

ORIGINAL ARTICLE

Meal provision in a UK National Spinal Injury Centre: a qualitative audit of service users and stakeholders

S Wong^{1,2}, A Graham¹, D Green¹, SP Hirani³, G Grimble² and A Forbes²**Study design:** A single centre survey.**Objectives:** The objective of this study is to (1) assess patients' food intake and (2) measure satisfaction with current food provision, as judged by patients and by stakeholders (medical and nursing staff, managers and catering staff).**Methods:** Standardised questionnaires were used to record food intake over a 24-h period, and to evaluate the quality, ordering, delivery and overall acceptability of food provided.**Results:** The food intake of 67 patients with spinal cord injury (SCI) was recorded (64% response rate) and 166 evaluations (50% response rate) were returned. Twenty-nine patients (48%) consumed three full meals a day, 17 (26%) received oral nutritional supplements, 22 (34%) received vitamin/mineral supplements, and 23 (35%) required assistance to eat. Some patients and stakeholders expressed satisfaction with the current food provision: taste good: 25 versus 17% (for patients and stakeholders, respectively); appropriate texture: 22 versus 21%; appropriate temperature: 55 versus 72% ($P=0.002$); well presented: 43 versus 28%; good choice: 49 versus 59%; received meal ordered: 65 versus 37% ($P<0.001$); meal served on time: 71 versus 58%; and no interruption during mealtimes: 62 versus 46%. Principal component analyses of item scores identified three main factors (food quality, food presentation and food delivery (logistics)).**Conclusion:** The present study identified some areas where there appeared to have been improvement in SCI hospital catering, but with much still to be achieved. Hospital-catering systems should be tailored to meet the demands of the different patient groups to optimise nutritional intake. Periodic quality control is essential to meet recommendations and patients' expectations.*Spinal Cord* (2012) **50**, 772–777; doi:10.1038/sc.2012.43; published online 17 April 2012**Keywords:** patient experience; hospital food; nutrition; malnutrition; spinal cord injury

INTRODUCTION

A recent multicentre study found that up to 40% of patients admitted to the UK spinal cord injuries (SCI) centres were malnourished, and more than half of patients reported weight loss after SCI.¹ Despite its importance, malnutrition is rarely identified by clinicians working in general hospitals² or in SCI centres (SCIC).³ We reported previously that the provision of dietetic resources in SCIC is suboptimal,⁴ and therefore, it is imperative that hospital catering staff in conjunction with ward-based personnel are proficient in optimising menu design, and in adapting menus, that they have the ability to improve the mealtime atmosphere, and are able to deal with individual patient needs as well as offering a balanced menu that meets patients' nutritional requirements.

Previous studies in general hospital patients have demonstrated that the dietary intake of hospitalised patients is often inadequate.⁵ Poor nutritional intake is associated with worse clinical outcomes,⁶ and appropriate nutritional care can improve these outcomes.^{7–9} The independent health watchdog in England, the Care Quality Commission, assesses all hospitals annually against Core Standard 5, meeting nutritional needs.¹⁰ The most recent Care Quality Commission national survey found that 20% of hospitals were not compliant in meeting this standard.¹⁰ Additionally, in a separate survey in 165 English hospital trusts, it was found that 20% of

patients felt that they did not get the help they needed to eat their meals.¹¹

There are currently limited data reporting how well the current catering system provides for the needs of patients with SCI. The aims of the present study were to (1) assess patients' food intake and (2) measure satisfaction with current food provision as judged by patients and by the professional stakeholders: medical staff, nursing staff, managers and catering staff.

METHODS

The study consists of an audit of patient food intake followed by an evaluation of the service by patients and professional stakeholders. Three questionnaires were employed (Figures 1, 2 and 3).

Questionnaires

The first questionnaire addressed individual patients' food intake; we invited patients to self-report (with help from nursing staff if the ability to write was impaired due to SCI) their actual food intake semi-quantitatively on a single day, by recording whether: all; greater than half; half; quarter; or none of the food served on the plate was consumed. The availability and consumption of snacks were also recorded. In addition, we recorded whether patients received oral nutritional supplements, vitamin and mineral supplements, and/or needed assistance to eat.

¹Department of Nutrition and Dietetics, National Spinal Injuries Centre, Stoke Mandeville Hospital, Aylesbury, UK; ²Centre for Gastroenterology and Clinical Nutrition, University College London, London, UK and ³Health Service Research, School of Health Sciences, City University, London, UK
Correspondence: S Wong, Department of Nutrition and Dietetics, National Spinal Injuries Centre, Stoke Mandeville Hospital, Aylesbury, Buckinghamshire HP21 8AL, UK.
E-mail: Samford.Wong@ucl.ac.uk

Received 9 January 2012; revised 5 March 2012; accepted 5 March 2012; published online 17 April 2012

Breakfast

All eaten >3/4 eaten 1/2 eaten <1/2 eaten None eaten Don't know

Morning snack offered

Yes No Don't know

Morning snack eaten

Yes No Don't know

Lunch

All eaten >3/4 eaten 1/2 eaten <1/2 eaten None eaten Don't know

Afternoon snack offered

Yes No Don't know

Afternoon snack eaten

Yes No Don't know

Please tick if patient consumes lunch from outside hospital (e.g. take away, brought by visitor)

Evening Meal

All eaten >3/4 eaten 1/2 eaten <1/2 eaten None eaten Don't know

Evening snack offered

Yes No Don't know

Evening snack eaten

Yes No Don't know

Please tick if patient consumes evening meal from outside hospital (e.g. take away, brought by visitor)

Does patient receive an oral nutrition supplement? Yes No

Does patient receive a vitamin/mineral supplement? Yes No

Does patient need assistance to eat? Yes No

Figure 1 Intake questionnaire.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Q1 There is a good choice / variety of dishes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q2 I am always able to select my own choice of meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q3 I always receive the meal I ordered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q4 Meals are served on time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q5 There are no interruptions during mealtimes. (e.g. due to procedures, ward rounds)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q6 The meals taste good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q7 The meals have an appropriate texture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q8 The meals are served at an appropriate temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q9 The meals are well presented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q10 The portions are large enough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q11 In my view the meals are healthy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q12 Overall, I am satisfied with the meals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2 Meal provision questionnaire—patients

The second part of the audit addressed service users' (Figure 2) and stakeholders' (Figure 3) evaluation of the current food provision in the SCIC. We invited participants to rate, with a 5-point Likert scale (strongly agree to strongly disagree) their opinions on (1) food choice; (2) food ordering; (3) food delivery; (4) quality of food; and (5) overall satisfaction with meals. Staff members were asked to report on their perception of the service as provided to patients.

The third component was an open question that aimed to seek the subject's views on how to improve food provision in the SCIC.

A pilot study ($n = 5$) was performed to assess the content and time required to complete the questionnaire; feedback from this guided the development of the final version of the questionnaire.

Ethics

This study was conducted according to the guidelines outlined in the Declaration of Helsinki. Formal ethical permission to conduct the study was not required by the hospital review board, as this was considered to be a

What is your profession?

Doctor Nurse Allied Health Professional

Manager Catering staff Student

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Don't know
Q1 There is a good choice / variety of dishes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q2 Patients are always able to select their own choice of meal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q3 Patients always receive the meal they ordered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q4 Meals are served on time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q5 There are no interruptions during mealtimes. (e.g. due to procedures, ward rounds)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q6 The meals taste good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q7 The meals have an appropriate texture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q8 The meals are served at an appropriate temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q9 The meals are well presented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q10 The portions are large enough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q11 In my view the meals are healthy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q12 Overall, the meals are good	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Would you like to make any additional comments relating to the food provision in the NSIC?

Figure 3 Meal provision questionnaire—staff.

clinical audit not involving active patient participation.¹² The questionnaires were approved by the local clinical audit department for phrasing and grammar of the questions.

Survey administration

The questionnaires were given to all in-patients ($n=115$) and to all the stakeholders working in the National Spinal Injuries Centre at Stoke Mandeville Hospital ($n=167$) during the period January 2011 to March 2011. Staff included doctors ($n=15$); nurses ($n=102$); allied health professionals ($n=40$); catering staff ($n=7$); and managers ($n=3$). One reminder was sent to staff by email 2 weeks after the initial distribution. Patients were reminded by a personal visit from the investigator.

The questionnaires were completed anonymously, and participants were asked to complete them without conferring with colleagues or fellow patients.

Statistical analysis

Descriptive statistics were used to calculate the response frequency. Data are reported as medians (range). For numerical data on an ordinal level, the Mann-Whitney test was used, and for cross-tabulation on a nominal level, the χ^2 -test was performed. Comparisons were made between those who agreed (strongly agree and agree) and disagreed (strongly disagree and disagree). The data were analysed using Minitab 15 (Minitab Ltd, Coventry, UK) and significance was accepted if $P<0.05$.

The questionnaire items were analysed by principal components analyses (PCA) with direct oblimin rotation. A scree plot was used to determine the

number of components to be extracted. Items with loadings above 0.5 in each component of the matrix were retained for scale construction, following appropriate reversal of items based on polarity of loadings. If scales consisted of a large number of items, these were explored with a further PCA to determine if they could be further broken down. This was analysed by using SPSS 17 (SPSS Inc., Brimingham, UK).

RESULTS

A total of 105 questionnaires were distributed for the first part of the study and responses were received from 67 patients (63.8%; age range: 15–81 years (median: 49 year), 14.9% female, 55.7% tetraplegic; 30.7% complete SCI). Ten (14.9%) patients required assistance from hospital staff to complete their questionnaire. Of 61 patients with a nutrition-risk score, 27 (44.2%) were at malnutrition risk.

The second questionnaires were sent to 272 potential participants and responses were received from 56 patients (53.3%) and 117 stakeholders (70.5%) with an overall response rate of 61.3%.

Food intake

A total of 52% cent of SCI patients did not eat all the food served (Table 1). Approximately 1 in 10 patients ate less than half of the hospital meals. A total of 25% of patients were found to miss one or more meals. A significantly higher proportion of patients missed

breakfast compared either with lunch or supper (12, 3 and 3%, respectively, χ^2 : 6.073, $P=0.048$).

Snacks were not provided to the great majority of patients (90%), whereas oral nutrition supplement appeared to be used by a quarter (26%), and one third of the patients reported taking vitamin and mineral supplements.

Overall, 23 (35%) patients reported they required assistance to eat.

Meal provision

Table 2 and Figure 4 summarise patient and staff evaluation of SCIC meals.

Overall, fewer patients (23.3%) than staff (50%) reported that the meal delivered failed to correspond to that ordered ($P<0.01$).

Fewer patients (55%) than staff (71.5%) felt that meals were served at an appropriate temperature ($P<0.01$).

Inadequate taste and lack of choice were the most commonly cited adverse comments (patients: 46.7%; staff: 49.3%), along with meals not served on time (patients:15%; staff: 24%) and interruptions during mealtimes (patients: 31%; staff: 31%).

The first PCA identified two components which accounted for 55.2% of the variance. The first factor (Q1, 6, 7, 8, 9, 10, 11, 12) accounted for 44.1% of the variance and the second (Q2, 3, 4, 5) accounted for 11.2%. As factor 1 was relatively large with eight items, these were subject to a further PCA. The resultant components of the second PCA accounted for 66.9% of the variance in these items. The first factor accounted for 56.7% of the variance, and the second a further 10.2%.

Therefore, principal component analyses of item scores identified three main factors: (i) food quality; (ii) food presentation; and (iii) food delivery (logistics). (Figure 5) represented the main sets of beliefs contained within the questionnaire. Items from each factor (Table 2) was used to make sub-scale scores, based on average item score. Differences between patients and staff beliefs on this sub-scale are shown in Figure 5.

Table 1 Distribution of food intake

Amount eaten	Breakfast		Lunch		Supper	
	n	%	n	%	n	%
All eaten	53	80	39	61	42	66
More than half eaten	4	6	14	22	14	22
Half eaten	—	—	6	9	2	3
Less than half eaten	1	2	3	5	4	6
None eaten	8	12	2	3	2	3

DISCUSSION

To our knowledge, this is the first study that reported the nutrient intake and evaluated the current meal provision among SCI patients and stakeholders. Their inevitable disabilities and the need for extended hospitalisation for acute care and rehabilitation in this group of patients renders extrapolation from unselected hospital populations unwise. We believe, however, that our sample size and response rate (which are comparable to other published studies) lend sufficient weight for our conclusions to be robust.^{13,14}

Food is the treatment for most malnourished patients in hospital. Although oral nutrition supplement are used to supplement food intake in a proportion of patients, artificial nutrition support, such as enteral and parenteral nutrition, is only used in a minority of SCI patients.¹

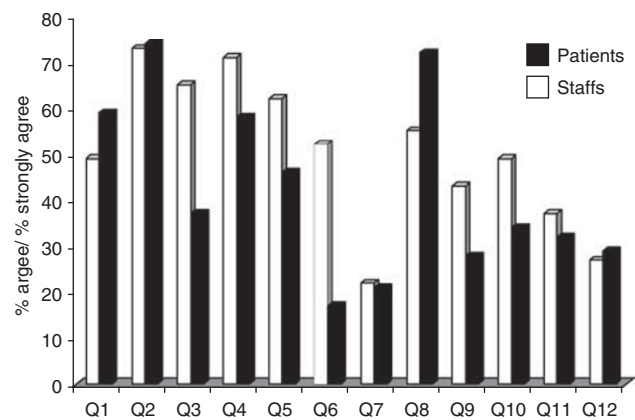


Figure 4 Patients' and Staffs' evaluation of a SCIC meals.

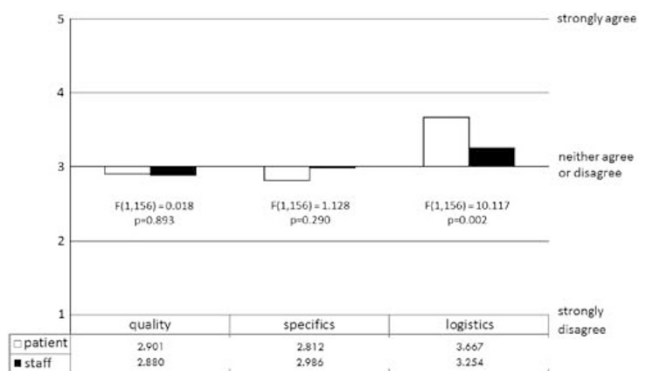


Figure 5 Mean scale scores plot.

Table 2 Evaluation summary from patients and staffs

	Food choice		Food ordering			Food delivery			Food quality			Overall satisfaction	
	Q1	Q2	Q3†	Q4	Q5	Q6	Q7	Q8†	Q9	Q10	Q11	Q12	
Number surveyed (% agree)													
Patients	44 (44.5%)	49 (83.6%)	48 (75%)	46 (84.7%)	49 (67.3%)	38 (36.8%)	35 (34.3%)	45 (68.9%)	42 (54.8%)	43 (60.4%)	42 (45.2%)	41 (36.5%)	
Staffs	87 (66.7%)	96 (85.4%)	85 (43.5%)	84 (67.8%)	87 (52.8%)	48 (25%)	46 (36.9%)	79 (86.1%)	76 (38.1%)	73 (45.2%)	69 (44.9%)	72 (40.2%)	

Q1: Good variety of dishes; Q2: known choice available; able to select own meal; Q3: receive meal ordered; Q4 meal serves on time; Q5: no interruptions of meals; Q6: good flavour; Q7: good texture, Q8: appropriate temperature; Q9: well presented; Q10: sufficient portion size; Q11: healthy meal; Q12: satisfied with meals. † Indicates $P<0.01$.

It is important to assess patients' food intake and to review their experience so that improvements can be made where necessary to optimise food intake during the hospital stay. SCI patients are vulnerable to malnutrition,¹ and the present audit provides evidence that improvements are indeed still needed. Recent national^{11,15} and international¹⁶ reports have highlighted the importance of nutritional screening, which is a multidisciplinary responsibility, as an important step in fighting hospital malnutrition. Through an effective nutrition screening followed by a successful implementation of appropriate nutrition care plan, which will include monitoring patients' intake if necessary, will help address the nutritional needs of this group.

We found that 52% of hospitalised patients did not eat all the food served; of these patients, 1 in 3 (34%) were found to miss one or more meals. Based on the UK's estimated average requirements and reference nutrient intake,¹⁷ the deficit from a single missed meal would be equivalent to 300–600 kcal and 1520 g protein per day (16–33% of daily requirement).

The study also demonstrated that snacks, which can contribute substantial energy (e.g., 400 kcal, 6 g protein, or approximately 15% of daily requirement), were not provided to/consumed by the majority of patients (90%), indicating an important missed opportunity in SCI patients.

To improve the current food provision and mealtime experience, patients and staff were invited to provide feedback for the current meal service in the SCIC. Inadequate taste, lack of choice and inappropriate texture were among the most commonly cited issues. This is of obvious importance when patients rely on hospital food to meet their nutritional needs. Furthermore, if the meals do not meet patients' expectations, increasing portion sizes would be unlikely to result in higher intake.

To tackle hospital malnutrition, the implementation of protected mealtimes is one of the key areas in the Council of Europe resolution: Food and Nutritional Care in Hospitals,¹⁶ and this is included in the recent UK Government policy 'Improving Nutritional Care'.¹⁵ Some of our patients and staff reported, however, that meals were not served on time and that there are frequent interruptions during mealtimes, suggesting this could relate to a lack of implementing of intended best practice. Indeed, recent evidence suggests that only minor improvements in mealtime experience can be expected after the implementation of 'protected mealtime',¹⁸ questioning its effectiveness, and perhaps further effort should be focused on dining companions or fortified hospital food.¹⁸

The present audit also support the need for more training of staff (catering staff and nursing staff) to educate regarding the importance of an effective meal service for hospital patients, and improve understanding of the benefits and implications of their role in the hospital.¹⁵ Ward staff may also require more assistance and consistent supervision to ensure the whole food service is adequate, and maximises food intake.¹⁵

The main limitation of this audit was that only one day's food intake was assessed, and therefore, assumptions have necessarily been made about food provision and net intake across a very prolonged hospital stay sometimes. More data from each patient would provide stronger evidence to permit a more conclusive comparison with the national standard.¹⁹ However, it is highly probable that by just asking for one day's intake, a higher response rate will be achieved.

After the survey, the SCI management team (physician, senior nurses and managers), catering management team, facility management team, occupational therapist, speech and language therapist, patient liaison officer and dietitian met to review the food-service

needs. A nutrition steering group was set up to oversee food provision, and to evaluate the implementation of nutrition policy on a continuing basis.

In conclusion, this is the first study to report the nutrient intake and mealtime experience as perceived by both patients and carers in a UK SCIC. It identified some areas where there had probably already been improvement, but left little doubt that current SCI hospital catering and its implementation is under-performing to the probable disadvantage of patients. A greater need for tailoring of meals to meet the demands of the different patient groups was identified if we are to optimise patients' nutritional intake. Effort should be made to ensure greater choice and better presentation for all meals. Periodic quality control helps to see that recommendations and patients' expectations are being met.

DATA ARCHIVING

There were no data to deposit.

CONFLICT OF INTEREST

Parts of the study data were presented at the British Association of Parenteral and Enteral Nutrition annual meeting in November 2011, in Harrogate, UK. University College London (UCL) staff receive support from the Comprehensive Biomedical Research Centre funding awarded to UCL and its partner Trust by the National Institute for Health Research.

ACKNOWLEDGEMENTS

We thank Miss Lynsey Spillman for reviewing the manuscript and all the SCI patients who participated in this audit, and the staff working in the National Spinal Injuries Centre, Stoke Mandeville Hospital, for completing the questionnaires.

Author contributions: SW, questionnaire development, data analysis, manuscript preparation; AG and DG, clinical supervision, manuscript revision; SPH, statistical supervision, PCA analysis, manuscript revision; GG, academic supervision, manuscript revision; AF, academic supervision, manuscript revision and guarantor

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