a pre and post education EFD. Intakes of fibre, calcium, iron, vitamin D and folic acid decreased following the GES, whereas consumption of vitamin B12 increased. These changes in nutrient intake were not statistically significant. The mean intake of calcium, vitamin D and fibre were below UK recommendations after attending the GES.

Discussion: Nutritional deficiencies are likely due to the exclusion of gluten, consuming less fortified products and the increased requirement for calcium, concluding that the GES was ineffective at enabling patients to meet requirements⁽³⁾. This is consistent with research assessing micronutrient deficiencies when following a GFD⁽¹⁾. More research is needed to assess whether calcium and vitamin D supplementation should be given to patients upon diagnosis. Limitations include poor participation, estimation of food quantities, reporting bias, subject bias, and the potential overestimation of nutrients⁽⁴⁾.

Conclusion: To improve this service the dietitian should increase emphasis on consuming a varied, nutrient rich, GFD to meet UK nutritional requirements.

References

- VICI, G., BELLI, L., BIONDI, M. and POLZONETTI, V. 2016. Gluten free diet and nutrient deficiencies: A review. *Clin Nutr*, 35, 1236–1241.
- NICE. 2015. Coeliac disease: recognition, assessment and management.
- BSG. 2014. Diagnosis and Management of Adult Coeliac Disease: Guidelines from the British Society of

Nutrient	Before Group Education		After Group Education		Mean Change (%)	P Value (2 dp)
	Reported Intake	Reported Intake as a Percentage of the Requirement (%)	Reported Intake	Reported Intake as a Percentage of the Requirement (%)		
Fibre (g)	24.3 ± 7.9	80.9 ± 26.3	22.9 ± 9.1	75.3 ± 30.3	-1.7 (-5.6)	0.40
Calcium (mg)	1083.9 ± 242.0	101.3 ± 23.4	1015.6 ± 328.6	95.7 ± 34.1	-68.2 (-6.6)	0.53
Iron (mg)	16.8 ± 4.4	193.5 ± 50.6	12.6 ± 2.9	145.0 ± 33.2	-4.2 (-48.5)	0.22
Vitamin D (µg)	5.0 ± 2.2	50.0 ± 22.3	4.4 ± 1.7	43.8 ± 18.8	-0.6 (-6.2)	0.74
Folic Acid (µg)	301.0 ± 82.4	150.5 ± 41.2	283.5 ± 86.9	141.7 ± 43.4	-17.6 (-8.8)	0.62
Vitamin B12 (µg)	5.2 ± 1.1	348.3 ± 74.0	5.4 ± 0.8	357.7 ± 53.9	+0.1(+9.4)	0.73

Gastroenterology. *BMJ gut*. <https://doi.org/10.1136/gutjnl-2013-306578>.

4. MARTIN, M. J. and WOODALL, A. 2016. Optimising the Management of Bone Disease for Coeliac Patients in a Dietetic-led Clinic. *IJCD*, 4(2), 48–54. <https://doi.org/10.12691/ijcd-4-2-6>.

Retrospective Irritable Bowel Syndrome (IBS) outpatient service evaluation prompts the introduction of a virtual IBS clinic

K Dobson & E Copeland

Department of Nutrition & Dietetics, Brighton & Sussex University NHS Hospital Trust, St Mary's Hall, Brighton, East Sussex, UK

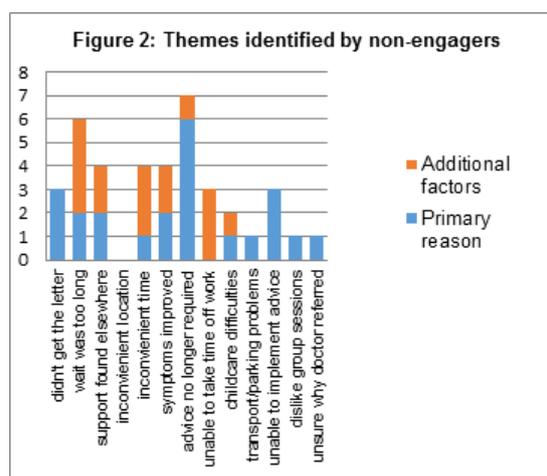
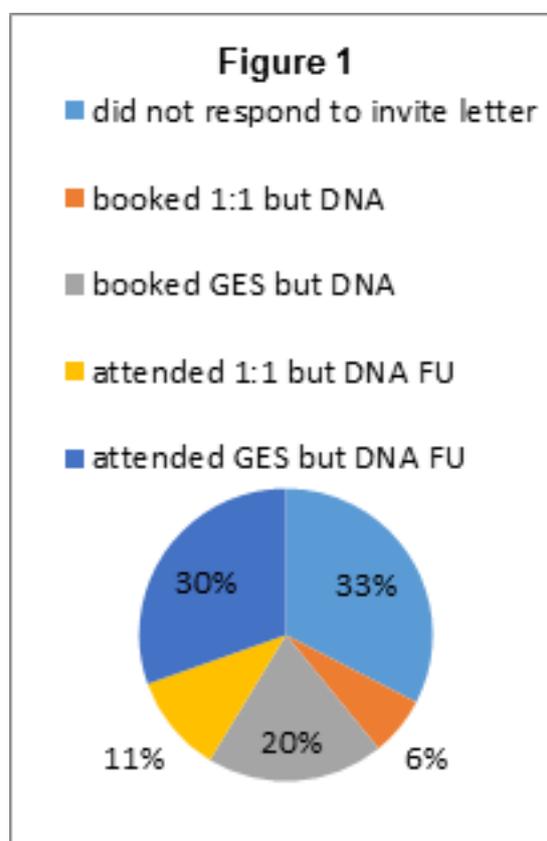
Background: Low FODMAP Group Education Sessions (GES) were introduced alongside traditional one to one (1:1) appointments with a gastro dietitian 3 years ago in response to increased service demand. Waiting times for both care pathways have since increased significantly and a high 28% non-attendance (DNA) rate (compared with 12% national dietetic mean¹) provoked a service evaluation.

Aim: To understand the personal and health-system related factors which influence IBS GES/1:1 non-attendance and evaluate alternative services DNA patients would like to be offered.

Methods: A retrospective observational evaluation of all 110 patients; 77% female, mean age 42 (range 18–79 years) referred July - October 2016 for dietary management of IBS. Attendance data was analysed from OASIS. Patients who did not respond to the 'invite to book' letter or who booked but then DNA were sent a service evaluation questionnaire with pre-paid envelope and pursued 1 month later by telephone.

Results: 55% of responders booked into 1:1 appointments, 45% into GES with average wait 95 days (range 20–187 days) and 86 days (range 26–185 days) respectively ($p = 0.23$). Only 58% ($n = 64$) completed the IBS care pathway of initial 1:1 or GES with at least one follow up (FU). The 46 DNA patients (Figure 1) were sent a questionnaire with an overall good² response rate of 37% ($n = 7$ by mail, $n = 10$ by telephone). Reasons for non-attendance (Figure 2) were multi-factorial with 62% ($n = 23$) citing personal and 38% giving ($n = 14$) system-focused explanations. Service improvement initiatives were polled at 35% for telemedicine clinics, 29% for evening / weekend clinics and 24% for web, app or email-based consultations.

Discussion: Factors contributing to non-engagement / DNA were interrelated with patients citing they no longer required advice or symptoms had improved having sought information elsewhere; often owing to delays in being seen. The mean waiting times breach our 12 week departmental target and is in part due to using a partial booking process. Web-based symptom evaluation and therapy is effective in IBS³ but there is limited data on the use of telemedicine in this group.



Conclusion: Given financial constraints to extend working hours or purchase software, the introduction of an initial straight-to-book 30 minute telemedicine consultation with a gastro dietitian to offer first line IBS advice and triage into 1:1 or GES was deemed the best solution. The IBS telemedicine clinic runs alongside the 1:1 and GES and has the flexibility to offer ongoing telemedicine contact; improving service accessibility to those who cannot attend in person.

References

1. NHS Benchmarking Network: Acute Therapies project 2017/18 (*data as yet unpublished*).
2. Nulty, Duncan D. "The adequacy of response rates to online and paper surveys: what can be done?." *Assessment & evaluation in higher education* 33.3 (2008): 301–314.
3. Georgi Grasczew . "Telemedicine Techniques and Applications" ISBN: 978-953-307-354-5 (June 2011)

The service evaluation of an enhanced dietetic service, including staff training, to reduce levels of malnutrition in care homes in Wales

A Evans,¹ AGRuss² & AC Bell³

¹Nutrition & Dietetic Department, Dewi Sant Hospital, Pontypridd, UK; ²Nutrition & Dietetic Department, Royal Glamorgan Hospital, Llantrisant, Pontyclun, UK and

³Nutrition & Dietetic Department, Prince Charles Hospital, Merthyr Tydfil, UK

Background: Around one-third of people aged over 70, on admission to a care home in the UK, are malnourished; about 29% within Wales⁽¹⁾. The cost of treating malnutrition is estimated in excess of £19 billion per year with malnourished people needing more admissions, readmissions and longer hospital stays^(II, III). Therefore, malnutrition poses a substantial care and financial burden within the older population living in care homes. By implementing a comprehensive and structured approach to nutritional care for residents living within a care home setting may lead to significant improvements in their nutritional status. The aim of the service evaluation was to improve the nutritional status of residents in care homes by raising the awareness of malnutrition amongst staff and developing individualised dietetic intervention for those identified at risk.

Methods: An enhanced dietetic service was established within the health board in November 2014 which included 4 nursing homes as part of the pilot study.

- Baseline data was collected for all care home staff within the 4 nursing homes which included information on weight, height, Body Mass Index, Malnutrition Universal Screening Tool (MUST) score and accuracy of MUST, nutritional supplement prescription

- A tailored nutrition education programme was delivered in individual care homes based on the findings from the baseline data collection, which included topics such as screening, meal time experience, food fortification and appropriate use of oral nutrition supplements (ONS). A suitable questionnaire was given before the training and after the training in order to gain

- Individualised dietetic intervention was provided to residents at risk of malnutrition and those already established on ONS. These patient assessments occurred monthly in order for the residents to meet their dietetic goals sooner.

- Data was captured post intervention in order to evaluate benefits and improvements in the nutritional status of the residents and the care home as a whole.

Ethical approval was not required for this service evaluation project.

Results: The service involves scoping the level of staff knowledge and the reliability of nutritional screening pre-intervention in order to identify training needs. The total resident population was 327.

Providing a dietetic assessment monthly has reduced the time for dietetic intervention by 4 months compared to the core community dietetic service. Residents are able to meet their dietetic goal sooner which has reduced the need for ONS.

Discussion: By implementing an enhanced dietetic service to care homes within the local health board, it has shown to decrease the risk of malnutrition amongst residents, increase the number screened for malnutrition and improve nutritional knowledge of staff. Nursing home 3 shows a significant improvement in the accuracy of the screening and improvement in staff knowledge which has resulted in an increase in the identification of residents at high risk of malnutrition.

Conclusion: Following completion of the project the enhanced dietetic service further funding has been secured for additional dietetic staff to expand the service throughout the whole health board. These initial findings imply a potential cost saving within the area; further research is pending with the medicines management department within the health board.

Table 1 Results showing pre & post intervention data for the 4 pilot nursing homes.

Nursing Home	%staff trained (Actual number trained)	%Staff knowledge on MUST		% residents accurately screened for malnutrition		%residents at high risk of malnutrition	
		Pre	Post	Pre	Post	Pre	Post
Nursing Home 1	64 (32)	21	78	46	73	15	10
Nursing Home 2	62 (25)	56	92	0	91	34	16
Nursing Home 3	72 (18)	33	89	47	89	11	18
Nursing Home 4	66 (30)	20	100	48	75	43	26

References

1. C A Russell C A, Elia M. Nutrition screening surveys in care homes in the UK, 2015. (Accessed June 21,2017, at <http://www.bapen.org.uk/pdfs/nsw/care-homes/care-homes-uk.pdf>)
2. British Association for Parenteral and Enteral Nutrition. Malnutrition matters meeting quality standards in nutritional care. Worcs: BAPEN, 2010.
3. Malnutrition Task Force: A review and summary of the impact of malnutrition in older people and the reported costs and benefits of intervention, May 2013. (Accessed June 16, 2017, at http://www.malnutritiontaskforce.org.uk/wp-content/uploads/2014/06/Addressing_Malnutrition_Care_Homes_Mini_Guide.pdf)

Parental satisfaction with a paediatric special educational needs and disability dietetic clinic

J Hilton,¹ D Radia² & Z Connor³

¹Kent Community Health NHS Foundation Trust, Clinical Nutrition and Dietetics, QEOM, Margate, Kent, UK;

²London Metropolitan University, London, UK and

³Department of Nutrition and Dietetics, Lewisham Hospital, Lewisham, UK

Background: Children with special educational needs and disability (SEND) often have eating problems which can result in faltering growth and nutritional deficiencies.⁽¹⁾ The Kaleidoscope Clinic offers a limited dietetic service to children with SEND in Lewisham. Children are offered a single appointment and then discharged with a plan. Dietitians are trained to use the Process for Nutrition and Dietetic Practice. A key part of this cyclical process includes monitoring and reviewing dietetic interventions which requires follow up ⁽²⁾. The author was unable to find a standard pathway for dietetic support for Autistic children. The dietitian has raised concerns regarding the clinical and reputational risks of this service⁽³⁾. Patient satisfaction with the service has not previously been explored and this study aims to investigate parental satisfaction through semi structured interviews.

Methods: Ethical approval was obtained from Lewisham and Greenwich NHS Foundation Trust and London Metropolitan University. Informed verbal consent was obtained from all participants. A convenience sample was used and parents were recruited by telephone using data from clinic lists. Parents without a telephone or did not speak English were excluded. Seven parents participated in semi-structured interviews, using a questionnaire developed by the author and which was reviewed by her supervisors. The interviews were recorded, transcribed and analysed thematically using Braun and Clark ⁽⁴⁾ methodology for thematic analysis.

Results: Three main themes were identified: firstly, 'Dissatisfaction' with the service, in which parents expressed feelings of frustration with the service and difficulties in accessing ongoing support and, secondly, 'Satisfaction' with the actual appointment encompassing increased knowledge and feeling empowered. Lastly, 'Monitor and Review' where parents felt

that a review was important so that they could ask further questions and discuss progress with the plan.

Discussion: Interviews were carried out by the student dietitian to minimise reflexivity and bias was reduced by asking parents open questions and informing them their answers would assist in service evaluation. Since parents without a telephone or did not speak English were not included it is possible that the study did not include patients in lower socio economic groups with higher need for support. Whilst parents were mostly satisfied with their actual appointment, they were dissatisfied with the service and lack of ongoing support or follow up. One child was followed up by an acute dietitian and it would be useful to establish the extent of this practice through audit.

Conclusion: The authors recommend that the dietetic service for children with SEND in Lewisham is revised and additional funding secured to commission a new service with a structured pathway which includes follow up. A further study looking at alternative methods of follow up would be useful.

References

1. Cornish E.(1998)A balanced approach towards healthy eating. *Journal of Human Nutrition and Dietetics*, 11, pp501-509. Available at <http://0-onlinewiley.com.emu.londonmet.ac.uk/doi/10.1046/j.1365-277x.1998.00132.x/epdf>. Accessed 9/2/17
2. Connor, Z. (2015) Audit of Kaleidoscope Dietetic Clinic. Department of Nutrition and Dietetics, Lewisham Hospital. 2015. (unpublished).
3. British Dietetic Association (BDA) (2008). Guidance for Dietitians for Record Keeping[Online]. Available at: <http://members.bda.uk.com/profdev/recordkeeping/GuidanceRecordKeeping.pdf>. Accessed 28/4/17
4. Braun, V. & Clarke, V. *Using thematic analysis in psychology*. *Qualitative Research in psychology*. 2006. Available at: <http://www.tandfonline.com/doi/pdf/10.1191/1478088706qp0630a>. Accessed 9/2/17.

Management of adult eosinophilic oesophagitis: retrospective analysis of medical and dietary outcomes in a UK centre

H Hunter,^{1,2} K Pupinyte,³ T Wong,^{4,5} J Dunn,^{4,5} E Toner,⁵ S Zeki,⁴ SJ Till² & MC Lomer^{1,3,4}

¹Department of Nutrition and Dietetics, Guy's and St Thomas' NHS Foundation Trust, Great Maze Pond, UK;

²Division of Asthma, Allergy and Lung Biology, King's College London, UK; ³Diabetes and Nutritional Sciences Division, King's College London, UK; ⁴Department of Gastroenterology, Guy's and St Thomas' NHS

Foundation Trust, UK and ⁵London Bridge Hospital, London, UK

Introduction: Eosinophilic oesophagitis (EoE) is an immune-mediated disorder characterized by oesophageal dysfunction and eosinophil predominant inflammation (1). It affects

13–49/ 100,000 inhabitants and typically manifests in adults as dysphagia and food bolus obstruction (1). Effective management strategies include proton pump inhibitors (PPIs) (2), topical steroids (3), or dietary intervention (4). Dietary management commonly consists of either the empiric six-food elimination diet (SFED) or allergy-test directed exclusion. This retrospective evaluation reports the patient clinical phenotype and outcomes for a number of interventions to manage EoE in a UK population, previously unreported,

Method: Adults (≥ 16 years) with an oesophageal eosinophil count ≥ 15 per high power field (hpf) were identified from histology reports and hospital clinical records from two hospitals covering a two-year period. Positive response to treatment was defined as < 15 eosinophils per hpf on repeat endoscopy or $\geq 50\%$ reduction in peak count. Response rates between groups were compared using Fisher's Exact and eosinophil counts with Wilcoxon Signed rank. The study was registered and approved as a hospital service evaluation.

Results: We identified 100 subjects 18–84 years of age (median 35) with a predominance of males (76%) and Caucasians (94%; 67/71). Atopic conditions were reported in 75% (65/87) and allergy testing was positive to foods for 71% (44/62) and aeroallergens 72% (38/53). Fifty-one patients had both biopsies covering 67 treatment episodes (see table 1), with some having more than one treatment. Significant reductions in eosinophil counts were seen for SFED and allergy-test directed diets. There were no significant differences in efficacy between treatment groups.

Table 1 Response rates and eosinophil counts for different treatments

Intervention	Response to treatment n/N (%)	Median peak eosinophil count [interquartile range]		p value
		Pre	Post	
PPI	8/23 (35)	42 [26]	36 [69]	0.352
Steroids	5/12 (42)	53 [52]	15 [66]	0.117
SFED	13/20 (65)	47 [46]	10 [46]	0.006
Test-directed diet	5/10 (50)	62 [38]	23 [29]	0.036
Elemental diet	2/2 (100)	33 [*]	1 [*]	*

n, number of responders, N: number who underwent intervention, *not calculated due to sample size

Through food reintroduction 14 patients identified triggers: 57% milk (n = 8), 29% gluten containing cereals (n = 4), 14% egg (n = 2), 7% soya, nuts, shellfish or fruit (each n = 1). Ten fully completed the reintroduction process, of which 50% had one trigger, 30% two, and 20% three or more.

Discussion: Baseline characteristics were comparable to other described cohorts (1) with a high proportion of males, Caucasians and high rates of atopy. There was a non-significant trend to higher response rates for dietary compared to medical interventions, however almost half did not have a follow up biopsy on treatment. Given the restrictive nature of

elimination diets, guidance and regular monitoring by a specialist dietitian is an important aspect of dietary management.

Conclusion: Dietary intervention particularly the SFED is effective in our population and future research would be beneficial to identify factors that predict response to different interventions.

References

1. Lucendo AJ, MolinaInfante J, Arias A, et al. Guidelines on eosinophilic esophagitis: evidence-based statements and recommendations for diagnosis and management in children and adults. *United European Gastroenterol J.* 2017;5:335–58.
2. Lucendo AJ, Arias A, MolinaInfante J. Efficacy of Proton Pump Inhibitor Drugs for Inducing Clinical and Histologic Remission in Patients With Symptomatic Esophageal Eosinophilia: A Systematic Review and Meta-Analysis. *Clin Gastroenterol Hepatol.* 2016;14:13,22.e1.
3. Chuang MY, Chinnaratha MA, Hancock DG, et al. Topical Steroid Therapy for the Treatment of Eosinophilic Esophagitis (EoE): A Systematic Review and Meta-Analysis. *Clin Trans Gastroenterol.* 2015;26:e82.
4. Arias A, Gonzalez-Cervera J, Tenias JM, Lucendo AJ. Efficacy of dietary interventions for inducing histologic remission in patients with eosinophilic esophagitis: A systematic review and meta-analysis. *Gastroenterology.* 2014;146:1639–48.

Evaluation of the current NHS Dietetic care provision and practice for patients with Chronic Fatigue Syndrome/Myalgic Encephalomyelitis. A National Scoping Exercise

R Lord, K Hart & N Klepacz

Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, UK

Background: At present, the current NHS dietetic care provision for Chronic Fatigue Syndrome (CFS) is unknown. CFS is an idiopathic illness and weight gain, weight loss and co-morbid Irritable Bowel Syndrome (IBS) are all commonly reported nutritional issues⁽¹⁾. Some patients restrict foods and take various supplements in an attempt to control symptoms⁽²⁾. Current nutritional guidelines for CFS include; NICE⁽²⁾, BDA food fact sheet⁽³⁾ and the Manual of Dietetic Practice⁽¹⁾. However, these guidelines lack robust evidence and the current UK dietetic care provision for CFS is unknown. The aim of this scoping exercise was to evaluate current NHS Dietetic care provision for patients with CFS, by using the Freedom of Information (FOI) Act for data collection.

Method: A FOI Act request letter was sent to 162 acute and 20 community NHS Trusts in England by using a list of Trusts gathered from various sources. Trusts were categorised by region: London, Midlands and East, South and North.

Responses were assessed for the number of patients with CFS referred to the Trust; the number of patients with CFS that were seen by a Dietitian and the nutritional guidelines that were used by Dietitians. A Microsoft Excel Document was created for the collection of data which was analysed descriptively.

Results: Eighty four percent of Trusts responded to the FOI Act request. The total number of patients with CFS reported by NHS Trusts was 14,518 (6% of individuals diagnosed with CFS in the UK¹). Only 281 patients with CFS (2% of those referred to NHS Trusts) were reported to have been seen by a Dietitian. Responses per region are shown below in *Table 1*.

Table 1 Responses from each region for the total number of patients with Chronic Fatigue Syndrome (CFS)

	Region				Total
	London (n = 24)	North (n = 45)	South (n = 32)	Midlands and East (n = 51)	
Total number of patients with CFS	2,407	4,004	4,386	3,721	14,518
Total number of patients with CFS seen by a Dietitian	26	125	100	30	281

Thirteen percent of Trusts (n = 20) reported that a nutritional guideline was used by Dietitians. Of these Trusts, the guideline produced by the BDA⁽³⁾ was most commonly used.

Discussion: The response rate from NHS Trusts was high at 84%. However, this rate was expected to be high as by using the FOI Act, there is a legal requirement for Trusts to provide requested information. The study suggested that very few patients with CFS are being referred to secondary care (6% of the total number of individuals diagnosed with CFS in the UK) and from there, to a Dietitian (2% of those referred to NHS Trusts). Nutritional guidelines that were reported to be used by Dietitians gave similar advice and encouraged patients to eat a well-balanced diet and to eat little and often, although there were some inconsistencies in the advice given. The guidelines that do exist have been in use for many years but the lack of good quality evidence makes it difficult for them to be updated.

Conclusion: This national scoping exercise showed that very few patients with CFS were reported to have been referred to secondary care or to see a Dietitian. As there is currently a lack of robust scientific evidence for the role of the Dietitian in the management in CFS, further research is required to update nutritional guidelines. Further research into Dietetic interventions and their successes in improving patient outcomes may be useful to update current guidelines.

References

- McIntosh J. Chronic fatigue syndrome/myalgic encephalomyelitis. In: Gandy J, editor. *Manual of Dietetic Practice*. Fifth edition. ed. GB: Wiley-Blackwell; 2014. p. 576–580.
- NICE. Chronic fatigue syndrome/myalgic encephalomyelitis (or encephalopathy): diagnosis and management | 1-Guidance | Guidance and guidelines | NICE. [Internet] 2007 [cited 2016 Dec] Available from: <https://www.nice.org.uk/guidance/cg53/chapter/1-guidance>.
- British Dietetic Association. Chronic Fatigue Syndrome. [Internet] 2016 [cited 2017 Apr]; Available at: <https://www.bda.uk.com/foodfacts/cfs-meanddiet.pdf>.

'Let them eat cake': a retrospective service evaluation of Focus on Undernutrition in care homes

R Masters

Focus on Undernutrition, Nutrition and Dietetics, County Durham and Darlington NHS Foundation Trust, South Church Enterprise Park, County Durham, UK

Background: Undernutrition is a major cause and consequence of poor health in older people, affecting 35% of residents in care homes¹. Focus on Undernutrition (FoU), a dietetic service delivered by competency trained dietetic assistants uses a multifaceted approach to undernutrition management. This includes training on the identification and treatment of undernutrition using the 'Malnutrition Universal Screening Tool', food first treatments and the appropriate use of oral nutritional supplements; specialist six week catering course on menu planning and special diets in care homes and annual assessment against a quality standard for undernutrition which is linked to Local Authority funding. This study aims to evaluate FoU's impact on undernutrition outcome measures in care homes; including FoU's influence on weight change in residents at risk of undernutrition, and prevalence of undernutrition and pressure ulcers (PU).

Methods: A retrospective pragmatic service evaluation was undertaken using standardised data collection sheets. Pseudonymised data was collected by dietetic assistants over 13 years on weight, undernutrition risk and PU from all permanent long-stay residents' notes before and six months after training (FoU). Data was analysed by a registered dietitian using an Access database and Statistical Packages for Social Sciences (SPSS). Continuous data was analysed using paired t-tests, categorical data using chi-square. Ethical approval was not required, but written consent was obtained from home managers in order to collect anonymised resident data.

Results: Analysis was completed on 104 homes, 4315 residents (71.3% female; mean stay 10.8 (1–278) months) in County Durham. Following FoU a significant difference was identified for:

- Improved rate of weight change for at risk residents ($p < 0.001$). Undernutrition risk significantly influenced weight change (low: ^B1.04 kg, ^E0.01 kg; moderate: ^B-1.79 kg, ^E-0.38 kg; high: ^B-2.83 kg, ^E1.00 kg, ^B $p < 0.001$, ^E $p = 0.001$)^P.

- Reduced undernutrition prevalence ($p < 0.001$) from 32.7% to 29.1% residents at risk of undernutrition (moderate: ^B13.1%, ^E8.9%; high: ^B19.6%, ^E15.9%)^C. Nutrition screening significantly improved (^B76.3%, ^E98.7%, $p < 0.001$)^C.

- Reduced prevalence PU (51%, $p < 0.001$). PU prevalence significantly increased with undernutrition severity at baseline ($p < 0.001$), but not following FoU ($p = 0.233$) (low: ^B5%, ^E2.3%; moderate: ^B6.9%, ^E1.6%; high: ^B10.5%, ^E3.9%)^C. Odds of developing PU reduced 53% (OR:0.47). ^B:baseline; ^E: evaluation; ^P:paired t-test, ^C:Chi-square, OR: odds ratio

Discussion: The service evaluation results show FoU positively impacts undernutrition outcome measures in care homes, through achieving significant improvements in weight for residents at risk of undernutrition, and reducing undernutrition and pressure ulcer prevalence. These results were comparable to similar studies^{2,3} which also identified improvements in quality of life and health economy. Although outside of scope for this service evaluation, it may be reasonable to assume FoU influenced similar outcomes locally.

Conclusion: These results demonstrate competency trained dietetic assistants delivering FoU is an effective model for improving undernutrition outcomes, with the potential of reducing possible harm, such as pressure ulcers in care homes.

Reference

1. Russell, C & Elia, M. Nutrition Screening Survey in care homes in England. A reported based on the amalgamated data from the four Nutritional Screening Week surveys. (Accessed June 12, 2017, at <http://www.bapen.org.uk/pdfs/nsw/care-homes/care-homes-england.pdf>.)
2. Cawood, AL., Smith, A., Dalrymple-Smith, J., et al. Prevalence of malnutrition and use of nutritional support in Peterborough Primary Care Trust. *Journal of Human Nutrition and Dietetics*. 2012; 21: 384.
3. Beck, AM., Damkjaer, K., Sorbye, LW. Physical and social functional abilities seem to be maintained by a multifaceted randomised control nutritional intervention among old (>65 years) Danish nursing home residents. *Archives of Gerontology and Geriatrics*. 2010; 50: 531–355.

Impact of an eating disorder day service on quality of life, body mass index and patient and staff experiences: a multi- method evaluation

J Parkin¹ & U Philpot²

¹CHCP CIC, Evolve, Hull, UK and ²Nutrition and Dietetic group/ School of Clinical and Applied Science, Leeds Beckett University, Leeds, UK

Background: Day service programmes for moderate to severe eating disorders (ED) have been consistently described and

evaluated worldwide, demonstrating good evidence for their clinical and cost effectiveness (1). Yet there is limited evidence evaluating the efficacy of the emerging trans-diagnostic, continuum of care approach to ED treatment (2). This service evaluation aimed to explore the effectiveness of an innovative Allied Health Professional (AHP) led, primary care eating disorder day service (EDDS) on Health Related Quality of Life (HRQoL) and Body Mass Index (BMI) from pre-post treatment. It also explored patient and staff experiences of the EDDS to enable greater understanding of contributing factors to effective treatment, and areas for improvement.

Methods: A multi-method design, drawing on the philosophical framework of pragmatism integrating both quantitative and qualitative studies to answer the overarching research aims. *Quantitative Design:* Retrospective, repeated measures design using secondary analysis of quantitative outcome data gathered from a convenience sample of 50 patients Eating Disorder Quality of Life Scale (EDQLS) scores and BMI (<18.5 at admission), collected naturalistically at pre-post EDDS treatment from 2013–2016. Data analysis used SPSS employing non-parametric dependent T-test equivalent Wilcoxon Signed-Rank Test. *Qualitative design:* Retrospective analysis of a convenience sample of 54 patients secondary data gathered from open responses to an anonymous, self-reported, service evaluation questionnaire collected routinely at discharge. In addition analysis of staffs ($n = 8$) open responses to a prospective, anonymous, online survey employing typical case purposive sampling. A general inductive approach to qualitative content analysis was employed for all qualitative data. Leeds Beckett University granted ethical approval.

Results: Results demonstrate a statistically significant improvement in BMI for underweight patients and EDQLS for a mixed diagnostic sample with large effect pre-post treatment (Table1). Staff and patients identified individualised approaches to evidence-based treatment, group peer support, MDT knowledge and skills and therapeutic relationship as core strengths of the EDDS.

	Pre-Treatment Mean (SD)	Post-Treatment Mean (SD)	p	Effect Size*
Table 1				
BMI ($n = 20 < 18.5$)	16.1 (1.6)	17.9 (2.3)	<0.001	0.57
EDQLS Total ($n = 50$)	93.2 (24.8)	127.3 (31.6)	<0.001	0.53

*Effect size = 0.1 small, 0.3 medium, 0.5 large.

Discussion: The results indicate that patients with moderate to severe ED are being retained in an AHP led, primary care EDDS with clinically and statistically significant improvements in BMI for underweight patients and HRQoL for a mixed ED diagnostic sample. The mean BMI at discharge is comparative with published EDDS evaluations and demonstrates clinically significant weight gain (1). Increases observed in EDQLS scores were comparable with published findings indicating clinically meaningful improvement in HRQoL (3). Qualitative

feedback from staff and patients is consistent with the essential features of a high quality ED service, identified by ED individuals, carers and health professionals in an international, large scale, online survey (4).

Conclusion: The service evaluation provides preliminary support for community management of a markedly ill group of ED patients within a primary care EDDS which is AHP led, trans-diagnostic, and employs a continuum of care model. Its innovative approach bridges the gap between primary and secondary care and has led to improvements in HRQoL for patients presenting along the full ED spectrum, and in some cases, recovery of their physical and nutritional health status through clinically meaningful increases in BMI.

References

1. Hepburn Z, Wilson K. Effectiveness of adult day treatment for eating disorders. *Mental Health Review Journal*. 2014;19(2):131–44.
2. Newton J, Bosanac P, Mancuso S, et al. Bridging the gap: does a specialist eating disorder service, aimed at developing a continuum of community care, make a difference? *Australas Psychiatry*. 2013;21(4):365–70.
3. Adair CE, Marcoux GC, Bischoff TF, et al. Responsiveness of the Eating Disorders Quality of Life Scale (EDQLS) in a longitudinal multi-site sample. *Health Qual Life Outcomes*. 2010;8:83.
4. Nishizono-Maher A, Escobar-Koch T, Ringwood S, et al. What are the top five essential features of a high quality eating disorder service? A comparison of the views of US and UK eating disorder sufferers, carers and health professionals. *Eur Eat Disord Rev*. 2011;19(5):411–6.

A service evaluation of patients using continuous subcutaneous insulin infusion and their clinical outcomes

R Picton,¹ L Walker¹ & S Beaden²

¹Department of Nutritional Sciences, Faculty of Health and Medical sciences, University of Surrey, Guildford, Surrey, UK and ²Queen Alexandra Hospital, Cosham, Portsmouth, UK

Background: Type 1 Diabetes Mellitus (T1DM) is an autoimmune condition that currently affects more than 370,000 adults in the UK.¹ The number of people with T1DM using Continuous Subcutaneous Insulin Infusion (CSII) to manage their blood glucose levels has increased over recent years.² This service evaluation aimed to audit the outcomes of patients initiating CSII via achievement of individualised goals (either to reduce HbA_{1c} or reduce hypoglycaemia) at 6 months and maintenance of these goals annually. Furthermore, this service evaluation analysed whether differences between individualised goals affected overall outcomes.

Methods: A retrospective observational evaluation including 58 patients with T1DM who started CSII at an NHS Trust

outpatients department (2012–2015). Data on patient's individualised goals and consequent achievement (either to reduce HbA_{1c} or reduce hypoglycaemia frequency), baseline HbA_{1c}, weight and quality of life were collected pre pump and 6 months post pump. A validated tool, Problem Areas In Diabetes (PAID) was completed by patients to assess quality of life. HbA_{1c} levels, weight and individualised goal maintenance were collected annually. The data were input and analysed by applying appropriate statistical tests on SPSS software using a significance value of 0.05. It was not possible to analyse all patients' weight change due to incomplete weight histories, the same limitation applied to changes in HbA_{1c} and PAID scores. Ethics were not required for this clinical service evaluation.

Results: 8 patients were excluded due to withdrawal from CSII, loss to follow up or insufficient data available; 50 patients (aged 41 ± 14 years, 40% male) were analysed. Regardless of group (to reduce HbA_{1c} or reduce frequency of hypoglycaemia) 93.8–94.4% of patients achieved their individualised goal and 66.7–70.6% of patients did this within the 6 months trial period. 100% of the patients in the hypoglycaemia group were maintaining their goal at 4 years compared to only 28.6% of the HbA_{1c} group. Mean weight did not significantly change between baseline (76.26 ± 13.54 kg) and 6 months (78.52 ± 18.82 kg) nor during the 4 year follow up period (72.89 ± 9.24 kg). HbA_{1c} significantly reduced from baseline (73.0 ± 14.0 mmol/L) to 6 months (67.0 ± 9.0 mmol/L) for the whole group (p < 0.001) and remained significantly lower than baseline for the following 3 years. Greater first year reductions in HbA_{1c} were seen in the group of patients whose goal was to reduce HbA_{1c} (change from baseline: 9% for HbA_{1c} versus 1% for hypoglycaemia group; p < 0.018). Baseline quality of life score (31 ± 17) significantly improved when re-assessed at 6 months (9 ± 8) for the whole sample (p < 0.001).

Discussion: This service evaluation shows improvement in patient outcomes when commencing CSII for diabetes management. Other than HbA_{1c} there were no significant differences between patient groups, showing benefit of CSII regardless of its primary indication for use. This evaluation is suggestive that in the long term the initial goal of reducing hypoglycaemic episodes is more sustainable than the initial goal of reducing HbA_{1c}. Although this suggestion concurs with a previous study³, limitations in this evaluation's design may be contributing to the contrasting findings.

Conclusions: This evaluation suggests that CSII therapy was successful at improving diabetes management outcomes in the short term, for the future it would be beneficial to re-evaluate the service with larger patient numbers, more quantifiable data alongside ongoing educational support to highlight the long term benefits of CSII for the management of T1DM.

References

1. The National Institute for Health and Care Excellence. Type 1 diabetes in adults: diagnosis and management | 1–Recommendations | Guidance and guidelines | NICE. [Internet].

- 2015 [cited 2017 Feb 14]; Available from: <https://www.nice.org.uk/guidance/ng17/chapter/1-recommendations>.
- Healthcare Quality Improvement Partnership. Health & Social Care Information Centre. National Insulin Pump Audit Report, 2013-15. National Health Service (NHS) Digital. [Internet]. 2016 Apr 1 [Cited 2017 Apr 3]; Available from: <http://content.digital.nhs.uk/catalogue/PUB20436>
 - Quirós C, Giménez M, Ríos P, Careaga M, Roca D, Vidal M, et al. Long-term outcome of insulin pump therapy: reduction of hypoglycaemia and impact on glycaemic control. *Diabetic Med* [Internet]. 2016 Apr 28 [Cited 2016 Dec 10]; 33(10):1422-1426. Available from: <https://doi.org/10.1111/dme.13094>

A service evaluation of coeliac annual review clinics with an assessment of the impact of gluten-free prescriptions on compliance with treatment

L Rounds, C Jones, K Fuente & SA Denton

Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, UK

Background: Coeliac disease (CD), an autoimmune disorder, triggered by ingestion of gluten is treated via a gluten-free (GF) diet¹. To improve dietary adherence, UK guidelines recommend that individuals with CD should be followed-up annually, ideally with a dietitian, and that they should receive gluten-free products on prescription¹⁻⁴. Since 2015, several clinical commissioning groups in England have removed access to GF prescriptions to save costs⁵. The impact this may have on compliance with the GF diet is unknown⁵. The aim of this study was to assess the service provision to patients attending coeliac annual review appointments in an NHS trust in Southern England and to assess the impact that GF prescriptions have on compliance with the GF diet.

Methods: Ethical approval was not required for this study. Inclusion criteria included all patients aged 18 above, that attended a coeliac annual review appointment at an NHS trust in Southern England in 2016 ($n = 39$). Data was collected retrospectively using dietetic record cards. Record cards were audited against a checklist used by dietitians during annual review appointments. To assess whether the checklist was in-line with the current evidence-base, it was compared to guidelines on the management of CD by the British Society of Gastroenterology¹, Coeliac UK², the National Institute of Health and Care Excellence³ and the Primary Care Society of Gastroenterology⁴. To assess the effect of GF prescriptions on compliance with the GF diet, independent t-tests were used to compare immunoglobulin A tissue transglutaminase (tTG) levels between patients receiving and not receiving prescriptions. Fisher's exact tests were also used to test for an association between receiving GF prescriptions and the presence of symptoms, gluten intake and an osteoporosis diagnosis.

Results: The record card audit showed that points on the checklist were assessed in 0–100% of annual review appointments, with compliance with the GF diet (such as assessing symptoms and antibody levels) assessed in more patients than nutritional adequacy of the diet (such as discussing iron and fibre intake). Eight of the recommendations from UK guidelines were not included in the checklist. No significant associations were found between patients receiving food on prescription and patients not, in terms of symptoms ($p = 0.71$) and an osteoporosis diagnosis ($p = 1.00$). However, a trend towards significance was found with tTGs ($p = 0.07$) and gluten intake ($p = 0.06$); patients with prescriptions had lower tTGs and were less likely to have gluten in their diet than patients without prescriptions.

Discussion: Due to the long-term health implications of not complying with the GF diet, assessing adherence to the GF diet may be viewed as a greater priority to dietitians than assessing factors such as healthy eating and fibre intake. The differences between the dietitian's checklist and UK guidelines may be because two of the guidelines were released after the checklist was last updated in 2015. Results suggest that receiving GF prescriptions may be associated with lower tTGs and increased compliance with the GF diet, however no significant differences were found between patients with and without prescriptions. This may be due to limitations of the study, such as small sample size.

Conclusion: To improve the service provision to patients attending coeliac annual review appointments, dietitians must update the tools they use during consultations, according to current guidelines. Further studies are required to assess the impact that GF prescriptions have on compliance with the GF diet and the factors that influence prescription use.

References

- Ludvigsson JF, Bai JC, Biagi F, Card TR, Ciacci C, Ciclitira PJ, et al. Diagnosis and management of adult coeliac disease: guidelines from the British Society of Gastroenterology. *Gut* 2014;63(8):1210–1228.
- Coeliac UK. Review patients: guidance for follow-up. 2016; Available at: <https://www.coeliac.org.uk/healthcare-professionals/management/review-patients/>. Accessed 22 April, 2017.
- National Institute of Health and Care Excellence. Coeliac disease: recognition, assessment and management. NICE guideline [NG20]. 2015; <https://www.nice.org.uk/guidance/ng20/chapter/Recommendations#serological-testing-for-coeliac-disease>.
- The Primary Care Society of Gastroenterology. The management of adults with coeliac disease in primary care; 2006; Available at: <http://pcsg.org.uk/wp-content/uploads/themanagementofadultswithcoeliacdiseaseinprimarycare.pdf>. Accessed 22 April, 2017.
- Department of Health. The availability of gluten-free foods on prescription in primary care; 2017; Available at: <https://>

www.gov.uk/government/uploads/system/uploads/attachment_data/file/604842/Gluten_free_foods_cons.pdf. Accessed 22 April, 2017.

Audit of vascular access devices in patients prescribed parenteral nutrition (PN)

P Turner & I King

Ulster Hospital, Upper Newtownards Road, UK

Background: Catheter related complications are common in patients given parenteral nutrition (PN) and can be associated with significant nutritional deficits, morbidity and mortality. As a result both NICE¹ and ESPEN² have issued guidance on appropriate vascular access in PN. The aim of this audit of devices used for PN at the Ulster Hospital was to assess practice against these guidelines and identify possible areas of concern.

Methods: A retrospective audit of the clinical records of 20 patients prescribed PN was carried out using an extraction tool to identify the type of line used, whether it was dedicated to PN, how long it was in place, the duration of PN and the number of devices required during the course of PN. Furthermore was a request for a mid or peripherally inserted central catheter (PICC) documented? Had the patient voiced any concerns with regard to the access device and was there any significant harm e.g. line infection? This audit project did not require ethical approval.

Results: 7 PICCs (single lumen), 2 central untunnelled lines, 7 midlines and 18 peripheral vascular cannulas (PVCs) were used for the administration of PN but these were documented as dedicated for PN in only 4 cases. Most lines remained in place for up to 10 days however 7 remained in situ for over 30 days. 2 lines were removed because of inflammation, 7 due to extravasation, 3 became infected, 1 could not be accessed

and 1 was no longer needed. Most courses of PN lasted 5 – 10 days however 3 lasted 25 – 30 days and 4 greater than 30 days. 13 patients required up to 10 devices for their course of PN, 6 required 10–20 devices and 1 required 30 – 40 devices. On four occasions a mid or PICC line was requested for PN but not placed, 1 patient voiced concerns that were documented in the clinical records about the PN access device causing discomfort and two patients developed infections in their lines (1 PICC, 1 mid line).

Discussion: This audit highlighted several areas of concern, most significantly lines not being dedicated to PN as this is a considerable risk for sepsis and is contrary to the recommendations of NICE¹ and ESPEN². In addition the number of short PVCs placed for peripheral PN is not optimal due to discomfort, cost of frequent replacement and damage to vascular access - much of which could be avoided with the use of midlines as recommended by ESPEN. Also PICC infections led to blood stream infections. The lack of a dedicated person to place PN lines and lead on their care may be a contributing factor to these findings and resultant impact on optimal nutritional care.

Conclusions: Several areas of concern were highlighted by the audit, in particular line sepsis and the number of cannulas used for peripheral PN. Employing a nutrition specialist nurse or specialist dietitian to place and care for lines may be a solution.

References

1. National Institute for Health and Care Excellence (NICE). Clinical Guideline 32: Nutrition Support in Adults 2006
2. Pittiruti et al. ESPEN Guidelines on Parenteral Nutrition: Central Venous Catheters. *Clinical Nutrition* 2009 (28) 365–377

Editor: **Simon Langley-Evans**

Journal of **Human Nutrition** and **Dietetics**

VOLUME 31 • ISSUE 1 • FEBRUARY 2018

- RENAL NUTRITION
- DIETETIC AND PROFESSIONAL PRACTICE
- FATTY ACIDS
- DIETARY PATTERNS
- NUTRITIONAL MONITORING

Journal of Human Nutrition and Dietetics

The Official Journal of the British Dietetic Association

Editor-in-Chief

Professor Simon Langley-Evans
Deputy Head of School of Biosciences
University of Nottingham,
UK.
E-mail: simon.langley-evans@nottingham.ac.uk

Associate Editors

S Burden, University of Manchester, UK
C Green, Nutricia, The Netherlands

Editorial Board

A. Anderson, *Centre for Public Health Nutrition Research, University of Dundee, UK*
T. Baranowski, *Baylor College of Medicine, USA*
J. Bauer, *School of Human Movement Studies, University of Queensland, Australia*
T. Burrows, *University of Newcastle, Australia*
J. Coad, *Massey University, New Zealand*
C. Collins, *University of Newcastle, Australia*
P. Collins, *Faculty of Health, Queensland University of Technology, Australia*
K. Davison, *Simon Fraser University, Canada*
J. Harvey, *University of Vermont, USA*
M. Hickson, *Faculty of Medicine, Imperial College London, UK*
J. Hodgson, *University of Western Australia, Australia*
M. Kiely, *County College Cork, Ireland*
F. Kolahdooz, *University of Alberta, Canada*
I. Lemieux, *Quebec Heart Institute, Laval University, Canada*
S. Lennie, *School of Pharmacy and Life Sciences, Robert Gordon University, UK*
A. Madden, *School of Health and Emergency Professions, University of Hertfordshire, UK*
M. McInley, *Queens University Belfast, UK*
D. Mellor, *University of Canberra, Australia*
C. Nowson, *Deakin University, Australia*
T. Ong, *Sao Paulo University, Brazil*
A. O'Sullivan, *Institute of Food and Health, University College Dublin, Ireland*
M. Pakseresh, *University of Alberta, Canada*
Y. Probst, *University of Wollongong, Australia*
A. Roefs, *Faculty of Psychology, Maastricht University, The Netherlands*
J. Swift, *School of Biosciences, University of Nottingham, UK*
M. Taylor, *School of Biomedical Sciences, University of Nottingham, UK*
K. Whelan, *Kings College London, UK*
L. Williams, *Department of Oncology, University of Sheffield, UK*
L. Wood, *University of Newcastle, Australia*

Aims and editorial policy

Journal of Human Nutrition and Dietetics is an international peer reviewed journal publishing papers in applied nutrition and dietetics. Papers are therefore welcomed on:

- Clinical nutrition and the practice of therapeutic dietetics
- Public health nutrition and nutritional epidemiology
- Health promotion and intervention studies and their effectiveness
- Food choice and the psychology of eating behaviour
- Food intake and nutritional status
- Sociology of food intake

Further information on this journal can be accessed at wileyonlinelibrary.com/journal/jhn

The Publisher, British Dietetic Association and

Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher, British Dietetic Association and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher, British Dietetic Association and Editors of the products advertised.

Journal of Human Nutrition and Dietetics © 2018 The British Dietetic Association. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the prior permission in writing from the copyright holder. Authorization to photocopy items for internal and personal use is granted by the copyright holder for libraries and other users registered with their local Reproduction Rights Organisation (RRO), e.g. Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923,

USA (www.copyright.com), provided the appropriate fee is paid directly to the RRO. This consent does not extend to other kinds of copying such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale. Permissions for such reuse can be obtained using the RightsLink "Request Permissions" link on Wiley Online Library. Special requests should be addressed to: permissions@wiley.com

The *Journal of Human Nutrition and Dietetics* is published by Blackwell Publishing Ltd: 9600 Garsington Road, Oxford OX4 2DQ, UK. Tel: +44 1865 776868; Fax: +44 (0)1865 714591. Blackwell Publishing was acquired by John Wiley & Sons in February 2007. Blackwell's programme has been merged with Wiley's global Scientific, Technical and Medical business to form Wiley Blackwell.

Production Editor: Patricia Joyce Tulayan (email: jhn@wiley.com)