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New to Research

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

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

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

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Background: Critically ill patients have an altered metabolism and hence an increased risk of malnutrition. Nutrition, therefore plays a fundamental role in the recovery of patients and is associated with improved health outcomes[(1)]. Research has highlighted that critically ill patients are frequently underfed and this can often be due to feed interruptions[(2)]. The aim of this study is; to evaluate the nutritional adequacy of

enteral nutrition (EN) and identify interruptions reasons to EN on an Intensive Care Unit (ICU) in the North East.

Method: An observational longitudinal descriptive study was conducted in a Northern hospital, 20 consecutive patients admitted to the surgical ICU that met the inclusion criteria of; adult patients (≥18 years) on the surgical ICU, who were intubated on admission or within 48 hours of admission to ICU, who remained on ICU ≥ 72 hours and showed no contraindication to EN were enrolled. Data were collected retrospectively from patients' records. The nutritional target of EN, quantity of calories and protein delivered, interruption time and reason to feed were recorded. Non-parametric testing was utilised to identify associations between length of ICU stay and adequacy of EN. Data was analysed using Statistical Package for Social Sciences (SPSS) and Microsoft Excel.

Ethical approval was gained by the Local Research Ethics Coordinator and the service evaluation were registered and approved by the Hospital trust where research was completed.

Results: The sample included 14 (70%) surgical patients and 6 (30%) medical patients. Patients received an average of 79.86% and 80.94% of their prescribed target calories and protein, respectively. Non-nutritional sources of energy, IV glucose and propofol 1.00% solution, were additional to the prescribed feeding regimens, and contributed to 21.37% of total calories received. There were 321 hours of feed interruption across all 20 patients, with the most common interruption and highest percentage of interrupted time due to admission to theatre, equating to 19.00% of interruptions and 121 hours of missed feed. Results showed no significant (p = .684) association between length of ICU stay and adequacy of feed delivered to patients.

Discussion: Findings from this study are supported by other literature, highlighting that patients' nutritional adequacy on ICU is often poor. Despite results showing patients are not meeting their nutritional targets in this study, they are receiving a higher percentage of nutrients compared to other research[(2)]. There is limited research which incorporates the delivery of non-nutritional sources, meaning no tangible conclusions can be made on the trends of percentage calories from non-nutritional sources. However, this study highlights these sources contribute to a high proportion (21.37%) of patients' total calories. Interruption reasons that caused EN to be stopped and hence a poorer nutritional adequacy consisted of both avoidable reasons (theatre admissions), and unavoidable reasons (vomiting), which is in line with literature. Findings of this research do not statistically show an association between length of stay and nutritional adequacy; nevertheless, findings illustrate a gradual increase in delivered calories during the first 5 days. These do not conclusively agree or disagree with literature; however, there is limited research into this aspect available. Dietitians are a pivotal factor to achieving good delivery rates and play an essential role in optimising enteral feeding, yet two-thirds of ICUs are allocated between a 0.10–0.50 weighting of dietetic resources[(3)], suggesting a need to re-evaluate services to promote nutritional adequacy.

Conclusion: Overall, it has been identified that feed interruptions often result in patients not receiving adequate nutrition in ICU, with results showing no association between ICU length of stay and the adequacy of calories delivered. This demonstrates the need for re-evaluation of feeding protocols within ICUs to maximise the delivery of enteral nutrition to patients.

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

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Background: With obesity prevalence rising, the use of total diet replacement (TDR) for weight control (very low-calorie diet (VLCD) or low-calorie diet (LCD)) is now considered an effective and accepted method for weight loss[(1)]. However, the current guidance and regulations (EU-wide and still applicable to the UK) which govern both the compositional and labelling criteria of these products are complicated and regularly evolving. This research aimed to investigate the compliance of major TDR providers and their products with current and future EU legislative requirements and guidance, and assess the understanding of TDR law by Health Care Professionals (HCPs) and TDR consumers.

Methods: A product review was conducted on 4 major commercial TDR providers and nutritional comparisons were made against current guidance and applicable EU regulations based on their calorie provision: 450–800 kcals/day (VLCD, overseen by CODEX Standards) or 800–1200 kcals/day (LCD, governed by Directive 96/8/EC). Nutritional comparisons were also made against the

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future regulation, mandatory from 2022 only, Regulation (EU) 2017/1798. Following this, each TDR provider was given a total percentage of compliance to the current applicable and future legislations. To assess consumer and HCP understanding, a questionnaire was designed, based on a traditional Likert scale[2], for use in a survey to investigate knowledge and interest in general food law, TDR and food labelling. The survey comprised of 22 or 23 questions for TDR consumers or HCPs, respectively. Results from the Likert scale were converted into percentages for each response. Participants were required to be over 18 years to partake and were recruited via social media and by word of mouth (causing a potential source for selection bias). This study was granted ethical approval by King's College London Ethics Committee (reference LRU-19/20-17822).

Results: In total across the 4 TDR providers, 94 products were analysed (with the number of products offered by each provider ranging from 8 to 49). It was found that just 1 of 3 TDR providers with available data met 100% of the specified compositional criteria for all nutrients according to the guidance applying to VLCDs. 0 of 3 met 100% of the specified criteria for LCDs. When assessed against the future regulation, none of the providers' current commercial offering met 100% of the desired compositional criteria. The questionnaire, which was completed by 30 TDR consumers and 55 HCPs, revealed 48% of TDR consumers and 34% of HCPs were 'not at all aware' of the required nutritional compositional criteria of TDR products.

Discussion: Food law is deemed by industry and HCPs to be one of the more functional and relevant areas of law[3]. However, the complexity of the language and continuous alterations to the law around food, with focus on TDR law, often makes it very difficult for manufacturers, the general public and HCPs to understand and stay up-to-date with the regulations - especially with them differing between VLCDs and LCDs.

Conclusion: This study highlights the marked variation amongst selected TDR providers and their compliance with the regulations governing their TDR products. Given that there are many other additional commercial providers of these types of products, the shortfalls in both consumer and HCP understanding may result in consumers being at risk of receiving inadequate macro- and micronutrient intakes, if purchasing from a manufacturer who does not abide by the law.

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

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

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

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

12th GW, a significantly higher percentage went on to develop anaemia by the 36th GW (10.6% vs 4.6%, $p = 0.032$).

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

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

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

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Background: Dietitians continue to use pen and paper methods for dietary assessment (DA) despite evidence to suggest technology assisted DA reduces healthcare costs and increases assessment accuracy[1]. The study aim was to examine the feasibility of using an online DA tool in outpatient dietetic practice.

Methods: This feasibility study took place in a large adult teaching hospital. Ethical approval was granted by Manchester East REC. Eligible dietitians and their patients were invited to take part by letter. Consent was taken at a study visit and was followed by training on the myfood24 website. This tool is used for research and teaching and was not adapted for this study. Patients were asked to submit at least three 24-hour dietary recalls for dietitians to review before appointments and these were used for DA. Screening, recruitment and baseline demographic data were collected. Validated paper-based questionnaires (Q) measuring technology readiness and patient activation provided further baseline data. On completion of the intervention, a validated Q measured the usability of the website and bespoke Qs for both patients and dietitians, based on a theoretical framework, measured the acceptability of the intervention. A post-consultation Q completed by dietitians examined differences with usual care including appointment duration and content. Descriptive and inferential statistical analysis was completed. Chi-squared test was used for categorical data and independent t-test for continuous data, with the significance level 0.05.

Results: Eleven dietitians consented from eight clinical areas. Of 212 patients invited, 39 (18.4%) volunteered to participate. They ranged in age from 18 to 84 years, 56.4% female, 92.3% white and index of multiple deprivation (IMD) showed 46% lived in areas with high levels of deprivation. There was no statistically significant difference in these baseline characteristics between those who consented and declined. 29 (74.4%) patients completed at least three 24-hour recalls. Seven (17.9%) completed no recall due to technology or health issues and technology readiness scores were lowest in this group.The mean usability score was 67.5 (95%CI 58.9, 76.1), 60–69 is marginal acceptable. The intervention was moderately acceptable to both dietitians and patients. However, patients found the intervention less of a burden, more effective use of time and a more positive and successful experience. Compared to usual care dietitians found clinic preparation took on average 15 minutes longer but consultation time could be reduced. More time was freed up for education. The software was thought to provided an accurate nutritional assessment.

Discussion: This was the first study using myfood24 as a tool in routine clinical practice. Health technology can potentially widen inequalities; however, a diverse range of participants were recruited in terms of age and IMD, and ethnicity was representative of the clinic population. Completion rates of the intervention were good despite both the technology readiness and software usability score being lower than that found in studies in healthy volunteers[2]. Acceptability scores suggest that despite the technical challenges, patients felt the intervention was worthwhile. Dietitians found this DA method accurate and overall found the intervention to be moderately acceptable. However, pre-clinic preparation, using unfamiliar software not designed for clinical dietetics, was time consuming.

Conclusion: The use of an online 24-hr recall dietary tool by patients prior to their dietetic appointment was a feasible and acceptable method of dietary assessment for both patients and dietitians. Tailoring the software of such tools to clinical dietetics in the future may further improve effectiveness and could enable DA technology to be used more widely in dietetic practice.

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

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Background: Dehydration has been associated with acute negative effects on cognition, work performance and long-term health[1]. Optimal hydration in the healthcare setting may have beneficial effects on staff health, productivity, safety and patient outcomes[2]. The aims of this research were to 1) characterise UK healthcare worker fluid intake, 2) assess adherence to European Food Safety Authority (EFSA) adequate intakes (AIs)[3] and 3) identify barriers to fluid intake while at work.
Methods: Ethical approval for this cross-sectional study was granted by King's College London [MRA-18/19-14102]. Self-reported fluid intake at work and over 24-hours on a typical working day were assessed using a modified version of an American beverage intake questionnaire[4]. Occupational and demographic data were collected; barriers to intake were assessed using a predefined list and free text option. The questionnaire was disseminated online between 13.11.19 and 26.11.19 via the social media platforms Facebook and Twitter. From 494 responses, 415 were complete and included in the analysis. Associations between intake, workplace environment and role were tested using Mann Whitney U, Kruskal-Wallis and Chi-squared tests.
Results: Median daily intake over 24-hours was 1600 ml (IQR 1200 ml) with significant differences across job role and location (Table 1). AIs of 2 L for men and 1.6 L for women were met by 55.7%. Median intake in the workplace was 800 ml/day (IQR 800 ml). Barriers to fluid intake (Table 2) were experienced by 84% of respondents. Intentionally restricting fluid intake at work was reported by 49% of these respondents 54% reported this was due to limited toilet access.

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

Job	n	Median intake (ml)	IQR	p
1) AHP	27	2200	1100	<.001
2) Doctor[‡]	155	1400	1200	
3) Nurse[†,‾]	192	1800	1200	
4) Non-clinical[†]	41	1600	1200	

Table 2. Frequency of experiencing barriers to drinking at work

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

Discussion: The fluid intakes reported in this study are comparable to workplace intakes of non-healthcare workers[5]. Adherence to AIs in this study were lower than the 70% reported in the UK Fluid Intake Study[6], suggesting that healthcare workers may be less able to meet recommendations, which could be due to workplace barriers. Limitations of this study include convenience sampling and the lack of a validated UK fluid intake assessment tool.
Conclusion: Approximately half of respondents did not achieve intake recommendations and barriers to fluid intake were experienced by the majority of respondents suggesting the need to promote hydration for people who work in healthcare environments.
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The clinical consequences of post-diagnosis weight gain in women with breast cancer: a systematic review

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Background: Weight gain after breast cancer diagnosis is common, and often persists into survivorship. While pre-diagnosis obesity is associated with poorer breast cancer outcomes[(1)], the clinical consequences of post-diagnosis weight gain require exploration. This systematic review aimed to determine the effects of post-diagnosis weight gain (≥5% bodyweight increase) on prognostic and patient-reported outcomes (PROs) in women with breast cancer.
Methods: Electronic databases were used to identify English-language studies published between 2009 and 2019, including: PubMed, PsycINFO and Web of Science. Articles considered for inclusion were quantitative observational and intervention studies comparing outcomes in adult women who gained weight (≥5% bodyweight increase) post breast cancer diagnosis with those who remained weight-stable (<5% change). A standardised data extraction form was used to report on study design and outcomes. The quality of the included studies was assessed using the Newcastle-Ottawa Scale for observational studies. Ethical approval was not required.
Results: No eligible intervention studies were identified; of eight included cohort studies, five reported prognostic outcomes (disease recurrence and mortality) and three evaluated PROs (physical function, physical health-related quality of life [HRQOL] and hot flush symptoms). Post-diagnosis weight gain was associated with an increased risk of all-cause mortality in two of four studies and breast cancer-specific mortality in one of two studies, but not recurrence. Women who gained weight reported significantly lower physical HRQOL ($p < 0.05$), and those whose weight increased by at least 10% also experienced significantly worse hot flush symptoms and physical function than weight-stable women.
Discussion: While post-diagnosis weight gain appears to adversely affect patient-reported outcomes (PROs) the prognostic consequences remain unclear, likely due to heterogeneity in study design such as duration of follow-up and level of covariate adjustment. Previous reviews have similarly reported conflicting findings[(2,3)], however, these have synthesised results from more dated studies that do not reflect prognostic outcomes in the context of current treatments. Further high-quality cohort studies of standardised design are needed to better define the needs of this patient group and support the development of evidence-based oncological weight management strategies.
Conclusions: Women who gain weight after breast cancer diagnosis may be at greater risk of mortality and poorer PROs (physical wellbeing) than weight-stable women, particularly if gains exceed 10%.

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

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Background: While obesity is a major health concern for the general population[(1)], individuals with learning disabilities experience a disproportionately high risk of obesity and obesity related co-morbidities[(2)]. People with learning disabilities who live in more restrictive environments (such as residential homes) are also more likely to be obese than the general population[(3)]. Dietary intake in those with a learning disability is often of poor nutritional quality and outside of recommended values for both macronutrients and micronutrients[(4)]. A food provision improvement strategy has the potential to improve the quality of the diets consumed by all residents within a residential home (RH). The aim of this study is to evaluate the impact of a staff education programme on the quality of food provided in residential homes for Adults with Learning Disabilities (RHALD) and on the weight of overweight and obese residents.
Methods: From the existing dietetic weight management caseload, fifteen RHALD were identified as having more than one resident who was overweight or obese. Weight of all consenting residents (n=64) was determined at baseline and at three monthly intervals throughout the intervention. Mean intervention length was 28.15 weeks. Dietary education comprising of basic healthy eating principles, portion size guidance and menu planning recommendations was provided by a dietitian, to RH staff. RH staff were instructed to make changes to their standard menu plans, based on the education they received, and further support was provided to ensure that the new menu plans represented a healthy balanced diet. Ethical approval was not required to provide education sessions to RH staff or to complete the service evaluation.

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

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

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

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

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

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

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

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

pregnant women, and groups at high-risk of deficiency, such as vegans.

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

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

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Background: Sickle Cell Disease (SCD) is the fastest-growing genetically inherited red blood cell disorder in the UK(1). Nutritional deficiency, which is thought to be the natural consequences of the pathophysiology of the condition(2), is prevalent in sickle cell patients. The deficiency is associated with impaired growth and development and increased morbidity and mortality. Currently, nutrition is not integrated into sickle cell healthcare provision in the UK and other countries. Indeed, the optimal nutrition needs of patients with the disease remain to be fully explored. The study aims to ascertain the knowledge of the optimum nutrition needs of sickle cell patients and the influencing socio-ecological factors.

Method: The research is part of a Professional Doctorate. It is a four-phase qualitative study using a Learning Alliance Methodology, purposive sampling and gatekeepers to recruit sickle cell service users and carers (n = 11) and service providers (n = 7). Full ethical approval was obtained from Anglia Ruskin University ((ESC-SREP-18-334). The study did not require NHS ethics, as data collection was conducted in non-NHS venues with free-living sickle cell patients. Data collection included zoom enabled focus groups, nutrition network meetings and an evaluation questionnaire. Thematic data analysis was used in the study.

Results:

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

Discussion: These findings support a case for the provision of a nutrition service in sickle cell healthcare management. Such a provision would help enhance the nutritional knowledge of both service users and providers, and promote health and wellbeing in patients by ameliorating nutritional deficiency and associated complications.

Conclusion: There is a need to provide a nutrition service in sickle cell healthcare management to improve health outcomes for sickle cell patients and address the nutrition knowledge gaps of both sickle cell service users and providers.

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

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Background: The reported prevalence of gestational diabetes mellitus (GDM) has risen sharply in recent years, owing to changing diagnostic criteria and population demographics(1). Regular outpatient contact is essential in GDM patients, which is limited by a large demand

for these services and comparatively limited capacity to fulfil them[2]. For this reason, there has been significant interest in alternatives to the standard outpatient model of care[3].

Methods: We analysed retrospective patient data from an antenatal diabetes service. This comprised two groups, one treated via an opt in Skype clinic, held weekly by a dietitian and diabetes specialist nurse (DSN) (n = 50). The comparison group were treated as per standard practice (n = 50), where an initial group education session was provided before discharge from the dietetic service. We assessed differences in pregnancy outcomes (birth outcomes, mode/onset of delivery) and time to treatment (TTT), or time until medication was required to help achieve blood glucose targets, between the groups. We also assessed patient satisfaction with the Skype service through a treatment satisfaction questionnaire. Ethical approval was granted in partial fulfilment of an MSc research project in the University of Chester (FREC: 1624/20/SMA/CSN).

Results: A significant difference in TTT was observed between the Skype intervention and traditional practice. Skype patients had a significantly longer TTT with metformin (30.5 days [IQR 23.75–46] vs. 10.5 days [IQR 4.25–17.75], p = 0.001) and significantly longer TTT with insulin (73.14 ± 40.03 days vs. 27.45 ± 18.92 days, p = 0.008) than patients in the traditional treatment group. Overall satisfaction with the Skype service was high. No significant differences were observed between baseline characteristics or pregnancy outcomes between groups.

Discussion: Skype appointments in the antenatal diabetes clinic can offer significant benefits to both the patient and the healthcare provider. We observed similar pregnancy outcomes and high levels of satisfaction with the service. We also saw significantly extended time to treatment with hypoglycaemic medications.

Conclusion: These results highlight the benefits of facilitating regular contact and additional dietetic support in this patient with GDM.

Keywords: Digital Health, Dietitian, Insulin, Metformin

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

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

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

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

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

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

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

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

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

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BDA The Association of UK Dietitians THE OFFICIAL JOURNAL OF THE BRITISH DIETETIC ASSOCIATION Journal of Human Nutrition and Dietetics

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

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Background: Enteral nutritional intervention on the Intensive Care Unit (ICU) needs to be carefully planned and tailored to each individual[(1)]. Dietitians have the knowledge and skills to provide the most appropriate enteral feeding regimens and ongoing monitoring for complex critical care patients to minimise weight loss[(2)]. Significant weight loss is defined as involuntary weight loss of 5% or more in one month[(3)].The Neuro ICU where this study took place does not routinely refer for dietetic input. A standard ICU protocol feeding regimen is used for all enterally fed patients. The aim of this audit was to determine the extent of weight changes in adults receiving standard protocol enteral feeding whilst on the Neuro ICU.

Methods: A retrospective audit to examine any weight changes that occur in enterally fed patients receiving standard protocol feeding on the Neuro ICU. A total of 35 patients (23 male, 12 female), selected between July and December 2019, met the inclusion criteria of being exclusively enterally fed during their entire stay on the Neuro ICU. Range of ICU length of stay (LOS) was 1 to 30 days. Anonymous data were collected during dietetic assessments of these patients on the acute Neurosurgical ward post ICU stay and via ICU database records. Data collected included; weight upon admission to and leaving the ICU, and length of stay (LOS) on the ICU. Microsoft Excel was used to analyse data. Results were expressed as mean and standard deviation. Ethical approval was not required, however, this audit was registered with the hospital audit office.

Results: Weight loss occurred in 77% (n = 27) of patients. No weight change occurred in 14% (n = 5) of patients. Weight gain occurred in 9% (n = 3) of patients. Mean weight changes for all patients on ICU were decreases of 3 Kg (±3.9) and 4% (±4.9) from admission weight. Mean weight changes, by LOS on the ICU, were decreases of 0.8 Kg (±1.3) and 1.1% (±1.6) for 1 to 7 days (n = 11), 4.3 Kg (±4.0) and 5.2% (±5.2) for 8 to 14 days (n = 16), 3 Kg (±0.0) and 5.3% (±1.0) for 15 to 21 days (n = 3) and 4.9 Kg (±6.1) and 6.6% (±7.8) for 22 to 30 days (n = 5). The co-efficient of determination values for mean weight decreases were $R^2 = 0.61$ and $R^2 = 0.81$, for Kg and %, respectively.

Discussion: The majority of patients receiving a standard protocol enteral feed lost weight during their ICU stay. The R^2 values indicate a strong correlation between LOS and mean weight loss, i.e., the longer patients remained on the ICU, receiving a standard protocol feed, the more weight they lost. For patients with LOS on the ICU for over 7 days, mean weight loss was significant (over 5%), increasing the risk of malnutrition in this patient population[(3)]. A limitation of this audit was its relatively small sample size.

Conclusion: The use of a standard feeding protocols on the Neuro ICU appears to contribute towards significant weight loss and an increased risk of malnutrition in exclusively enterally fed patients. This occurs especially when LOS is over 7 days and the longer the LOS, the greater the mean weight loss. A pilot study of how dietetic input could minimise weight loss and risk of malnutrition in this patient population is recommended.

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

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

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

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

Table 1. Mean differences between provision and estimated requirements by propofol (ml/hr) category

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

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

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

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