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UNIVERSITY OF SOUTHAMPTON

Faculty of Medicine

Human Development and Health

Volume 1 of 1

**THE IMPLEMENTATION OF TRAINED
VOLUNTEER MEALTIME ASSISTANTS IN
FOUR HOSPITAL DEPARTMENTS**

by

FIONA F A HOWSON

Thesis for the degree of Doctor of Medicine

May 2018

ABSTRACT

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF MEDICINE

Human Development and Health

Doctor of Medicine

IMPLEMENTATION OF TRAINED VOLUNTEER MEALTIME ASSISTANTS IN FOUR HOSPITAL

DEPARTMENTS

By Fiona F A Howson

Malnutrition is a common problem in older people admitted to hospital, and it is associated with negative healthcare outcomes and considerable healthcare costs. One factor that has been identified as contributory to this is insufficient assistance for patients at mealtimes. A systematic review identified small studies and service improvement projects where volunteers were trained as mealtime assistants and demonstrated that this is feasible and safe, and has a positive impact on satisfaction with mealtime care, although evidence of an effect on dietary intake was unconfirmed. No large-scale studies were identified by this review.

This study examined the implementation of volunteer mealtime assistants in four departments of a large university hospital. Volunteers were introduced to Medicine for Older People, the Acute Medical Unit, Trauma & Orthopaedics and General Medicine. Each department was described by characterising 50 patients and measuring dietary intake and nutritional indices on each ward. Implementation was described in terms of adoption (volunteer recruitment, training and characteristics), feasibility (volunteer sessions and activity), sustainability (volunteer retention), acceptability (patients, staff and volunteer interviews and focus groups) and implementation cost.

201 participants were recruited from the four departments. Multimorbidity, polypharmacy and frailty were common, as was risk of malnutrition; dietary intake was often insufficient. 64 volunteers were recruited and adopted across the departments, where they delivered 846 sessions and recorded assisting 1721 patients. The intervention was sustainable, with 52% of volunteers continuing to be active at the end of the study. Patients and staff found the volunteer programme acceptable and volunteers enjoyed their role. The programme released £17,131-£32,359 in staff costs.

This study has demonstrated that volunteer mealtime assistants can be successfully trained and implemented in four different hospital departments, and are received positively by both patients and staff. Strategies must be put in place to support volunteers and ongoing training is required to maintain volunteer numbers, but the costs of this are more than offset by staff costs released.

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ACADEMIC THESIS: DECLARATION OF AUTHORSHIP

I, Fiona Howson, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

The Implementation of Trained Volunteer Mealtimes Assistants in Four Hospital Departments

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. Either none of this work has been published before submission, or parts of this work have been published as:
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Rossiter FFA, Culliford DJ, Sayer AA, Roberts HC. The assessment of frailty in acute hospitals: a comparison of the Fried frailty score, the FRAIL scale and grip strength measurement. Age & Ageing 2016; 45(suppl1):i16. doi:10.1093/ageing/afw031.02.

Signed:

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LIST OF ABBREVIATIONS

AMU	Acute Medical Unit
ASPEN	American Society of Parenteral and Enteral Nutrition
BAPEN	British Association of Parenteral and Enteral Nutrition
BMI	Body Mass Index
CCI	Charlson Comorbidity Index
CQC	Care Quality Commission
ESPEN	European Society of Clinical Nutrition and Metabolism
GDS	Geriatric Depression Score
GM	General Medicine
HCA	Health Care Assistant
MMSE	Mini Mental State Examination
MNA	Mini Nutritional Assessment
MOP	Medicine for Older People
MRC	Medical Research Council
MTA	Mealtime Assistant
MUST	Malnutrition Universal Screening Tool
NICE	National Institute for Health and Care Excellence
NRS-2002	Nutritional Risk Screening Tool 2002
ONS	Oral Nutritional Supplements
PASE	Physical Activity Scale in the Elderly
RN	Registered Nurse
SGA	Subjective Global Assessment
SMAS	Southampton Mealtime Assistance Study
SNAQ	Simplified Nutritional Appetite Questionnaire
T&O	Trauma and Orthopaedics
UHS	University Hospitals Southampton NHS Foundation Trust
VRQ	Volunteer Retention Questionnaire
WHO	World Health Organisation

CHAPTER 1: AN OVERVIEW OF MALNUTRITION IN HOSPITAL INPATIENTS, VOLUNTEERING IN HEALTHCARE AND THE USE OF IMPLEMENTATION RESEARCH

This thesis describes a study of the implementation of trained volunteer mealtime assistants in four departments of an acute hospital trust. In this chapter, the background context to the study is considered, with reference to the problem of malnutrition in hospital inpatients, the use of volunteers within healthcare and their impact on patient care, and the necessity of implementation research in complex interventions, such as this one.

1.1 Malnutrition in Hospital Inpatients

1.1.1 *Definition*

Malnutrition is defined by the British Association of Parenteral and Enteral Nutrition (BAPEN) as “a state of nutrition in which a deficiency, excess or imbalance of energy, protein, and other nutrients causes measurable adverse effects on tissue, body form, body function and clinical outcomes”¹. This definition encompasses both under-nutrition and over-nutrition, yet the term malnutrition is often taken to be synonymous with under- rather than over-nutrition. In this thesis, use of the term malnutrition will reflect this and refer solely to under-nutrition.

1.1.2 *Diagnosis*

Establishing a formal diagnosis of malnutrition can be problematic, as there are no universally accepted diagnostic criteria^{2,3}. Studies differ in their method of identifying malnutrition, using various combinations of anthropometrics (height, weight and the derived body mass index (BMI), mid upper arm circumference and triceps skin fold thickness), biochemical markers (albumin and prealbumin), and dietetic data (estimated dietary intake and recent weight loss)⁴⁻⁹.

Each of these methods has limitations, which may explain why formal diagnostic criteria do not exist. Anthropometry is widely used in research, but may not always produce accurate results or be practical to measure in a clinical setting. Vertebral compression or kyphosis can render height measurements inaccurate in older people and weight may be confounded by dehydration, oedema or ascites. Furthermore, it is often not practically possible to measure height and weight in the acutely unwell: in one study of hospital inpatients, BMI could not be assessed in 56% due to a lack of accurate height or weight data¹⁰. Although skinfold thickness is easy to measure in younger

people, it can be more difficult in older people, as it may be harder to distinguish between muscle and fat. In addition, normative skinfold thickness values vary significantly with geography and age, meaning appropriate values must be used when interpreting findings^{11,12}. Another problem with using anthropometrics alone to diagnose malnutrition is that the cohort of patients in whom malnutrition and obesity co-exist will not be identified.

Biochemical markers, such as albumin and prealbumin, are also problematic when used to diagnose malnutrition. Albumin has been shown to be an unreliable measure of nutritional status in multiple clinical settings^{13–15}, including in older people¹⁶. Similarly, prealbumin has been found to be unreliable in unwell patients, where low levels are more likely to reflect ongoing inflammatory processes, rather than nutritional status^{17,18}.

Assessment of dietary intake by patient recall has frequently been shown to be inaccurate, leading to some experts calling for it to be abandoned in research practice¹⁹. Identifying recent weight loss can also be problematic, as patients may not be able to accurately quantify the extent of their weight loss and historical measurements may not be available from clinical notes. Furthermore, an accurate history of weight loss or dietary intake in unwell or cognitively impaired patients is often unachievable.

In view of these difficulties, and the variety of diagnostic criteria used in the research literature, several international groups have attempted to reach a consensus in definition and diagnosis^{2,20–22}. The most recent of these was published by a group from the European Society of Clinical Nutrition and Metabolism (ESPEN), and presents two options for the diagnosis of malnutrition². The first is a BMI of $< 18.5\text{kg/m}^2$; the second is unintentional weight loss (of $> 5\%$ within 3 months or $> 10\%$ over any time period) with a BMI $< 20\text{kg/m}^2$ in adults under 70 years, or $< 22\text{kg/m}^2$ in adults over 70 years. This statement made clear that the uptake of diagnostic criteria published in previous consensus statements has been inconsistent, but the recent nature of this statement means that its own success in standardising the diagnosis of malnutrition has not yet been established.

1.1.3 Screening

Despite the lack of clarity in how to diagnose malnutrition, there is international agreement that all hospital inpatients should be screened for risk of malnutrition^{23–25}. Many different tools exist for this purpose, with the American Society of Parenteral and Enteral Nutrition (ASPEN) recognising 11 different instruments²⁵ and ESPEN recommending the use of three tools²⁴ (Table 1).

Despite this, a recent systematic review of nutrition screening tools in hospital inpatients reported that no tool in current use was able to accurately assess nutritional status and predict clinical outcome²⁶. The Malnutrition Universal Screening Tool (MUST)²⁷, which is widely used in the UK and recommended by both the National Institute for Health and Care Excellence (NICE)²³ and BAPEN²⁷, was reported to be fair to good in assessing nutritional status and reasonable at predicting clinical outcomes in younger and middle-aged adults (but not older patients). The Subjective Global Assessment (SGA)²⁸ and Nutrition Risk Screening Tool 2002 (NRS-2002)²⁹ were

also reasonable at predicting clinical outcome in adults, but not in older patients. The Mini Nutritional Assessment (MNA)³⁰, which was designed for and validated in older patients, was reported to be fair to good in assessing nutritional status in older patients, but not in predicting outcomes.

Table 1: Malnutrition Screening Tools Recommended by ASPEN and ESPEN

ASPEN	ESPEN
Malnutrition Universal Screening Tool (MUST) ²⁷	Malnutrition Universal Screening Tool (MUST) ²⁷
Mini Nutritional Assessment (MNA) ³⁰	Mini Nutritional Assessment (MNA) ³⁰
Nutritional Risk Screening 2002 (NRS-2002) ²⁹	Nutritional Risk Screening 2002 (NRS-2002) ²⁹
Maastricht Index ⁴²	
Nutrition Risk Classification ⁴³	
Nutritional Risk Index ⁴⁴	
Malnutrition Screening Tool ⁴⁵	
Prognostic Inflammatory and Nutritional Index ⁴⁶	
Prognostic Nutritional Index ⁴⁷	
Simple Screening Tool ⁴⁸	
Short Nutrition Assessment Questionnaire ⁴⁹	
Birmingham Nutrition Risk Score ⁵⁰	
Subjective Global Assessment (SGA) ²⁸	

ASPEN= American Society of Parenteral and Enteral Nutrition; ESPEN = European Society of Clinical Nutrition and Metabolism

In summary, multiple methods exist for screening for and diagnosing malnutrition, each with their own advantages and disadvantages. The current evidence base is not robust enough to recommend one screening tool or set of diagnostic criteria, with debate about both ongoing.

1.1.4 Prevalence

The most recent large studies examining the prevalence of malnutrition in hospital inpatients are presented in Table 2; prevalence in these studies ranged from 9% to 61%. This wide variation in prevalence is at least partly due to differences in diagnostic criteria, study population and timing of assessment. Three studies applied different diagnostic criteria to the same population of inpatients, and found that the prevalence varied between 17-53%³¹, 27-46%³² and 15-61%³³ depending on the criteria used. A further three studies looked at the prevalence of malnutrition in different hospital departments, and found that it ranged between 16-34%³⁴, 36-57%³⁵ and 7-49%³⁶. Furthermore, given that approximately one third of patients admitted with a normal nutritional status are malnourished on discharge from hospital^{37,38}, the timing of assessment also has an impact on the prevalence reported. The most

consistent estimates from the studies presented in Table 2 are of a prevalence of malnutrition (assessed using the SGA) in acute hospital inpatients of between 31% and 46%^{32,39-41}.

Even though malnutrition is commonplace in hospitals, it is frequently under-recognised by clinical staff. Lazarus & Hamlyn diagnosed 324 Australian inpatients with malnutrition using the SGA, but found that this had been identified by clinical staff in only 42% of cases⁴⁰. In one UK study of 337 inpatients, Kelly et al used a combination of BMI and weight loss to define malnutrition, and found that the diagnosis was not recognised by staff in 70% of malnourished patients⁵³.

In summary, it is difficult to confidently state the true prevalence of malnutrition in hospital inpatients, although the most consistent evidence appears to support a prevalence of 30-40% when using the SGA as the diagnostic tool. Malnutrition may develop or worsen during a hospital admission and it is frequently not identified by clinical staff.

Table 2: The Prevalence of Malnutrition in Hospital Inpatients in 13 Studies

Study	Population and Timing of Assessment	Diagnostic criteria for malnutrition	Reported prevalence of malnutrition
BAPEN, 2012³⁴	UK	MUST	25% of all patients
	7541 acute hospital inpatients		34% in MOP wards
	Assessed on admission		16% in T&O wards
			27% in those aged over 65 years
Kaiser, 2010⁵¹	5 European countries	MNA	45.2% of men malnourished
	1384 acute hospital inpatients 65 years and over		41.0% men at risk
	Timing of assessment not reported		36.0% of women malnourished
			49.9% women at risk
Banks, 2007⁴¹	Australia	SGA	35% in year 1
	2208 acute hospital inpatients from 20 hospitals		31% in year 2
	Point prevalence survey on one day for 2 years		
Lazarus, 2005⁴⁰	Australia	SGA	42%
	324 acute hospital inpatients		
	Assessed on admission		
Neumann, 2005³¹	Australia	1. MNA	1. 53%
	133 rehabilitation inpatients	2. BMI < 22kg/m ²	2. 17%
	Assessed on admission	3. CAMA < 21.4cm ² (male) or < 21.6cm ² (female)	3. 20%
Planas, 2004³²	Spain	1. SGA	1. 46%
	400 acute hospital inpatients	2. BMI < 18.5kg/m ² or BMI < 20kg/m ² with TSF or	2. 27%
	Assessed on admission	MAMC < 15 th percentile	
Rasmussen, 2004³⁵	Denmark	Modified version of NRS-2002	40% of all patients
	590 patients in internal medicine, gastrointestinal surgery, orthopaedic surgery		57% in gastrointestinal surgery
	Point prevalence survey		36% in orthopaedic surgery
			42% in internal medicine

Study	Population and Timing of Assessment	Diagnostic criteria for malnutrition	Reported prevalence of malnutrition
Kondrup, 2002³²	Denmark 750 acute hospital inpatients from 3 hospitals Assessed on admission	NRS-2002 without age adjustment	17%
Kyle, 2003⁹	Switzerland & Germany 1760 acute hospital inpatients Assessed on admission	1. Fat free mass < 10 th centile 2. BMI < 20kg/m ²	1. 31% in Geneva cohort 17% in Berlin cohort 2. 17% in Geneva cohort 9% in Berlin cohort
Kyle, 2002³³	US 995 acute hospital inpatients Assessed on admission	1. BMI < 20kg/m ² 2. SGA 3. Serum albumin < 35g/L	1. 17% 2. 61% 3. 15%
Beck, 2001³⁶	Australia 5149 acute or rehabilitation inpatients Assessed on admission	SGA	12% of all patients 49% of rehabilitation inpatients 45% of oncology inpatients
Middleton, 2001³⁹	Australia 819 acute inpatients from 2 hospitals Point prevalence survey on one day for 3 months	SGA	36%
Kelly, 2000⁵³	Scotland 337 acute hospital inpatients Assessed on admission	BMI < 18.5kg/m ² or BMI 18.5-20kg/m ² and weight loss of \geq 3kg in preceding 3 months	13%
Edington, 2000⁵⁴	England 850 elective and acute inpatients Assessed on admission	BMI < 20 kg/m ² or weight loss \geq 10% usual body weight	20%

BAPEN = British Association of Parenteral and Enteral Nutrition; MUST = Malnutrition Universal Screening Tool; MOP = Medicine for Older People; T&O = Trauma and Orthopaedics; MNA = Mini Nutritional Assessment; SGA = Subjective Global Assessment; BMI = Body Mass Index; CAMA = corrected arm muscle area; TSF = triceps skinfold thickness; MAMC = mid arm muscle circumference; NRS-2002 = Nutritional Risk Screening 2002

1.1.5 Impact

The negative consequences of malnutrition on health have been extensively studied, although the varying diagnostic criteria make it difficult to directly compare studies.

One community UK based study examined the general practice records of 1000 patients who had a malnutrition diagnostic code recorded and had a BMI < 18.5kg/m² (patients were excluded if they were known to have fluid retention or were unable to have BMI measured due to immobility)⁵⁵. These patients were then compared with a randomly selected cohort matched on age and gender. In the six months of the study duration, the malnourished patients were more likely to consult their general practitioner (GP, 18.90 consultations versus 9.12, $p < 0.001$) and be admitted to hospital (13% versus 5% $p < 0.05$).

Studies in the hospital setting have also demonstrated the negative effects of malnutrition. A study of 709 hospital inpatients in Brazil found that malnutrition, diagnosed on admission using the SGA, was an independent predictor of longer length of hospital stay (odds ratio [OR] 0.70 in the well-nourished group)⁵⁶. Malnutrition was also an independent predictor of mortality during admission (relative risk [RR] 2.63). Another study, of 414 inpatients in Israel, also found that malnutrition, defined by the MNA, was an independent predictor of mortality during admission (OR 1.64)⁵⁷. Long term follow-up demonstrates that this increased risk of mortality persists following hospital discharge. In a study of 322 US patients followed for 6 years, nutrition risk (identified by low BMI and low serum albumin) was the variable most associated with mortality⁵⁸. Another US study of 660 patients, followed for 1 year, found that BMI, recent weight loss and mid arm muscle circumference all independently predicted mortality (adjusted relative risk [ARR] 1.83, 2.31 and 2.19 respectively)⁵⁹.

There is also evidence that malnourished patients are more at risk of complications in hospital. A study of 850 patients in 4 English hospitals used BMI, mid arm muscle circumference and > 10% loss of body weight to define malnutrition, and demonstrated that their malnourished patients were more likely develop a hospital acquired infection (0.38 episodes versus 0.23, $p = 0.001$)⁵⁴. Pressure ulcers are also associated with malnutrition: in 2208 hospital inpatients, patients diagnosed with malnutrition using the SGA were more likely to have a pressure ulcer (OR 2.6)⁶⁰.

Malnutrition also has an impact on functional recovery from illness. In a study of 60 orthopaedic inpatients, nutritional risk was assessed by measuring albumin, haemoglobin, triceps skinfold thickness and mid arm muscle circumference and weight, with patients who were below the 5th percentile for 3 of these measures considered to be at nutritional risk. Upon follow up, these patients were more likely to be dependent on walking aids at discharge and at 6 months (46% versus 11%), and were less likely to be discharged home than their normally nourished counterparts⁴. These findings have been corroborated in a rehabilitation setting. A study of 133 rehabilitation inpatients who were malnourished using the MNA or anthropometry (CAMA) had an increased risk of admission to

higher level care (relative risk ratio [RRR] 2.29 and 2.07 respectively)³¹. Malnourished patients also had poorer function (defined by the Barthel Index) at 90 days than those who were well nourished.

The increased morbidity and mortality associated with malnutrition has a substantial impact on health and social care costs. BAPEN estimates that these costs were £19.6 billion in England in 2011-12, accounting for approximately 15% of health and social care expenditure⁶¹. The National Institute for Health and Clinical Excellence (NICE) has identified that significant cost savings could be made in the NHS by better screening, assessment and treatment of malnutrition⁶², with BAPEN estimating these cost savings could be as much as £229 million⁶¹.

1.1.6 Causes and contributory factors

The development or exacerbation of malnutrition in hospital inpatients is likely to be multifactorial, even in an individual patient. The first necessity in maintaining the nutrition of inpatients is clearly the provision of sufficient diet in hospital.

In the UK, hospital food is governed by standards set out by the Department of Health⁶³, which incorporate the recommendations of the British Dietetic Association on daily macronutrient requirements (Table 3). However, these requirements are not always met. In Leicestershire, an audit of seven hospitals found that the mean amount of daily energy and protein provided was 1440kcal and 54g respectively⁶⁴, insufficient even for the “nutritionally well” patient. A Scottish study evaluated the daily food provision in three rehabilitation wards and found a significant range in the daily protein (41-68g) and energy (range 1251-1760kcal) provided, with only one ward meeting protein requirements for the “nutritionally well” patient and none meeting the energy requirements⁶⁵. In London, comparison of two food service systems in one hospital also reported significant variation in energy and protein provided, with neither system providing the required amount of energy⁶⁶.

Table 3: Nutrient Requirements for Adults in Care Settings⁶⁷

Nutrient	Daily Requirement for Nutritionally	Daily Requirement for Nutritionally
	Well	Vulnerable
Energy (kcal)	1810-2550	2250-2625
Protein (g)	56 for men; 45 for women	60-75

kcal = kilocalories; g = grams

Provision of adequate energy and protein is clearly necessary to maintain nutrition. However, even when food provision is sufficient, patients frequently do not eat enough to meet their requirements. A study of Swiss inpatients found that 69% did not meet their energy and/or protein requirements, a figure that had not improved in the 10 years since a prior study in their institution (when the figure was 70%)^{68,69}. Similarly, an Australian study of inpatients

aged over 60 years found that energy or protein requirements were not met in 86% and 69% of participants respectively⁷⁰. Studies examining plate waste generated in hospitals support these findings: analysis of 32 studies has shown a median plate waste of 30%⁷¹. Multiple factors often contribute to inadequate intake and high wastage in hospital, and these factors can be food related, patient related or staff related.

1.1.6.1 Food Related Factors

Public perception of hospital food is poor, with initiatives in the UK such as the Department of Health's Better Hospital Food Programme⁷² and the Campaign for Better Hospital Food⁷³ attempting to improve food quality. UK and international research has examined the impact of changing food service processes to improve quality and satisfaction. Changing to hotel-style room service, taking orders closer to mealtimes and bulk trolley delivery have all been shown to improve patient satisfaction⁷⁴⁻⁷⁷. However, there is evidence that food quality is less important in reduced nutritional intake than is widely assumed⁷⁸⁻⁸⁰. Organisational barriers, such as the timing of meals, lack of access to food between meals and lack of menu choice have all been identified as more prevalent problems^{79,81,82}. Lack of variability in portion size is another commonly reported problem in older inpatients, who frequently describe being put-off by large portions of food^{79,81,82}.

1.1.6.2 Patient Related Factors

Anorexia of aging was first described in 1988, with a recognition that, although poor appetite could be due to disease processes, a separate phenomenon of anorexia in the absence of disease existed⁸³. In hospital inpatients, anorexia is common, and may be long standing or related to acute illness. One recent study reported that 32% of hospital inpatients over the age of 65 years had experienced at least three days of anorexia⁸⁴, whilst another found that 60% of patients reported anorexia at some point during their hospital admission⁸⁵. In a study of older female inpatients using the Simplified Nutritional Appetite Questionnaire, 42% of participants had a low appetite⁸⁶. Nursing staff cite poor appetite as contributing to reduced intake of their patients^{52,82}, and it has been shown to be an independent predictor of poor nutritional intake⁸⁷.

Acute illness also has an impact on food intake, beyond its association with poor appetite⁷⁸, with factors such as nausea, pain and tiredness all cited by patients as contributing to reduced food intake⁸⁸. Additional patient factors include confusion^{78,87} and dysphagia, with the need for a modified texture diet^{78,79}. Modified texture diets are seen by staff as unappealing^{81,89}, and are associated with a reduced energy and protein intake when compared to normal diet⁹⁰.

These factors may co-exist and pre-dominate during different parts of a patient's hospital stay: one study suggests that anorexia is more common at the beginning of a hospital stay and less common later, whilst confusion and dysphagia have an impact on food consumption throughout admission⁷⁸.

1.1.6.3 Staff Related Factors

In the UK, NICE guidance recommends that all hospital inpatients are screened for malnutrition²³, although the BAPEN survey of nutritional screening in 2011 demonstrated that this does not always happen in practice, with only 78% of the 171 hospitals that took part screening more than 75% of their inpatients³⁴. Furthermore, patients who are identified by screening do not always have an appropriate care plan put in place or adhered to^{52,91}. Exploration of the reasons for this identifies some common themes, including inadequate nutritional education of hospital staff, uncertainty over where the responsibility for nutritional care lies, lack of support and guidance at a managerial level and difficulty prioritising nutritional care above patients' other needs^{52,89,92–94}.

In addition to this, numerous studies have reported that hospital inpatients receive insufficient assistance at mealtimes^{79,81,82,85,94–96}. This problem was brought to national attention in the UK by the failings at Mid Staffordshire NHS Foundation Trust. The Francis Report of the Public Inquiry described multiple examples of patients not receiving enough help to eat and drink⁹⁷. Providing sufficient assistance with eating and drinking is incorporated into the Health and Social Care Act 2008 (Regulation 14: Meeting nutritional and hydration needs)⁹⁸, and is therefore one of the standards by which the Care Quality Commission (CQC) inspect UK hospitals. The CQC's Dignity and Nutrition inspections in 2011 and 2012 found that older patients in particular were not always offered the assistance they needed with eating^{99,100}.

Functional dependency and the need for assistance with feeding is associated with poor nutritional intake⁸⁷, yet it is common, with over half of older hospital inpatients requiring some form of help at mealtimes^{95,96}. This may be preparation to eat (such as repositioning, meal trays being brought within reach, help with packaging or seasoning) or assistance with feeding itself. Observations of ward mealtimes have demonstrated that patients receive insufficient assistance with all these tasks^{82,95}. Ward staff recognise that patients often require more help than they are available to give, with medication rounds, workload and staff meal breaks all cited as contributing to the problem^{81,82,94,96}.

In addition to the issue of insufficient mealtime assistance, the CQC's Dignity and Nutrition inspections also reported concerns about patients being disturbed during their meal^{99,100}. This has also been reported in observational studies^{79,82,96}, and interruptions during meals (e.g. for investigations or interventions) are associated with a reduction in protein and energy intake¹⁰¹.

1.2 Interventions to combat malnutrition in hospitals

Considering the strong evidence of the high prevalence of malnutrition in hospitals, its clinical significance and the multiple factors that can be causative or contributory, a substantial amount of research has been conducted to

identify successful interventions to treat malnutrition. Dietary interventions aim to increase nutritional intake through supplementation or patient education, but a range of behavioural and environmental interventions have also been reported, aiming to correct the multiple additional factors which contribute to malnutrition in hospitals.

1.2.1 Dietary interventions

Protein and energy supplementation is the most widely studied intervention in the treatment of malnutrition. In 2009, a Cochrane review examined the effects and acceptability of dietary supplementation in older people in hospital or the community¹⁰². The review included randomised or quasi-randomised studies where the intervention was provision of oral nutritional supplements (ONS), milk based supplements or food fortification in participants with an average age of at least 65 years. The review included 10,187 participants from 62 trials, 71% of whom were hospital inpatients. A meta-analysis of 42 of these trials showed that there was a reduction in mortality when supplements were provided to malnourished participants (RR 0.79; 95% CI 0.64 to 0.97). A reduction in complications (such as pressure ulcers, infections, readmissions and incomplete wound healing) was also demonstrated in a meta-analysis of 24 of the trials (RR 0.86; 95% CI 0.75 to 0.99). There was also evidence of weight gain of 2.2% (95% CI 1.8-2.5). Despite these positive findings, the quality of many of the included studies was said to be poor, with further robust research into the area called for by the authors.

Another Cochrane review examined the effect of dietary advice and oral nutritional supplements in malnourished adults¹⁰³. 45 randomised and quasi-randomised studies of dietary advice with or without ONS were included. Participants who received dietary advice gained a mean of 1.47 kg (95% CI 0.32-2.61) when compared with those receiving no advice; this weight gain was more substantial in studies where the intervention lasted more than 12 months (mean 3.75 kg, 95% CI 0.97-6.53). In 7 studies comparing dietary advice with provision of ONS, there was a significant weight gain in the ONS group of 0.91 kg (95% CI 0.23-1.60, $p = 0.009$). There was also a statistically significant improvement of anthropometric measurements (mid arm muscle circumference and triceps skin fold thickness) with both dietary advice and ONS. However, there was no evidence of any difference in mortality or morbidity in any analyses. The quality of the trials included in the review was reported to be low to moderate at best, with inadequate blinding and sample sizes in many studies. Despite this, the authors concluded there was reasonable evidence that dietary advice, either alone or in combination with oral nutritional supplements, can lead to weight gain and improvements in anthropometric measurements.

A more recent systematic review and meta-analysis included 36 randomised controlled trials assessing the effects of high protein ONS (> 20% energy from protein) in both community and hospital settings. This meta-analysis found a significant reduction in complications (OR 0.68, 95% CI 0.55-0.83, $p < 0.001$, 10 studies) and hospital readmissions (OR 0.59, 95% CI 0.41-0.84, $p = 0.004$, 2 studies) and a mean weight gain of 1.7kg (95% CI

0.8-2.7, $p < 0.001$, 12 studies). There was a non-significant trend towards a reduced length of hospital stay, but no effect on mortality.

An alternative strategy to improve nutritional intake is food fortification. A recent systematic review and meta-analysis examined the effect of fortification in adults aged over 65 years¹⁰⁴. Seven studies were included and there were two broad strategies of fortification: enrichment, where additional fortified snacks are added to the diet, and densification, where existing food choices are made more energy and protein dense, without requiring any additional food intake. A meta-analysis of 4 of these studies demonstrated an increase of 200kcal and 7.0g protein per day with food fortification. However, the methodological quality of the studies was poor, the heterogeneity was high, and there was insufficient evidence to comment on clinical outcomes.

In summary, there is reasonable evidence that oral nutritional supplements can lead to weight gain in malnourished adults, with weaker evidence of an effect on morbidity and mortality. There is also evidence that food fortification is of benefit in increasing energy and protein intakes. Larger, more methodologically robust studies are required to confirm these benefits.

1.2.2 Non-dietary interventions

1.2.2.1 Protected mealtimes

The concept of protected mealtimes is that all non-urgent clinical duties cease, reducing unnecessary interruptions for patients. Protected mealtimes have been endorsed by the Royal College of Physicians, the Royal College of Nursing and the British Association of Parenteral and Enteral Nutrition¹⁰⁵, and are considered one of 10 key characteristics in good nutritional care by the Council of Europe¹⁰⁶. Despite this, the National Patient Safety Association concluded that the uptake of the policy in the UK has been variable and inconsistent¹⁰⁷. The Nutrition Care Survey in Australia and New Zealand reported a similar finding, with only 5% of hospitals surveyed implementing protected mealtimes¹⁰⁸.

Evidence of the benefit of protecting mealtimes as a solitary strategy is conflicting. Two reports found a significant reduction in interruptions, although neither demonstrated any improvement in nutritional intake^{109,110}. Both were published in abstract form only, making it difficult to assess the quality of the study methodology. A larger study, of over 500 patients, found no change in interruptions or nutritional intake, but some evidence of improvement in the number of patients who were offered the opportunity to wash their hands before meals, whose tray tables were clear on arrival of their meal and who were being monitored on food charts¹¹¹. The authors of this study reported that the implementation of protected mealtimes had been poor, with insufficient staff education and support, which may have contributed to the lack of effect observed.

There is, however, some evidence that introducing protected mealtimes as one component of a wider nutritional strategy may be of benefit. In a small pilot study in Canada, protected mealtimes were introduced along with stopping staff breaks at patient mealtimes and encouraging visitors to come and help feed their relatives. This led to a reduction in the number of interruptions, but no change in nutritional intake¹¹².

A larger Australian study combined the introduction of protected mealtimes with mealtime volunteers and an educational intervention for food servers. In this study, interruptions increased post intervention, although more patients received mealtime assistance¹¹³. Further analysis of the results of this study identified that, although the introduction of protected mealtimes was not associated with improved dietary intake, certain aspects of the programme were (such as appropriate positioning during meals and having more time to eat)¹⁰¹.

A further Australian study compared the introduction of protected mealtimes with provision of an additional member of staff at mealtimes or a combination of the two interventions¹¹⁴. Multidisciplinary education was a component of all interventions. There was no change in interruptions with any intervention, but there was an increase in assistance provided and evidence that patients were more likely to meet their estimated energy requirement (OR 3.4).

The nature of the evidence demonstrates that the benefit of protected mealtimes alone remains unproven, although there is tentative evidence of a benefit if adopted as part of a wider nutritional strategy.

1.2.2.2 Coloured meal trays and lids

The use of coloured meal trays to identify patients at nutritional risk was first reported in the UK in 2003¹¹⁵. Red trays were used for patients who needed support or assistance with feeding or whose intake was being monitored, providing an instant visual clue to all staff that the patient was at risk. Variations of this, with different coloured trays or meal lids have been used globally for the same purpose¹¹³. The red tray system was advocated in Age UK's Hungry to be Heard publications as one of the "Seven Steps to End Malnutrition in Hospitals"¹¹⁶, and has been identified by the CQC as good nutritional practice⁹⁹. Despite this, there is no published evidence examining the impact of a coloured tray or lid system on nutritional outcomes.

1.2.2.3 Coloured plates

High contrast red and blue plates have been associated with improved food and fluid intake in one study of nine residential home dwellers with Alzheimer's disease¹¹⁷. The mechanism behind this improvement is thought to be the increase in colour contrast between food and crockery, as visual contrast sensitivity is known to be diminished in normal ageing¹¹⁸ and Alzheimer's disease¹¹⁹. The Alzheimer's Society recommend considering the use of coloured crockery to improve food intake¹²⁰, and it is used in several hospitals across the UK. However, research examining its use in hospital inpatients is lacking, with current published literature limited to one audit¹²¹ and one service improvement project (conducted by this author)¹²², both published in abstract form. Both reported an increase in the

weight of food eaten using coloured plates, but nutritional intake was not calculated in either. Further evidence is needed before the impact of coloured crockery can be confidently stated.

1.2.2.4 Environmental changes

Several strategies to modify the mealtime environment have been investigated. Eating at a dining table has been examined in two small studies, both of which found that patients eating at the dining table consumed more energy^{123,124}. However, the number of participants in each study was small (n = 48 and 13), and, in one study, participants were allowed to choose their preferred eating location¹²⁴. This element of choice adds bias to the results, as patients who may eat less (for example, due to a poor appetite) may choose to remain at their bedside, giving the intervention group a falsely elevated intake.

The playing of music during mealtimes has been evaluated in one study of patients in a dementia assessment unit¹²⁵. In this study, participants were found to consume significantly more energy (129kcal per 24 hours, p value not given) when compared to a control group. Again, the sample size of this study was small (n = 28) and a larger evaluation of this intervention has not been published.

1.2.2.5 Additional mealtime assistance

The abundance of evidence suggesting that patients do not receive sufficient mealtime assistance has led to research into the provision of additional mealtime assistance. Mealtime assistants may be additional paid staff or volunteers and provide additional mealtime support, including cleaning patients' tables, positioning meal trays, opening packaging and cutlery, cutting up food, and feeding patients.

The largest study to date that has investigated the use of additional staff recruited 592 patients aged over 65 years (median age 82 years)¹²⁶. Patients were then randomised to receive either standard nutritional care or nutritional care delivered by health care assistants (HCAs) who had undergone additional nutritional training. One HCA was available for each of the three study wards at two mealtimes five days a week. As well as helping at mealtimes, they were also able to offer additional snacks and drinks throughout the day, and helped to identify patients with risk factors for malnutrition. There were a range of outcomes measured, including nutritional indices (weight, mid arm circumference, serum albumin, nutritional intake), functional indices (Barthel score, grip strength) and clinical outcomes (use of antibiotics, length of stay, in-hospital mortality). The intervention group had significantly less intravenous antibiotics days than the control group (4 days vs 6, $p < 0.007$), but there was no other significant difference in any other outcome measure. However, the measured effect of the intervention may have been lessened by a generally increased nutritional focus on the wards under study. Patients in the intervention and control group were managed on the same wards, and, although the HCAs deliberately had very little contact with the patients in the control arm, they did share their knowledge and expertise with other nursing staff on the ward. Furthermore, the presence of an extra member of staff available to help a subset of patients may have released extra

time for nursing staff to concentrate on nutritional issues in the control group patients. It is impossible to identify the effect (if any) that this may have had on the study's results.

Another large randomised control trial evaluated the introduction of dietetic assistants on an orthopaedic trauma unit¹²⁷. The dietetics assistants had two weeks of training and were available on the ward for 6 hours a day, 7 days a week. Their role included assisting with meal choices, ordering nutritional supplements and assisting at two mealtimes per day. 318 patients with a fractured neck of femur over the aged of 65 years were randomised to receive care from the dietetic assistant or standard nursing care. The patients in the intervention group had a significant increase in their energy intakes (349 kcal per 24 hours, $p < 0.001$) and an absolute reduction in mortality of 6% at discharge ($p = 0.048$) and 9.8% at 4 months ($p = 0.036$). Mid-arm circumference declined less in the intervention group ($p = 0.002$), but there was no change in other anthropometric or biochemical measures. Although a full economic analysis was not performed, the cost of the dietetic assistant was thought to be offset by time released in dietician and nursing costs.

The provision of additional staff has also been evaluated as a component of a wider nutritional strategy, including protected mealtimes. A study of 254 patients aged over 65 compared three interventions: employment of an additional HCA, the introduction of protected mealtimes and nutritional education for staff, and a combination of both these interventions¹¹⁴. The HCAs' role included assisting with meals and snacks, helping patients with menu orders (encouraging high energy choices where necessary) and liaising with nursing staff about patient barriers to intake. When compared with pre-intervention data, there was no significant increase in total protein and energy intakes for any intervention, but significantly more patients met their estimated energy intake, with improvements from 8% prior to intervention to 21% in the HCA only group, 20% in the protected mealtimes group and 31% in the combined intervention group. The differences between the groups were not statistically significant, leading to the conclusion that this improvement in nutritional intake can be achieved by increasing nutritional awareness and improving staff education, rather than the necessity of employing additional staff.

The impact of additional mealtime assistance has been examined in a systematic review, which included five studies (including the three above) where assistance was provided by staff or volunteers to patients over 65 years¹²⁸. A meta-analysis of four of these studies found that additional mealtime assistance was associated with improved daily energy and protein intakes of 116kcal and 5.9g ($p = 0.04$ and $p = 0.02$ respectively). However, despite this evidence of benefit, the cost of employing additional staff has to be considered. Only one of the three studies above considered employing an extra member of staff financially justifiable¹²⁷, and this justification was not based on a full economic analysis of the results of their study, rather an estimate of resources released through employment of a new staff member. In the current era of financial restraint in healthcare, it seems unlikely that employing additional staff on the required scale can be considered a sustainable solution for most hospitals.

As an alternative to employing staff to provide additional mealtime assistance, volunteers can be trained to fulfil this role. The use of volunteers in healthcare and their use as mealtime assistants are considered below.

1.3 Volunteering

Volunteering is defined by the United Nations as activities “undertaken of free will, for the general public good and where monetary reward is not the principal motivating factor”¹²⁹. In the UK, 27% of the population undertake regular formal volunteering in any setting¹³⁰, with corresponding figures of 25% in the US¹³¹ and 31% in Australia¹³². Within health and social care, there are an estimated 3 million volunteers in England alone¹³³, 4.6 million in the US¹³¹ and 600,000 in Australia¹³².

1.3.1 *Volunteers in Healthcare*

1.3.1.1 *Characteristics of Healthcare Volunteers*

The characteristics of healthcare volunteers are well described within volunteering literature, with evidence to suggest specific characteristics dominate in the volunteering population. Table 4 presents commonly reported characteristics in seven healthcare volunteer programmes in four countries; healthcare volunteers were predominantly a population of older white women with higher level education and, frequently, concurrent employment^{134–140}.

Much of the evidence examining the motivations of healthcare volunteers has taken place in the hospice setting. In this cohort, altruistic motives (i.e. a desire to help) are the most common motivation for taking up volunteering^{140–142}, with many volunteers also citing personal experience of the death of a loved one as an important factor in their decision^{140,143,144}. Altruism and personal experience are closely linked, with one study characterising the volunteers as being motivated by altruism, but reporting that personal experience was the trigger for them to volunteer within the specific context of palliative care¹⁴³. Studies of volunteers in a range of other healthcare roles, such as provision of dietary interventions, peer support for pregnancy loss, post-partum depression and breast-feeding and mealtime assistance, have found that both altruism and personal experience are commonly cited as important motivators^{134,136,137,139,145}. Another noteworthy (although less common) motivation for volunteering is the desire to gain experience in order to pursue a career in healthcare^{134,140,143,145,146}.

Table 4: Volunteer Characteristics in Five Healthcare Programmes

	Location	Volunteer Programme	Gender	Volunteer Age	Race	Educational qualification	Employment
Roberts et al¹³⁴	UK	n = 29; mealtime assistants	97% female	Median 61-70 years	Not described	Not described	38% employed
Addington-Hall et al¹³⁵	UK	n = 215; palliative care support	84% female	58% over 60 years	98% white	Not described	Not described
Bowen et al¹³⁶	US	n = 205; provision of dietary advice	99% female	Mean 45.5 years	96% white	80% had degree	68% employed
Etkin et al¹³⁸	US	n = 82; assistance with exercise programme	86% female	Median 53 years	86% white	Not described	Not described
Boyle et al¹³⁷	Australia	n = 24; peer support following pregnancy loss	All women due to role	42% over 50 years	Not described	Not described	71% employed
Dennis et al¹³⁹	Canada	n = 121; peer support for post-partum depression	All women due to role	Mean age 38 years	69% white	60% post-secondary education	52% employed
Claxton-Oldfield et al¹⁴⁰	UK	n = 162; palliative care support	75% female	Mean age 64 years	Not described	69% post-secondary education	18% employed

n = number of volunteers; % = percentage

Motivation for volunteering may depend upon volunteer age. One US study of 351 hospice volunteers demonstrated that altruism was the most common motivation in older volunteers, and career related motivation most common in younger volunteers¹⁴². This finding was echoed in a survey of US hospital volunteer administrators, who reported that younger people tended to volunteer as a requirement of their studies and to gain experience for applications into healthcare careers¹⁴⁶. In contrast to these two studies, a survey of 105 college students in Canada found that altruism was the most common motivator for interest in palliative care volunteering¹⁴¹. However, the purpose of this study was to determine the views of students on palliative care volunteering and whether they would consider taking this up and therefore, these results may not necessarily be extrapolated to existing volunteers.

1.3.1.2 Recruiting and Retaining Healthcare Volunteers

Volunteer recruitment and retention have been identified as two of the key challenges for any successful volunteer programme^{136,145–147}. Successful recruitment strategies described include advertising via local media^{134,136,139}, posters and flyers^{136,139,148}, talks at universities and colleges¹⁴⁷ and promotion via community groups or societies^{136,147}.

Volunteer retention rates depend upon the nature and duration of the volunteer programme (Table 5), varying between 59% and 71% over 12 months in four studies where retention was reported^{134,136,138,149}.

Table 5: Volunteer Retention Rates in Four Healthcare Volunteer Programmes

Authors	Volunteer Role	Duration of Programme	Retention Rate
Bowen et al¹³⁶	Provision of dietary advice	12 months	68%
Roberts et al¹³⁴	Mealtime assistance	12 months	59%
Etkin et al¹³⁸	Exercise programme	4 months	61%
Giles et al¹⁴⁹	Falls prevention programme	4 months	71%

% = percentage

Research examining volunteer retention demonstrates that several characteristics are associated with a longer duration of volunteering, namely being female^{150,151}, being older (or retired)^{151,152}, having a higher level of education^{152,153} and having religious belief¹⁵³. Furthermore, being motivated by altruism has also been associated with being less likely to discontinue volunteering^{150,151}, as has being personally asked to volunteer within an organisation¹⁵⁴. There is also research to demonstrate that volunteers who have prior experience of volunteering are more likely to stay in their role^{136,153}, and that those who have delivered a greater number of volunteer hours are more likely to continue volunteering^{153,154}.

Use of a Volunteer Retention Questionnaire (VRQ) within the palliative care setting demonstrates that volunteers considered enjoying volunteering, feeling adequately trained and prepared for their role and interacting with patients as the most important reasons for continuing to volunteer¹⁵⁵. Factors such as recognition of time served and regular contact or meetings with the volunteer co-ordinator were amongst those considered the least important. In studies of volunteer mealtime assistants and volunteers assisting with reminiscence activities, qualitative work confirmed that the support of the research team and their presence as a point of contact if needed was considered crucial by volunteers^{134,156}. A subtle difference is demonstrated here, suggesting that being adequately trained, prepared and supported in the volunteer role is important to volunteers, yet regular or unprompted contact is not.

1.3.1.3 Benefits of Volunteers in Healthcare

Volunteers in healthcare are proven to benefit patient care: a systematic review carried out for Volunteering England in 2008 demonstrated that improved self-esteem, disease management, mental health and patient-professional relationships can all result from volunteer interactions¹⁵⁷.

In addition to improving patient care, volunteers provide economic value for the institutions where they volunteer. Although this can be difficult to quantify, the Institute of Volunteering Research estimates that the financial value of volunteering is an average of £700,000 per year in an acute hospital trust¹⁵⁹.

Volunteering not only benefits patients and organisations; there is clear evidence that volunteering has a positive effect on volunteers themselves. A recent literature review demonstrated that volunteering is associated with benefits to mental health and self-reported physical health, less functional limitation and decreased mortality among volunteers¹⁶⁰. A recent study using census data from 244,429 Northern Irish residents has also demonstrated a mortality benefit for volunteers¹⁵⁸.

1.3.1.4 Roles for Volunteers in Healthcare Settings

Despite evidence of the benefits of volunteering to patients and organisations, it has been suggested that the full potential of volunteering within health and social care has not been realised, and that further benefits could be achieved by developing new and innovative ways for volunteers to work within healthcare¹³³. The traditional roles with which healthcare volunteers have been associated include providing directions to hospital visitors, serving in tea bars, administrative duties, managing hospital radio and book or newspaper distribution. Volunteers have also been successfully trained to provide peer support in clinical situations, such as women in labour, patients undergoing palliative care, people with cancer and carers of people with dementia^{161–164}. Increasing pressure on healthcare services has also led to greater interest in training volunteers to perform roles involving direct patient care¹³³, with volunteer programmes being developed to relieve this pressure.

One example of such a volunteer programme is the Hospital in Elder Life Program (HELP), a series of interventions designed to prevent delirium and functional decline in hospital inpatients. This program involves

training volunteers in six different aspects of patient care: patient orientation, cognitive stimulation activities, mobilisation, visual and hearing adaptation protocols, sleep enhancement and assistance with eating and drinking¹⁶⁵. The programme demonstrated that it was feasible to train volunteers to perform these roles, although adherence rates of each intervention varied, from 90% adherence to the vision protocol, compared with 10% adherence to the sleep protocol. The adherence rate for feeding assistance, oral fluid repletion and early mobilisation protocols was 45-46%, with the most common reason for non-adherence being staff or volunteer availability (32%) followed by patient refusal (26%)¹⁶⁵. Furthermore, when the programme was implemented across multiple sites, intervention protocols were frequently adapted, with 46% of sites adapting the early mobilisation protocol and 31% of sites adapting the feeding assistance protocol; reasons cited for this included insufficient volunteer workforce or concerns about the volunteer role in mobilisation and feeding¹⁴⁷.

Despite the concerns raised by some hospitals where HELP was implemented, training volunteers to assist with eating and drinking is not a new concept. Evidence of volunteers assisting with feeding care home residents dates back to 1990¹⁶⁶ and the first report of the use of volunteers for this task in hospital inpatients was published in 2002¹⁶⁷. In 2010, a systematic review examined the impact of volunteers on the quality of mealtime care in hospitals and long term care settings¹⁶⁸. This review found some evidence that volunteers improved mealtime care, with three studies reporting improved nutritional intake and all reporting increased patient, relative or staff satisfaction with mealtimes. However, findings were limited by the poor methodological design of many of the studies available. A more recent systematic review has been published, but included participants assisted by either paid staff or volunteers¹²⁸. Therefore, the meta-analysis outcome (of increased protein and energy intakes with additional assistance) cannot be assumed to demonstrate an effect of volunteer assistance specifically. In view of this, and to provide an update of the current evidence, a new systematic review was carried out, examining the impact of trained volunteer mealtime assistants on dietary intake and quality of mealtime care in hospital inpatients¹⁶⁹. This review is presented here.

1.4 The Impact of Trained Volunteer Mealtime Assistants on Dietary Intake and Satisfaction with Mealtime Care in Adult Hospital Inpatients: A Systematic Review

1.4.1 *Methods*

The review was carried out in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines¹⁷⁰. It was prospectively registered with PROSPERO (registration ID CRD42016035419).

1.4.1.1 *Identification of Articles*

A systematic search was carried out in Medline, EMBASE and CINAHL to identify articles relating to the use of mealtime volunteers helping hospital inpatients. The search strategy used a combination of Medical Subject Headings (MeSH) and key words (Figure 1). No limitations in publication date or language were applied. The final database search was performed in August 2015. The reference lists of all included articles and any relevant reviews identified by the search were examined to identify any additional articles.

Figure 1: Medline Search Strategy

exp Meals/ or (feed* or eat* or food* or dine* or dining or breakfast* or dinner* or lunch* or tea or teatime* or supper* or meal* or diet*).tw
AND Exp Volunteers/ or (assist* or help* or encourag*).tw
AND exp Inpatients/ or exp Hospital Units/ or exp Hospitals/ or (hospital* or in-patient* or inpatient* or in-hospital*).tw
AND exp Nutrition Disorders/ or exp Nutritional Requirements/ or (nutri* or malnutri* or malnourish* or undernutri* or under-nutri* or undernourish* or protein-energy malnutrition).tw

1.4.1.2 *Criteria for inclusion*

Scoping searches identified a paucity of literature on this subject, and therefore broad inclusion criteria were applied in order to identify as many relevant articles as possible. Inclusion criteria are shown in Table 6. There was no restriction on study design.

Table 6: Inclusion Criteria for Articles Included in the Review

Population	Adult hospital inpatients, including rehabilitation units. Long term care facilities were excluded.
Intervention	Provision of additional mealtime assistance by trained volunteers.
Comparator	Presence of a comparator group was not a requirement for inclusion in the review. Articles reporting any, or no, comparator group were considered.
Outcomes	Any nutritional outcomes, satisfaction with mealtime care (including questionnaires, interviews or informal reports from patients, staff or volunteers)

1.4.1.3 Selection of Studies

Titles identified in the literature search were reviewed and the abstracts of any relevant articles were retrieved. Following review of these abstracts, the full text of any articles that potentially met the inclusion criteria for the review were retrieved. These full articles were screened against the inclusion criteria for the review and included where appropriate. Trials with multiple publications were identified and the most complete version was included in the review. Each of these stages (title, abstract and full text review) were performed by two reviewers working independently (myself and one supervisor), who came together at the end of each stage to compare results. During title and abstract review, any article that either myself or my supervisor felt was relevant was retrieved (for abstract or full text review, depending on the stage of the process). When the full text of articles had been retrieved, any disagreements about inclusion in the review were to be resolved by discussion, although when the review was ultimately conducted, there were no disagreements between myself and my supervisor at this stage of the process.

1.4.1.4 Data extraction

Data were extracted by each reviewer independently using a standardised template. This template had been used in our department for prior systematic reviews and was adapted by myself for this review. The template was piloted on a sample of articles identified in scoping searches and further refined by myself before use in the review.

The data extracted from each article comprised: study design and setting, participant inclusion and exclusion criteria, volunteer recruitment, training and role, details of participants and control group, outcomes measures and how assessed, study findings, subgroup analyses, statistical analyses and adverse event reporting.

Following independent data extraction by each reviewer, we then came together to resolve any differences by discussion.

1.4.1.5 Quality assessment

The quality of each research study was assessed using a checklist designed for randomised and non-randomised studies¹⁷¹, as recommended by the Centre for Reviews and Dissemination at the University of York¹⁷². The checklist consists of 27 items, and includes within it assessment of risk of bias at a study level. Risk of bias at an outcome level was not formally assessed, but was discussed within the narrative of the results. Assessment was performed by each reviewer independently and the two reviewers then came together to discuss their results and resolve any differences through discussion. Quality assessment was not performed on reports of quality improvement projects.

1.4.1.6 Data Synthesis

The heterogeneity of study design and outcome measures meant that a formal meta-analysis was not feasible. A narrative synthesis was therefore undertaken. The narrative synthesis was constructed using the structure of the data extraction and quality assessment forms as a template.

1.4.2 Results

1.4.2.1 Search Results

5576 results were identified through the database searches (Figure 2). Following removal of duplicates, 3478 titles were reviewed, with 38 articles identified as potentially relevant to the review. After full text review, 20 articles met the inclusion criteria of the review, of which 6 were multiple reports of the same study. 14 original articles were therefore included in the review process.

1.4.2.2 Quality of Articles

Of the nine research studies, eight studies were of moderate quality, scoring 15-20 points from an available total of 31. One study was of lower quality and scored 12 points. Of the seven points available in the risk of bias section, seven studies received 4 points and two studies received 5 points.

1.4.2.3 Overview of Articles

The characteristics of the 14 articles are summarised in Table 7. Publication date ranged from 2002 to 2015, with eight published within the last 5 years^{113,134,173–178}. The setting in thirteen articles was an acute hospital^{113,134,167,173–182}, with the remaining study set in a short stay dementia assessment unit¹²⁵. The UK was the most common location (7 articles)^{134,173,175,178–180,182}, followed by Australia (4 articles)^{113,176,177,181}, the United States (2 articles)^{167,174} and New Zealand (1 article)¹²⁵.

Figure 2: Selection of articles for inclusion

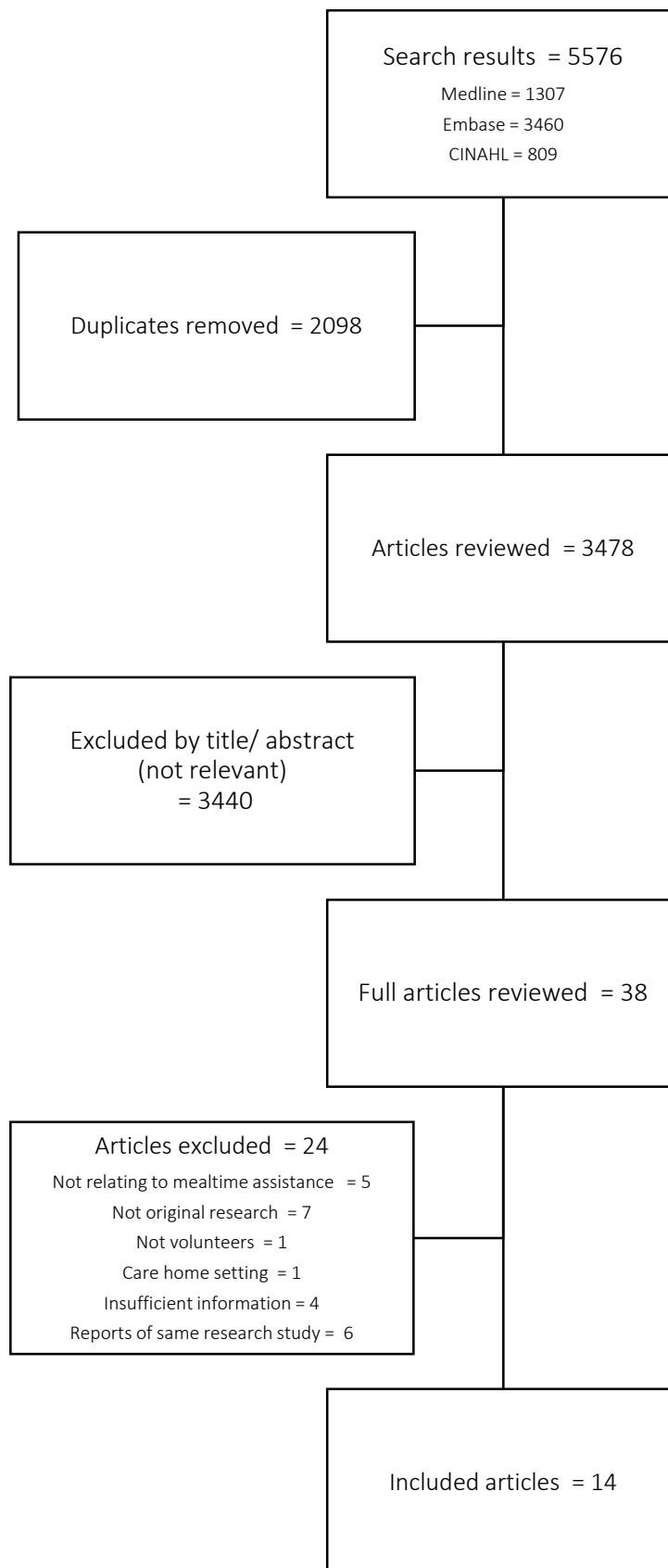


Table 7: Characteristics of Included Articles

Study	Design	Population & Setting	Volunteer intervention	Co-interventions	Control group	Outcome measures and how assessed	Outcomes	Quality Assessment	
								Risk of bias	Total
Brown & Jones, 2009¹⁷⁹	Pilot project	Acute hospital, UK Frail older patients from 2 wards	6 volunteers, recruited by voluntary services team and trained by speech and language team, providing mealtime assistance	Annual audit of nutritional screening Additional staff training Nutrition awareness week Update of screening tool, care pathways and referral forms to dieticians	None	<ul style="list-style-type: none"> • Rate of nutritional screening: annual audit • Informal feedback from staff 	<ul style="list-style-type: none"> • No difference in nutritional screening • Decreased number of patients at high or medium risk of malnutrition in annual audit • Reports that food intake improved in reluctant eaters • Reports that nurses felt more supported to provide mealtime care. • Reports that nurses had greater awareness of nutritional care 	Not scored	
Buys et al, 2013	Observational programme evaluation	Acute hospital, USA Patients over 65 years of age on the Acute Care of Elders Unit	Volunteers, recruited from pool of existing hospital volunteers and trained by registered nurse, providing mealtime assistance	None	None	<ul style="list-style-type: none"> • Volunteer activity: analysis of encounter forms • Staff costs saved: time spent by volunteers and equivalent staff cost 	<ul style="list-style-type: none"> • Volunteers performed an average of 3 tasks per patient. • Mean time of 47.8 minutes spent with each patient with cost saving of \$11.94-\$26 per encounter 	4/7	12/31
Gilbert et al, 2013¹⁷⁵	Cross-sectional observational study	Acute hospital, UK 191 patients from 6 medical wards; mean age 85 years	95 volunteers, recruited from local sixth form colleges and trained by speech and language therapists, providing mealtime assistance	None	87 patients from the same wards receiving usual care	<ul style="list-style-type: none"> • Food and drink intake: estimated % of meal eaten • Patient enjoyment of meal: questionnaire 	<ul style="list-style-type: none"> • Significant increase in food and drink intake, $p < 0.01$ (raw data not presented) • Significant increase in enjoyment of meals, $p < 0.001$ (raw data not presented) 	Not scored	

Study	Design	Population & Setting	Volunteer intervention	Co-interventions	Control group	Outcome measures and how assessed	Outcomes	Quality Assessment	
								Risk of bias	Total
Huang et al, 2015 ¹⁷⁶	Pilot study	Acute hospital, Australia 8 malnourished patients from 2 aged care wards; mean age 83 years	5 volunteers, trained by dietician, speech and language therapist and nurses, providing mealtime assistance	None	Same participants on days without volunteers	<ul style="list-style-type: none"> • Dietary intake: visual estimate of food items to nearest 10% • Nurse and volunteer opinions: questionnaire 	<ul style="list-style-type: none"> • Non-significant trend towards increased protein and energy intake with volunteers • Positive feedback from nurses and volunteers, programme felt to be helpful 	4/7	18/31
Huxtable & Palmer, 2013 ¹¹³	Quasi-experimental observational study	Acute hospital, Australia 1012 patients on 6 adult wards; mean age 65 years.	Volunteers providing mealtime assistance	Protected mealtimes: main focus of study	Demographically similar cohort from the same wards prior to the introduction of the intervention.	<ul style="list-style-type: none"> • Energy and protein intake: estimated proportion of meal consumed • Assistance provided: observed • Interruptions at mealtimes: observed 	<ul style="list-style-type: none"> • Increase in protein intake at breakfast of 2g (p = 0.025) • No change in energy or protein intake at lunch, dinner or over 24 hours • Twice as many patients fed post intervention (15% vs 29% p = 0.002) • Mean time until assistance provided reduced from 5 minutes to 1 minute at dinnertime • Increase in amount of meals within reach (p = 0.000). • Increase in time provided to eat meals (p = 0.000). • Increased number of patients positioned appropriately prior to meal (p = 0.015) • Mealtime interruptions increased (p = 0.000) 	4/7	20/31
Manning et al, 2012 ¹⁷⁷	Cross-sectional mixed methods study	Acute hospital, Australia Convenience sample of 23 patients from 2 wards; mean age 83.2 years	Volunteers, trained by programme staff, providing mealtime assistance	None	Same participants on days without volunteers	<ul style="list-style-type: none"> • Energy and protein intake: food waste weighed • Time spent assisting: observed • Patient opinion on programme: informal patient interviews 	<ul style="list-style-type: none"> • Intake increased by 396 kJ (p = 0.005) and 4.3g protein (p = 0.009) at lunchtime and by 448 kJ (p = 0.113) and 8.7g protein (p = 0.004) over 24 hours • Volunteers assisted by a mean of 12.3 minutes, nurses by 6.0 minutes • Positive feedback from patients and nurses on volunteer presence. 	4/7	19/31

Study	Design	Population & Setting	Volunteer intervention	Co-interventions	Control group	Outcome measures and how assessed	Outcomes	Quality Assessment	
								Risk of bias	Total
Murray, 2006¹⁸⁰	Service development project	Acute hospital, UK Patients from admissions ward and 4 sub-acute wards for older people	Volunteers, recruited by voluntary services and trained by programme nurse, providing mealtime assistance	Protected mealtimes Extra snacks available to all patients	None	<ul style="list-style-type: none"> • Nursing and volunteer opinion: questionnaires • Barriers to intake: multidisciplinary team discussion • Informal feedback on programme 	<ul style="list-style-type: none"> • Nurses considered volunteers effective, helpful, essential • Barriers reported prior to implementation: lack of time and staff, not enough cutlery, workload, staff breaks, interruptions • Positive informal feedback from patients and staff • Anecdotally mealtimes a greater priority and social aspects become more important 	Not scored	
Roberts et al, 2014¹³⁴	Quasi experimental with before and after comparison and qualitative study	Acute hospital, UK 3911 female patients on one acute elderly ward	29 volunteers, recruited via voluntary services department and trained by dietician and speech and language therapists, providing mealtime assistance	None	Cohort of patients on the same ward pre-intervention, as well as contemporaneous control ward with comparable elderly female inpatients	<ul style="list-style-type: none"> • Feasibility of recruiting and training volunteers: number of volunteers recruited and trained • Acceptability of volunteers: semi-structure interviews with patients, relatives, staff and volunteers 	<ul style="list-style-type: none"> • Feasible to recruit and train volunteers in the role; 59 volunteers identified, 29 trained • Positive impact of volunteers agreed by patients, relatives, staff and nurses. Quality of mealtime care improved 	5/7	15/31
Robinson et al, 2002¹⁶⁷	Pilot study	Acute hospital, US 34 patients over the age of 65 years; mean age 78.2 years	19 volunteers (15 students), recruited via local press and trained by a range of health professionals, providing mealtime assistance	None	34 patients matched on age, assistance required, reasons for needing help	<ul style="list-style-type: none"> • Food intake: estimated percentage of meal consumed • Volunteer experiences: recorded on encounter forms 	<ul style="list-style-type: none"> • 59% of meal eaten with volunteers, 33% eaten with nurses ($p < 0.001$) • Volunteers enjoyed experience and felt they were a positive influence • Nurses enthusiastic about volunteers 	4/7	15/31
Sneddon & Best, 2011¹⁷⁸	Quality improvement project	Acute hospital, UK Patients on eight medical	35 volunteers, recruited by voluntary services manager and trained by a variety of health	None	None	<ul style="list-style-type: none"> • Volunteer opinion of programme: informal feedback • Nursing opinion of programme: formal and informal feedback 	<ul style="list-style-type: none"> • Volunteers enjoy their role and feel useful • Reports that patients receive meals and assistance more quickly • Mealtimes a more sociable event 	Not scored	

Study	Design	Population & Setting	Volunteer intervention	Co-interventions	Control group	Outcome measures and how assessed	Outcomes	Quality Assessment	
								Risk of bias	Total
		wards and two rehabilitation wards	professionals, providing mealtime assistance			<ul style="list-style-type: none"> • Patient experience: informal feedback 	<ul style="list-style-type: none"> • Patients enjoyed talking with the volunteers and being assisted by them 		
Walton et al, 2008 ¹⁸¹	Pilot study	Acute hospital, Australia Convenience sample of 9 patients from an aged care ward; mean age 89 years	25 volunteers, trained by programme staff, providing mealtime assistance	None	Same participants on days without volunteers	<ul style="list-style-type: none"> • Energy and protein intake: waste food weighed. • Nurse and volunteer opinion of the programme: questionnaires and focus group with volunteers. 	<ul style="list-style-type: none"> • Increase in protein (10.1g, p = 0.015) and energy (105kcal, p = 0.072) intake at lunchtimes and over 24 hours (protein 10.7g, p = 0.015, energy 56kcal, p = 0.509) • All nurses (n = 13) felt volunteers were valuable • Most volunteers (12/14) felt company at mealtimes positively influenced dietary intake 	4/7	15/31
Wong et al, 2008 ¹²⁵	Quasi experimental observational study	Dementia assessment unit, NZ 7 patients; mean age 77 years	Volunteers providing mealtime assistance to one patient	None at same time as volunteers introduced	Same participants prior to introduction of volunteers	<ul style="list-style-type: none"> • Energy and protein intake: estimated proportion of meal consumed • Nutritional status: weight, BMI and MNA 	<ul style="list-style-type: none"> • Increase of 44.1kcal per patient at lunchtime (p<0.001) • BMI increased by 0.37 (p < 0.04) and mid arm circumference by 0.14cm (non-significant) 	4/7	18/31
Wright et al, 2008 ¹⁸²	Prospective observational study with retrospective control	Acute hospital, UK 16 patients over 65 years prescribed a modified diet or thickened fluids Mean age 76 years	3 volunteers (nutrition students), trained by dietician and speech and language therapists, present 8 hours a day for three days per week. Role included mealtime assistance, help with menu choices, distributing snacks and supplements, attending nursing	Individualised eating and drinking plan	Historical control group: 30 patients over 60 years eating a modified texture diet. Differences in assistance required and diet prescribed compared with	<ul style="list-style-type: none"> • Energy and protein intake: food record charts completed by volunteers 	<ul style="list-style-type: none"> • Increase in energy intake from 1180 kcal to 1798 kcal (p<0.001) • Increase in protein intake from 25g to 53g (p = 0.01) • Increase in median energy and protein intake derived from oral nutritional supplements: from 0 to 1204kcal (p<0.0002) and from 0 to 15g (p<0.001) 	5/7	20/31

Study	Design	Population & Setting	Volunteer intervention	Co-interventions	Control group	Outcome measures and how assessed	Outcomes	Quality Assessment	
								Risk of bias	Total
			handovers, close contact with dieticians and speech and language therapists		intervention group.				
Anonym ous, 2012¹⁷³	Service development project	Acute hospital, UK	12 volunteers providing help with pre-meal preparation and socialisation but not feeding patients	None	None	• Volunteer and nursing opinion: informal comment	• Volunteers provide extra support to nurses	Not scored	

% = percentage; g = grams; kcal = kilocalories; kJ= kilojoules; BMI = body mass index; MNA = Mini Nutritional Assessment; cm = centimetres

Of the 14 articles, eight reported research studies of varying quasi experimental design^{113,125,134,167,176,177,181,182}. One article defined itself as both a study and a programme evaluation, but was considered a study in this review due to the scientific nature of the published report¹⁷⁴. Of the nine research studies, six had received standard research ethics approval^{125,134,176,177,181,182}, one was exempted by the local ethics board¹¹³ and two did not make reference to the ethical approvals process^{167,174}. Four articles were descriptions of service or quality improvement projects^{173,178–180}. One article was a research letter and was considered a quality improvement project for the purposes of this review due to the limited information available¹⁷⁵.

1.4.2.4 Population

The number of participants included in nine of the articles varied widely from 8 to 3911^{113,125,134,167,175–177,181,182}; one study and four quality improvement projects did not report the number of patients^{173,174,178–180}. In six studies, patients requiring mealtime assistance were specifically identified and recruited, with participant numbers ranging from 8–68^{125,167,176,177,181,182}. In two studies, all patients on study wards were included, regardless of a pre-defined need for assistance, and greater numbers of participants were included (1012 and 3911)^{113,134}. In one project report it was not clear how participants were selected¹⁷⁵.

The patient population was older hospital inpatients in the majority of studies and projects: five took place in wards where only older people were admitted^{134,174,176,180,181}, two studies recruited patients aged over 65 years^{167,182}, three studies had a mean participant age over 75 years^{125,175,177}, and one project described its population as “frail older patients”¹⁷⁹. The remaining study had a participant population with a mean age of 65 years¹¹³ and the other two projects did not describe the age of their patient population^{173,178}.

Eight studies and one report included a control group^{113,125,134,167,175–177,181,182}. In four studies, the control group was the same patients on days when volunteers were not present^{125,176,177,181}. Huxtable and Palmer used a demographically similar cohort from the study ward prior to the intervention as their control group¹¹³. Robinson et al used a control group that was matched to the participants in respect of age and the amount of assistance required¹⁶⁷. Wright et al used a historical control group, although this group differed in the amount of feeding assistance required and the type of modified diet prescribed¹⁸². Roberts et al used a cohort of patients from the study ward prior to intervention as well as a cohort of patients from a parallel ward as a contemporaneous control¹³⁴. Gilbert et al used patients on the study wards receiving usual care as their control, although the similarity of this group to the participants was not reported¹⁷⁵.

1.4.2.5 Intervention

The number of volunteers trained to provide mealtime assistance was reported in nine articles^{134,167,173,175,176,178,179,181,182}, and ranged from 3 to 95. Volunteers were commonly local students: two studies

exclusively recruited students^{175,182} and four more reported that students were a prominent component of their volunteer workforce^{167,174,178,179}.

The training programme for volunteers was described in seven articles^{134,167,174,177–179,182}. The most common method, described in three studies^{134,174,177} and one project¹⁷⁹, was a training session followed by a practical observation session. A three-hour training session was reported in a further two articles^{167,178}. Wright et al described a week long training programme for their volunteers¹⁸². Training was led by speech and language therapists and dietitians in six hospitals^{134,175,176,178,179,182}, and by nurses in four hospitals^{113,167,174,180}. Four articles made no reference to who provided volunteers' training^{125,173,177,181}.

In twelve of the fourteen articles^{113,125,134,167,174–181}, the role of the volunteer included all forms of mealtime assistance, such as preparing the meal area, re-arranging meal trays, assisting with packaging, cutting up food and feeding. Wright et al described an extended role, where volunteers were present for 8 hours a day, 3 days a week¹⁸². As well as providing mealtime assistance, the volunteers helped with menu choices, and distributed and encouraged snacks and nutritional supplements. In the remaining project report, volunteers assisted with pre meal preparation and socialisation at mealtimes but did not feed patients¹⁷³.

The introduction of trained mealtime volunteers was the sole intervention in 9 articles^{134,167,173–178,181}. A variety of co-interventions were reported in the remaining five. The main focus of two studies was the implementation of a protected mealtimes programme, with additional assistance by volunteers incorporated into this programme^{113,180}. In addition to implementing protected mealtimes, Murray and colleagues also made additional snacks available to all patients¹⁸⁰. Brown & Jones combined the introduction of volunteers with a renewed focus on nutritional care, holding a "Good Nutrition Awareness Week", updating nutrition screening tools and implementing new care pathways and dietetic referral forms¹⁷⁹. An individualised eating and drinking plan was part of the intervention in one study¹⁸². Wong et al examined 3 different mealtime interventions in their study, although each was investigated in isolation with a washout period between the introduction of the next intervention¹²⁵.

1.4.2.6 Outcomes

Dietary Intake

The most common outcome measured was dietary intake, reported in eight of the research studies and one project. Six calculated protein and energy intake^{113,125,176,177,181,182} and two reported the proportion of a meal consumed^{167,175}. Both these articles reported a significant increase in consumption when volunteers were present. Robinson et al reported 59% of the meal was consumed when volunteers were assisting, compared to 32% when they were not ($p<0.001$)¹⁶⁷. Gilbert et al did not present the raw data, but stated that food intake was significantly better ($p<0.01$) in those assisted by volunteers¹⁷⁵.

The six studies that calculated protein and energy intake used a variety of methods. Two studies weighed food waste^{177,181}, three studies used researchers' visual estimates of plate waste^{113,125,176} and the remaining study used food record charts completed by the volunteers¹⁸². All used the known nutritional content of the meal to determine the protein and energy consumed. The results of these six studies are shown in Table 8.

Walton et al measured dietary intake in the same participants with and without volunteer assistance and found that protein intake significantly increased: by 10.1g at volunteer mealtimes ($p = 0.015$) and 10.7g over the course of 24 hours ($p = 0.015$)¹⁸¹. Mealtime energy intake also improved by 105kcal ($p = 0.072$), although there was no significant increase over 24 hours.

Manning et al used similar methodology, and also reported significant increases in mealtime protein (4.3g, $p = 0.009$), daytime protein (8.7g, $p = 0.004$) and mealtime energy intake (95kcal, $p = 0.005$)¹⁷⁷. Again, there was no significant increase in energy intake over 24 hours.

Wong et al measured the energy intake of participants before the introduction of volunteers, whilst volunteers were present and after the intervention had finished¹²⁵. Mealtime energy intakes increased (by an average of 44kcal, $p < 0.001$) when volunteers were present and returned to pre-volunteer levels when the intervention ceased. Protein intakes were not reported.

Wright et al measured energy and protein intake between 8am and 4pm (the rostered hours of their volunteers) and compared this to an historical control group¹⁸². There were significant increases of both energy and protein intake in the intervention group (618kcal and 28g, $p < 0.001$ and $p = 0.01$ respectively). The provision of additional snacks and nutritional supplements was part of the volunteers' role, and there was also a significant increase in the energy and protein obtained from nutritional supplements.

Huxtable & Palmer measured dietary intake on one ward before and after the introduction of a protected mealtimes programme (which included the provision of trained volunteers)¹¹³. There was a statistically significant increase in protein intake (of 2g) at breakfast ($p = 0.025$), but no difference in lunch, dinner or daytime protein intake and no difference in energy intake at individual meals or over a whole day.

Huang et al compared dietary intake in a cohort of participants on days when volunteers were and were not present, and found increases in energy and protein intakes at mealtimes and on days when volunteers were present¹⁷⁶. Although there was a trend to increased protein and energy intakes, none of the increases were of statistical significance.

Table 8: Protein and Energy Intake Following Introduction of Volunteers

	Participants	Control Group	Method of Calculating Intake	Change in Protein Intake		Change in Energy Intake	
				Single Meal	Daytime	Single Meal	Daytime
Huang et al¹⁷⁶	Targeted population, n = 8	Same participants on days	Visual estimate	+3.1g	+0.8g	+76kcal	+59kcal
		without volunteers		NS	NS	NS	NS
Huxtable & Palmer¹¹³	Total ward population, n = 1012	Pre-intervention cohort	Visual estimate	+2g at breakfast p = 0.025	No difference	No difference	No difference
Manning et al¹⁷⁷	Targeted population, n = 23	Same participants on days	Weighed	+4.3g	+8.7g	+95kcal*	+107kcal*
		without volunteers		p = 0.009	p = 0.004	p = 0.005	NS
Walton et al¹⁸¹	Targeted population, n = 9	Same participants on days	Weighed	+10.1g	+10.7g	+105kcal	+56kcal
		without volunteers		p = 0.015	p = 0.015	p = 0.072	NS
Wong et al¹²⁵	Targeted population, n = 7	Same participants on days without volunteers	Visual estimate	Not reported		+44.1kcal p < 0.001	Not reported
Wright et al¹⁸²	Targeted population, n = 16	Historical group, n = 30	Food charts	Not reported	+28g** p = 0.01	Not reported	+618kcal** p < 0.001

N = number; g = grams; NS = not significant; kcal = kilocalories; *reported in original paper as kilojoules but converted to kilocalories to aid comparability in this analysis; **intake from 8am to 4pm when volunteers were present

Satisfaction with mealtime care

Five studies formally documented opinions and feedback from patients, staff or volunteers, most commonly via a combination of questionnaires and interviews or focus groups^{134,167,176,177,181}. No study described the design or validation of their questionnaire. Five project reports included informal feedback^{173,175,178–180}, although there was little discussion of how this feedback was gained in most.

Huang et al provided questionnaires to staff and volunteers, and all respondents agreed that the programme was beneficial¹⁷⁶. Nurses reported that the volunteer presence gave them time to complete other nursing duties.

Manning et al administered questionnaires to staff and volunteers and conducted interviews with patients¹⁷⁷. Nursing staff frequently reported lack of time to assist patients at mealtimes, whilst the majority of volunteers found they had enough time to assist. Volunteers and staff found the programme worthwhile, and patient feedback was similarly positive.

Roberts et al conducted interviews and focus groups with patients, relatives, staff and volunteers¹³⁴. Staff again reported that having volunteers to assist at mealtimes provided them with additional support and enabled them to complete other clinical tasks. Patients were appreciative of the additional help and enjoyed the opportunity to build a relationship with the volunteers. Volunteers felt appreciated in their role and enjoyed their duties.

Robinson et al asked volunteers to complete evaluation forms, describing their thoughts and experiences¹⁶⁷. Volunteers felt their role was necessary to help support the nurses, benefited the patients and was enjoyable.

Walton et al asked volunteers and staff to complete an open-ended questionnaire, and carried out a focus group with four volunteers¹⁸¹. Staff again identified time pressures at mealtimes that were eased by the introduction of the volunteer programme. Volunteers felt that talking with patients at mealtimes had a positive impact on nutritional intake.

Four project reports included positive informal feedback from staff, volunteers and patients, reflecting many of the themes identified in the above studies^{173,178–180}. Furthermore, Gilbert et al, in their project, administered questionnaires to patients to determine their enjoyment of their meals¹⁷⁵. The contents of the questionnaire and results were not reported, but patient enjoyment of meals was reported to be significantly increased when volunteers were assisting ($p < 0.001$). No study or project reported any negative feedback.

Volunteer Activity

Two studies^{174,177} reported the activity of the volunteers. Buys et al analysed volunteer encounter forms and reported that volunteers completed an average of 3 tasks for each patient they saw and spent an average of 48 minutes with each patient¹⁷⁴. This was equivalent to savings of \$12-26 in staff costs for each volunteer-patient encounter.

Manning et al observed mealtimes and found that volunteers were able to provide each patient with twice as much time as nursing staff, with volunteers spending an average of 12 minutes per patient, compared to 6 minutes from nursing staff¹⁷⁷.

Other Reported Outcomes

Huxtable & Palmer observed mealtimes and reported that the proportion of patients being fed doubled following the introduction of protected mealtimes and volunteers¹¹³. There were also significant increases in the number of patients positioned appropriately prior to their meal, the number of meals placed within reach and the amount of time spent assisting at mealtimes, as well as a significant reduction in the time before patients received assistance with their meals.

Outcomes relating to nutritional status were reported in two articles^{125,179}. Wong et al measured nutritional status of participants using weight, BMI and mid-arm circumference and reported a significant increase in BMI (of 0.37, $p < 0.04$) following the introduction of volunteers, but no change in mid-arm circumference¹²⁵. Brown & Jones reported that fewer patients were at high or medium risk of malnutrition following the introduction of their intervention¹⁷⁹.

Adverse Events

The absence of adverse events was specifically reported in 3 articles^{134,174,179}; in the remaining 11, adverse events were not discussed.

1.4.3 Discussion

This systematic review identified 14 articles describing the introduction of trained volunteer mealtime assistants; nine were research studies and five were quality improvement projects. The majority of studies were of moderate quality; none were of high quality.

Of the 14 articles identified, the majority had been published in the last five years and related to acute hospital care. Volunteering in hospitals is a long held tradition in many countries, and the current climate of increasing demand in healthcare systems has led to greater recognition of the value of volunteers and the development of innovative volunteer roles¹³³. This, coupled with the continuing problem of malnutrition in hospital inpatients, may account for the growing interest in volunteer mealtime assistants demonstrated by this recent increase in publications.

Participant numbers varied widely in the nine articles where this was reported. Studies where mealtime assistance was targeted to a specific population had smaller participant numbers (< 100) than those where the intervention was targeted at all patients on the ward (> 1000). Most articles focussed on older inpatients, who are more likely to experience difficulties at mealtimes and receive insufficient assistance⁷⁹.

The volunteer role was to assist with all aspects of mealtime care in most articles, although there were two notable exceptions to this. In one project, volunteers were not trained to feed patients, and simply assisted with preparation and focussed on social contact with patients during mealtimes¹⁷³. By contrast, Wright et al described an extended role for their three volunteers: they attended a week of training and were present on the wards 8 hours a day three days a week¹⁸². This commitment of time, by both volunteers and trainers, may be difficult to sustain, and the transferability of this intensive programme into other hospitals is far from certain.

Dietary intake was measured in eight articles, but the methods used varied, making direct comparisons difficult. In two articles, volunteers estimated food intake as a proportion of the meal consumed by the intervention group, but neither described how this data was collected in the control group^{167,175}. Visually estimating plate waste has previously been found to be comparable to weighing plate waste¹⁸³, but neither study reports if volunteers were specifically trained to estimate plate waste and how inter-observer variability was minimised. Additionally, the proportion of a meal consumed does not directly correspond to energy and protein intake. Therefore, although both studies reported significant increases in the amount eaten, these results must be interpreted with caution.

The remaining six studies reported energy and protein intake. In three, this was done by researchers visually estimating the proportion of a meal consumed and using the known nutritional content of the meal to calculate energy and protein intake^{113,125,176}. In these three studies, inter and intra-observer variability of visual estimates was monitored and minimised by regular training of the researchers. Wright et al used food record charts completed by volunteers to calculate energy and protein intake, using an average of three days intake¹⁸². It is not clear whether the volunteers' ability to estimate plate waste and complete food record charts was assessed. The remaining two studies^{177,181} weighed food waste and used the known weight and composition of meals to calculate energy and protein intake, a method which provides a high degree of accuracy.

These six studies had mixed results. Four studies reported an increase in protein and/or energy intake. The three studies which targeted feeding assistance to a specific cohort of patients acting as their own controls^{125,177,181} all reported increased energy intakes, and two reported increased protein intakes, with volunteers^{177,181}. The greatest increases in protein and energy intakes were reported by Wright et al¹⁸², which is unsurprising, as volunteers were present on the wards for longer and had an extended role that included provision of snacks and supplements; the significant increases in energy and protein derived from nutritional supplements is likely to be one of the main reasons for the considerable increase in dietary intake. An additional problem with this study was that the control group differed from the intervention group in terms of the assistance required and the type of modified diet they ate. Both of these factors are known to influence nutritional intake^{87,90}. The control group data was collected 3 years previously, and nutritional practices in the hospital may have changed. Lastly, protein and energy intakes were measured differently in the control and intervention groups (weighed food intake versus food record charts

completed by volunteers). Therefore, although substantial increases in protein and energy intake were demonstrated, several confounding factors must be considered.

Two studies found little difference when volunteers were present. For Huang et al, this may have been due to the small sample size of this study ($n = 8$)¹⁷⁶. Huxtable & Palmer reported a solitary increase in protein intake at breakfast¹¹³. The authors did not report which mealtimes volunteers helped at, and so the significance of this finding, and its association with volunteer mealtime assistance, is uncertain.

In summary, there is some evidence from small studies that volunteers providing targeted mealtime assistance to specific patients may lead to an improved energy and protein intake.

All articles that explored the opinions of patients, staff or volunteers reported universally positive findings. Common themes that emerged included: volunteers provided support to nurses and enabled them to concentrate on other tasks, mealtimes became more enjoyable and social, volunteers enjoyed their role and saw the benefits to staff and patients, and patients appreciated the help from volunteers. Accordingly, there is consistent evidence that trained volunteer mealtime assistants are appreciated by staff and patients, and improve satisfaction with mealtime care.

The average time volunteers spent with a patient differed considerably in the two articles where it was reported (12 minutes and 48 minutes)^{113,174}. It is not obvious from the reports why this time should vary so widely, and no other reports provided this information to allow further comparisons. Buys et al calculated the staff costs saved by taking this average volunteer-patient encounter, and demonstrated that \$12-\$26 could be saved, depending on the seniority of the staff member released¹⁷⁴. However, there was no discussion of the cost of establishing the volunteer programme, so no conclusion about the overall economic benefit can be drawn.

Huxtable & Palmer reported other additional positive outcomes of their study, with more patients positioned correctly, more meals within reach, more time spent assisting patients and less time waited before assistance was given¹¹³. However, it is not clear whether these outcomes were attributable to the presence of volunteers on the ward, or due to improved mealtime care as a result of the wider protected mealtimes programme.

Wong et al found an improved BMI in their 7 participants¹²⁵. However, this increase was small (0.37), with uncertain clinical significance. Brown & Jones reported a decrease in the number of patients who were classified at high or medium risk of malnutrition¹⁷⁹, but this could have been due to the additional nutrition focus that was included in the project, rather than the introduction of volunteers. No firm conclusions can be drawn about the effect of volunteers on nutritional status.

No adverse events were reported in any article, demonstrating that trained volunteer mealtime assistants can safely help older patients including those who require help with feeding.

1.4.4 Limitations

One limitation of this review is that grey literature was not searched, meaning some relevant articles may have been omitted. However, it is likely that searching of grey literature would have identified more quality improvement projects, which frequently have uncertain methodology and outcomes, and may not have contributed further to the conclusions of this review.

No formal assessment of the risk of publication bias or selective outcome reporting was carried out. However, given that a meta-analysis was not carried out and that no definitive conclusions could be reached regarding the impact of trained volunteer mealtime assistants on dietary intake, the review's overall conclusions are unlikely to have been affected by this.

1.4.5 Conclusions

This systematic review investigated whether volunteers, trained to provide mealtime assistance, had any effect on dietary intake and satisfaction with mealtime care. There are few large-scale studies examining this subject, but smaller studies and quality improvement projects suggest that training volunteers is feasible, safe and improves patient and staff satisfaction with mealtime care, although evidence of an effect on dietary intake is unconfirmed. Having demonstrated these benefits of trained volunteer mealtime assistants, the focus of research now needs to progress to how a volunteer programme can be implemented on a larger scale.

1.5 The Southampton Mealtimes Assistance Study

The Southampton Mealtimes Assistance Study (SMAS) was a pilot study, led by my supervisor on one ward of the Medicine for Older People department of University Hospital Southampton¹³⁴. This study was conducted in 2011, and found that it was feasible and acceptable to train volunteers as mealtimes assistants. However, as with many other studies identified by the systematic review, this was a small study, with 29 volunteers assisting patients on one ward over one year. Following this study, volunteers continued to work successfully on the trial ward, but expansion of the programme was relatively limited. The need for further research into how to implement the intervention on a larger scale (across multiple wards and departments of the hospital) was identified and formed the rationale for the current study. The use of implementation research and complex interventions in this context is now discussed further.

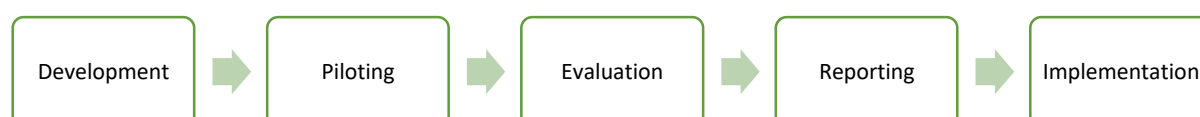
1.6 Implementation Research and Complex Interventions

The use of trained volunteers to provide mealtimes assistance is a complex intervention. The Medical Research Council (MRC) have defined complex interventions as those which are built up from a number of components that can act both independently and inter-dependently¹⁸⁴. Complexity of an intervention may result from one or several different dimensions (Figure 3)¹⁸⁵.

Figure 3: Dimensions of Complexity¹⁸⁵

Number of and interactions between components within the experimental and control interventions
Number and difficulty of behaviours required by those delivering or receiving the intervention
Number of groups or organisational levels targeted by the intervention
Number and variability of outcomes
Degree of flexibility or tailoring of the intervention permitted

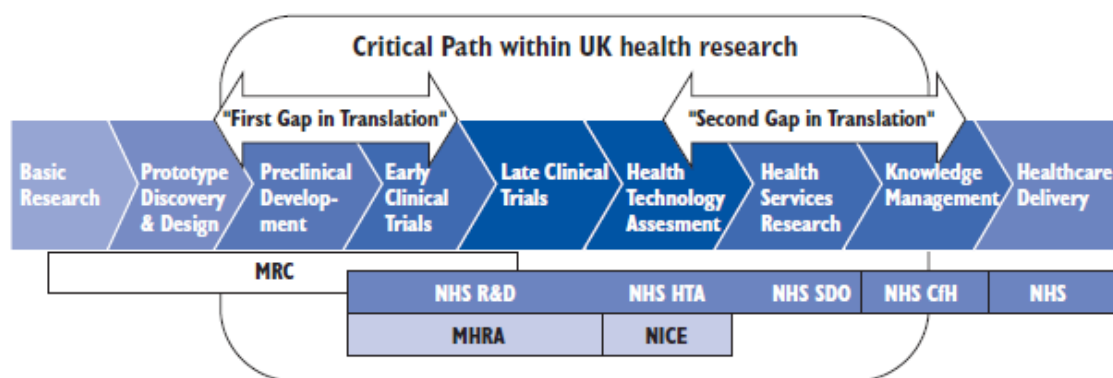
In 2008, the Medical Research Council (MRC) produced guidance on developing and evaluating complex interventions¹⁸⁵, in which the processes involved were defined as follows:



The use of trained volunteer mealtime assistants was piloted in University Hospital Southampton in 2009, and evaluated and reported by the Southampton Mealtime Assistance Study¹³⁴. Therefore, the next stage is to evaluate the implementation of the intervention, which is the subject of this thesis.

Implementation research is the examination of how proven interventions are implemented into actual practice, and explores the factors influencing implementation, the process of implementation itself and its outcomes¹⁸⁶. The importance of implementation research has been highlighted by the World Health Organisation (WHO), who have described implementing proven interventions in “real-world” situations as one of the greatest challenges currently facing the global health community¹⁸⁶. The necessity of implementation research has also been recognised within the UK. In 2006, an independent review of the public funding of health research in the UK identified two gaps in the translation of health research into practice: the translation of ideas from basic research to the development of new interventions, and the implementation of new interventions and approaches into clinical practice (Figure 4)¹⁸⁷.

Figure 4: Translation Gaps in Health Research



Implementation research aims to address this “second gap in translation”. The rate of adoption of research findings into clinical practice is known to be slow, with one group estimating that only 14% of original research is ever implemented into patient care, and that this implementation takes 17 years¹⁸⁸. Barriers to implementation may be cultural, institutional or financial¹⁸⁷, and one of the aims of implementation research is to identify these barriers and resolve them where possible.

The research objectives and questions that occur in implementation research are diverse (Table 9), ranging from exploration of the factors involved in implementation to determining if a specific outcome is related to implementation of the intervention in question¹⁸⁶.

Table 9: Types of Implementation Research Objectives and Questions¹⁸⁶

Objective	Implementation Question
Explore	What are the possible factors and agents responsible for good implementation of a health question?
Describe	What describes the context in which implementation occurs? What describes the main factors influencing implementation in a given context?
Explain	How and why does implementation of the intervention lead to effects on health behaviour, services or status in all its variations?
Predict	What is the likely course of future implementation?
With Adequacy	Is coverage of a health intervention changing among beneficiaries of the intervention?
With Plausibility	Is a health outcome plausibly due to the implemented intervention rather than other causes?
With Probability	Is a health outcome due to implementation of the intervention?

The methods used in any given piece of implementation research depend upon the research objective and questions being asked. Research examining the effect of implementation of an intervention on a health outcome may be a pragmatic controlled trial, an effectiveness-implementation hybrid trial (combining intervention and observation of the implementation) or a quality improvement study (based on the plan-do-study-act [PDSA] cycle¹⁸⁹). However, research exploring, describing or explaining implementation is particularly suited to mixed methods research, as these research questions are often examining several perspectives and outcomes, making the use of mixed qualitative and quantitative research particularly valuable¹⁸⁶. Further guidance from the MRC has also highlighted the importance of process evaluation when assessing implementation of complex interventions¹⁹⁰. In this context, process evaluation can provide additional insight into the reasons behind the success or failure of implementation of an intervention. The addition of an economic evaluation is also recommended, in order to provide clear evidence of the cost-effectiveness of the intervention and its implementation¹⁸⁵.

When assessing the outcome of implementation research, the WHO has defined eight “implementation outcome variables” (Table 10), one or more of which will be relevant depending upon the specific research question.

Table 10: WHO Implementation Outcome Variables¹⁸⁶

Implementation Outcome	Working Definition
Acceptability	The perception among stakeholders that an intervention is agreeable
Adoption	The intention, initial decision or action to try to employ a new intervention
Appropriateness	The perceived fit or relevance of the intervention in a particular setting or for a particular target audience or issue
Feasibility	The extent to which an intervention can be carried out in a particular setting or organisation
Fidelity	The degree to which an intervention was implemented as it was designed in an original protocol, plan or policy
Implementation Cost	The incremental cost of the delivery strategy, including the cost of the intervention itself
Coverage	The degree to which the population that is eligible to benefit from an intervention actually receives it
Sustainability	The extent to which an intervention is maintained or institutionalised in a given setting

In the current study, acceptability, adoption, feasibility, implementation cost and sustainability were all identified as relevant and examined as outcome variables.

1.7 Summary

Malnutrition is a common problem in hospital inpatients and is associated with multiple negative health outcomes. There are multiple causes and contributory factors, including inadequate dietary provision, negative opinions of hospital catering, patient illness, anorexia or confusion, mealtime interruptions and insufficient assistance from time-pressured staff. A variety of interventions have been studied to resolve these factors, including the provision of additional paid staff to provide additional assistance. However, in the light of financial restraint within the NHS and healthcare globally, there has been increasing interest in training volunteers to perform this role.

There are an estimated 3 million volunteers in health and social care in the UK, and these volunteers are increasingly being trained to take on roles involving direct clinical care. A systematic review of volunteers trained as mealtime assistants was performed by myself and identified 14 articles describing their use. There was inconsistent evidence of an improvement in dietary intake with volunteers, but there was evidence that the training of volunteers was safe and that they were positively received by staff and patients and enjoyed the role. No large scale studies were identified by the review.

Implementation research is research dedicated to investigation of the factors influencing the implementation of proven interventions. It is necessary in complex interventions (such as the use of trained volunteers as mealtime assistants) because a range of factors can influence the success of an intervention when it is implemented on a large scale. Implementation can be assessed using a range of outcome variables; for this study the variables adoption, feasibility, sustainability, acceptability and implementation cost were identified as relevant.

1.8 Study aims and objectives

The aim of this study was to describe the implementation of trained volunteer mealtime assistants in four hospital departments of an acute hospital trust. There were two elements to this process:

- To define the context in which the volunteers were working and identify factors that could have an impact on implementation, by describing:
 - The four hospital departments and characterising their patient population
 - The dietary intake and nutritional indices of patients in the four hospital departments
 - Patient, staff and volunteer opinions on the pre-intervention hospital mealtime experience
- To evaluate the implementation of trained volunteer mealtime assistants, with reference to:
 - Adoption: measured by volunteer recruitment and training and volunteer characteristics
 - Feasibility: measured by volunteer sessions delivered and volunteer activity within these sessions
 - Sustainability: measured by volunteer retention
 - Acceptability: assessed through the experiences of patients, staff and volunteers relating to the programme
 - Implementation cost: measured by analysis of the costs of implementation compared with potential costs saved through release of nursing staff

CHAPTER 2: A MIXED METHODOLOGY APPROACH TO EXPLORE THE IMPLEMENTATION OF TRAINED VOLUNTEER MEALTIME ASSISTANTS

2.1 Study Design

This study took place at University Hospital Southampton (UHS) over a 2-year period from March 2014 to March 2016, with data collection for 15 months. It was a mixed methods study of the implementation of trained volunteer mealtime assistants in four hospital departments: Medicine for Older People (MOP), the Acute Medical Unit (AMU), Trauma & Orthopaedics (T&O) and General Medicine (GM).

University Hospital Southampton is a large, city centre teaching hospital with approximately 1300 inpatient beds. The departments included in the study were selected to ensure generalisability of results, as they all admit a high proportion of older patients and are present in most acute hospital trusts. Two wards were selected for inclusion from each department, with the exception of AMU, a self-contained 50-bedded unit, which was included in its entirety. In Medicine for Older People, the two wards selected admitted male patients only, as the Southampton Mealtime Assistance Study (SMAS) had already demonstrated that introducing trained volunteer mealtime assistants in a female ward in the same department was feasible and acceptable¹³⁴. In Trauma and Orthopaedics and Adult Medicine, the wards included in the study were those identified by the senior departmental nursing staff as the wards with the greatest need for additional mealtime assistance and included both men and women.

The implementation of the mealtime assistant programme in these four departments was evaluated through the collection of quantitative data relating to the recruitment, training, characteristics, activity and retention of volunteers, along with qualitative data collected through interviews and focus groups with patients, relatives, staff and volunteers. This data was used to assess the implementation outcomes of adoption, feasibility, sustainability and acceptability. In order to define the context in which volunteers were working and identify factors that may have had an impact on implementation, data were also collected on the characteristics of the patient population of each department and their dietary intake. An economic analysis, comparing the cost of implementation with the costs saved, was also performed.

2.2 Intervention

The intervention under study was the provision of mealtime assistance by trained volunteers at either lunch or supper time on weekdays.

2.2.1 Volunteer Recruitment and Training

Volunteers were recruited by the hospital voluntary services manager assisted by myself. The voluntary services department continued their usual methods of volunteer recruitment, which included talks at university fairs, church and community groups and promotion via local press. In addition to this, I gave five talks with the voluntary services manager at local sixth form colleges, where the benefits of volunteering in a hospital setting and the specific role of the mealtime assistant were promoted. Furthermore, the mealtime assistant role was advertised within the hospital, in the form of posters (Figure 5), which were placed in strategic locations around the trust, banners, which were rotated around the hospital entrances and areas of maximum footfall, and postcards, which were distributed at food outlets across the hospital. I assisted in both the design and distribution of this advertising.

Figure 5: Promotional Poster



In line with hospital policy, the voluntary services manager interviewed all potential volunteers to determine their expectations and anticipated experience of volunteering. Any potential volunteer who expressed an interest in becoming a mealtime assistant had their details forwarded to the research team (myself, assisted by a research nurse

and clinical trials assistant), so that they could be invited to training. All volunteers were required to undergo the standard hospital checks (two references, Disclosure Barring Service clearance and occupational health clearance).

Volunteer training consisted of a half day classroom session (which took place on a monthly basis), followed by a one-to-one competency assessment. Potential volunteers were contacted by the research team as soon as practicably possible after their details were provided by the volunteer office (usually within 48 hours). Contact was made either by email or phone, depending upon the volunteer's stated preference. At this stage, the next two available training dates were offered to the volunteer. If neither date was acceptable, additional dates were offered as required. If no response was received from the volunteer, another attempt at contact was made one week later. If there was still no response after a further week, the volunteer office made one further attempt at contact, after which the potential volunteer would not be pursued further. Formal invitations to the half-day training were sent two weeks before the session, followed by a further reminder one week prior. Volunteers who booked but failed to attend the half-day training session were contacted on one more occasion with further available dates. If there was no response, the volunteer was not pursued.

Half-day training sessions were run by myself with help from the research team. The sessions were presented using Microsoft PowerPoint (Appendix 1: Volunteer Training PowerPoint) and were deliberately interactive rather than being a formal didactic teaching experience. Each session began with an introduction to the study and the background to mealtime assistants in the hospital, and then an open discussion with the volunteers about their reasons for volunteering, any previous experience and their expectations of the role. Basic education was provided on normal nutrition and malnutrition, including its prevalence in the hospital setting, its consequences on health and wellbeing and strategies for its management. Safe feeding strategies, an understanding of dysphagia and the bed signs relating to feeding in use across the hospital were also discussed. A practical session, where volunteers role played being a patient with particular needs (e.g. a blind patient, a patient with communication difficulties) or a mealtime assistant displaying negative behaviours (e.g. standing too close to the patient, not focussing on the patient interaction) was used to demonstrate effective feeding strategies. The session concluded with a discussion of the expectation and limitations of the mealtime assistant role. The format of these sessions was the same as that used successfully in SMAS¹³⁴, although the practical scenarios were updated to reflect the most common scenarios mealtime assistants were likely to encounter.

Following attendance at the formal training session, volunteers were then required to attend a one-to-one competency assessment. This session enabled the volunteer to be directly observed by myself or the research nurse interacting with patients in the ward environment, but also served as a revision of the important aspects of the half day training, allowed the volunteer to meet the ward team and resolve any queries from the training session. In order for the competency assessment to take place, the standard hospital checks had to have taken place and clearance

obtained from the volunteer office. At the end of the half-day training session, volunteers who had obtained this clearance were encouraged to book a convenient time for their competency assessment. For volunteers where clearance had not been obtained, booking of the competency assessment was deferred until this was in place.

When arranging the competency assessment, each volunteer was allocated to a ward and mealtime. This decision was made in conjunction with the volunteer, taking into account their availability and expectations of the role. The competency assessment was the volunteer's first ward session. The volunteer was orientated to the ward area and introduced to key members of staff and then observed performing their role, including the feeding of at least one patient. During the session, the trainer completed a competency checklist to ensure the volunteer was safe to work independently (Figure 6). This competency checklist was based on subjects covered during the half day training session as well as the practical aspects of mealtimes on their chosen ward, and allowed a more practical demonstration by the trainer of subjects such as bed signs and puree diets. The assessment was collaborative, involving discussion between the trainer and volunteer, rather than a formal "test" situation, although volunteers were required to demonstrate safe feeding of one patient in order to pass the assessment. If the trainer or volunteer felt that further supervision was needed prior to independent working, further sessions were arranged as needed.

Competency assessments were repeated annually for those volunteers who continued in the role.

Figure 6: Competencies for Volunteer Mealtime Assistants

Competencies	Method to achieve
a) To discuss and identify puree and soft diet options	Discussion/demonstration
b) To recognise and show an understanding of the following terms/signs: Red trays; Nil by Mouth; Other possible signs around the patient's bed	Discussion/demonstration
c) To have attended the volunteer mealtime assistance training session	Attend session
d) To have attended an Infection Prevention session (including hand hygiene)	Trust course or discussion
e) To assess and prepare the feeding environment. This may include: waking the patient prior to their meal arriving; identifying the need for a patient to be re-positioned; washing hands and clearing tables; moving a patient's table within their reach; speaking to the relevant member of staff if clarification required regarding bed signs; removing distractions e.g. turning down radios	Discussion/demonstration
f) To provide appropriate assistance to the patient during a mealtime. This may include: providing encouragement; opening packets; cutting up of food; guiding food to a patient's mouth; feeding	Discussion/demonstration
g) To provide support in a way that respects the rights and dignity of the patient	Discussion/demonstration
h) To be able to identify the warning signs of dysphagia, to include coughing, fluid spilling from the lips, effortful swallowing, choking	Discussion
i) To demonstrate the safe feeding of 1 patient	Discussion/demonstration
j) To complete the Food Record Chart	Demonstration
k) To liaise with ward staff before and after the meal to give feedback	Discussion/demonstration
l) To attend a 1:1 assessment update after 1 year	Attend 1:1 update

2.2.3 Volunteer Role

Building on previous experience from SMAS¹³⁴, the initial aim was to provide each ward with two mealtime assistants for one mealtime (either lunch or supper time) on each weekday, with the exception of AMU, which was provided with two mealtime assistants at both lunch and supper time. The decision regarding whether to provide lunch or supper time assistance in other departments was made in conjunction with the senior ward staff, taking into account the time of greatest need and the availability of volunteers for the given mealtime. On this basis, across the four hospital departments, 80 volunteer sessions were required each week.

Mealtime assistants were available to help any patient on the ward, regardless of age, with several exceptions:

- Patients with dysphagia, as identified by a current speech and language care plan or the need for a modified texture diet (due to the risk of aspiration)
- Patients in side rooms: standard hospital policy was that volunteers did not enter side rooms due to infection control restrictions; although some patients in side rooms may not have been isolated for infection control reasons, volunteers were instructed not to feed any patients in side rooms for the sake of clarity
- Patients lying flat and unable to sit up to eat (due to the risk of aspiration)
- Patients with significant problems with aggression: volunteers would be advised by staff of any patients who had been aggressive or violent towards staff and would not approach these patients for their own safety

Volunteers would arrive at least 15 minutes before the mealtimes, sign the ward register, and then approach the appropriate member of staff to identify which patients were likely to require assistance and which patients were not appropriate for them to help. The volunteer role included pre-meal preparation, (clearing and cleaning patients' tables, waking sleeping patients, wiping patient's hands and identifying patients who would need repositioning before eating), assisting patients with the meal tray (positioning the tray appropriately, re-organising the tray, opening packets), cutting up food, supporting patients to get food or drink to their mouths and feeding those who required it. At the end of the mealtime, volunteers would complete food charts for the patients they had assisted and report back to the nurse looking after the bay. Each mealtime session lasted approximately 90 minutes.

2.3 Participants

2.3.1 Patient Participants

Patient participants could be included in the study in three different ways: in characterisation of the patient population of each department, in characterisation of the dietary intake and nutritional indices of patients in each

department, or through participation in a semi-structured interview. One participant could be involved in all three ways.

2.3.1.1 Participants to Characterise Each Department

50 patients were prospectively recruited from each of the four departments to characterise the patients aged 70 years and over within each department. Participants were recruited three weekdays per week (dependent on research nurse availability), working through the departments in the same order that volunteers were to be introduced (i.e. MOP, AMU, T&O and GM). All patients on the ward(s) meeting the inclusion and exclusion criteria on each of these days were approached for involvement.

Inclusion and Exclusion Criteria

The inclusion criteria were:

- Age over 70 years
- Present on the ward(s) under study

The exclusion criteria were:

- Occupying a side room: these patients would not be fed by volunteers for infection control reasons
- On an end of life pathway: it would be inappropriate to approach these patients for inclusion
- Artificial nutrition (enteral or parenteral): these patients would not be fed by volunteers
- Primary reason for admission was bowel disease or surgery: these patients could have more complex reasons for a reduced dietary intake than simply insufficient mealtime assistance

All these participants gave informed, written consent to participate. Patients who lacked capacity to give informed consent were not included in this part of the study.

2.3.1.2 Participants to Characterise Dietary Intake and Nutritional Indices

Dietary intake and relevant nutritional indices were measured in all patients on the study wards who met the inclusion and exclusion criteria.

Inclusion and Exclusion Criteria

The inclusion criteria were:

- Age 70 years and over
- Present on the ward and eating at the mealtime when dietary intake and nutritional indices were assessed

Exclusion criteria were limited to patients who would not be fed by a volunteer. These groups of patients were those:

- Occupying a side room

- Receiving enteral or parenteral nutrition
- On an end of life pathway

Individual consent was not required for inclusion in this part of the study; posters around the ward informed patients that their care was being observed and that routine data were being collected as part of a research study, and that they could approach a member of staff or the research team if they did not want their data to be collected. This method received ethical approval in view of the minimal, anonymised data that was collected on each patient (weight of leftover food and basic demographic data).

2.3.1.3 Participants in Semi-Structured Interviews

A purposive sample of eight patients took part in a semi-structured interview. The sampling strategy ensured representation of older (aged over 85 years) and younger (aged 70-85 years) men and women.

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were the same as those for participants recruited to characterise each department (Section 2.3.1.1 Participants to Characterise Each Department). All participants gave informed, written consent to participate, and patients who lacked capacity to give informed consent were not included.

2.3.2 Volunteer Participants

All volunteers who completed the full mealtime assistant training (including passing the competency assessment) and volunteered on the study wards were included, asked to record their attendance and activity, and invited to complete a volunteer profile. All active volunteers were invited (via email and notices located with the ward registers) to participate in a focus group to discuss their experiences.

2.3.3 Staff Participants

A purposive sample of nursing staff was invited to attend a focus group or participate in a semi-structured interview. The sampling strategy incorporated staff from each of the study departments as well as a mix of seniority (including housekeepers, nurses and senior ward staff).

2.4 Data Collection

2.4.1 Defining the Context

2.4.1.1 Characterisation of the Patient Population

Once participants had given informed consent, they were assessed by a research nurse, who recorded the following information:

2.4.1.2 Demographic Information

Date of birth, gender, marital status and usual living arrangements were recorded. Any care requirements prior to admission were noted and categorised as: no assistance, assistance with shopping, cleaning or meals, assistance with personal care or residence in a long-term care facility (either residential or nursing home).

Current and previous cigarette use was documented and total pack years of smoking were calculated. Weekly alcohol consumption prior to admission was recorded.

2.4.1.3 Medical History

Diagnosis on admission and active co-morbidities were ascertained and confirmed with the participant's medical records. This information was used to calculate the Charlson Comorbidity Index (CCI). This is a weighted index, consisting of a comorbidity component (with points assigned to specific comorbidities) and an age component. The index was originally developed in a cohort of medical patients and validated in a cohort of breast cancer patients, where it was shown to predict 10 year survival¹⁹¹.

The participant's regular prescribed medication was ascertained from the computerised prescribing system on the day of their inclusion into the study and the name of each medication recorded. Medications prescribed on an "as required" basis were not recorded.

2.4.1.4 Cognition and Mood

Cognition was assessed using the Mini Mental State Examination (MMSE)¹⁹². This 30-point scale is widely used in research and clinical practice and has been validated in many different populations. Traditionally, a score of $\leq 24/30$ is used as an indicator of cognitive impairment¹⁹³. However, in the UK, NICE suggests the following cut-off scores are used in decisions surrounding treatment of dementia¹⁹⁴:

$\geq 27/30$	Normal
21-26/30	Mild dementia
10-20/30	Moderate dementia
$< 10/30$	Severe dementia

Furthermore, both age and educational attainment can affect MMSE performance, and therefore should be taken into account when making a full assessment of cognition^{195,196}. In this study, a full assessment of the cognition of each participant was not feasible or necessary, and MMSE was used as a simple, easily comparable indicator of the cognitive function of participants in different areas.

Mood was assessed using the 15 item Geriatric Depression Scale (GDS). This is a widely used and well validated screening tool for depression¹⁹⁷. Each answer in bold scores one point and a score of more than 5 indicates that depression is likely.

2.4.1.5 Activities of Daily Living and Physical Activity

The Modified Barthel Index was used to ascertain the participant's current abilities in respect of activities of daily living. The 100-point scale was used, which was developed to improve the sensitivity of the original index¹⁹⁸.

Participants' physical activity prior to admission was recorded using the Physical Activity Scale in the Elderly (PASE). This is a 10-point questionnaire designed and validated specifically for those aged over 65 years¹⁹⁹. The questionnaire records activity in the preceding seven days and so participants were asked about the seven days prior to their hospital admission to give a measure of their physical activity at home.

Each item in the questionnaire is assigned an activity value, which is then multiplied by an activity frequency dependent upon the respondent's reported participation (days and hours) of the activity. All values are summed to provide a total score, which can range from 0 to a theoretical maximum of over 600.

2.4.1.6 Appetite and Nutrition

Appetite was assessed using the Simplified Nutritional Appetite Questionnaire (SNAQ), a 4-item questionnaire in which each question is assigned a score of 1-5 (a=1, b=2, etc.)²⁰⁰. Scores below 14 have been shown to predict weight loss in community dwellers²⁰⁰.

The most recent height, weight, BMI and MUST score were abstracted from the clinical records. MUST score is routinely recorded on a weekly basis for all inpatients in UHS. In the event that a height, weight, BMI or MUST score had not been recorded in the patient's records, it was calculated by the research team.

2.4.1.7 Grip Strength and Frailty

Hand grip strength was measured using a Jamar dynamometer, using a standard protocol²⁰¹. Participants were seated in a chair with their forearms resting on the arms of the chairs and their feet flat on the floor. Grip strength was measured twice in each hand, alternating between sides after each measurement to reduce any influence of tiring. If a participant was unable to use one hand, two measurements were recorded from the other hand. All members of the research team who measured grip strength were trained to use this protocol and test measurements were carried out to determine inter and intra-observer reliability. This ensured that results would be reproducible for each assessor and comparable between assessors. The use of a standard protocol when measuring grip strength is important to maintain reliability of measurements, as body position can affect grip strength readings²⁰¹. The dynamometer was calibrated prior to the study and regularly checked for accuracy using known weights throughout the study. Results that signified low grip strength were those defined by the European Working Group on Sarcopenia²⁰² and are shown in Table 11.

Table 11: Reference Values for Grip Strength

Men		Women	
BMI < 24	< 29kg	BMI < 23	< 17kg
BMI 24.1-28	< 30kg	BMI 23.1-26	< 17.3kg
BMI > 28	< 32kg	BMI 26.1-29	< 18kg
		BMI > 29	< 21kg

BMI = body mass index; kg = kilograms

Frailty was assessed using two different scales, the Fried frailty score and the FRAIL scale.

The Fried frailty score is a five-item instrument that is used widely in research literature²⁰³. It incorporates both questions and physical measurements. The physical activity item in the published scale is measured by calculating the average calorie expenditure per week and identifying the lowest quintile of participants. A PASE score in the lowest quintile was used as a surrogate for this in our participants, in order to avoid participant burden by completing an additional physical activity questionnaire. The presence of each item in the scale scores one point, giving a maximum score of 5. A score of 0 is considered normal, scores of 1-2 indicate a pre-frail state and scores of 3-5 indicate frailty.

Despite its widespread use in research settings, the Fried frailty score is not widely used in clinical practice, as it can be time consuming to complete (up to 20 minutes) and requires the use of specialist equipment. As a result of this, alternative scales have been developed that are easier to perform in a clinical setting. The FRAIL scale is one such instrument: a self-reported 5-point scale, designed to be easy to use and without the need for face-to-face examination²⁰⁴. It has been validated in community populations, where it has been shown to predict disability and mortality²⁰⁵⁻²⁰⁹. Each item is scored as 0 or 1, with a maximum score of 5. The scores are interpreted in the same way as the Fried frailty score, with scores greater than 3 suggestive of frailty.

In this study, both scales were used to allow comparison between a predominantly measured instrument (Fried frailty scale) and a self-reported instrument (FRAIL scale).

2.4.1.8 Outcome of Hospital Stay

On discharge from hospital, the following information was recorded:

- Length of hospital stay
- Discharge destination and any change in usual domicile
- Care needs: as with pre-admission information, need for assistance shopping, cleaning or meals or personal care were recorded.

Readmissions and death within 6 months were also abstracted from the hospital patient administration system.

2.4.1.9 Characterisation of Dietary Intake and Nutritional Indices

Dietary intake and nutritional indices were assessed on eight occasions in each hospital department: two weekday mealtimes prior to and two weekday mealtimes after the introduction of the volunteers on each ward. On each ward, initial measurements took place no sooner than 4 weeks before the volunteers were introduced and at the mealtime (lunch or supper) they were to be introduced at. Measurements were then repeated once the volunteers were established on the ward (after at least 4 weeks), at a mealtime where 2 volunteers were present.

2.4.1.10 Measurement of Dietary Intake

The methods established in SMAS were used to calculate protein and energy intake²¹⁰. The hospital operated a steam-cook food service system, with meals delivered to the hospital in individual portions and heated to order in the ward kitchens. The weight and nutritional content of each meal was obtained from the manufacturer, who used standardised portion control measures to ensure that the weight of each component of the meal was within 10% of the stated weight. Weights of servings of soup and custard (where the portion is controlled by the ward catering team) were determined from average weights of test portions served in the cups and bowls used on the ward.

Protein and energy intake was calculated by weighing each patient's food waste. The research team removed the meal tray once the patient had finished eating, and the uneaten food was separated into its individual components, each of which was weighed. If components were mixed together and could not be easily separated (e.g. mashed potato and gravy), the combined weight was recorded and the amount of each component was calculated according to the proportion served in the original meal. Using this method, energy and protein intake were calculated for each patient. The scales used were calibrated every 3 months and accurate to ± 0.1 g.

2.4.1.11 Nutritional Indices and Patient Data

Anonymised data was collected for each patient whose dietary intake was measured:

- Gender
- Date of birth
- Primary diagnosis
- Height, weight and BMI
- MUST score
- Level of confusion
- Amount of mealtime assistance received
- Current prescription of oral nutritional supplements
- Need for a modified texture diet

Gender, date of birth and primary diagnosis were abstracted from the nursing handover document. Height, weight, BMI and MUST were obtained from nursing records. Level of confusion at that mealtime was determined from discussion with the nursing staff and categorised as none, mild, moderate or severe. The amount of mealtime assistance received was directly observed by a member of the research team and recorded as either none, encouragement, preparation (including help with repositioning either themselves or the meal tray, rearranging the meal tray, opening packets and cutting up food), assistance in getting food or drink to the mouth but able to hold the cutlery or cup, or feeding. Any refusal of assistance was also documented. Each patient's electronic prescription record was examined for a current prescription of oral nutritional supplements. The need for a modified texture diet was determined from the meal tickets and confirmed on delivery of the meal tray.

2.4.2 Implementation of Trained Volunteer Mealtime Assistants

The implementation of volunteer mealtime assistants was assessed using the WHO implementation outcome variables of adoption, feasibility, sustainability, acceptability and implementation cost.

2.4.2.1 Adoption: Volunteer Recruitment, Training and Characteristics

Volunteer Recruitment and Training

The numbers of volunteers reaching each stage of the recruitment and training process were recorded: those who expressed an interest in the role, those who attended the half day training session, those who passed their competency assessment and those who delivered mealtime assistance in each department. The time taken between these stages was also noted.

Volunteer Characteristics

Volunteer characteristics were recorded by asking volunteers who passed the competency assessment to complete a short profile questionnaire with the research team (Figure 7). This included open ended questions relating to previous volunteering or healthcare experience and further details on their motivation for volunteering, as well as demographic information. Questions relating to car ownership, household tenure and educational attainment were included as simple indicators of socioeconomic position, as has been previously reported²¹¹.

Figure 7: Volunteer Profile Questionnaire

1. Do you have any previous volunteering experience?				
2. Do you have any previous healthcare or caring experience?				
3. Why did you choose to become a Mealtime Assistant (MTA)?				
4. How did you hear about the Mealtime Assistant Programme?				
5. Sex:	Male <input type="checkbox"/>	Female <input type="checkbox"/>		
6. Ethnicity:				
7. Marital status:	Single <input type="checkbox"/>	Married/living with partner <input type="checkbox"/>	Divorced <input type="checkbox"/>	Widowed <input type="checkbox"/>
8. DOB:				
9. Employment status:	Employed: Part-time <input type="checkbox"/>	Full-time <input type="checkbox"/>	Unemployed <input type="checkbox"/>	Retired <input type="checkbox"/>
	Student <input type="checkbox"/>	Other <input type="checkbox"/>		
10. How do you get to the hospital?				
11. Do you own a car?	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
	If no, do you hold a current driving licence?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
12. Accommodation:	Rented <input type="checkbox"/>	Owned <input type="checkbox"/>	Other <input type="checkbox"/>	
13. At what age did you leave full-time education?				
14. What qualifications did you achieve before leaving education?				
	GCSE/O-level or equivalent <input type="checkbox"/>	A-level or equivalent <input type="checkbox"/>	College or university degree <input type="checkbox"/>	
	Professional qualification <input type="checkbox"/>	Other <input type="checkbox"/> (please state)		

2.4.2.2 Feasibility: Volunteer Sessions Delivered and Activity

Volunteer Sessions Delivered

The number of sessions each volunteer delivered was measured using the attendance registers kept in a folder on each ward. During their competency assessment, volunteers were instructed on the location of the folder, and the importance of signing the register on each attendance.

The attendance percentage of each volunteer was calculated by dividing the number of sessions actually attended by the number of sessions timetabled for that volunteer. The number of timetabled sessions was taken as the number of sessions each volunteer agreed to attend per week multiplied by the number of weeks from when they began volunteering to the end of the study period or the date that they discontinued volunteering, whichever was the sooner.

Volunteer Activity

Activity was recorded by the volunteers at each session. Activity forms (Figure 8) were kept in each ward folder, and volunteers were instructed on how to complete them during their competency assessment.

Although volunteers could record several activities per patient (e.g. social interaction, preparation and feeding), only the most clinically significant activity was analysed. The hierarchy of clinical significance was as per the order of activity listed on the activity form, with feeding considered the most significant activity, assistance with getting food to the mouth the next most significant and so on. A form was completed for each patient assisted.

Figure 8: Mealtime Assistants Activity Form

MTA:

Date:

Bay:	Bed:
Feeding patient	<input type="checkbox"/>
Assisting patient getting food/drink to mouth but with patient holding cutlery/cup	<input type="checkbox"/>
Preparation (e.g. opening packets, cutting food, re-organising tray)	<input type="checkbox"/>
Encouragement with eating	<input type="checkbox"/>
Social interaction	<input type="checkbox"/>
Other comments:	

2.4.2.3 Sustainability: Volunteer Retention

The number of volunteers who discontinued the role was noted and all were contacted to ascertain their reasons for discontinuation.

2.4.2.4 Acceptability: Interviews and Focus Group

Qualitative data was collected via semi-structured interviews with patients and staff and a focus group with volunteers. The qualitative study was designed to enrich data collected in the evaluation of the implementation of the mealtime assistant programme, including exploring the context of the pre-implementation mealtime experience as well as the acceptability of the programme. The qualitative approach used was deductive (given that the intention of the interviews and focus groups was to specifically explore the acceptability of trained volunteer mealtime assistants) and narrative, focussing on the experiences of patients, staff and volunteers. Interview and focus group guides were developed to reflect this, focussing on two main areas: experience of hospital mealtimes and experiences of trained volunteer mealtime assistants. The topic guides were originally based on those used successfully for the qualitative work in SMAS²³⁷, with amendments made to focus more specifically on factors relating to the implementation of volunteer mealtime assistants. The intention was for the topic guides to be piloted

and refined after the first two interviews with patients and staff, although, in reality, only minimal changes to probes and prompts were made at this stage.

The interviews and focus group were all conducted by myself. When approaching patient participants, I described myself as a researcher with the university. I felt it was possible that informing patients I was a doctor could influence them to be more positive about their experiences in order to not be seen to be complaining, and that by acting as a researcher from the university, I would appear more impartial and be able to elicit a broader range of information. The staff members who participated in interviews were all known to me through the implementation of the volunteer programme and this in itself could have introduced bias in the results, with the possibility that staff would not want to be critical, given that they knew I had been instrumental in the volunteer programme. Similarly, the volunteers who participated in the focus group all knew me and many had been trained by me, with the risk that they also would not want to appear overtly critical. These biases were acknowledged at the outset.

Informed consent was taken from all participants, who were assured that the interview and focus group would remain confidential and would be anonymised. The interviews and focus group were tape recorded and transcribed verbatim. Analysis of transcripts took place after five patient and five staff interviews, at which point a thematic framework was identified. Data saturation was deemed to have occurred when no new themes emerged from analysis of further interviews and participant recruitment was concluded at that point.

Patient Interviews

Patient participants were purposively sampled to provide a range of older (over 85 years of age) and younger (between 70 and 85 years of age) male and female participants. To ensure the richest data possible was collected, I approached the ward staff to identify patients who were likely to have had substantial experience of hospital mealtimes (either because they had been in hospital for several days already, or because they had had multiple admissions to hospital). In addition, patients who needed help with meals or were likely to have witnessed other patients needing help were targeted.

Sampling continued until data saturation was reached. Patients were given the option of the interview taking place at their bedside or in a private room. The interview schedule used is shown in Figure 9.

Figure 9: Patient Interview Schedule

Experience of mealtimes in hospital
Organisation and ordering of food
Timing of meals
Experience of the food
Help available with eating
Mealtimes in hospital compared to at home
Quantity of food eaten (more or less) and why
Similarities and differences in food eaten
Need for more or less assistance
Experiences of trained volunteer mealtime assistants
Thoughts in general about the concept of the programme
Any personal experiences of mealtime assistants
Suggestions for improvement
Relating to mealtimes in general
Relating to mealtime assistants

Volunteer Focus Group

A convenience sample of volunteers took place in a focus group, as the most practical way of gaining experiences from the participants, with the benefit of group interaction to identify and further discuss any

commonalities and differences in the views presented. All active volunteers were invited to take place in the focus group (via email and notices in the ward folders), and it was scheduled for immediately after one of the regular volunteer meetings to maximise attendance and minimise inconvenience to the participants.

The focus group schedule is shown in Figure 10.

Figure 10: Volunteer Focus Group Schedule

<p>Motivations for volunteering</p> <p>Reasons for choosing to volunteer generally and at the hospital</p> <p>How they heard about volunteering at the hospital and about the mealtime assistance programme</p>
<p>Training</p> <p>Experience of training</p> <p>Adequacy of training in preparing for MTA role</p>
<p>Experiences of being a mealtime assistant</p> <p>Typical routine</p> <p>Expectations versus reality of the role</p> <p>Benefits of the role</p> <p>Challenges associated with the role</p>
<p>Experiences of hospital mealtimes</p> <p>Organisation and ordering of food</p> <p>Timing of meals</p> <p>Experience of the food</p> <p>Help available with eating</p>
<p>Suggestions for improvement</p> <p>Relating to mealtimes in general</p> <p>Relating to mealtime assistants</p>

Staff Interviews

Staff participants were purposively selected as those who had had frequent contact with the volunteers, aiming to include a range of staff roles (including junior and senior staff) and with each department of the study represented. I

selected the staff members based on my knowledge of them and their involvement with the volunteer programme to ensure that the participants were those with significant experience to convey. Again, sampling continued until data saturation was achieved. The interview schedule is shown in Figure 11.

Figure 11: Staff Interview Schedule

Experiences of hospital mealtimes
Organisation and ordering of food
Timing of meals
Experience of the food
Help available with eating
Experiences of trained volunteer mealtime assistants
Typical routine
Expectations versus reality of volunteers on the ward
Benefits of volunteers
Challenges associated with the programme
Suggestions for improvement
Relating to mealtimes in general
Relating to mealtime assistants

2.4.2.5 Implementation Cost

The potential costs incurred in the implantation of the implementing the programme, in terms of volunteer training, support and administration were recorded and estimates of the potential costs saved through the release of ward staff were made. The total potential cost saving of the programme was then calculated from these figures.

2.5 Data Management and Analysis

2.5.1 Data Management

All participants were allocated a unique study identifier, which was the only reference to the participant's identity on the data collection sheets. All data were stored in a locked cabinet in a locked room at UHS. A paper record of participant identifier and identity was securely stored separately from the data collection sheets.

Data were double-entered into Microsoft Excel by myself and another member of the research team to ensure accuracy of data entry; these electronic databases, created by myself, were stored securely on the University of Southampton or UHS networks.

2.5.2 Data Analysis

2.5.2.1 Defining the Context

Data collected from the 50 participants recruited in each department were presented using descriptive statistics for non-normally distributed data (median and inter-quartile range; number and percentage). Tests of statistical significance used were either the Mann Whitney U test or Kruskal Wallis test for numerical data and the Chi squared test for categorical data.

Dietary intake and nutritional indices were also presented using descriptive statistics and statistical tests for non-normally distributed data, as described above. Planned subgroup analyses were by gender (given that dietary intake and requirements of men and women differ^{65,67,70}) and by mealtime (as it was theorised that intake may differ between lunch and supper time).

Patients who were acutely unwell and those with cognitive impairment were likely to be under-represented in the fully characterised sample due to issues surrounding informed consent. However, these patients would have been represented in the dietary intake sample because this was measured in all patients (apart from those in side rooms, receiving enteral or parenteral nutrition or who were on an end of life pathway). This greater representation of those who were acutely unwell or had cognitive impairment meant that the two groups of participants could not be considered to be equivalent. Therefore, the two groups were compared using the indices that were recorded in both cohorts: age, BMI and MUST score.

2.5.2.2 Implementation of Trained Volunteer Mealtime Assistants

Adoption, Feasibility and Sustainability

Descriptive statistics (median and inter-quartile range; number and percentage) were used to analyse volunteer recruitment, training, characteristics, sessions delivered, activity and retention. Tests of statistical significance for non-normally distributed data were used (Mann Whitney U test and Kruskal Wallis test for numerical data and Chi squared test for categorical data). The exception to this was when describing a typical volunteer session, where mean rather than median values were used. The use of median values in this analysis frequently returned values of either zero or one, making the results difficult to interpret and compare. Therefore, mean values were used for ease of analysis.

Planned subgroup analyses of data on volunteer characteristics, sessions delivered, activity and retention were by hospital department, volunteer age and level of experience. Analysis by hospital department allowed recognition

of any differences between volunteers between departments that may impact upon implementation. This was cross-referenced with the characterisation of the hospital departments in terms of patient population and dietary intake. Volunteer age has been cited before as a factor influencing the duration of volunteering^{150,151}, and it was theorised that age may also affect volunteer attendance and activity. Therefore, volunteers were separated into two groups with a discriminating age of 25 years. Data were also analysed by subgroups of less experienced and more experienced volunteers. Following informal discussions with existing volunteers, twelve was chosen as the number of sessions at which volunteers typically felt established in their role, and therefore those delivering less than twelve sessions were considered less experienced and those delivering twelve or more sessions were considered more experienced. The comparison of these two subgroups was planned to identify any important differences in volunteer characteristics that might, in future, allow identification of those volunteers who were likely to remain in their role for longer, which would be of benefit in planning a future volunteer programme, as recruitment and encouragement could be directed towards these volunteers. Additionally, it would determine if volunteers being more experienced and confident in their role affected their activity during mealtime sessions.

Acceptability

The interviews and focus group were transcribed verbatim and the transcripts read and coded by myself and one supervisor independently. The data was analysed thematically based on framework analysis, the five key stages of which are: familiarization; identifying a thematic framework; indexing; charting; and mapping and interpretation²¹². Patient and staff interviews were analysed after five of each had been conducted. Both myself and my supervisor analysed these independently (as well as the volunteer focus group) and then came together to identify the themes of the data. Following this, I indexed, charted and mapped the data using a Microsoft Excel spreadsheet for each group of participants. Once this process was complete, any further patient and staff interviews were also analysed by myself and my supervisor independently to identify the presence of any new themes, after which the data was indexed, charted and mapped by myself as previously.

Implementation Cost

Implementation costs were calculated using the NHS Agenda for Change pay scales²¹³. The cost of volunteer training was calculated using a Band 4 salary, as prior to the study all training was carried out by a Band 4 practitioner. The mean time taken per volunteer was calculated from the number of hours for training and competency over the study period divided by the number of volunteers trained. The time taken in volunteer administration was costed using a Band 2 practitioner salary, as a reflection of the requirements of the role. During the study, the time taken in administrative duties for each volunteer was approximately one hour.

The costs saved by the volunteer programme were estimated on the basis of releasing time spent in preparing patients and the ward environment for mealtime (releasing time from the ward housekeeper, Band 1) and time spent

assisting and feeding patients (releasing time from the healthcare assistants, Band 3, and registered nursing staff, Band 5). Our experience during the study led to estimates of the release of 15 minutes of housekeeper time and one hour of healthcare assistant (HCA) or registered nursing (RN) time, depending upon which member of staff would have been assisting with feeding of patients. The mix of staff members available to provide feeding assistance varied day to day, depending upon the staffing of the wards; on some days the feeding was predominantly carried out by HCAs, whilst on others, RNs did the majority of feeding. Because of this variability, a series of calculations were made to provide a range of estimates of costs released (Table 12).

Table 12: Calculations Made of Staff Released by Volunteers

HCA time released	RN time released	HCA: RN ratio
100%	0%	1:0
75%	25%	0.75:0.25
50%	50%	0.5:0.5
25%	75%	0.25:0.75
0%	100%	0:1

HCA = healthcare assistant (Band 3); RN = registered nurse (Band 5)

The total cost saving was then calculated across the whole study period, by subtracting the costs incurred from the costs saved.

2.6 Ethical Considerations

The study was reviewed and approved by the London-Chelsea Research Ethics Committee on 31st July 2014 (reference number 14/LO/1363). The study was sponsored by University Hospitals Southampton NHS Foundation Trust (UHS), and was approved by the Research and Development department within the trust. Approval was also obtained from the Research and Development department at the University of Southampton.

CHAPTER 3: DEFINING THE CONTEXT OF VOLUNTEER IMPLEMENTATION

In this chapter, data are presented to describe the setting into which volunteers were introduced. The characteristics of the patients in each hospital department, including their dietary intake, and the opinions of patients, staff and volunteers on hospital mealtimes are presented. This data provides the background that informed the implementation of volunteer mealtime assistants and gives context to the environment in which the volunteers were working.

3.1 Characterisation of the Four Hospital Departments

The four hospital departments included in the study were Medicine for Older People (MOP), the Acute Medical Unit (AMU), Trauma & Orthopaedics (T&O) and General Medicine (GM). The intention was to provide two volunteers to each ward every weekday at either lunch or suppertime (or at both mealtimes in the case of AMU), but it became clear as the study progressed that some wards only required one volunteer per mealtime.

MOP is a 6-ward department, which preferentially admits medical patients over the age of 80 years. Medical patients under the age of 80 years were occasionally admitted to the department, but this was an infrequent occurrence. The two wards from MOP included in the study were Ward A and Ward B. Due to its smaller size, Ward A only required one volunteer per mealtime.

The AMU is the admitting ward for all adult medical patients admitted to the hospital (either via the Emergency Department or following a referral from their GP). It is composed of 3 sub-units, all of which were included in the study.

Trauma & Orthopaedics (T&O) is a 4-ward department which admits emergency and elective orthopaedic patients of any age. The two study wards (Ward C and Ward D) both admitted emergency patients of both genders; elective patients were seldom admitted to these wards.

General Medicine (GM) is a 4-ward department, which admits adult medical patients generally under the age of 80 years. Of the two study wards, Ward E preferentially admitted male patients with a respiratory diagnosis, whilst Ward F included patients of both genders with any medical diagnosis. The number of patients requiring assistance on these wards was lower, due to a greater proportion of younger patients as well as lower levels of physical dependency, and, therefore, both wards only required one volunteer per mealtime. This was identified to the research team by the volunteers assigned to these wards, who found there was not sufficient work for them to do when two volunteers were scheduled.

The mealtime routine for volunteers was similar in MOP, T&O and GM. On their arrival on the ward, volunteers approached the nurse in charge to identify where they could be of most assistance. In MOP, there was a tendency to allocate volunteers to a specific bay of patients, whereas in T&O and GM, volunteers often helped several patients across different bays. Volunteers would assist with cleaning tables and preparing patients for lunch in all bays until the meal arrived, at which point they would assist the patients they had been allocated to. The housekeeper on each ward was responsible for mealtime co-ordination, and were the volunteers' point of contact for any meal-related queries. In addition to this, the housekeepers on wards B and C were able to feed patients if needed once all meals had been delivered. At the end of the meal, volunteers reported back to the nurse in charge.

On AMU, the routine for the volunteers differed slightly. Due to size of the unit and rapid turnover of patients, the volunteers reported directly to the housekeeper, who had the most up-to-date information about the requirements of patients across the whole unit. As in the other departments, the volunteers assisted with clearing tables and preparing patients for meals prior to food service. However, once the meal service began, volunteers would accompany the housekeeper in delivering meals until they identified a patient who needed additional assistance, at which point they would stay with this patient and provide the assistance required. After they had assisted that patient, they then moved through the unit identifying patients who needed further help. Volunteers handed over any relevant information directly to the nurse responsible for that specific patient.

A summary of this information is presented in Table 13.

At the time of the study, meals were provided to the hospital by an outside catering company. Meals arrived at the hospital in individual portion sizes, were stored until needed, and were then steamed to order in the ward kitchen at each mealtime. This method of food delivery meant that the hospital menu was fixed and did not change day-to-day. There were approximately 25 main meal choices, as well as a variety of sandwiches and salads available at both lunch and supper times.

Table 13: Department Characteristics and Mealtime Routine

	Ward	Layout	Patient Population	Volunteer mealtime	Mealtime co-ordinator	Initial point of contact	Allocation of patients	Handover contact
MOP	A	12 beds in bays	Older male patients initially	Lunch:	Housekeeper	Nurse in charge	One bay	Nurse in charge
		2 x side rooms	One bay of older female patients as study progressed	one volunteer				
AMU	B	22 beds in bays	Older male patients	Dinner: two	Housekeeper	Nurse in charge	One bay	Nurse in charge
		4 x side rooms		volunteers				
T&O	C	36 beds in bays	Acute medical admissions of both	Lunch and Dinner:	Housekeeper	Housekeeper	Across the unit	Patient's named nurse
		12 side rooms	genders	two volunteers				
GM	D	30 beds in bays	Emergency orthopaedic patients of	Lunch: two volunteers	Housekeeper	Nurse in charge	Across bays	Nurse in charge
		4 side rooms	both genders					
	E	28 beds in bays	Emergency orthopaedic patients of	Dinner: two	Housekeeper	Nurse in charge	Across bays	Nurse in charge
		4 side rooms	both genders	volunteers				
	F	28 beds in bays	Adult medical patients of both	Lunch: one volunteer	Housekeeper	Nurse in charge	Across bays	Nurse in charge
		4 side rooms	genders, with preference for male respiratory patients					
		26 beds in bays	Adult medical patients of both genders	Lunch: one volunteer	Housekeeper	Nurse in charge	Across bays	Nurse in charge
		4 side rooms						

3.2 Characterisation of the Patient Population

201 patient participants were recruited to the study: 50 in MOP, AMU and T&O and 51 in GM. Participant demographics are shown in Table 14. The median age of all participants was 75 years, although age differed significantly across the departments ($p < 0.001$), with the highest median age in MOP (85 years) and the lowest in GM (74 years). 60% of all participants were men, yet this also varied significantly across the departments ($p < 0.001$), as all participants recruited in MOP were male (as only wards with male inpatients were included), whilst only 30% participants in T&O were male.

Table 14: Age and Gender of Patient Participants

		All, n = 201	MOP, n = 50	AMU, n = 50	T&O, n = 50	GM, n = 51	p value
Age							
	Range	70-100	72-93	70-98	71-100	70-94	< 0.001
	Median	75	85	81	80	74	
	IQR	80-86	82-89	75-85	76-86	71-78	
Gender, n (%)							
	Male	121 (60)	50 (100)	19 (38)	15 (30)	37 (73)	< 0.001
	Female	80 (40)	0 (0)	31 (62)	35 (70)	14 (28)	

n = number of participants; % = percentage; IQR = inter-quartile range; p value for age calculated using Kruskal Wallis test; p value for gender calculated using Chi squared test

The marital status of the study participants is shown in Table 15. Nearly half (49%) of all participants were married, although in AMU and T&O, it was more common for participants to be widowed rather than married (44% and 56% versus 34% and 38%). These differences were significant ($p = 0.005$). There was also a significant difference between the marital status of men and women, with men most likely to be married (59%) and women most likely to be widowed (55%). When analysed separately, there was still a significant difference in the marital status of men between departments, with more men being married in T&O and GM than in MOP and AMU (67% and 70% compared with 56% and 37%, $p = 0.029$), but there was no significant difference in the marital status of women.

Table 15: Marital Status of Patient Participants

	All, n (%)	MOP, n (%)	AMU, n (%)	T&O, n (%)	GM, n (%)	p value
Marital status						
All	201	50	50	50	51	
Single	12 (6)	3 (6)	4 (8)	2 (4)	3 (6)	
Cohabiting	2 (1)	0 (0)	2 (4)	0 (0)	0 (0)	0.005
Married	98 (49)	28 (56)	17 (34)	19 (38)	34 (67)	
Separated	14 (7)	3 (6)	5 (10)	1 (2)	5 (10)	
Widowed	75 (37)	16 (32)	22 (44)	28 (56)	9 (18)	
Marital status (M)						
All	121	50	19	15	37	
Single	7 (6)	3 (6)	0 (0)	1 (7)	3 (8)	
Cohabiting	2 (2)	0 (0)	2 (11)	0 (0)	0 (0)	0.029
Married	71 (59)	28 (56)	7 (37)	10 (67)	26 (70)	
Separated	10 (8)	3 (6)	3 (16)	0 (0)	4 (11)	
Widowed	31 (26)	16 (32)	7 (37)	4 (27)	4 (11)	
Marital status (F)						
All	80	0	31	35	14	
Single	5 (6)		4 (13)	1 (3)	0 (0)	
Cohabiting	0 (0)		0 (0)	0 (0)	0 (0)	0.142
Married	27 (34)		10 (32)	9 (26)	8 (57)	
Separated	4 (5)		2 (7)	1 (3)	1 (7)	
Widowed	44 (55)		15 (48)	24 (69)	5 (36)	

n = number of participants; % = percentage; M = male participants; F = female participants; p values calculated using Chi squared test

The usual residence and care provision of participants are presented in Table 16. 94% of participants lived in a private home (either alone or with family or friends), and this proportion was fairly constant across the departments. Almost half of all participants (49%) had no formal care provided prior to admission, although there were significant differences between departments ($p = 0.004$), varying from 38% in MOP to 71% in GM. In T&O and GM, fewer participants had help with personal care (14% and 10%) than in MOP and AMU (32% in both departments).

Table 16: Usual Residence and Care Provision of Patient Participants

	All, n = 201	MOP, n = 50	AMU, n = 50	T&O, n = 50	GM, n = 51	p value
Usual residence, n (%)						
Private home, alone	78 (39)	17 (34)	20 (40)	25 (50)	16 (31)	0.295
Private home, with others	110 (55)	28 (56)	28 (56)	20 (40)	34 (67)	
Sheltered accommodation	8 (4)	3 (6)	2 (4)	2 (4)	1 (2)	
Residential home	4 (2)	2 (4)	0 (0)	2 (4)	0 (0)	
Nursing home	1 (1)	0 (0)	0 (0)	1 (2)	0 (0)	
Care provision, n (%)						
None	98 (49)	19 (38)	21 (42)	22 (44)	36 (71)	0.004
Shopping, cleaning or meals	54 (27)	13 (26)	13 (26)	18 (36)	10 (20)	
Personal care	44 (22)	16 (32)	16 (32)	7 (14)	5 (10)	
Long term care resident	5 (3)	2 (4)	0 (0)	3 (6)	0 (0)	

n = number of participants; % = percentage; p values calculated using Chi squared test

Smoking and alcohol use are shown in Table 17. The median number of cigarette pack years reported was zero, although in MOP and GM, it was considerably higher (13 and 22 respectively, $p = 0.014$). However, there were also significant differences in the number of cigarette pack years when comparing male participants with female participants (median 20 pack years versus 0 pack years, $p < 0.001$), and therefore data for men and women were analysed separately. When this analysis was performed, there were no significant differences in cigarette pack years between hospital departments.

The median number of alcohol units consumed per week prior to admission was zero for all participants and in all departments. Although there was a significant difference in intake between men and women ($p < 0.001$), analysis of the data by gender did not show any significant differences between hospital departments.

Table 17: Smoking and Alcohol Use of Patient Participants

	All	MOP	AMU	T&O	GM	p value
Cigarette Pack Years						
Participants, n	199	49	50	50	50	
Range	0-180	0-130	0-90	0-96	0-180	0.014
Median	0	13	4	0	22	
IQR	10-35	2-33	0-27	0-30	0-40	
Cigarette Pack Years (M)						
Participants, n	119	49	19	15	36	
Range	0-180	0-130	0-75	0-96	0-180	0.849
Median	20	13	20	30	26	
IQR	1-40	2-33	0-40	0-52	0-40	
Cigarette Pack Years (F)						
Participants, n	80	0	31	35	14	
Range	0-135		0-90	0-50	0-135	0.314
Median	0		0	0	3.5	
IQR	0-22		0-23	0-13	0-37	
Alcohol Units Per Week						
Participants, n	201	50	50	50	51	
Range	0-280	0-280	0-120	0-36	0-63	0.138
Median	0	0	0	0	0	
IQR	0-4	0-4	0-2	0-1	0-14	
Alcohol Units Per Week (M)						
Participants, n	121	50	19	15	37	
Range	0-280	0-280	0-120	0-23	0-63	0.529
Median	0	0	0	1	1	
IQR	0-7	0-4	0-7	0-7	0-18	
Alcohol Units Per Week (F)						
Participants, n	80	0	31	35	14	
Range	0-36		0-14	0-36	0-30	0.496
Median	0		0	0	0	
IQR	0-0		0-1	0-0	0-3	

n = number of participants; IQR = inter-quartile range; M = male participants; F = female participants; p values calculated using Kruskal

Wallis test

The median number of comorbidities of all participants was five, and the median number of regular medications was nine (Table 18). There were significant differences in the number of comorbidities across the departments, with participants in MOP and AMU having a greater number of comorbidities than those in T&O and GM (median comorbidities seven and six compared with four and five, $p < 0.001$). The number of medications did not significantly differ between departments.

The median Charlson Comorbidity Index was five, with participants in MOP having the highest scores and those in T&O having the lowest (6 compared with 4, $p < 0.001$, Table 18). There was a significant difference in Charlson Comorbidity Index between men and women (median 6 versus 4, $p < 0.001$) and so scores were also analysed by gender. When analysed separately, there was no significant difference in the scores of women across the departments, but a significant difference in the scores of men persisted ($p = 0.021$).

Table 19 presents the nutritional indices of participants (SNAQ, MUST and BMI). The median SNAQ score of all participants was 14, varying from 13 to 15 across the study departments, although this was not a significant difference ($p = 0.227$). SNAQ scores < 14 have been associated with weight loss in a community dwelling population²⁰⁰.

The majority of participants (81%) were scored as “low-risk of malnutrition” according to the MUST. The greatest proportion of low-risk participants was seen in T&O (86%), and the lowest in MOP (76%). These differences were not significant.

The median BMI of all participants was 25.7, and ranged from 24.3 in MOP to 26.9 in AMU; these differences were not significant. In each department, participants ranged from being underweight (BMI < 18.5) to obese (BMI > 30).

Table 18: Comorbidities, Regular Medications and Charlson Comorbidity Index of Patient Participants

	All	MOP	AMU	T&O	GM	p value
Number of comorbidities						
Participants, n	201	50	50	50	51	
Range	0-15	2-12	1-14	0-8	1-15	< 0.001
Median	5	7	6	4	5	
IQR	4-7	5-8	4-8	3-6	4-7	
Number of medications						
Participants, n	201	50	50	50	51	
Range	0-23	2-23	2-14	0-16	0-16	0.156
Median	9	9	7	8	9	
IQR	6-11	7-12	6-10	5-12	6-11	
Charlson Comorbidity Index						
Participants, n	201	50	50	50	51	
Range	3-14	3-14	3-9	3-10	3-12	< 0.001
Median	5	6	5	4	5	
IQR	4-7	5-7	4-6	4-6	4-7	
Charlson Comorbidity Index (M)						
Participants, n	121	50	19	15	37	
Range	3-14	3-14	3-9	3-10	3-12	0.021
Median	6	6	6	5	5	
IQR	4-7	5-7	5-7	4-7	4-7	
Charlson Comorbidity Index (F)						
Participants, n	80	0	31	35	14	
Range	3-11		3-9	3-7	3-11	0.357
Median	4		5	4	4	
IQR	4-6		4-6	4-6	4-7	

n = number of participants; IQR = inter-quartile range; M = male participants; F = female participants; p values calculated using Kruskal

Wallis test

Table 19: Nutritional Indices of Patient Participants

	All	MOP	AMU	T&O	GM	p value
SNAQ						
Participants, n	200	49	50	50	51	
Range	7-18	7-17	7-18	8-18	7-18	0.227
Median	14	15	13	14	14	
IQR	12-16	13-16	12-15	12-15	12-15	
MUST, n (%)						
Participants	200	50	49	50	51	
Low risk	161 (81)	38 (76)	40 (82)	43 (86)	40 (78)	0.820
Medium risk	20 (10)	6 (12)	6 (12)	3 (6)	5 (10)	
High risk	19 (9)	6 (12)	3 (6)	4 (8)	6 (12)	
BMI						
Participants, n	200	50	49	50	51	
Range	12.9-49.7	19.2-36.1	12.9-49.7	13.3-43.4	14.3-36.9	0.131
Median	25.7	24.3	26.9	25.6	25.4	
IQR	22.5-28.6	22.0-27.1	23.0-30.3	21.9-28.4	22.5-29.1	

n = number of participants; % = percentage; IQR = inter-quartile range; p values for SNAQ and BMI calculated using Kruskal Wallis test;

p value for MUST calculated using Chi squared test

Mini Mental State Examination (MMSE) scores ranged between 12 and 30, with a median of 28 (Table 20). There was a significant difference between departments ($p < 0.001$), with scores being lower in MOP (median 26), and higher in GM (median 29). Men had lower scores than women (27 compared with 28, $p = 0.047$) and when analysed by gender, the difference persisted in men ($p < 0.001$) but not in women ($p = 0.290$).

The median score on the Geriatric Depression Scale (GDS) was 4, below the score of 5 that is indicative of depression¹⁹⁷. There was no significant difference between departments (Table 20).

Table 20: MMSE and GDS of Patient Participants

	All	MOP	AMU	T&O	GM	p value
MMSE						
Participants, n	200	50	50	49	51	
Range	12-30	12-30	18-30	22-30	16-30	< 0.001
Median	28	26	28	28	29	
IQR	25-29	22-28	25-29	27-29	27-30	
MMSE (M)						
Participants, n	121	50	19	15	37	
Range	12-30	12-30	24-30	24-30	17-30	< 0.001
Median	27	26	27	29	29	
IQR	24.5-29	22-28	25-29	27-29	27-30	
MMSE (F)						
Participants, n	79	0	31	34	14	
Range	16-30		18-30	22-30	16-30	0.290
Median	28		28	28	29	
IQR	26-30		24-30	27-29	28-30	
GDS						
Participants, n	199	49	50	50	50	
Range	0-13	0-13	1-12	0-10	0-11	0.264
Median	4	4	4	3	4	
IQR	2-5	2-5	3-6	3-5	2-5	

n = number of participants; IQR = inter-quartile range; M = male participants; F = female participants; p values calculated using Kruskal

Wallis test

Barthel scores ranged between 11 and 100, with a median of 88 (Table 21). Scores were similar in MOP, AMU and GM (median 90-92), but significantly lower in T&O (median 70, $p < 0.001$). Men had higher scores than women (median 91 compared with 81, $p = 0.002$). When analysed by gender, there was no significant difference in Barthel scores in men across departments, but the difference remained in women, with lower scores in T&O than in AMU or GM (median 90 and 87 compared with 70, $p < 0.001$).

PASE scores ranged from 0-317, with a median of 50 (Table 21). The median was highest in T&O and GM (53 and 55) and lowest in MOP, but this difference was not significant ($p = 0.288$).

Table 21: Barthel and PASE scores of Patient Participants

	All	MOP	AMU	T&O	GM	p value
Barthel						
Participants, n	201	50	50	50	51	
Range	11-100	34-100	49-100	11-100	20-100	< 0.001
Median	88	90	92	70	90	
IQR	71-100	78-98	81-100	41-86	78-100	
Barthel (M)						
Participants, n	121	50	19	15	37	
Range	20-100	34-100	49-100	22-100	20-100	0.115
Median	91	90	100	70	95	
IQR	76-100	78-98	70-100	41-100	80-100	
Barthel (F)						
Participants, n	80	0	31	35	14	
Range	11-100		50-100	11-100	61-100	< 0.001
Median	81		90	70	87	
IQR	66-92		81-100	39-82	77-100	
PASE						
Participants, n	201	50	50	50	51	
Range	0-317	0-189	0-317	0-267	0-234	0.288
Median	50	31	41	53	55	
IQR	25-114	2-106	25-111	29-109	25-138	

n = number of participants; IQR = inter-quartile range; M = male participants; F = female participants; p values calculated using Kruskal

Wallis test

52% of participants were considered frail by the Fried frailty scale, and 36% by the FRAIL scale (Table 22). Using the Fried frailty scale, MOP had the greatest number of frail patients (69%) and GM had the least (40%). In direct contrast to this, the FRAIL scale identified the highest number of participants as frail in GM (44%) and lowest in MOP (27%). Using the Fried frailty scale, the proportion of participants categorised as not frail was < 10% in every department, whereas this figure was approximately 20% when using the FRAIL scale. The differences between departments were not significant for either the Fried frailty scale or the FRAIL scale.

The majority of participants (64%) had low grip strength (Table 22). Low grip strength was significantly more common in MOP and T&O (89% and 72%), and less common in AMU and GM (49% and 45%, $p < 0.001$).

Table 22: Frailty Indices of Patient Participants

	All, n (%)	MOP, n (%)	AMU, n (%)	T&O, n (%)	GM, n (%)	p value
Fried Frailty Scale						
Participants, n	188	45	45	48	50	
Not frail	9 (5)	1 (2)	2 (4)	2 (4)	4 (8)	0.171
Pre-frail	82 (44)	13 (29)	20 (44)	23 (48)	26 (52)	
Frail	97 (52)	31 (69)	23 (51)	23 (48)	20 (40)	
FRAIL scale						
Participants, n	198	49	50	49	50	
Not frail	38 (19)	11 (22)	10 (20)	9 (18)	8 (16)	0.760
Pre-frail	89 (45)	25 (51)	22 (44)	22 (45)	20 (40)	
Frail	71 (36)	13 (27)	18 (36)	18 (37)	22 (44)	
Grip strength						
Participants, n	190	47	45	47	51	
Normal	69 (36)	5 (11)	23 (51)	13 (28)	28 (55)	< 0.001
Low	121 (64)	42 (89)	22 (49)	34 (72)	23 (45)	

n = number of participants; % = percentage; p values calculated using Chi squared test

Participants' outcomes on discharge are presented in Table 23. The median length of stay of all participants was 11 days, with a range of 1-89 days. The shortest length of stay was observed in AMU (median 4 days) and the longest in MOP and T&O (median 15 days, $p < 0.001$).

The majority of patients (66%) were discharged to their usual residence with the same level of care provision that was in place prior to admission. However, the proportion of participants in this category was higher in AMU and GM (78% and 80%) than in MOP and T&O (58% and 46%). Discharge to usual residence but with increased care provision was more common in MOP (26% versus 10-14%), as was discharge to a new residential or nursing placement (8% versus 0-4%). Discharge to inpatient rehabilitation was most common in T&O (22% compared with 4-6%), and inter-hospital transfer only occurred in T&O. The need for inter-hospital transfer in T&O reflects both the hospital's status as a major trauma centre, with patients admitted from across the region, and its location on the south coast, with holidaymakers frequently being admitted following fractures. These differences were statistically significant ($p < 0.001$). Death during admission occurred in 3% of participants, and there was no significant difference in this between departments.

Follow up data collected at 6 months revealed that 15% of participants had died (including in-hospital mortality), with the highest proportion in MOP (24%) and the lowest in T&O (8%), although this difference was not significant. The median number of readmissions over 6 months was one, and this did not significantly differ between departments.

Table 23: Discharge Outcomes of Patient Participants

	All	MOP	AMU	T&O	GM	p value
	n = 200	n = 50	n = 49	n = 50	n = 51	
Length of stay						
Range	1-89	2-89	1-24	2-63	1-62	<0.001
Median	11	15	4	15	7	
IQR	5-19	9-23	2-14.5	8-23	4-16	
Discharge Destination, n (%)						
Usual residence, same care	131 (66)	29 (58)	38 (78)	23 (46)	41 (80)	< 0.001
Usual residence, increased care	30 (15)	13 (26)	5 (10)	7 (14)	5 (10)	
New long-term placement	7 (4)	4 (8)	0 (0)	1 (2)	2 (4)	
Inpatient rehabilitation	19 (10)	3 (6)	3 (6)	11 (22)	2 (4)	
Inter-hospital transfer	7 (4)	0 (0)	0 (0)	7 (14)	0 (0)	
Died	6 (3)	1 (2)	3 (6)	1 (2)	1 (2)	
Death at discharge, n (%)						
Yes	6 (3)	1 (2)	3 (6)	1 (2)	1 (2)	0.537
No	194 (97)	49 (98)	46 (94)	49 (98)	50 (98)	
Death at 6 months, n (%)						
Yes	29 (15)	12 (24)	6 (12)	4 (8)	7 (14)	0.196
No	171 (86)	38 (76)	43 (88)	46 (92)	44 (86)	
Readmissions at 6 months						
Range	0-10	0-5	0-10	0-6	0-9	0.131
Median	1	1	0	0	1	
IQR	0-2	0-1	0-2	0-1	0-2	

n = number of participants; % = percentage; IQR = inter-quartile range; p values for length of stay and readmissions calculated using

Kruskal Wallis test; p values for discharge destination, death at discharge and death at 6 months calculated using Chi squared test

3.3 Characterisation of Dietary Intake and Nutritional Indices

Dietary intake during the mealtime that volunteer mealtime assistance would be available (either lunch or suppertime) was measured in 465 participants: 126 in MOP, 137 in AMU, 138 in T&O and 64 in GM. Patients were eligible to be included in this part of the study if they were aged over 70 years and eating at the mealtime concerned, provided they were not in a side room, on an end of life pathway or receiving enteral or parenteral nutrition. Participants were not required to give written consent. Results are presented separately for men and women and for lunch and suppertimes.

Table 24 shows the characteristics and dietary intake of all male participants at lunch and suppertimes. Participants were similar in their characteristics, apart from age, with lunchtime participants being statistically significantly younger than those at suppertime (median age 84 years versus 86 years, $p = 0.003$). 73% of participants were considered to be at low risk of malnutrition (according to their MUST score), which corresponded with the fact that the median BMI was in the normal range and that 26% of participants were prescribed oral nutritional supplements. Nearly half (45%) of all participants had some degree of confusion, and just over half (52%) required some form of mealtime assistance. A soft diet was eaten by only 8% of all participants. Despite these similarities in characteristics, lunchtime protein intake was significantly greater than intake at suppertime (16.3g as compared with 13.8g, $p = 0.005$), although calorie intake was similar (392 kcal at lunchtime and 353 kcal at dinnertime, $p = 0.131$).

Table 25 shows the characteristics and dietary intake of men at lunchtime across hospital departments. The median age of men was significantly different, being the highest in MOP and lowest in GM ($p < 0.001$), but other characteristics did not significantly differ between departments. Median protein intake was lowest in AMU (12.4g) and highest in MOP (21.0g), which was of borderline statistical significance ($p = 0.052$). Calorie intake was similarly lowest in AMU (299 kcal) and highest in MOP (481 kcal), a finding which was significant ($p = 0.022$).

Table 26 shows the equivalent data for male participants whose intake was measured at suppertime. In contrast to lunchtime male participants, the median age did not significantly differ between departments ($p = 0.106$). However, there were significant differences in BMI, ONS prescriptions and assistance received. Participants in AMU had a higher BMI (median BMI 25.9 compared with 22.7 and 23.1 in MOP and T&O, $p = 0.015$), were less likely to be prescribed ONS (3% participants, compared with 31% and 26% in MOP and T&O, $p = 0.010$), and were more likely to be independent with eating (63% compared with 43% in MOP and 32% in T&O, $p = 0.005$). Participants in T&O were more likely to require feeding or assistance with getting food to their mouths (26% for both categories, compared with 17% and 10% for feeding in MOP and AMU, and 3% for assisting food to the mouth in both MOP and AMU). In terms of dietary intake, dietary protein intake was significantly different across

departments, being lowest in T&O (9.4g) and highest in MOP (15.8g, $p = 0.042$), although calorie intake did not significantly differ across departments (median 303-379 kcal, $p = 0.527$).

Table 24: Dietary Intake and Nutritional Indices of Men at Lunch and Supper

		Total	Lunch	Supper	p value
		n =286	n = 156	n = 130	
Age					
	Range	70-100	70-100	70-99	0.003
	Median	85	84	86	
	IQR	80-89	76-89	82-89	
BMI*					
	Range	14.2-53.1	15.6-53.1	14.2-36.5	0.942
	Median	23.7	23.7	23.6	
	IQR	20.8-27.2	20.8-26.9	20.9-27.5	
MUST score, n (%)**					
	Low risk	208 (73)	115 (74)	93 (72)	0.844
	Medium risk	35 (12)	18 (12)	17 (13)	
	High risk	41 (15)	22 (14)	19 (15)	
ONS prescribed, n (%)					
	Yes	75 (26)	44 (28)	31 (24)	0.404
	No	211 (74)	112 (72)	99 (76)	
Level of confusion, n (%)					
	None	128 (45)	75 (48)	53 (41)	0.428
	Mild	66 (23)	37 (24)	29 (22)	
	Moderate	51 (18)	26 (17)	25 (19)	
	Severe	40 (14)	18 (12)	22 (17)	
	Unknown	1 (0)	0 (0)	1 (1)	
Assistance received, n (%)					
	None	148 (52)	87 (56)	61 (47)	0.283
	Encouragement	6 (2)	4 (3)	2 (2)	
	Preparation	58 (20)	28 (18)	30 (23)	
	Assisting food to mouth	13 (5)	5 (3)	8 (6)	
	Feeding	51 (18)	29 (19)	22 (17)	
	Refused	10 (4)	3 (2)	7 (5)	

	Total	Lunch	Supper	
	n =286	n = 156	n = 130	p value
Soft diet eaten, n (%)				
Yes	22 (8)	12 (8)	10 (8)	1.000
No	264 (92)	144 (92)	120 (92)	
Protein intake, g				
Range	0.0-39.7	0.0-39.7	0.0-39.0	0.005
Median	15.1	16.3	13.8	
IQR	9.1-23.6	10.5-25.5	8.0-20.1	
Energy intake, kcal				
Range	0-1046	0-1045	0-1046	0.131
Median	378	392	353	
IQR	213-549	242-582	161-533	

n = number of participants; % = percentage; IQR = inter-quartile range; BMI = body mass index; MUST = Malnutrition Universal

Screening Tool; ONS = oral nutritional supplements; p values for age, BMI, protein intake and energy intake calculated using Mann Whitney U test; p values for MUST score, ONS prescription, level of confusion, assistance received and soft diet eaten calculated using Chi squared test; *BMI unavailable for 4 participants at lunchtime and 3 at dinnertime; **MUST unavailable for 1 participant at lunchtime and 1 at dinnertime

Table 25: Dietary Intake and Nutritional Indices of Men at Lunchtime

		Total	MOP	AMU	T&O	GM	p value
		n = 156	n = 40	n = 41	n = 21	n = 54	
Age							
Range		70-100	78-100	70-99	70-95	70-92	< 0.001
Median		84	87	85	81	78	
IQR		76-89	84-89	79-91	75-88	72-85	
BMI*							
Range		15.6-53.1	15.6-35.3	16.1-29.4	17.4-36.9	16.8-53.1	0.704
Median		23.7	24.3	23.0	25.6	23.6	
IQR		20.8-26.9	20.9-26.6	20.6-26.7	21.2-28.9	20.1-27.5	
MUST score, n (%)**							
Low risk		115 (74)	28 (70)	31 (78)	18 (86)	38 (70)	0.553
Medium risk		18 (12)	5 (13)	5 (13)	1 (5)	7 (13)	
High risk		22 (14)	7 (18)	4 (10)	2 (10)	9 (17)	
ONS prescribed, n (%)							
Yes		44 (28)	9 (23)	11 (27)	3 (14)	21 (39)	0.125
No		112 (72)	31 (78)	30 (73)	18 (86)	33 (61)	
Level of confusion, n (%)							
None		75 (48)	17 (43)	23 (56)	10 (48)	25 (46)	0.049
Mild		37 (24)	10 (25)	8 (20)	3 (14)	16 (30)	
Moderate		26 (17)	12 (30)	2 (5)	4 (19)	8 (15)	
Severe		18 (12)	1 (3)	8 (20)	4 (19)	5 (9)	
Assistance received, n (%)							
None		87 (56)	19 (48)	22 (54)	14 (67)	32 (59)	0.275
Encouragement		4 (3)	1 (3)	1 (2)	0 (0)	2 (4)	
Preparation		28 (18)	13 (33)	6 (15)	1 (5)	8 (15)	
Assisting food to mouth		5 (3)	2 (5)	1 (2)	1 (5)	1 (2)	
Feeding		29 (19)	3 (8)	11 (27)	5 (24)	10 (19)	
Refused		3 (2)	2 (5)	0 (0)	0 (0)	1 (2)	

	Total	MOP	AMU	T&O	GM	p value
	n = 156	n = 40	n = 41	n = 21	n = 54	
Soft diet eaten, n (%)						
Yes	12 (8)	6 (15)	0 (0)	1 (5)	5 (9)	0.076
No	144 (92)	34 (85)	41 (100)	20 (95)	49 (91)	
Protein intake, g						
Range	0.0-39.7	2.1-39.7	2.2-33.7	4.5-29.4	0.0-35.0	0.052
Median	16.3	21.0	12.4	13.3	16.6	
IQR	10.5-25.5	14.9-27.3	9.0-24.2	8.8-23.2	11.2-26.8	
Energy intake, kcal						
Range	0-1045	98-1045	71-872	134-743	0-983	0.022
Median	392	481	299	451	393	
IQR	242-582	305-695	190-450	233-513	277-620	

n = number of participants; % = percentage; IQR = inter-quartile range; BMI = body mass index; MUST = Malnutrition Universal Screening Tool; ONS = oral nutritional supplements; p values for age, BMI, protein intake and energy intake calculated using Kruskal Wallis test; p values for MUST score, ONS prescription, level of confusion, assistance received and soft diet eaten calculated using Chi squared test; *BMI unavailable for 3 participants in AMU and 1 participant in GM; **MUST score unavailable for 1 participant in AMU

Table 26: Dietary Intake and Nutritional Indices of Men at Suppertime

		Total	MOP	AMU	T&O	p value
		n = 130	n = 81	n = 30	n = 19	
Age						
	Range	70-99	77-95	70-96	71-99	0.106
	Median	86	86	83	84	
	IQR	82-89	84-89	77-90	81-87	
BMI*						
	Range	14.2-36.5	14.2-36.5	18.6-35.9	17.3-31.3	0.015
	Median	23.6	22.7	25.9	23.1	
	IQR	20.9-27.5	20.2-27.1	23.4-28.4	19.8-27.0	
MUST score, n (%)**						
	Low risk	93 (72)	56 (69)	25 (86)	12 (63)	0.269
	Medium risk	17 (13)	11 (14)	4 (14)	2 (11)	
	High risk	19 (15)	14 (17)	0 (0)	5 (26)	
ONS prescribed, n (%)						
	Yes	31 (24)	25 (31)	1 (3)	5 (26)	0.010
	No	99 (76)	56 (69)	29 (97)	14 (74)	
Level of confusion, n (%)						
	None	53 (41)	32 (40)	15 (50)	6 (32)	0.259
	Mild	29 (22)	15 (19)	7 (23.3)	7 (37)	
	Moderate	25 (19)	14 (17)	6 (20)	5 (26)	
	Severe	22 (17)	19 (24)	2 (7)	1 (5)	
	Unknown	1 (1)	1 (1)	0 (0)	0 (0)	
Assistance received, n (%)						
	None	61 (47)	36 (44)	19 (63)	6 (32)	0.005
	Encouragement	2 (2)	1 (1)	0 (0)	1 (5)	
	Preparation	30 (23)	22 (27)	6 (20)	2 (11)	
	Assisting food to mouth	8 (6)	2 (3)	1 (3)	5 (26)	
	Feeding	22 (17)	14 (17)	3 (10)	5 (26)	
	Refused	7 (5)	6 (7)	1 (3)	0 (0)	

	Total	MOP	AMU	T&O	p value
	n = 130	n = 81	n = 30	n = 19	
Soft diet eaten, n (%)					
Yes	10 (8)	9 (11)	0 (0)	1 (5)	0.136
No	120 (92)	72 (89)	30 (100)	18 (95)	
Protein intake, g					
Range	0.0-39.0	0-39.0	0-33.8	0.4-29.0	0.042
Median	13.8	15.8	11.7	9.4	
IQR	8.0-20.1	9.4-22.6	8.0-16.0	5.6-17.1	
Energy intake, kcal					
Range	0-1046	0-1046	0-1031	49-897	0.527
Median	353	379	303	310	
IQR	161-533	158-601	187-485	109-543	

n = number of participants; % = percentage; IQR = inter-quartile range; BMI = body mass index; MUST = Malnutrition Universal Screening Tool; ONS = oral nutritional supplements; p values for age, BMI, protein intake and energy intake calculated using Kruskal Wallis test; p values for MUST score, ONS prescription, level of confusion, assistance received and soft diet eaten calculated using Chi squared test; *BMI unavailable for 1 participant in MOP, 1 participant in AMU and 1 participant in T&O; **MUST unavailable for 1 participant in AMU

The characteristics and dietary intake of female participants are shown in Table 27. In contrast to men, neither participants' characteristics nor dietary intake were significantly different between lunchtime and suppertime measurements. The proportion of women considered to be at low risk of malnutrition was similar to men, at 73%, as was the proportion prescribed oral nutritional supplements, at 26%. 44% of participants had some degree of confusion and 40% required mealtime assistance. As expected, median protein and calorie intakes were lower than those of men (12.7g protein in women, compared with 15.1g in men and 299 kcal in women, compared with 378 kcal in men).

Table 28 presents the characteristics and dietary intake of women at lunchtime in each study department. Age was significantly different across the departments, being highest in MOP, at 87 years, and lowest in GM, at 78 years ($p = 0.009$). The proportion of women considered to be at low risk of malnutrition varied from 60% in MOP to 78% in AMU, but this difference was not statistically significant ($p = 0.239$). Corresponding to this, in MOP the median BMI was lowest (20.8) and the use of ONS was most prevalent (40%), whilst the highest median BMI (26.2) and least ONS prescriptions (13%) occurred in AMU. These differences were not statistically significant. There was a non-significant trend towards a higher prevalence of confusion in MOP, AMU and GM (53-60%), compared with T&O (36%, $p = 0.588$). The need for mealtime assistance was lowest in GM (30%) and highest in T&O (58%), but the difference was not statistically significant ($p = 0.547$). Median protein and calorie intake was lowest in MOP (5.6g and 215 kcal), and highest in GM (16.6g and 323 kcal), but again this was not statistically significant.

The characteristics and dietary intake of women at suppertime across study departments are shown in Table 29. Dietary intake of women at suppertime was only measured in AMU and T&O; in MOP, the ward where suppertimes were included admitted only men, and in GM, only lunchtime meals were included. There were no significant differences between the departments in age, BMI or MUST score, although there was a significant difference in the proportion of patients prescribed ONS (6% in AMU compared with 42% in T&O, $p < 0.001$). Although there was a higher prevalence of confused patients in T&O (49%) compared with AMU (32%), this difference was not statistically significant ($p = 0.247$). Similarly, more patients were independent with eating in AMU than in T&O (67% versus 44%), but this was not statistically significant ($p = 0.280$). Mealtime protein and energy intakes were similar in both departments.

Table 27: Dietary Intake and Nutritional Indices of Women at Lunch and Supper

		Total	Lunch	Supper	p value
		n = 179	n = 104	n = 75	
Age					
	Range	70-102	70-98	71-102	0.644
	Median	84	84	84	
	IQR	78-89	77-89	78-89	
BMI*					
	Range	13.9-42.4	15.5-42.4	13.9-35.2	0.911
	Median	24.2	24.1	24.3	
	IQR	20.2-27.3	20.1-27.5	20.3-27.3	
MUST score, n (%)**					
	Low risk	129 (73)	73 (70)	56 (76)	0.531
	Medium risk	20 (11)	12 (12)	8 (11)	
	High risk	29 (16)	19 (18)	10 (14)	
ONS prescribed, n (%)					
	Yes	46 (26)	77 (74)	56 (75)	0.924
	No	133 (74)	27 (26)	19 (25)	
Level of confusion, n (%)					
	None	101 (56)	57 (55)	44 (59)	0.651
	Mild	20 (11)	14 (14)	6 (8)	
	Moderate	28 (16)	17 (16)	11 (15)	
	Severe	30 (17)	16 (15)	14 (19)	
Assistance received, n (%)					
	None	101 (56)	60 (58)	41 (55)	0.875
	Encouragement	8 (5)	5 (5)	3 (4)	
	Preparation	34 (19)	20 (19)	14 (19)	
	Assisting food to mouth	7 (4)	5 (5)	2 (3)	
	Feeding	25 (14)	12 (12)	13 (17)	
	Refused	4 (2)	2 (2)	2 (3)	

	Total	Lunch	Supper	p value
	n = 179	n = 104	n = 75	
Soft diet eaten, n (%)				
Yes	1 (1)	1 (1)	0 (0)	0.394
No	178 (99)	103 (99)	75 (100)	
Protein intake, g				
Range	0.0-43.8	0.0-43.8	0-39.4	0.378
Median	12.7	13.5	12.4	
IQR	7.4-18.9	7.5-19.7	7.4-17.9	
Energy intake, kcal				
Range	0-795	0-795	0-791	0.868
Median	299	304	296	
IQR	206-449	195-449	212-434	

n = number of participants; % = percentage; IQR = inter-quartile range; BMI = body mass index; MUST = Malnutrition Universal

Screening Tool; ONS = oral nutritional supplements; p values for age, BMI, protein intake and energy intake calculated using Mann

Whitney U test; p values for MUST score, ONS prescription, level of confusion, assistance received and soft diet eaten calculated using Chi

squared test; *BMI unavailable for 2 participants at lunchtime and 12 at dinnertime; **MUST unavailable for 1 participant at dinnertime

Table 28: Dietary Intake and Nutritional Indices of Women at Lunchtime

	Total	MOP	AMU	T&O	GM	p value
	n = 104	n = 5	n = 32	n = 57	n = 10	
Age						
Range	70-98	81-92	70-95	70-98	70-79	0.009
Median	84	87	86	83	78	
IQR	77-89	83-91	78-90	77-90	74-78	
BMI*						
Range	15.5-42.4	17.3-30.0	15.5-42.4	15.6-42.4	15.9-32.6	0.126
Median	24.1	20.8	26.2	23.6	26.2	
IQR	20.1-27.5	17.3-26.0	21.2-30.1	19.8-25.7	16.7-31.6	
MUST score, n (%)						
Low risk	73 (70)	3 (60)	25 (78)	38 (67)	7 (70)	0.239
Medium risk	12 (12)	0 (0)	3 (9)	9 (16)	0 (0)	
High risk	19 (18)	2 (40)	4 (13)	10 (18)	3 (30)	
ONS prescribed, n (%)						
Yes	27 (26)	2 (40)	4 (13)	19 (33)	2 (20)	0.149
No	77 (74)	3 (60)	28 (88)	38 (67)	8 (80)	
Level of confusion, n (%)						
None	57 (55)	2 (40)	15 (47)	36 (63)	4 (40)	0.588
Mild	14 (14)	0 (0)	6 (19)	7 (12)	1 (10)	
Moderate	17 (16)	2 (40)	6 (19)	7 (12)	2 (20)	
Severe	16 (15)	1 (20)	5 (16)	7 (12)	3 (30)	
Assistance received, n (%)						
None	60 (58)	2 (40)	18 (56)	33 (58)	7 (70)	0.547
Encouragement	5 (5)	1 (20)	0 (0)	3 (5)	1 (10)	
Preparation	29 (19)	1 (20)	6 (19)	13 (23)	0 (0)	
Assisting food to mouth	5 (5)	0 (0)	1 (3)	4 (7)	0 (0)	
Feeding	12 (12)	1 (20)	6 (19)	3 (5)	2 (20)	
Refused	2 (2)	0 (0)	1 (3)	1 (2)	0 (0)	

	Total	MOP	AMU	T&O	GM	p value
	n = 104	n = 5	n = 32	n = 57	n = 10	
Soft diet eaten, n (%)						
Yes	1 (1)	0 (0)	0 (0)	1 (2)	0 (0)	0.842
No	103 (99)	5 (100)	32 (100)	56 (98)	10 (100)	
Protein intake, g						
Range	0.0-43.8	3.4-21.6	0-31.8	0.0-43.8	0.3-32.1	0.548
Median	13.5	5.6	12.7	13.4	16.6	
IQR	7.5-19.7	3.6-18.2	8.6-19.3	7.3-19.3	7.2-26.0	
Energy intake, kcal						
Range	0-795	130-492	0-583	0-795	10-728	0.683
Median	304	215	260	322	323	
IQR	195-449	162-393	198-395	203-480	136-496	

n = number of participants; % = percentage; IQR = inter-quartile range; BMI = body mass index; MUST = Malnutrition Universal

Screening Tool; ONS = oral nutritional supplements; p values for age, BMI, protein intake and energy intake calculated using Mann

Whitney U test; p values for MUST score, ONS prescription, level of confusion, assistance received and soft diet eaten calculated using Chi

squared test; *BMI unavailable for 2 participants in T&O

Table 29: Dietary Intake and Nutritional Indices of Women at Suppertime

		Total	AMU	T&O	p value
		n = 75	n = 34	n = 41	
Age					
	Range	71-102	72-96	71-102	0.798
	Median	84	82	84	
	IQR	78-89	79-89	78-90	
BMI*					
	Range	13.9-35.2	16.7-33.5	13.9-35.2	0.587
	Median	24.3	24.5	24.1	
	IQR	20.3-27.3	20.1-27.7	20.3-26.0	
MUST score, n (%)**					
	Low risk	56 (76)	27 (79)	29 (73)	0.087
	Medium risk	8 (11)	5 (15)	3 (8)	
	High risk	10 (14)	2 (6)	8 (20)	
ONS prescribed, n (%)					
	Yes	19 (25)	2 (6)	17 (42)	< 0.001
	No	56 (75)	32 (94)	24 (59)	
Level of confusion, n (%)					
	None	44 (59)	23 (68)	21 (51)	0.247
	Mild	6 (8)	3 (9)	3 (7)	
	Moderate	11 (15)	5 (15)	6 (15)	
	Severe	14 (19)	3 (9)	11 (27)	
Assistance received, n (%)					
	None	41 (55)	23 (67)	18 (44)	0.280
	Encouragement	3 (4)	0 (0)	3 (7)	
	Preparation	14 (19)	4 (12)	10 (24)	
	Assisting food to mouth	2 (3)	1 (3)	1 (2)	
	Feeding	13 (17)	5 (15)	8 (20)	
	Refused	2 (3)	1 (3)	1 (2)	

	Total	AMU	T&O	p value
	n = 75	n = 34	n = 41	
Soft diet eaten, n (%)				
Yes	0 (0)	0 (0)	0 (0)	0.573
No	75 (100)	34 (100)	41 (100)	
Protein intake, g				
Range	0-39.4	0-39.4	0.0-27.7	0.573
Median	12.4	12.9	12.4	
IQR	7.4-17.9	6.3-21.3	7.4-15.9	
Energy intake, kcal				
Range	0-791	0-763	0-791	0.953
Median	296	292	302	
IQR	212-434	214-449	199-440	

n = number of participants; % = percentage; BMI = body mass index; MUST = Malnutrition Universal Screening Tool; ONS = oral nutritional supplements; p values for age, BMI, protein intake and energy intake calculated using Mann Whitney U test; p values for MUST score, ONS prescription, level of confusion, assistance received and soft diet eaten calculated using Chi squared test; *BMI unavailable for 1 participant in AMU and 11 participants in T&O; MUST unavailable for 1 participant in T&O

3.4 Comparison of Characterised Patient Population and Dietary Intake Participants

Participants who were fully characterised as part of the study were compared with participants whose dietary intake was measured in Table 30. This comparison was made because participants who were fully characterised were required to give informed consent to participate, whilst those whose dietary intake was measured were not. The likely inclusion of greater numbers of patients with cognitive impairment and acute illness in the dietary intake group meant it was possible that the two cohorts of participants differed: it is known that acute illness and confusion contribute to poor nutritional intake^{78,87}. Age, body mass index and MUST score were obtained in both groups of participants and therefore these indices are compared between the two populations.

Dietary intake participants were consistently older than those who were fully characterised, with this difference being statistically significant in MOP (0.028) and of borderline significance in GM ($p = 0.056$). Median BMI was higher in fully characterised participants in all groups except for female participants in GM, although these higher values were only of statistical significance in women in AMU ($p = 0.025$) and men in GM ($p = 0.025$). In accordance with this, the proportion of participants who were considered at risk of malnutrition using the MUST score was always higher in the dietary intake participants compared with the fully characterised participants, although this difference was not statistically significant in any group.

Table 30: Comparison of Median Age, Median BMI and Proportion at Risk of Malnutrition in Characterised Patient Participants and Dietary Intake Participants

	MOP			AMU			T&O			GM		
	CPP	DIP	p value	CPP	DIP	p value	CPP	DIP	p value	CPP	DIP	p value
Median Age												
Men, n	50	121	0.028	19	71	0.283	15	40	0.116	37	54	0.056
Age	85	86		82	85		78	82		74	78	
Women, n	0	5	0.101	31	66	0.101	35	98	0.227	14	10	0.172
Age		87		81	84		81	84		73	78	
Median BMI												
Men, n	50	120	0.092	19	67	0.354	15	39	0.165	37	53	0.025
BMI	24.3	2.5		26.1	24.4		25.7	24.1		25.6	23.6	
Women, n	0	5	0.025	30	65	0.025	35	85	0.004	14	10	0.403
BMI		20.8		28.3	25.2		25.5	23.9		24.1	26.2	
% at risk of malnutrition using MUST score												
Men, n	50	121	0.387	19	69	0.760	15	40	0.130	37	54	0.248
% at risk	24	31		16	19		7	25		19	30	
Women, n	0	5	0.892	30	66	0.892	35	97	0.116	14	10	0.939
% at risk		40		20	21		17	31		29	30	

n = number of participants; % = percentage; CPP = characterised patient participants; DIP = dietary intake participants; p values calculated using Mann Whitney U test

3.5 Experiences of Hospital Mealtimes

Interview and focus group schedules were designed to include two main areas for discussion: experiences relating to hospital mealtimes and experiences relating to trained volunteer mealtime assistants. Themes relating to hospital mealtimes are discussed in this section, to provide added context to the setting in which the volunteers were working, whilst themes relating to experiences of trained volunteer mealtime assistants are discussed with the results relating to implementation of the programme.

3.5.1 Patient Participants

Eight patients were approached and asked to participate in an interview, and all eight gave written consent (Table 31). After the first five interviews, transcripts were analysed and a thematic framework identified by myself and my supervisor. Once the final three interviews were analysed, it was found that no new themes were identified and therefore data saturation was agreed to have been reached and no further participants were approached.

Table 31: Patient Participants

	Male	Female
Younger (70-85 years)	P001	P003
	P008	P006
Older (> 85 years)	P002	
	P004	P005
	P007	

3.5.2 Staff Participants

Seven staff members agreed to participate in an interview, representing a range of roles and hospital departments (Table 32). Two participants were interviewed together, but all other staff members were interviewed individually. Again, a thematic framework was agreed after analysing five interviews, and no new themes emerged in the next two interviews, demonstrating that data saturation had been reached. The earlier interviews were predominantly conducted in MOP, as the department with the longest experience of the volunteers. It was anticipated that there would be differences in experiences across the four hospital departments, but when the data were analysed, with inclusion of one staff member from each area, it was found that staff perspectives were very similar, and therefore, given that data saturation had been reached, attempts were not made to interview additional staff members in AMU, T&O and GM.

Table 32: Staff Participants

Study Phase	Participants
MOP	Ward manager
	Charge nurse
	Student nurse
	Housekeeper
AMU	Housekeeper
T&O	Ward manager
GM	Ward manager

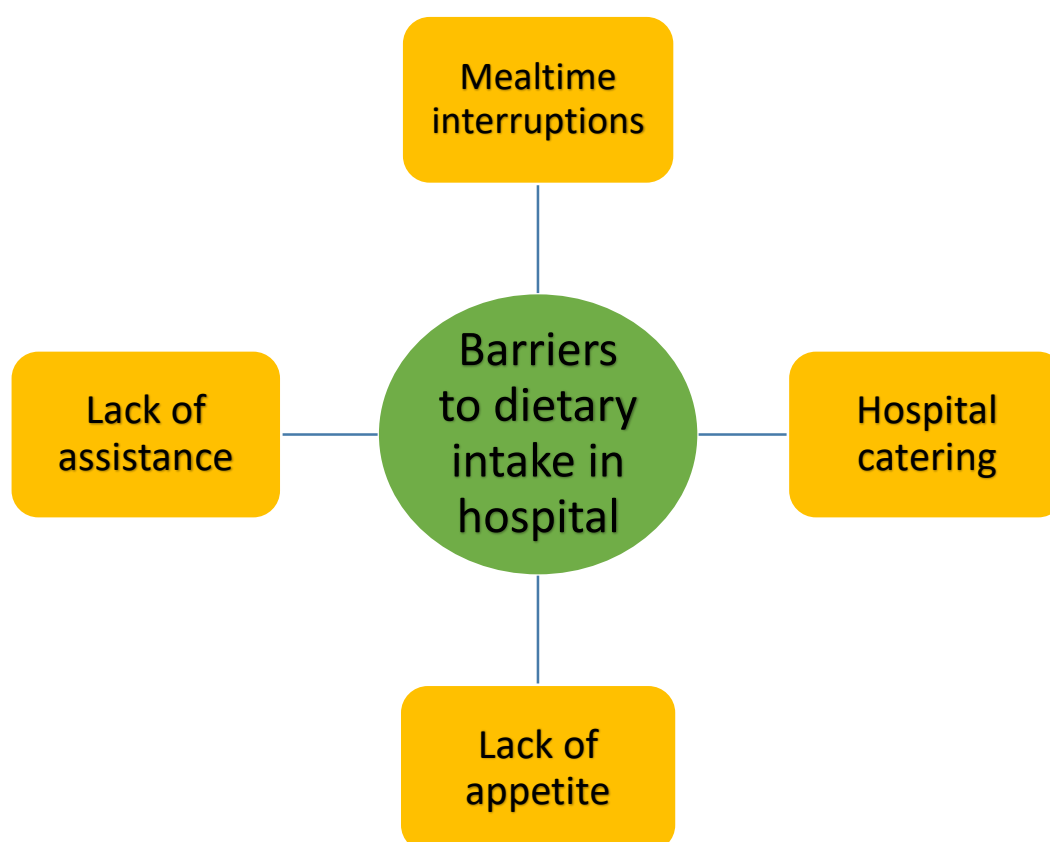
3.5.3 Volunteer Participants

Nine volunteers were available to attend the focus group and gave written consent to participate. Although this was a convenience sample, volunteers attending ranged in age, level of experience and the department in which they volunteered.

3.5.4 Results of thematic analysis

The dominant theme in patients, staff and volunteers' experiences of hospital mealtimes was barriers to dietary intake in hospital, which could be divided into four further subthemes (Figure 12). All four subthemes were common to all hospital departments, being commented on by patients, staff or volunteers in each area.

Figure 12: Themes Identified by Patients, Staff and Volunteers Relating to Experiences of Hospital Mealtimes



3.5.4.1 Theme 1: Barriers to Dietary Intake in Hospital

There was widespread recognition, by both volunteers and staff, that the nutritional status and dietary intake of some patients in hospital was insufficient.

“Some of these elderly people, they’re so skinny and so frail they need as much as help and encouragement they can get” **S004**

“I wonder how some of the patients can survive sometimes if they don’t eat, I really do.” **V004**

Multiple contributory factors to poor dietary intake were identified by volunteers, staff and patients.

3.5.4.2 Theme 1a: Mealtime Interruptions

Two staff members described the hospital policy of protected mealtimes to minimisation interruptions:

“They have a set time, protected mealtimes... all the patients should have support from nursing staff, we don’t have any therapy teams coming in that protected area of time, and doctors really also we ask not to come in doing ward rounds in that area” **S001**

“We have protected mealtimes. So, in theory everybody should be dropping their, dropping whatever they’re doing and helping with that” **S007**

However, both volunteers and patients cited examples of where the protected mealtimes policy had not been enforced and the negative impact this could have on dietary intake:

“I found sugar testing going on during the meals... and other observations, they interrupt the patient eating, you know for those that are fully compos mentis and able to feed themselves, they’re interrupting them to do obs while they’re eating.”

V005

“We’re supposed to have protected lunchtimes. It doesn’t stop the doctors coming, you know in the middle of food... I think quite often if the doctor is there for quite a while, they go back to their food and you sort of put a table back in front of them, because of course they move the table away, and they don’t want to know, no it’s cold, or no I don’t want it.”

V008

“Sometimes they come round after doing tests on you, you know, and your dinner’s left there you know... I mean your dinner comes in nice and hot and then they want the blood and then you’ve got to wait until somebody else comes back with something else, by the time you know you get it, it’s icy cold”

P008

3.5.4.3 Theme 1b: Hospital catering system

Hospital catering was also identified as an issue by all groups of participants. Staff were particularly aware of organisational problems:

“There’s a lot of chasing involved, we’re getting the right meals to the right patients and certainly if they’ve got a new staff or whatever, there can be a lot of labour involved with getting the right meals to the right patients”

S006

Volunteers concentrated less on organisational issues, but were concerned about the way that the food was served and presented. There was general agreement that that food presentation was important in encouraging patients to eat as much as possible:

“It was braised steak, but with the vegetables and all sort of shredded carrots and greenery and things like that, new potatoes... But it was beautiful, it was colourful, it looked tasty. I could have eaten it myself you know.”

V006

“The lady I fed last week, and she’d had salmon with the butter sauce and broccoli and little new potatoes and I thought cor that’s nice”

V007

“If it looks nice it’s going to be more appealing”

V002

However, volunteers often felt that presentation and service were not as good as they could be:

“When they have like the trifles or the jellies, it’s be nice if they could have a teaspoon, because you cannot get a desert spoon in there”

V001

“And this gentleman last night, he said well I haven’t got a plate to put my sandwich on”

V001

“It’s very important with the elderly, because we sometimes, I sometimes cut [sandwiches] up into little tiny fingers and take off the crusts and things like that, and you need a plate for that and it makes it look nice”

V002

“I took the top off and I thought, I wouldn’t like to eat that”

V007

Patients were divided in their views on the hospital food, with some patients unhappy with the food, yet others satisfied with their meals:

“I’ve always been very disappointed. It’s never sort of been that good”

P001

“I first came in, and at that time the food was absolutely A1, really nice... But when I come back this time... I just could not believe how the food had deteriorated. It was horrific by comparison”

P006

“I can’t complain about anything with the meals. I mean a couple of times they’ve made a bloomer and they haven’t brought the right meal or something, but they soon rectify it, you know”

P003

“I’ve not come across anything that I don’t like”

P003

Patients also identified system and organisational problems with the food service, but were more sympathetic towards the constraints of mass catering:

“I’ve ordered them and they keep getting them wrong, so my daughter put two meals on there I’d like, what do they give me now, just one of them, either the top one or the bottom one... So, then they might read that, but you know and they still got it wrong yesterday... but they’ve got so many mouths to feed they can’t suit everybody; it’s impossible”

P008

“Well considering the number of patients there is and the distance it’s got to come, I suppose it’s understandable that it’s not going to be hot by the time, is it?”

P007

“To say [breakfast is] going to happen at two minutes past nine; ridiculous. On the other hand, if people are told breakfast is at eight o’clock...”

P001

3.5.4.4 Theme 1c: Appetite

Many patients identified a poor appetite as contributing to their poor intake, with some patients describing this as an acute problem related to their admission and illness, and others reporting it to be a long-standing problem:

"I suppose if you're ill that's one thing you lose isn't it, you lose your appetite don't you, so you know some days you can have, it's better than other days"

P007

"Because when you're in hospital you're not working, you're not doing anything, you're laying in bed most of the time, so when you can get up you're sat on a chair, so you don't really have an appetite you know"

P007

"Sometimes good, sometimes not... sometimes the meal is too big for me, and I'll only eat what I could eat"

P003

"I never have much of an appetite anyways, so it doesn't make much difference"

P005

Despite this, patients were aware that nutrition was important for their health, and described the need to eat even if they didn't have an appetite.

"I just get on with it; eat what I've got to, try and eat as much as I can... I know it's the only way I'll get any stronger"

P005

"I don't want it but I know that I've got to eat it, because you've got to eat something haven't you"

P007

"I mean the way I go about it you've got to eat to live, so if you don't eat you don't live"

P004

Staff and volunteers were less likely to describe patient appetite as a particular issue, but it was reported by one staff member and one volunteer (from AMU and MOP):

"I sometimes think then that they may not have ever eaten anything, because they're ill. I mean there in a sort of catch-22, they're not well so they don't want to eat"

V002

"[Sometimes they are] just not really feeling very well and just don't really want to eat"

S004

3.5.4.5 Theme 1d: Lack of assistance

Staff identified that, prior to the introduction of the volunteers, lack of assistance at mealtimes was a factor in patients not eating enough:

"Everyone would get fed, but it might take a little while so the food might get a little bit cold"

S006

"There's not enough staff to feed all the patients that need feeding... they will be helped, but by that time sometimes their food's gone cold, because they've already helped somebody else"

S004

“Lunch would just arrive and then it would just, you know there may be a wait for people to arrive to help feed”

S005

“It was very hard and I had to be in twenty places at once to be able to be able to feed the patients”

S003

“We’ve got to meals and because we’ve been feeding other patients or dealing with other issues, like cleaning the toilet, we’ve got to a meal and they’re cold”

S007

Volunteers also recognised this as a problem, and described the competing priorities that nurses had to face at mealtimes:

“Those nurses, they’ve got the patience of an angel; they really are wonderful, and of course they go around feeding as many as they can, but of course by the time you get commodes and this and that and running around, their work has been cut out, so we are really needed”

V006

“The nurses do a great job, but there’s just, there is so much... The nurses just haven’t got the time”

V009

Most patients agreed that the nurses had too much to do to be able to provide effective help at mealtimes, and several patients had witnessed specific instances where other patients had not been helped:

“I mean these girls are so run off their feet”

P006

“There’s not enough nurses to help. Like there’s [name] next door, she can’t feed herself, she’s got a crook arm and a crook hand. And there’s another lady down there, so that’s two ladies amongst six ladies, that need help. So uhm yeah, that’s a bit, that’s a bit hard, you know for the nurses anyway”

P003

“Sometimes the nurses will give them a couple of spoonfuls, then they’re called away for something else, and they either go to sleep or they don’t see it”

P008

3.6 Summary of Results: Defining the Context

The four hospital departments in which volunteer mealtime assistants were introduced differed included medical and surgical specialties. Two departments preferentially admitted patients according to their age: MOP admitted patients over the age of 80 years, and GM under the age of 80 years. All departments admitted both male and female patients, although only male wards were included in MOP, as a small study of the introduction of mealtime assistants on a female ward in this department had been previously carried out. The mealtime routine was broadly

similar in all departments, apart from AMU, where volunteers were required to work more flexibly due to the size and nature of the unit.

201 patient participants were recruited across the four departments. Multimorbidity, polypharmacy, risk of malnutrition, frailty and low grip strength were all commonplace. Participants in MOP were older, had greater comorbidities, poorer cognition, lower grip strength and greater care requirements, whilst participants in GM were younger, more cognitively able, higher grip strength and lesser care requirements. Participants in T&O had less chronic comorbidity but a higher level of current dependency and low grip strength. Length of stay was highest in MOP and T&O.

Dietary intake was measured in 465 participants across the four hospital departments. These participants accurately represented the ward population over the age of 70 years at the time of measurement because all patients on the ward were included, without the need for informed consent. They were commonly older and more likely to be at risk of malnutrition than participants who gave informed consent to be fully characterised. Malnutrition, confusion and the need for mealtime assistance were common, but there were no consistent differences in the type of assistance required by participants in each hospital department. Indices suggestive of malnutrition appeared to be less common in AMU than in other hospital departments. Male participants consumed more energy and protein than female participants; male participants in MOP had significantly higher protein intakes than in other departments, although female participants in MOP consumed significantly less.

Interviews and one focus group with patients, staff and volunteers identified multiple barriers to explain the poor dietary intake of patients in hospital, including mealtime interruptions, organisational factors relating to hospital catering, poor appetite and lack of assistance. These experiences were common to all four hospital departments.

CHAPTER 4: IMPLEMENTATION OF TRAINED VOLUNTEER MEALTIME ASSISTANTS

4.1 Adoption

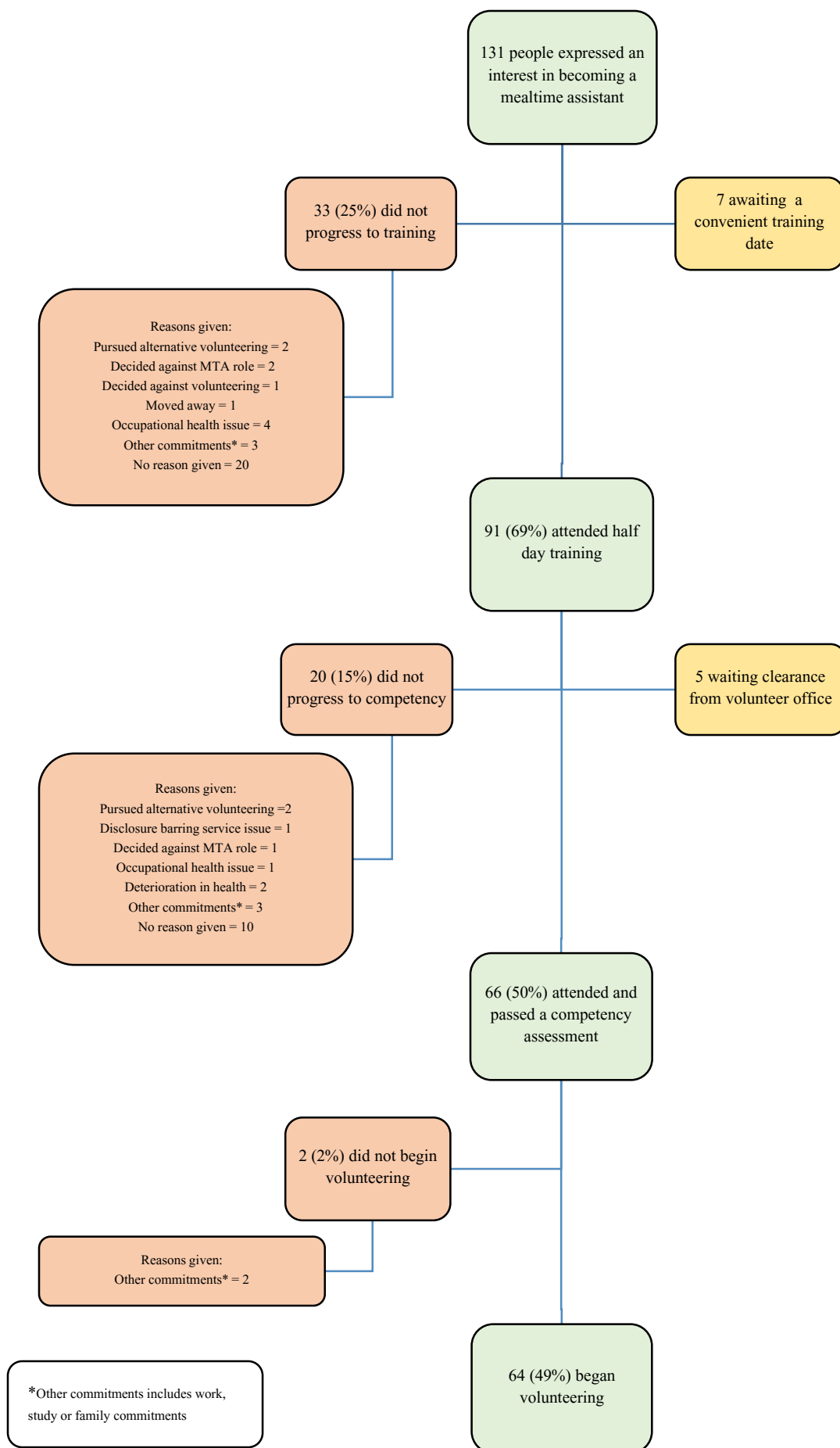
4.1.1 *Volunteer Recruitment and Training*

The process of volunteer recruitment and training is shown in Figure 13. Throughout the study period, 131 people expressed an interest in becoming a mealtime assistant via the voluntary services manager, of whom 66 volunteers (50%) completed the full training package. Two of these volunteers did not ever begin volunteering, leaving 64 active volunteers (49% of the total who expressed an interest). No volunteers failed their competency assessment. At the end of the study, twelve volunteers (9%) were waiting to attend a training session or competency assessment, and the training and ongoing management of these volunteers was taken on by the hospital volunteering team.

Fifty-five volunteers (42%) expressed an interest in the MTA role, but did not ever begin volunteering. Of these, the majority (33 volunteers, 60%) withdrew before completing any training; the reasons were unknown in most (20 volunteers, 61%). A further 20 volunteers (36%) attended the half day training session but did not progress to a competency assessment; the reason for withdrawal was known in ten (50%), and, for half of these, reflected a change in circumstances since completing the training session (such as a change in the volunteer's own health or other commitments). The two volunteers who passed their competency assessment but did not begin volunteering both cited other commitments as the cause of this. Throughout the study period, six volunteers (5%) could not gain the required clearances to volunteer in the hospital; for five volunteers, this was for occupational health reasons.

The date of their first contact with the volunteer office was known for 73/91 (80%) volunteers who attended a training session. The median time between expressing an interest via the volunteer office and attending training was 31 days, although it ranged from 3 to 421 days. This information was unknown for 11 volunteers who were trained as part of the study, but had expressed an interest in the role prior to the study commencing, and was not recorded for the remaining seven volunteers for unknown reasons. For the 66 volunteers who attended a competency assessment, the time between attending training and the competency assessment ranged between 0 and 197 days, with a median of 26 days. The longest delays at this stage were predominantly due to volunteers acquiring the required clearances to work on the ward, particularly the Disclosure Barring Check.

Figure 1: Volunteer Recruitment and Training



4.1.1.1 Volunteer Characteristics

Volunteer profiles were completed for 65 of the 66 volunteers who passed their competency assessments. The volunteer who did not complete a profile was one of the two volunteers who did not begin volunteering after passing their competency assessment.

The demographics of the remaining 65 volunteers are presented in Table 33. There was a female preponderance, with 80% of volunteers being women. The ages of volunteers ranged from 17-77, with a median age of 22. Although the majority of volunteers declared their ethnicity as White British (75%), a mix of ethnicities were represented. Students comprised the largest proportion of volunteers (48%), with unemployed and retired people the next largest groups.

18 (28%) volunteers owned their own homes, and the proportions of those in rented accommodation and those still living with their parents were approximately equal (37% and 35% respectively, Table 34). Many volunteers owned a car (51%), and only a small proportion (17%) had a driving licence but did not own a car. Public transport was the most common way that volunteers reached the hospital (45%), with another 37% driving. Of the 36 volunteers (55%) who were no longer in full time education, most had left school under the age of 16 years (25%). Two volunteers had previously left full-time education, but had returned to studying later in their lives and were current students. GCSE (or an equivalent) was the most common qualification at leaving education (15%), and also the most common current qualification of volunteers (45%).

Table 35 shows the previous experience of volunteers. For 28 volunteers (43%), this was their first experience of volunteering, although the majority of volunteers had some previous experience (57%), most commonly within a healthcare setting (42%). Similarly, most volunteers (66%) had some healthcare experience, either in a professional capacity (35%), a work experience placement (19%) or informal experience of caring for friends or family (12%).

The most common reason for volunteering was an interest in a healthcare career, which was the case for 41 volunteers (63%). The next most common reason was a desire to help, expressed by 14 (22%) volunteers. For half of these volunteers, this was driven by personal experience of the hospital (either as a patient or relative). Other volunteers were motivated by having provided a caring role for a family member or friend (5%) or were former healthcare professionals who wanted continued patient contact (6%).

The majority of volunteers (54%) applied to the hospital without any awareness of the MTA role and became interested in this when they attended the preliminary interview at the volunteer office. However, a significant minority (22%) became specifically interested in becoming an MTA after hearing a talk promoting the role at their college or university, and others had seen specific marketing, either within the hospital or the local press (17%).

Table 33: Volunteer demographics

Characteristic		Total
		n = 65
Gender, n (%)		
	Female	52 (80)
	Male	13 (20)
Age		
	Range	17-77
	Median	22
	IQR	18-52
Ethnicity, n (%)		
	Arab	3 (5)
	Bangladeshi	4 (6)
	Black African	1 (2)
	Indian	3 (5)
	Pakistani	1 (2)
	White British	49 (75)
	White European	2 (3)
	Unknown	2 (3)
Marital Status, n (%)		
	Single	40 (62)
	Married/with partner	17 (26)
	Divorced	4 (6)
	Widowed	4 (6)
Employment Status, n (%)		
	Full-time employed	7 (11)
	Part-time employed	4 (6)
	Student	31 (48)
	Retired	11 (17)
	Unemployed	12 (19)

n = number of volunteers; % = percentage

Table 34: Car Ownership, Home Ownership and Level of Education

Characteristic	Total, n (%), n = 65
Home Ownership	
Home owner	18 (28)
Renting	24 (37)
Lives with parents	23 (35)
Car Ownership	
Yes	33 (51)
No- has driving licence	11 (17)
No- no driving licence	21 (32)
Transport to Hospital	
Public transport	29 (45)
Car	24 (37)
Walk	9 (14)
Cycle	3 (5)
Age at Leaving Full Time Education	
≤ 16 years	16 (25)
17-18	5 (8)
19-22	14 (22)
≥ 23 years	1 (2)
Still in full time education	29 (45)
Current Qualification	
None	3 (5)
GCSE	29 (45)
A level	15 (23)
Professional qualification	7 (11)
Degree	9 (14)
Other	2 (3)
Qualification at Leaving Full Time Education	
None	3 (5)
GCSE	10 (15)
A level	4 (6)
Professional qualification	7 (11)
Degree	8 (12)
Other	2 (3)
Still in education	31 (48)

n = number of volunteers; % = percentage

Table 35: Previous Experience and Reasons for Becoming an MTA

Characteristic	Total, n (%)
	n = 65
Previous Volunteering Experience	
None	28 (43)
Previous healthcare volunteering	27 (42)
Previous non-healthcare volunteering	10 (15)
Previous Healthcare Experience	
None	22 (34)
Informal caring role	8 (12)
Student work experience	12 (19)
Professional experience	23 (35)
Reasons for Becoming an MTA	
Former healthcare career	4 (6)
Interest in healthcare career	41 (63)
Desire to help due to:	
Previous informal caring role	3 (5)
Personal experience of hospital	7 (11)
Other	4 (6)
Other	6 (9)
Method of Hearing About MTA Role	
Volunteer Office	35 (54)
College or university talk	14 (22)
Marketing	11 (17)
Word of mouth	3 (5)
Other	2 (3)

n = number of volunteers; % = percentage

4.1.1.2 Volunteer Characteristics by Hospital Department

Volunteer demographics across the four hospital departments are shown in Table 36. There were fewer male volunteers in Trauma and Orthopaedics (T&O: 7% compared with 20-29% in other areas), but this was not statistically significant ($p = 0.450$). Although the median age of volunteers in MOP and GM was higher than that of those in AMU and T&O (28 and 36 years versus 21 and 18 years respectively), again this was not statistically significant ($p = 0.114$). In T&O and GM, there was a greater range of ethnicities, and a lower proportion of volunteers who were white British (60% and 50% compared with 81% and 95% in MOP and AMU). These differences were not significant when all ethnicities were examined ($p = 0.187$). However, when ethnicity was re-categorised into either white British or other minority ethnic group, this was of borderline significance ($p = 0.041$). There was also a borderline significant difference ($p = 0.044$) in the marital status of volunteers across the departments: volunteers in GM were more commonly married (60% versus 19%, 16% and 27% in MOP, AMU and T&O) and less commonly single (20% versus 62%, 84% and 60% in MOP, AMU and T&O). The proportion of students was lowest in GM, at 20%, compared with 48-53% in MOP, AMU and T&O, although this was not of statistical significance ($p = 0.083$).

Car and home ownership did not significantly differ across hospital departments (Table 37). Similarly, age at leaving education and qualification at leaving education were not significantly different. However, there was a significant difference ($p = 0.016$) in the current educational qualification of volunteers between departments: the most common qualification was GCSE or equivalent in MOP, AMU and T&O (43%, 47% and 73%), contrasting with no volunteers reporting this as their current educational qualification in GM. In GM, the most common qualification reported was a professional qualification (40% of volunteers), yet this was relatively uncommon in other departments (5%, 5% and 13%).

The previous experience of volunteers in each department is shown in Table 38. There were no significant differences between departments, although prior experience in healthcare volunteering was less prevalent in GM than in MOP, AMU and T&O (20% versus 48%, 42% and 47%). There was also a trend towards volunteers in AMU being less likely to have healthcare experience (42% versus 76%, 73% and 80%) and less likely to have professional healthcare experience (11% versus 48%, 40% and 50%).

Table 36: Volunteer Demographics by Hospital Department

Characteristic		MOP, n = 21	AMU, n = 19	T&O, n = 15	GM, n = 10	p value
Gender, n (%)						
	Female	15 (71)	15 (79)	14 (93)	8 (80)	0.450
	Male	6 (29)	4 (21)	1 (7)	2 (20)	
Age						
	Range	17-77	17-68	17-76	19-70	0.114
	Median	28	21	18	36	
	IQR	20-59	18-23	17-53	25-61	
Ethnicity, n (%)						
	Arab	2 (10)	0 (0)	0 (0)	1 (10)	0.187
	Bangladeshi	2 (10)	0 (0)	1 (7)	1 (10)	
	Black African	0 (0)	0 (0)	1 (7)	0 (0)	
	Indian	0 (0)	0 (0)	2 (13)	1 (10)	
	Pakistani	0 (0)	0 (0)	0 (0)	1 (10)	
	White British	17 (81)	18 (95)	9 (60)	5 (50)	
	White European	0 (0)	0 (0)	1 (7)	1 (10)	
	Unknown	0 (0)	1 (5)	1 (7)	0 (0)	
Ethnicity, n (%)						
	White British	17 (81)	18 (95)	9 (60)	5 (50)	0.041
	Other ethnicity	4 (19)	0 (0)	5 (33)	5 (50)	
	Unknown	0 (0)	1 (5)	1 (7)	0 (0)	
Marital Status, n (%)						
	Single	13 (62)	16 (84)	9 (60)	2 (20)	0.044
	Married/with partner	4 (19)	3 (16)	4 (27)	6 (60)	
	Divorced	1 (5)	0 (0)	2 (13)	1 (10)	
	Widowed	3 (14)	0 (0)	0 (0)	1 (10)	
Employment Status, n (%)						
	Full-time employed	3 (14)	2 (11)	1 (7)	1 (10)	0.359
	Part-time employed	0 (0)	3 (16)	1 (7)	1 (10)	
	Student	10 (48)	10 (53)	8 (53)	2 (20)	
	Retired	5 (24)	1 (5)	1 (7)	4 (40)	
	Unemployed	3 (14)	3 (16)	4 (27)	2 (20)	

n = number of volunteers; % = percentage; IQR = inter-quartile range; p value calculated for age using Kruskal Wallis test; p values calculated for all other variables using Chi squared test

Table 37: Car Ownership, Home Ownership and Level of Education by Hospital Department

Characteristic	MOP, n = 21	AMU, n = 19	T&O, n = 15	GM, n = 10	p value
Home Ownership, n (%)					
Home owner	5 (24)	3 (16)	5 (33)	5 (50)	0.075
Renting	11 (52)	7 (37)	2 (13)	4 (40)	
Lives with parents	5 (24)	9 (47)	8 (53)	1 (10)	
Car Ownership, n (%)					
Yes	11 (52)	8 (42)	6 (40)	8 (80)	0.115
No- has driving licence	5 (24)	3 (16)	1 (7)	2 (20)	
No- no driving licence	5 (24)	8 (42)	8 (53)	0 (0)	
Transport to Hospital, n (%)					
Public transport	7 (33)	11 (58)	8 (53)	3 (30)	0.280
Car	7 (33)	5 (26)	6 (40)	6 (60)	
Walk	6 (29)	2 (11)	1 (7)	0 (0)	
Cycle	1 (5)	1 (5)	0 (0)	1 (10)	
Age at Leaving Full Time Education, n (%)					
≤ 16 years	6 (29)	3 (16)	5 (33)	2 (20)	0.323
17-18	1 (5)	1 (5)	1 (7)	2 (20)	
19-22	4 (19)	6 (32)	1 (7)	3 (30)	
≥ 23 years	0 (0)	0 (0)	0 (0)	1 (10)	
Still in full time education	10 (48)	9 (47)	8 (53)	2 (20)	
Current Qualification, n (%)					
None	1 (5)	0 (0)	1 (7)	1 (10)	0.016
GCSE	9 (43)	9 (47)	11 (73)	0 (0)	
A level	5 (24)	6 (32)	1 (7)	3 (30)	
Professional qualification	1 (5)	0 (0)	2 (13)	4 (40)	
Degree	5 (24)	3 (16)	0 (0)	1 (10)	
Other	0 (0)	1 (5)	0 (0)	1 (10)	
Qualification at Leaving Full Time Education, n (%)					
None	1 (5)	0 (0)	1 (7)	1 (10)	0.083
GCSE	4 (19)	2 (11)	4 (27)	0 (0)	
A level	1 (5)	3 (16)	0 (0)	0 (0)	
Professional qualification	1 (5)	0 (0)	2 (13)	4 (40)	
Degree	4 (19)	3 (16)	0 (0)	1 (10)	
Other	0 (0)	1 (5)	0 (0)	1 (10)	
Still in education	10 (48)	10 (53)	8 (53)	3 (30)	

n = number of volunteers; % = percentage; p values calculated using Chi squared test

Table 38: Previous Experience and Reasons for Becoming an MTA by Hospital Department

Characteristic	MOP, n = 21	AMU, n = 19	T&O, n = 15	GM, n = 10	p value
Previous Volunteering Experience, n (%)					
None	8 (38)	9 (47)	7 (47)	4 (40)	0.354
Previous healthcare volunteering	10 (48)	8 (42)	7 (47)	2 (20)	
Previous non-healthcare volunteering	3 (14)	2 (11)	1 (7)	4 (40)	
Previous Healthcare Experience, n (%)					
None	5 (24)	11 (58)	4 (27)	2 (20)	0.080
Informal caring role	1 (5)	2 (11)	2 (13)	3 (30)	
Student work experience	5 (24)	4 (21)	3 (20)	0 (0)	
Professional experience	10 (48)	2 (11)	6 (40)	5 (50)	
Reasons for Becoming an MTA, n (%)					
Former healthcare career	2 (10)	0 (0)	1 (7)	1 (10)	0.231
Interest in healthcare career	11 (52)	16 (84)	10 (67)	4 (40)	
Desire to help due to:					
Previous informal caring role	1 (5)	0 (0)	0 (0)	2 (20)	
Personal experience of hospital	3 (14)	1 (5)	3 (20)	0 (0)	
Other	2 (10)	0 (0)	1 (7)	1 (10)	
Other	2 (10)	2 (11)	0 (0)	2 (20)	
Method of Hearing About MTA Role, n (%)					
Volunteer Office	15 (71)	10 (53)	8 (53)	2 (20)	0.180
College or university talk	2 (10)	5 (26)	5 (33)	2 (20)	
Marketing	2 (10)	2 (11)	2 (13)	5 (50)	
Word of mouth	1 (5)	1 (5)	0 (0)	1 (10)	
Other	1 (5)	1 (5)	0 (0)	0 (0)	

n = number of volunteers; % = percentage; p values calculated using Chi squared test

4.1.1.3 Volunteer Characteristics by Volunteer Age

Subgroup analysis of volunteer characteristics by volunteer age (under 25 years or 25 years and older) was carried out to determine if there were important differences between younger and older volunteers that might require a different approach to implementation.

The demographics of younger and older volunteers are compared in Table 39. Gender and ethnicity were similar across ages, but marital status and employment status significantly differed ($p < 0.001$ for both characteristics). All volunteers under 25 years old were single, whereas the majority of volunteers 25 years and over were married (57%). 80% of younger volunteers were students, whereas only 10% of older volunteers were; two of these were volunteers who had returned to studying later in life. Older volunteers were most commonly retired (37%) or unemployed (33%).

There were also statistically significant differences in car and home ownership and the educational qualifications of younger and older volunteers (Table 40). The majority of younger volunteers were living with their parents (66%), whilst the majority of older volunteers were home owners (60%, $p < 0.001$). Older volunteers were predominantly car owners (80%), while only 26% of younger volunteers were, and the majority of younger volunteers did not have a driving licence (54%, $p < 0.001$). Younger volunteers more commonly used public transport to get to the hospital (60% versus 26.7%), whereas older volunteers were more likely to drive (47% versus 29%, $p = 0.015$).

Most younger volunteers were still in full time education (80%) and none had left school at the age of 16 years or less, in contrast to older volunteers, where only one volunteer (3%) was still in education and 53% had left school at the age of 16 years or less ($p < 0.001$). In both younger and older volunteers, the most common current educational qualification was at GCSE level (51% and 37%), but older volunteers were more likely to have no formal qualifications (10% versus 0%), a professional qualification (23% versus 0%) or a degree (20% versus 9%, $p < 0.001$).

Table 39: Volunteer Demographics by Volunteer Age

Characteristic	Age < 25 years	Age ≥ 25 years	p value
	n = 35	n = 30	
Gender, n (%)			
Female	26 (74)	26 (87)	0.213
Male	9 (26)	4 (13)	
Age			
Range	17-23	26-77	
Median	18	53.5	
IQR	17-21	37-63	
Ethnicity, n (%)			
Arab	1 (3)	2 (7)	0.619
Bangladeshi	3 (9)	1 (3)	
Black African	0 (0)	1 (3)	
Indian	2 (6)	1 (3)	
Pakistani	1 (3)	0 (0)	
White British	25 (71)	24 (80)	
White European	1 (3)	1 (3)	
Unknown	2 (6)	0 (0)	
Marital Status, n (%)			
Single	35 (100)	5 (17)	< 0.001
Married/with partner	0 (0)	17 (57)	
Divorced	0 (0)	4 (13)	
Widowed	0 (0)	4 (13)	
Employment Status, n (%)			
Full-time employed	3 (9)	4 (13)	< 0.001
Part-time employed	2 (6)	2 (7)	
Student	28 (80)	3 (10)	
Retired	0 (0)	11 (37)	
Unemployed	2 (10)	10 (33)	

n = number of volunteers; % = percentage; IQR = inter-quartile range; p values calculated using Chi squared test

Table 40: Car Ownership, Home Ownership and Level of Education Depending by Volunteer Age

Characteristic	Age < 25 years, n = 35	Age ≥ 25 years, n = 30	p value
Home Ownership, n (%)			
Home owner	0 (0)	18 (60)	< 0.001
Renting	12 (34)	12 (40)	
Lives with parents	23 (66)	0 (0)	
Car Ownership, n (%)			
Yes	9 (26)	24 (80)	< 0.001
No- has driving licence	7 (20)	4 (13)	
No- no driving licence	19 (54)	2 (7)	
Method of Transport to Hospital, n (%)			
Public transport	21 (60)	8 (27)	0.015
Car	10 (29)	14 (47)	
Walk	2 (6)	7 (23)	
Cycle	2 (6)	1 (3)	
Age at Leaving Full Time Education, n (%)			
≤ 16 years	0 (0)	16 (53)	< 0.001
17-18	1 (3)	4 (13)	
19-22	6 (17)	8 (27)	
≥ 23 years	0 (0)	1 (3)	
Still in full time education	28 (80)	1 (3)	
Current Qualification, n (%)			
None	0 (0)	3 (10)	0.001
GCSE	18 (51)	11 (37)	
A level	13 (37)	2 (7)	
Professional qualification	0 (0)	7 (23)	
Degree	3 (9)	6 (20)	
Other	1 (3)	1 (3)	
Qualification at Leaving Full Time Education, n (%)			
None	0 (0)	3 (10)	< 0.001
GCSE	0 (0)	10 (33)	

Characteristic	Age < 25 years, n = 35	Age ≥ 25 years, n = 30	p value
A level	3 (9)	1 (3)	
Professional qualification	0 (0)	7 (23)	
Degree	3 (9)	5 (17)	
Other	1 (3)	1 (3)	
Still in education	28 (80)	3 (10)	

n = number of volunteers; % = percentage; p values calculated using Chi squared test

There were also significant differences in the previous experience of younger and older volunteers (Table 41). Younger volunteers were more likely to have previous volunteering experience (71% versus 40% $p = 0.038$), with healthcare still the most common setting for previous volunteering in both groups (51% and 30% of volunteers respectively). Younger volunteers were less likely to have previous healthcare experience (54% versus 80%, $p < 0.001$). In the younger volunteers who did have healthcare experience, a student work experience placement was the most common experience (34%), whilst in older volunteers professional or informal experience were more common (57% and 23% respectively).

The reasons for choosing to become an MTA were also significantly different in younger volunteers (Table 41, $p < 0.001$). Interest in a healthcare career was the reason for volunteering in all but two of the younger volunteers (94%) but was less common in older volunteers (27%), who were more likely to describe altruistic reasons for volunteering (43% versus 3%).

Table 41: Previous Experience and Reasons for Becoming an MTA Depending by Volunteer Age

Characteristic	Age < 25 years, n = 35	Age ≥ 25 years, n = 30	p value
Previous Volunteering Experience, n (%)			
None	10 (29)	18 (60)	0.038
Previous healthcare volunteering	18 (51)	9 (30)	
Previous non-healthcare volunteering	7 (20)	3 (10)	
Previous Healthcare Experience, n (%)			
None	16 (46)	6 (20)	< 0.001
Informal caring role	1 (3)	7 (23)	
Student work experience	12 (34)	0 (0)	
Professional experience	6 (17)	17 (57)	
Reasons for Becoming an MTA, n (%)			
Former healthcare career	0 (0)	4 (13)	< 0.001
Interest in healthcare career	33 (94)	8 (27)	
Desire to help due to:			
Previous informal caring role	0 (0)	3 (10)	
Personal experience of hospital	0 (0)	7 (23)	
Other	1 (3)	3 (10)	
Other	1 (3)	5 (17)	
Method of Hearing About MTA Role, n (%)			
Volunteer Office	17 (49)	18 (60)	0.001
College or university talk	14 (40)	0 (0)	
Marketing	1 (3)	10 (33)	
Word of mouth	2 (6)	1 (3)	
Other	1 (3)	1 (3)	

n = number of volunteers; % = percentage; p values calculated using Chi squared test

4.1.1.4 Volunteer Characteristics by Level of Experience

Analysis of volunteer characteristics depending on a volunteer's level of experience was performed to determine if there were any identifiable differences in volunteers who were more successful (i.e. those who completed 12 or more volunteering sessions).

The demographics of volunteers who attended less than 12 sessions are compared with those who attended 12 sessions or more in Table 42. There were no gender differences, and, although the median age of volunteers who completed 12 sessions or more was higher (50 years versus 21 years), this difference was not statistically significant ($p = 0.090$). Volunteers who completed more than 12 sessions were more likely to be retired (29% versus 12%) and less likely to be students (29% versus 58%), but these differences were not statistically significant ($p = 0.190$). There were no significant differences in ethnicity or marital status between the two groups.

Home ownership, car ownership and educational qualifications of experienced and less experienced volunteers are shown in Table 43. Home and car ownership were not significantly different between the two groups, and neither were educational qualifications. Less experienced volunteers were more commonly still in education 53% versus 29%), but this was not a significant difference ($p = 0.141$).

Table 42: Volunteer Demographics Depending by Level of Experience

Characteristic		< 12 sessions	≥ 12 sessions	p value
		n = 43	n = 21	
Gender, n (%)				
	Female	34 (79)	18 (86)	0.523
	Male	9 (21)	3 (14)	
Age				
	Range	17-77	17-74	0.090
	Median	21	50	
	IQR	18-38	19.5-60	
Ethnicity, n (%)				
	Arab	3 (7)	0 (0)	0.467
	Bangladeshi	4 (9)	0 (0)	
	Black African	1 (2)	0 (0)	
	Indian	2 (5)	1 (5)	
	Pakistani	1 (2)	0 (0)	
	White British	29 (67)	19 (91)	
	White European	1 (2)	1 (5)	
	Unknown	2 (5)	0 (0)	
Marital Status, n (%)				
	Single	30 (70)	10 (48)	0.169
	Married/with partner	10 (23)	6 (29)	
	Divorced	2 (5)	2 (10)	
	Widowed	1 (2)	3 (14)	
Employment Status, n (%)				
	Full-time employed	4 (9)	3 (14)	0.190
	Part-time employed	3 (7)	1 (5)	
	Student	25 (58)	6 (29)	
	Retired	5 (12)	6 (29)	
	Unemployed	6 (14)	5 (24)	

n = number of volunteers; % = percentage; IQR = inter-quartile range; p value for age calculated using Mann Whitney U test; p values for all other variables calculated using Chi squared test

Table 43: Car Ownership, Home Ownership and Level of Education by Level of Experience

Characteristic	< 12 sessions, n = 43	≥ 12 sessions, n = 21	p value
Home Ownership, n (%)			
Home owner	10 (23)	7 (33)	0.602
Renting	16 (37)	8 (38)	
Lives with parents	17 (40)	6 (29)	
Car Owner, n (%)			
Yes	20 (47)	12 (57)	0.183
No- has driving licence	10 (23)	1 (5)	
No- no driving licence	13 (30)	8 (38)	
Method of Transport to Hospital, n (%)			
Public transport	21 (49)	8 (38)	0.878
Car	15 (35)	9 (43)	
Walk	5 (12)	3 (14)	
Cycle	2 (5)	1 (5)	
Age at Leaving Full Time Education, n (%)			
≤ 16 years	9 (21)	6 (29)	0.141
17-18	4 (9)	1 (5)	
19-22	6 (14)	8 (38)	
≥ 23 years	1 (2)	0 (0)	
Still in full time education	23 (53)	6 (29)	
Current Qualification, n (%)			
None	2 (5)	1 (5)	0.593
GCSE	17 (40)	11 (52)	
A level	13 (30)	2 (10)	
Professional qualification	4 (9)	3 (14)	
Degree	6 (14)	3 (14)	
Other	1 (2)	1 (5)	
Qualification at Leaving Full Time Education, n (%)			
None	2 (5)	1 (5)	0.238
GCSE	3 (7)	6 (29)	
A level	3 (7)	1 (5)	
Professional qualification	4 (9)	3 (14)	
Degree	5 (12)	3 (14)	
Other	1 (2)	1 (5)	
Still in education	25 (58)	6 (29)	

n = number of volunteers; % = percentage; p values calculated using Chi squared test

Table 44 compares the previous experience and reasons for volunteering depending upon the number of sessions completed. Volunteers who attended 12 sessions or more were less likely to have previous volunteering experience (52% versus 37%), but these volunteers all gained their previous experience in a healthcare setting, compared with volunteers attending less than 12 sessions, who had both healthcare and non-healthcare volunteering experience. These differences were of borderline significance ($p = 0.053$).

Volunteers who attended more than 12 sessions were more likely to be volunteering due to altruistic reasons (29% versus 16%) and less likely to be volunteering due to an interest in a healthcare career (48% versus 72%). These differences were not significant ($p = 0.115$).

Table 44: Previous Experience and Reasons for Becoming an MTA by Level of Experience

Characteristic	< 12 sessions, n = 43	≥ 12 sessions, n = 21	p value
Previous Volunteering Experience, n (%)			
None	16 (37)	11 (52)	0.053
Previous healthcare volunteering	17 (40)	10 (48)	
Previous non-healthcare volunteering	10 (23)	0 (0)	
Previous Healthcare Experience, n (%)			
None	11 (26)	10 (48)	0.075
Informal caring role	4 (9)	4 (19)	
Student work experience	11 (26)	1 (5)	
Professional experience	17 (40)	6 (29)	
Reasons for Becoming an MTA, n (%)			
Former healthcare career	2 (5)	2 (10)	0.115
Interest in healthcare career	31 (72)	10 (48)	
Desire to help due to:			
Previous informal caring role	3 (7)	0 (0)	
Personal experience of hospital	2 (5)	5 (24)	
Other	2 (5)	1 (5)	
Other	3 (7)	3 (14)	
Method of Hearing About MTA Role, n (%)			
Volunteer Office	20 (47)	14 (67)	0.354
College or university talk	11 (26)	3 (14)	
Marketing	7 (16)	4 (19)	
Word of mouth	3 (7)	0 (0)	
Other	2 (5)	0 (0)	

n = number of volunteers; % = percentage; p values calculated using Chi squared test

4.2 Feasibility

4.2.1 Volunteer Sessions Delivered

A total of 846 sessions were delivered throughout the study period (Table 45). These sessions included the initial competency assessments for 65 volunteers, but excluded the competency assessment for one volunteer who chose to volunteer on a ward not included within the study. Volunteers attended between 1 and 109 sessions (including the initial competency assessment) and the median number of sessions attended was 8.

The attendance percentage of volunteers (calculated from the number of sessions each volunteer actually delivered relative to the number they were anticipated to attend) ranged from 27% to 150%. The figure of 150% demonstrates that some volunteers delivered additional sessions beyond those they were timetabled to attend. The median attendance percentage was 75%.

Table 45: All Volunteer Sessions

All Volunteer Activity	
n = 65	
Number of volunteers	65
Sessions attended	846
Sessions per volunteer	
Range per volunteer	1-109
Median per volunteer	8
IQR	4.5-13.5
Volunteer attendance percentage (%)	
Range	27-150
Median	75
IQR	61-94

n = number of volunteers; IQR = interquartile range; % = percentage

4.2.1.1 Volunteer Sessions Delivered by Hospital Department

Volunteer sessions delivered in each hospital department are presented in Table 46. Volunteers were introduced sequentially throughout the departments, with mealtime assistants working in MOP (the first study department) for 68 weeks, but in GM for only 19 weeks (the last study department). Three quarters of volunteer sessions took place in MOP and AMU (637/846, 75%), where 40/65 (62%) study volunteers were placed. The median number of sessions delivered per volunteer was highest in AMU (9 sessions) and lowest in GM (4.5 sessions), but these differences were not statistically significant (Table 46). In direct contrast to this, the attendance percentage was lowest in AMU (67%) and highest in GM (100%); this was of borderline statistical significance ($p = 0.044$).

Table 46: Volunteer Sessions Delivered by Hospital Department

	MOP	AMU	T&O	GM	p value
Number of volunteers	21	19	15	10	
Duration of volunteering	68 wks	54 wks	35 wks	19 wks	
Sessions attended, n (%)	410 (48)	227 (27)	146 (17)	63 (7)	
Sessions per volunteer					
Range per volunteer	7	9	8	4.5	0.326
Median per volunteer	1-109	2-49	3-23	1-16	
IQR	4.5-14	6-14	5-14	3-10.25	
Volunteer attendance percentage (%)					
Range	33-125	27-100	29-150	61-100	0.044
Median	78	67	75	100	
IQR	53-89	43-89	63-93	74-100	

n = number of sessions; % = percentage; IQR = interquartile range; wks = weeks; p values calculated using Kruskal Wallis test

4.2.1.2 Volunteer Sessions Delivered by Volunteer Age

The number of sessions attended by younger and older volunteers are shown in Table 47. The volunteer for whom a profile was not completed and the one session they attended have been excluded from this analysis because their age was not known. There were fewer older volunteers (29 versus 35) but they attended more sessions in total than the younger volunteers (557 versus 288), and the median number of sessions was also higher (9 versus 7), although this was not statistically significant ($p = 0.085$). Younger volunteers had a lower attendance percentage compared with older volunteers (median 70% of their timetabled sessions, versus 80% for older volunteers), but this was not statistically significant ($p = 0.282$).

Table 47: Volunteering Sessions Delivered by Volunteer Age

	Age < 25 years	Age ≥ 25 years	p value
Number of volunteers	35	29	
Sessions attended, n (%)	288 (34)	557 (66)	
Sessions per volunteer			
Range per volunteer	1-24	1-109	0.085
Median per volunteer	7	9	
IQR	4-12	5.5-16	
Volunteer attendance percentage (%)			
Range	29-150	27-125	0.282
Median	70	80	
IQR	50-93	67-92	

n = number of sessions; % = percentage; IQR = interquartile range; p values calculated using Mann Whitney U test

4.2.1.3 Volunteer Sessions Delivered by Level of Experience

Sessions delivered by less and more experienced volunteers are shown in Table 48. For volunteers who delivered less than 12 sessions, the median number of attendances was 6, whereas it was 16 for those who delivered 12 or more sessions. The attendance percentage of less and more experienced volunteers did not significantly differ (76% and 71% respectively, $p = 0.564$).

Table 48: Volunteering Sessions Delivered by Level of Experience

	< 12 sessions	≥ 12 sessions	p value
Number of volunteers	43	21	
Sessions attended, n (%)	250 (30)	596 (70)	
Sessions per volunteer			
Range per volunteer	1-11	12-109	0.564
Median per volunteer	6	16	
IQR	3-8	14-24	
Volunteer attendance percentage (%)			
Range	27-150	28-100	0.564
Median	76	71	
IQR	51-100	65-87	

n = number of sessions; % = percentage; IQR = interquartile range; p value calculated using Mann Whitney U test

4.2.2 Volunteer Activity

Activity forms were available for 655 of the 846 sessions (77%). For the remaining 191 sessions, volunteers did not complete activity forms for unknown reasons. Five volunteers did not complete any activity forms for the entire duration of their volunteering, so the analysis of volunteer activity relates to 60 volunteers. In the 655 sessions where activity forms were completed, 1,721 patients were assisted, of whom 718 (42%) were fed (Table 49). Volunteers often performed more than one activity for each patient, but the results presented refer to the most clinically significant activity carried out for each patient.

Table 49: All Volunteer Activity

	All volunteers
Number of volunteers	60
Number of sessions	655
Activity recorded, n (%)	
All	1721
Social interaction	142 (8)
Encouragement	227 (13)
Preparation	468 (27)
Assisting food to mouth	166 (10)
Feeding	718 (42)

n = number of patients assisted; % = percentage

At each volunteer session, a mean of 2.6 patients were assisted, with 1.1 patients fed (Table 50). Preparation was the next most common activity recorded (0.7 patients per session). The recording of social interaction, encouragement and assisting food or drink to the mouth were less common (0.2, 0.4 and 0.3 patients per session respectively).

Table 50: Mean Number of Patients Assisted Per Session

Activity	All volunteers
	n = 60
All	2.6
Social interaction	0.2
Encouragement	0.4
Preparation	0.7
Assisting food to mouth	0.3
Feeding	1.1

n = number of volunteers

4.2.2.1 Volunteer Activity by Hospital Department

Volunteer activity recorded in each department is shown in Table 51. Five episodes of volunteer activity (2 of social interaction, 2 of preparation and one of feeding) were recorded on activity forms where the volunteer carrying out the activity could not be identified. Because the study department or volunteer could not be identified, these episodes have been excluded from further analysis, leaving the total number of episodes of activity as 1,716.

The largest number of episodes of assistance was recorded in AMU (637) and the lowest in GM (138). The activity performed differed significantly between departments ($p < 0.001$). Feeding was the most commonly recorded activity in each department, but the proportion was highest at 56% in MOP, compared with 34-35% in AMU, T&O and GM. Social interaction as the sole activity was rarely recorded in MOP (2% activity), but was more commonly reported in T&O and GM (13-14%). Encouragement was similarly commonly recorded in MOP and GM (18-19%), but was less common in AMU and T&O (11% and 8%). Preparation was half as common in MOP as in AMU and T&O (17% compared with 33% and 34%).

Table 51: Volunteer Activity Recorded by Hospital Department

	MOP	AMU	T&O	GM	p value
Number of volunteers	16	19	15	10	
Number of sessions	313	167	121	54	
Duration of volunteering	68 weeks	54 weeks	35 weeks	19 weeks	
Activity recorded, n (%)					
All	546	637	395	138	
Social interaction	12 (2)	53 (8)	57 (14)	18 (13)	
Encouragement	104 (19)	68 (11)	30 (8)	25 (18)	< 0.001
Preparation	90 (17)	208 (33)	136 (34)	32 (23)	
Assisting food to mouth	35 (6)	83 (13)	32 (8)	16 (12)	
Feeding	305 (56)	225 (35)	140 (35)	47 (34)	

n = number of patients assisted; % = percentage; p value calculated using Chi squared test

Typical volunteer sessions in each hospital department are shown in Table 52. Although there were noticeable differences in the mean number of patients helped during each session (3.8 in AMU, compared with 1.7 in MOP), these differences were not of statistical significance ($p = 0.073$). In contrast, differences in reporting of preparation and social interaction as the ‘highest’ level of activity were significantly different between departments. Preparation was less common in MOP (0.3 patients per session) compared with AMU and GM (0.4 and 0.5 patients per session, $p = 0.003$). Social interaction was also less common in MOP (0 patients per session), when compared with AMU, T&O and GM (0.3-0.5 patients per session, $p = 0.028$). Differences in the mean number of patients encouraged, assisted getting food to the mouth or fed were not significant between departments.

Table 52: Mean Number of Patients Assisted per Session by Department

Activity	MOP, n = 16	AMU, n = 19	T&O, n = 15	GM, n = 10	p value
All	1.7	3.8	2.7	2.6	0.073
Social interaction	0.0	0.3	0.5	0.3	0.028
Encouragement	0.3	0.4	0.3	0.5	0.644
Preparation	0.3	1.3	1.1	0.6	0.003
Assisting food to mouth	0.1	0.5	0.3	0.3	0.912
Feeding	1.0	1.4	1.2	0.9	0.211

n = number of volunteers; p values calculated using Kruskal Wallis test

4.2.2.2 Volunteer Activity by Volunteer Age

Table 53 shows recorded volunteer activity depending on volunteer age. Social interaction and encouragement accounted for a greater proportion of activities recorded by older volunteers (10% and 15% respectively) when compared with younger volunteers (5% and 9% respectively). In contrast, preparation was more common in younger volunteers rather than older (33% compared with 25%). These differences were highly significant ($p < 0.001$).

Table 53: Volunteer Activity Recorded by Volunteer Age

	Age < 25 years	Age ≥ 25 years	p value
Number of volunteers	32	28	
Number of sessions	183	472	
Activity recorded, n (%)			
All	569 (100)	1147 (100)	
Social interaction	31 (5)	109 (10)	
Encouragement	50 (9)	177 (15)	< 0.001
Preparation	185 (33)	281 (25)	
Assisting food to mouth	53 (9)	113 (10)	
Feeding	250 (44)	467 (41)	

n = number of patients assisted; % = percentage; p values calculated using Chi squared test

In accordance with this, a typical session reported by a younger volunteer involved more preparation than one reported by an older volunteer (1.0 versus 0.6, Table 54). Younger volunteers also reported assisting more patients in total per session (3.1 versus 2.4). Neither of these differences were statistically significant ($p = 0.301$ and $p = 0.694$, Table 54). There was a statistically significant difference in the number of patients encouraged by younger volunteers (0.3 patients per session) when compared with older volunteers (0.4 patients per session, $p = 0.037$).

Table 54: Mean Number of Patients Assisted per Session by Volunteer Age

Activity	Age < 25 years	Age ≥ 25 years	p value
	n = 32	n = 28	
All	3.1	2.4	0.694
Social interaction	0.2	0.2	0.065
Encouragement	0.3	0.4	0.037
Preparation	1.0	0.6	0.301
Assisting food to mouth	0.3	0.2	0.205
Feeding	1.4	1.0	0.079

n = number of volunteers; p values calculated using Mann Whitney U test

4.2.2.3 Volunteer Activity by Level of Experience

Volunteer activities recorded by less experienced and more experienced volunteers are shown in Table 55. Social interaction, encouragement and feeding were all similarly recorded in both groups, but more experienced volunteers assisted with preparation in a greater proportion than less experienced volunteers (29% compared with 23%). In contrast, assisting food to mouth was more frequently reported by less experienced volunteers than more experienced volunteers (14% compared with 8%). These differences were statistically significant ($p = 0.002$).

Table 55: Volunteer Activity Recorded by Level of Experience

	< 12 sessions	≥ 12 sessions	p value
Number of volunteers	39	21	
Number of sessions	181	474	
Activity recorded, n (%)			
All	478 (100)	1238 (100)	
Social interaction	41 (9)	99 (8)	
Encouragement	62 (13)	165 (13)	0.002
Preparation	109 (23)	357 (29)	
Assisting food to mouth	66 (14)	100 (8)	
Feeding	200 (42)	517 (41)	

n = number of patients assisted; % = percentage; p values calculated using Chi squared test

The activity reported during a typical volunteer session depending upon volunteers' level of experience is shown in Table 56. Although there were some differences in preparation and assisting food to the mouth, these were not significant, and the average sessions were broadly similar regardless of a volunteer's level of experience.

Table 56: Mean Number of Patients Assisted per Session Delivered by Level of Experience

	< 12 sessions	\geq 12 sessions	p value
	n = 39	n = 21	
All	2.6	2.6	0.126
Social interaction	0.2	0.2	0.797
Encouragement	0.3	0.4	0.711
Preparation	0.6	0.8	0.101
Assisting food to mouth	0.4	0.2	0.719
Feeding	1.1	1.1	0.316

n = number of volunteers; p values calculated using Mann Whitney U test

4.3 Sustainability

4.3.1 Volunteer Retention

Of the 66 volunteers who passed their competency assessment, 34 (52%) were still volunteering at the end of the study. The reasons for stopping volunteering are shown in Table 57.

The most common reason for leaving, cited by 14 volunteers, was insufficient time to volunteer due to alternative commitments (Table 57), either work (e.g. new employment or change in working hours), study (e.g. gaining a place at university or upcoming exams) or family (e.g. family bereavement or caring responsibilities). Three volunteers (9%) stopped volunteering due to changes in staffing on two study wards, which led them to feeling unsettled within the ward environment.

Table 57: Reasons for Stopping Volunteering

Reason	All volunteers, n = 32
Total volunteers	66
Volunteers discontinuing, n (%)	32 (48)
Reason, n (%)	
Medical reasons	1 (3)
Moved away	7 (22)
Other commitments	
Work commitments	8 (25)
Study commitments	4 (13)
Family commitments	2 (6)
Changes to ward environment	3 (9)
Unknown reason	7 (22)

n = number of volunteers; % = percentage

4.3.1.1 Volunteer Retention by Hospital Department

There were no significant differences in the reason given for leaving by volunteers in the four hospital departments (Table 58). The proportion of volunteers leaving the role was highest in MOP and AMU (62% and 63%) and lowest in GM (20%); this finding did not quite reach statistical significance ($p = 0.064$). Other commitments remained the most common reason in all departments of the study, although moving out of area was equally common in MOP (39%).

Table 58: Reasons for Stopping Volunteering by Hospital Department

	MOP	AMU	T&O	GM	p value
Total volunteers	21	19	15	10	
Volunteers discontinuing, n (%)	13 (62)	12 (63)	5 (33)	2 (20)	0.064
Reason, n (%)					
Medical reasons	0 (0)	1 (8)	0 (0)	0 (0)	
Moved away	5 (42)	2 (17)	0 (0)	0 (0)	
Other commitments					
Work commitments	2 (17)	2 (17)	3 (60)	1 (50)	
Study commitments	1 (8)	2 (17)	0 (0)	1 (50)	0.199
Family commitments	2 (17)	0 (0)	0 (0)	0 (0)	
Changes to ward environment	0 (0)	1 (8)	2 (40)	0 (0)	
Unknown reason	3 (25)	4 (33)	0 (0)	0 (0)	

n = number of volunteers; % = percentage; p value calculated using Chi squared test

4.3.1.2 Volunteer Retention by Volunteer Age

Table 59 shows the number and reasons why younger and older volunteers stopped volunteering. There was no significant difference in the proportion of younger or older volunteers choosing to discontinue the role. Younger volunteers were more likely to leave due to moving away (31% versus 13%) and study commitments (25% versus 0%) and less likely to leave due to work commitments (46.7% versus 6.3%) and changes to the ward environment (20% versus 0%). These differences were statistically significant ($p = 0.013$).

4.3.1.3 Volunteer Retention by Level of Experience

Volunteers who attended less than 12 sessions were more likely to leave due to other commitments (55% versus 18%) and less likely to leave due to disruption within the ward environment (18% versus 5%), but these differences were not statistically significant ($p = 0.413$, Table 60). There was no difference in the proportion of less or more experienced volunteers who stopped volunteering during the study period.

Table 59: Reasons for Stopping Volunteering by Volunteer Age

	Age < 25 years	Age ≥ 25 years	p value
Total volunteers	35	30	
Volunteers discontinuing, n (%)	16 (46)	15 (50)	0.462
Reason, n (%)			
Medical reasons	1 (6)	0 (0)	
Moved away	5 (31)	2 (13)	
Other commitments			
Work commitments	1 (6)	7 (47)	0.013
Study commitments	4 (25)	0 (0)	
Family commitments	0 (0)	1 (7)	
Changes to ward environment	0 (0)	3 (20)	
Unknown reason	5 (31)	2 (13)	

n = number of volunteers; % = percentage; p value calculated using Chi squared test

Table 60: Reasons for Stopping Volunteering Depending by Level of Experience

Reason	< 12 sessions	≥ 12 sessions	p value
Total volunteers	43	21	
Volunteers discontinuing, n (%)	20 (47)	11 (52)	0.398
Reason, n (%)			
Medical reasons	0 (0)	1 (9)	
Moved away	4 (20)	3 (27)	
Other commitments			
Work commitments	6 (30)	1 (9)	0.413
Study commitments	3 (15)	1 (9)	
Family commitments	2 (10)	0 (0)	
Changes to ward environment	1 (5)	2 (18)	
Unknown reason	4 (20)	3 (27)	

n = number of volunteers; % = percentage; p value calculated using Chi squared test

4.4 Acceptability

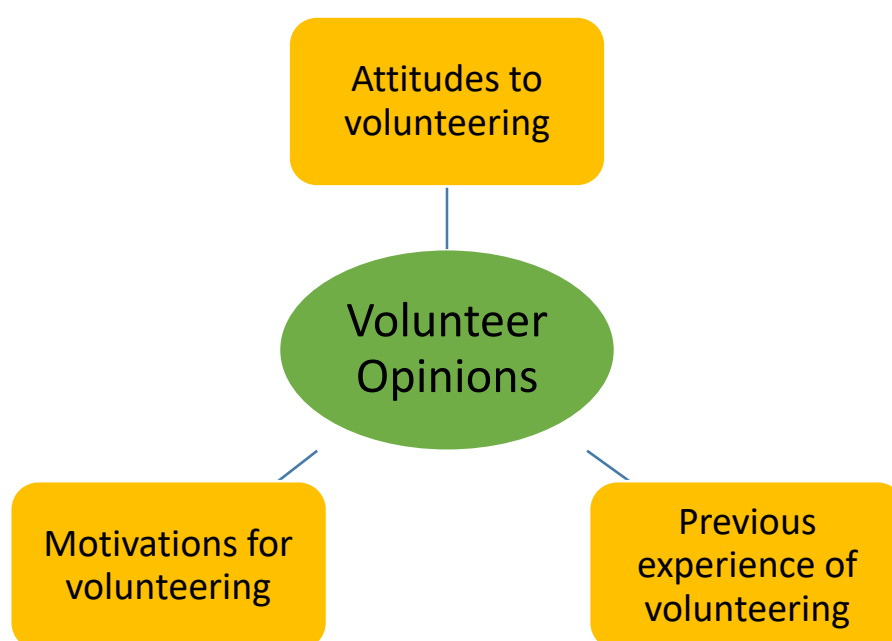
4.4.1 Results of thematic analysis of interviews and focus group

The majority of themes relating to experiences of trained volunteer mealtime assistants were identified for all three groups of participants (patients, staff and volunteers, Figure 14), although there were three themes that were specific only to volunteers (Figure 15). Again, all themes were found to be common to patients, staff or volunteers from each hospital department.

Figure 14: Themes Identified by Patients, Staff and Volunteers Relating to Trained Volunteer Mealtime Assistants



Figure 15: Additional Themes Identified by Volunteers Relating to Trained Volunteer Mealtime Assistants



4.4.2 Theme 1: Mealtime Assistant Role

Volunteers identified several components to their role as a mealtime assistant. They considered maximising patients' dietary intake as crucial, but also recognised that this could be a significant challenge in some circumstances:

"My first week I was given a patient, he was, he was a nice chap, and I was feeding him soup, and it was quite thick, so it didn't sort of come off the spoon too easy, and he had about half a spoonful, maybe a little bit more, and then he said he didn't want any more" **V007**

"If somebody just doesn't want to eat, there's nothing whatsoever you can do" **V002**

Volunteers had often developed strategies to encourage patients to eat as much as possible over the mealtimes:

"Sometimes you're with a patient who says they're adamant they don't want anything, and that you manage bit by bit to coax them and they do eat something..." **V002**

"You know when they've eaten their dessert I've gone round and said would you like something else you know and I've gone and scrumpted another dessert for them, because I thought well at least it's something going down inside" **V005**

"The lady I was thinking of last week... she actually did eat the whole of the yoghurt, but not all at once, I kept sort of coming back... I'd just go off and check everybody else... and bit by bit she ate the whole

yoghurt. But of course, we have the time to do that, and that's not something that the nurses have time for"

V002

Staff were universally positive about the impact of the volunteers on the assistance patients received with eating

"There's less of a delay from food arriving on their tables to them eating, if they need full assistance"

S005

"They already start feeding, so even though I need to go and check on the meal, they're already feeding the patients so meals don't go cold"

S003

"if you know that the patient's been fed and their food chart's been filled in, it just means we are freed up then to crack on and do other stuff"

S006

"Having the extra pairs of hands coming up is one less thing that my HCAs or the nurses need to do, as well as drugs and turns and toilets, which all happen at the same time... just lightens the load"

S007

"it definitely just means that somebody will get their dinner sooner than they otherwise would have, because if, say you have three people that need feeding and there's two staff, one will have to wait and obviously the volunteer can sort of fill that gap"

S001

"They're a real benefit to this ward, because the nurses are under pressure so much with the quick patient turnover, they haven't got time to sit and feed people. So, they have been a real asset"

S004

Staff also recognised that volunteers were often particularly good at encouraging reluctant eaters:

"Because they're very encouraging, you know have one more spoonful, but then you know there is times when they're just sat there having a chat, that kind of distracts them to how much they're eating and then you find then that they've eaten loads of their meal"

S005

"With a volunteer, the patients will eat a lot more, definitely, because they're getting that bit of conversation as well at the same time. Sometimes they don't want to, but they will prompt and keep trying or if they don't want that, they'll come and try another meal, or come and get a bit of a sandwich or change some soup"

S004

These comments also demonstrate that both staff and volunteers felt a key reason for the volunteers' success was not necessarily a difference in feeding technique, but was reflective of the time they had available to both help and socialise with the patients. For those who struggled to eat large amounts at one time, volunteers were able to either stay and talk with the patient until they were ready to eat more, or to keep returning to the patient to encourage small amounts over an extended time scale. The nurses felt they lacked the capacity to spend this time with patients.

In addition to the feeding component of the role, volunteers also felt that preparing patients for their meal was important, and staff also recognised the benefit of this:

“They will help with the tables, like the tables if I haven’t had time to get round to them, they’ll go round and just make, or bring up the teacups from the last tea round, so that that’s not in the way at mealtimes”

S004

“They make sure that their hands are clean and so make sure that they’re ready for their lunch, and prepared for lunch as well, that it’s not just a surprise when it arrives”

S005

“I find I get the most thanks when you’re actually cleaning and wiping the tables down”

V005

“The simple thing of repositioning the tables, for somebody who is perfectly capable of feeding themselves, and it just, you’ve facilitated them actually being able to eat. And you know it’s silly little things like that I get great satisfaction from”

V005

Staff and volunteers were also felt that socialising was an important part of the volunteer role, and that this had a clear benefit to the patients:

“It’s nicer for them to have them because they’ve got someone else to talk to as well... they can go and talk to the patients as well when they’re feeding them... Everyone gets some attention, they get someone to sit with them and help them feed and so it’s nicer I think.”

S003

“Just going round for a chat with people as well... you know it’s a long, long day in hospital if you haven’t got anyone to come and visit”

S006

“She’ll help someone, but while she’s talking to that patient she’s talking to the other three as well, so they’re all sort of having a little chat while having their lunch. And then like as soon as she leaves that room it goes quiet. So, she’s made a massive difference in that ten minutes she’s been in there”

S004

“I think it’s important that mealtimes are sociable in some way, and I think it is nice that we can come in and have the time to talk to the patients... and that aspect of it, I really enjoy it... sometimes you do get to see the same patient the next week... and you can sort of pick up on things and I like that very much”

V003

“It’s not just the feeding, it’s the social thing I think is as important as well”

V002

“They’re sort of, you know, down in the dumps and then you sort of give them a little chat and get them all ready for their meals and they sort of blossom, you know, it bucks up their day”

V005

Two patients had had direct experience of being assisted by a volunteer, and both were happy with the experience:

“When I was in the first time I had the roast chicken, and there was a man used to come in and help at mealtimes, and I used to get him to cut the chicken up for me, which he did quite willingly. And they’re the sort of people that you need around.” **P006**

“quite good really, oh yeah, they help yeah, and cut anything up you want cut up” **P004**

One patient had seen volunteers on the ward but had not needed any assistance:

“Yeah, I’ve seen them around helping people, yeah. Yeah, they’re pretty good, yeah” **P008**

Other patients were not aware of the volunteer programme, but were supportive of the idea:

“The nurses are so run off their feet here... It would be good if we had volunteers to step in there and help” **P003**

“It is a good idea, yeah. I mean the nurses, they can’t be doing other jobs and feeding them as well can they” **P008**

“The people that are being helped will also enjoy it because they at last have got some assistance” **P001**

4.4.3 Theme 2: Training and Programme Organisation

Volunteers were happy with the training they received, but recognised that, once they started on the ward, sometimes situations would arise that had not been discussed in the training session:

“I’d say the training was very good, but of course nothing can ever prepare you totally for what it’s like when you actually start” **V002**

“I think there was a role-play with a blind person... except that when I actually did have a blind person... he actually didn’t want feeding” **V003**

“I think I sort of hadn’t realised how on your own you are actually once you start... I’d say at the beginning it is quite hard and I can see how sometimes people might not come back, and think this is all too much, until you get used to everything” **V002**

Despite this, they found their own ways to adapt to the role and developed strategies to manage:

"[I did it] based on the clock, whereabouts the food was on the plate- I said look you don't like broccoli, I've moved that one o'clock, but the chicken's at six because you know you said you liked your chicken and the potatoes at seven and, between seven and eight"

V003

"You realise you have to use a lot of common sense and just think for yourself... I find now it's absolutely fine. I feel very relaxed because I know everybody"

V002

Only one patient (in MOP) reported an opinion on the training and management of volunteer mealtime assistants; he was broadly supportive of the role, but felt training and supervision were important to maintain safety:

"People in any sort of duties need to be trained... if it was defined very clearly as the lady that was over here, that was pottering around and doing all sorts of things, that's ideal... she's always there on hand to lend a hand; it works. But then you've got to have somebody in charge that's running it"

P001

One member of staff (also in MOP) reported that their ward had initially had some concerns about how volunteers would be trained and how the programme would work, but that these had been quickly allayed once the volunteers started on the ward:

"Initially there were a lot of fears that we probably, their feeding might be inappropriate, they might, but then again this is why we had the structure of the form being filled in, consulting the nurses in charge or the senior nurses on that ward before they go off and feed somebody inappropriately."

S001

No other staff members reported any concerns about the safety or appropriateness of volunteer feeding, and many agreed that the routine that was in place (of volunteers making contact with a staff member on arrival) ensured that the programme was safe:

"As long as they have the right information before they go and do anything, then that's not going to happen... they do follow the instructions"

S005

"I mean there's, you know we gave the instructions when they first come in, they know you know who to help. And you know they have the training, and we haven't really had to do too much with them really. They've always been, I've found that they've always worked with other volunteers to know the routine and things before, yeah, so I don't think we've had to, that it hasn't been a challenge"

S005

"It's about the nurses knowing that they can't have anyone with any eating disorders or anything like that, or any specialist diets, and then they just need people who, simple people who need feeding"

S007

4.4.4 Theme 3: Challenges of the Programme

Staff and volunteers both identified different challenges associated with the mealtime assistant programme. Several staff members recognised that recruiting and maintaining a volunteer workforce was a challenge in itself:

“It is a shame that they leave, they don’t stay long, but of course they’ve got other things to do and they don’t want to stay, so.” **S003**

“Recruit a few more then it would be amazing... but we have to look at it like this, they’re volunteers, they’re not being paid for it” **S004**

“I think get more volunteers that actually stay bit longer would be lovely” **S003**

All staff were keen for volunteer numbers to be increased:

“A more frequent service would be lovely. It would really, really help... I think you could definitely say that we could utilise them three meals a day, seven days a week” **S006**

“The more the better, as far as I’m concerned” **S007**

“It would just be nice if there was, because, but it would be nice to have it every day; I know we can’t, because that would be pushing our luck, but it would be nice to have that extra bit of support” **S003**

One staff member reported that the younger volunteers on their ward were more reticent to help than some of older volunteers:

“We have got some youngsters... the older people have got more, I don’t know what it is about them, they’re more, they seem to be more approachable. The youngsters seem a bit shy” **S004**

Challenges reported by the volunteers all related to their interaction with patients. They found it difficult if they had built a relationship with a patient who then deteriorated:

“It can be quite upsetting, can’t it, if you get to know a person and then I never know next week if they’re not there because they’ve gone home or possibly died” **V002**

“You know I think sometimes if you’ve been there or they’ve been there for a few weeks and you’ve sort of seen to them every week and you can see their decline” **V006**

They also recognised that they could not build relationships with all patients:

“I’ve actually had two aggressive patients, one was quite easy to actually walk away from and then the second aggressive patient, I was a bit worried about what would actually happen” **V003**

“You get patients, some of them... the odd one or two can be really rude”

V005

Despite this, volunteers were unanimous in the enjoyment they expressed for their role, and the satisfaction they gained from volunteering was also related to the patient contact:

“Some of the stories they tell, you wish you had a little recorder, because they could write a book on it you know... it seems to be such a waste that all that knowledge and excitement and adventure and everything is just lost”

V006

“Particularly nice if you get the continuity... so you do see the same patient more than once, and that’s really, really nice, because you start to get that bit of a relationship going”

V001

“The thing I find the most satisfying is when I get a patient and they eat the lot, a hundred percent, the lot”

V004

“I had one man and he was there four weeks, and the fourth week I went to feed him and the nurse said he doesn’t need feeding, but he certainly had the previous, and he didn’t, so that was lovely to see”

V001

“You go in and one week you’re in and the person is virtually just sleeping all the time and then you go in the next week and they’re sitting up and they’re looking heaps better, and that’s really lovely to see”

V002

“We deal with a lot of patients who have dementia, sometimes there’s no communication and then you just, I’ve had odd occasions where there’s just been just a little something, the person’s smiled of they have reached out and patted your cheek and you think ‘yes, they are understanding’”

V003

4.4.5 Theme 4: Volunteers’ opinions on volunteering

Volunteers were unanimous in agreeing that volunteering was a commitment, and that it was important to take this seriously:

“You’ve got to have the time to commit to it”

V002

“The joy of volunteering now, when you’re retired, is you do have more time... I think when you commit to it you can keep it up, you regard it as that’s your day and you always come and you’ve got no other distractions really”

V001

“I feel guilty, if I have to take a Tuesday off for something else, I find, I feel I need to come in on the Wednesday to make up”

V005

4.4.6 Theme 4a: Motivations for volunteering

Various reasons were described for deciding to become involved in volunteering. Most volunteers were motivated by a desire to help:

"I just wanted to do something positive with my life really... I just wanted to have something to get up for in the morning"

V001

"When I retired I wanted to do something in the voluntary sector"

V002

"I saw it in the paper a long time ago... and I just thought well when I retire I'd like to do that and then I retired and had plenty of time"

V008

Although not all volunteers were aware of the mealtime assistant programme when applying to volunteer, many were attracted to the role due to personal experiences:

"I had a vivid memory of being in A&E with my mum and the food coming in for all the patients in this sort of sub-ward, and there was an elderly lady who had her arm in plaster and whose food tray was just put in front of her and the other person just walked off... I felt, and I needed to actually, go up to this other elderly lady to actually cut up her food and see what assistance she actually wanted. And that is a number of years ago, and that's remained with me for quite a long, a long, long time"

V003

"My mother was in hospital for the last two years of her life and ... I ended up feeding her at teatime every day, and that's when I thought yes, I might like to do this and give something back in return"

V004

"My mum was in the South Hants the last few months of her life, and the lady opposite her kept telling us every time we went in your mum's not eat her lunch today or things like that, so me and my two sisters, we started taking it in turns lunchtimes and evenings to help feed her. I always said I would like to do that when I retire"

V007

"My mother was also in hospital and ate very little when she was there"

V002

For other volunteers, the social aspect of the role was important in their decision:

"I like to meet people and chat with them"

V007

"As an ex-nurse, it was real patient contact that was really, really nice"

V005

Two volunteers had specifically asked for a role that contrasted with their previous career:

"I used to be an infant school teacher, and she [the volunteer services manager] said would I like to work in a school, and I said definitely not, I wanted something totally different"

V002

“She [the voluntary services manager] said to me we’ve got an admin job going, would you like to do that, and I said no thank you, I’ve been doing admin most of my working life, in reception, that sort of thing, I wanted to do something completely different”

V007

Three of the nine volunteers had previous experience of volunteering, but the remaining six had never volunteered previously:

“I have volunteered in, you know earlier on in my life when I was working”

V001

“I did a bit for Age UK... they had a system where people go round to peoples’ home and who don’t have friends, don’t have relatives and are on their own”

V003

“I did CRUSE and The Samaritans when I was in my twenties, and then I had my own business so I didn’t do anything for about thirty-odd years and come back into volunteering again now”

V007

One volunteer, who had no previous experience reported that volunteering at the hospital had encouraged her to take on an additional volunteering role outside the hospital:

“No, I hadn’t done it before, no. But it also prompted me to do something else as well, which is where I’m going this afternoon”

V008

4.5 Implementation Cost

4.5.1 Costs Incurred

Thirteen training sessions and 66 competency sessions were completed during the study period, at a total cost of £4,228. The additional cost of volunteer administration was £1,518. Therefore, the total cost to the hospital of training 66 volunteers was £5,746 or £87.06 per volunteer (Table 61).

Table 61: Costs of Volunteer Programme

Activity	Time	Staff member	Total Cost
Training session	4 hours	Band 4	£1,456
	13 during study	£28 per hour	
Competency session	1.5 hours	Band 4	£2,772
	66 during study	£28 per hour	
Administration	1 hour	Band 2	£1,518
	66 during study	£23 per hour	
Total			£5,746

4.5.2 Potential Costs Saved

The release of 15 minutes of housekeeper time (through organisation and preparation) saved £2.04 per session. The release of one hour of healthcare assistant (HCA) or registered nurse (RN) time (through assisting or feeding) saved £25 for a HCA and £43 for a RN. The estimated total savings per session and over the study period, depending on the ratio of healthcare assistant to registered nurse time saved, is shown in Table 62.

Table 62: Estimated Costs Saved Depending upon Staff Released

Staff released	Cost saved per session	Cost saved over study period*
Housekeeper + HCA: RN 1:0	£27.04	£22,875.84
Housekeeper + HCA: RN 0.75:0.25	£31.54	£26,682.84
Housekeeper + HCA: RN 0.5:0.5	£36.04	£30,489.84
Housekeeper + HCA: RN 0.25:0.75	£40.54	£34,296.84
Housekeeper + HCA: RN 0:1	£45.04	£38,103.84

HCA = healthcare assistant (Band 3); RN = registered nurse (Band 5); *846 sessions in total

4.5.3 Total Potential Cost Saving

Once the costs incurred were accounted for, the total potential cost saving of training 66 volunteers to act as mealtime assistants was between £17,131.21 and £32,359.21, depending upon the staff released by volunteer feeding (Table 63). This cost saving can only be considered an estimate, because the staff time released was estimated upon observation of typical volunteer sessions and was not directly measured by observation of each volunteer mealtime during the study.

Table 63: Total Cost Saving of Volunteer Programme

Staff Released	Total Cost Saving
HCA: RN 1:0	£17,131.21
HCA: RN 0.75:0.25	£20,938.21
HCA: RN 0.5:0.5	£24,745.21
HCA: RN 0.25:0.75	£28,552.21
HCA: RN 0:1	£32,359.21

HCA = healthcare assistant (Band 3); RN = registered nurse (Band 5)

4.6 Summary of Results: Implementation of Trained Volunteer Mealtime Assistants

4.6.1 *Adoption*

64 volunteers were recruited, trained as mealtime assistants and became active volunteers, 49% of those who expressed an initial interest in the role. The most common stage of the recruitment process at which volunteers withdrew was prior to any training and the most common reason for withdrawal was a change in personal circumstances. All volunteers who attended a competency assessment were deemed safe to volunteer independently on the wards. On average, it took two months from a volunteer expressing interest in the role to completing their competency assessment.

Volunteers had a median age of 22 years, 80% were women and 48% were students. Previous volunteering experience was common (57%) as was previous healthcare experience (66%). The most common motivation for volunteering was a desire to pursue a healthcare career. 39% of volunteers were specifically attracted to the mealtime assistant role, having heard about it either via a talk at their college or university or via specific marketing strategies within the hospital.

Differences in volunteer characteristics were noted between hospital departments, but only differences in level of current education (highest in GM), marital status (with more married volunteers in GM) and ethnic diversity (greater in T&O and GM) reached statistical significance. Younger volunteers differed from older volunteers in many respects, including being more likely to have previous volunteering experience, yet less likely to have previous healthcare experience, and more likely to be motivated by interest in a healthcare career. Characteristics of less and more experienced volunteers were only significantly different with respect to their previous volunteering experience, with less experienced volunteers being more likely to have previous experience.

4.6.2 *Feasibility*

65 volunteers delivered 846 volunteer sessions. The median number of sessions delivered by each individual volunteer was 8, and the median attendance percentage was 75%. Older volunteers delivered more sessions and had a higher attendance percentage than younger volunteers, although this was not of statistical significance. Attendance percentage was highest in GM, but did not differ depending upon the level of volunteer experience.

Volunteer activity was known for 77% sessions, in which 1721 patients were assisted. Feeding was the activity most commonly recorded. Typical volunteer sessions significantly differed across hospital departments and between younger and older volunteers, but not between less and more experienced volunteers.

4.6.3 Sustainability

At the end of the study period, 52% of volunteers were still volunteering. For those who had discontinued the mealtime assistant role, other time commitments were the most commonly cited reason. Reasons for leaving did not significantly differ between hospital departments or depending upon the level of volunteer experience, but did when comparing younger and older volunteers, with younger volunteers more likely to leave due to moving away and study commitments and older volunteers more likely to leave due to work commitments.

4.6.4 Acceptability

Eight patients, seven staff members and nine volunteers took part in interviews and a focus group, describing their experiences of the volunteer programme. Preparation, feeding and socialisation were all recognised as important facets of the volunteer role. Many volunteers had developed strategies to maximise dietary intake and staff reported they were often more successful at this than themselves. All patients and staff reflected positively on the volunteer programme. Staff recognised recruitment and retention of volunteers as a challenge, whilst volunteers described building relationships with patients who became unwell as a challenging part of their role. Nevertheless, volunteers derived a great deal of satisfaction from their role.

4.6.5 Implementation Cost

The cost of training the volunteers was £5,681, and the estimated costs saved in staff time were £22,876-£38,104 depending on the seniority of the staff released. Therefore, there is a potential cost saving of £17,131-£32,359 in the implementation of the programme.

CHAPTER 5: DISCUSSION

5.1 Summary of Principal Results

201 participants were recruited from the four hospital departments. Multimorbidity, polypharmacy, frailty and low grip strength were commonplace across patients in all of the departments. In the 465 patients whose dietary intake was measured, the need for assistance at mealtimes was common (44%). Women had lower energy and protein intakes than men, and neither group consistently met their daily requirements, although only 27% of these participants were recognised to be at risk of malnutrition using the Malnutrition Universal Screening Tool. Four main barriers to dietary intake were identified during qualitative data analysis: mealtime interruptions, the hospital catering system, poor appetite and lack of assistance.

Volunteer mealtime assistants were successfully adopted in each of the four hospital departments. 64 volunteers completed the mealtime assistant training and subsequently volunteered within Medicine for Older People (MOP), the Acute Medical Unit (AMU), Trauma and Orthopaedics (T&O) or General Medicine (GM). Volunteers were predominantly female and interested in pursuing a career in healthcare. The implementation of trained volunteer mealtime assistants was feasible with volunteers recorded attending 846 sessions in total, during which they assisted 1721 patients, with feeding being the most common activity volunteers recorded (718 patients). Volunteers attended a median of eight sessions. The programme was sustainable, with 52% volunteers trained during the study still volunteering at the end of the 15-month study period. The most common reason cited for leaving was time pressure due to other commitments. Mealtime assistants were found to be acceptable and positively received by patients and staff, although recruitment and retention were identified as a challenge to the volunteer programme. Volunteers reported gaining considerable satisfaction from their role. The cost saved in implementation of trained volunteer mealtime assistants was between £17,196 and £32,424.

5.2 Defining the Context

5.2.1 *Characterisation of Patient Population*

201 participants were recruited to characterise the patient population of each department. The participants were significantly older in MOP (median 85 years) and younger in GM (median 74 years), with those in AMU and T&O similar at 80 and 81 years. This difference can be explained by the admissions policies of each department. MOP preferentially admits patients over the age of 80 years, and GM preferentially admits patients under the age of 80 years. Both AMU and T&O do not have any age criteria in their admissions policies.

Participants in MOP were all male by design, as an earlier small feasibility study with volunteer mealtime assistants had already examined their impact in one female MOP ward in our department¹³⁴. In AMU and T&O, more participants were female than male; this reflects the national picture of more frequent hospital admissions in women and a higher prevalence of female inpatients²¹⁴. In GM, more participants were male; again, this reflects the ward admissions policies- although ward F admitted both male and female patients, ward E preferentially admitted men.

Marital status differed significantly between participants, which can be predominantly explained by the age and gender differences observed. Male participants were more likely to be married, and therefore, in departments with a higher proportion of men, more participants were married. When analysed by gender, a greater proportion of male participants were found in T&O and GM; for GM, this probably reflects the lower median participant age.

Overall care provision was comparable in participants in MOP, AMU and T&O, although there were some differences in the type of care provided. Participants in GM were significantly less likely to have care in place prior to their hospital admission. Again, this may be explained by the younger median age in this department.

Smoking history and alcohol intake were significantly higher in male participants than women, but did not differ between departments. This is consistent with international trends, with smoking reported to be five times more common in men than women²¹⁵, and alcohol consumption more common and in higher amounts in men compared to women²¹⁶.

Levels of comorbidity (median number of comorbidities and Charlson comorbidity index, CCI) were highest in MOP and lowest in T&O. This is unsurprising, given that participants in MOP were older, and therefore would be more likely to have higher levels of comorbidity. Participants in T&O were usually admitted after a fracture, and therefore may represent a cohort of patients with less chronic comorbidity but admitted due to an acute event. Despite the difference in CCI being statistically significant between departments, the difference between MOP (median six) and AMU and GM (median five) is unlikely to be of clinical significance: in the original CCI series, all patients with a score of five or greater were considered as one cohort, with a 10 year risk of mortality of 66%¹⁹¹. However, in T&O, the median score of four equates to a lower 10-year mortality risk of 53%. It is interesting to note that the differing age of participants in each hospital department did not appear to have an impact on the level of comorbidity.

As a reflection of these high levels of comorbidity, polypharmacy was commonplace, with the median number of medications being nine. This is in accordance with other published literature: in a series of 1187 Australian inpatients over the age of 70 years, the median number of medications on admission was seven²¹⁷. Despite the differences in the level of comorbidity between departments, there was no significant difference in the number of medications that participants were taking.

The Malnutrition Universal Screening Tool, used as standard in our hospital, demonstrated that almost a fifth (19%) of all participants were deemed to be at risk of malnutrition, with no significant difference between hospital departments. This proportion is lower than the prevalence reported by the BAPEN in their UK nutrition screening survey, where they identified that 27% of patients over the age of 65 years admitted to hospital were at risk of malnutrition. The reason for this discrepancy may be because the BAPEN survey included all patients admitted to hospital, whereas our participants had to give informed consent to participate in our research. Both dementia and acute illness are risk factors for malnutrition^{78,88,218}, and both of these groups of patients are likely to be under-represented in our participants due to issues surrounding being able or feeling well enough to give informed consent. Therefore, it could be expected that there would be a lower prevalence of malnutrition in our participants when compared to the hospital population as a whole.

Appetite, as quantified by the SNAQ score, was poor across all departments. A SNAQ score of < 14 has been associated with weight loss in a community population²⁰⁰, as well as increased mortality and risk of infection in a hospital population⁸⁶. The median SNAQ score in our participants was 14, just above this cut off point. In AMU, SNAQ scores dipped below this, with a median score of 13. Although this was not statistically significant, it is plausible that the participants in AMU, having just been admitted to hospital, were in a more acute phase of their illness and therefore more likely to be experiencing a poor appetite. This is corroborated by previous research, which noted that anorexia was more common early in a hospital admission⁷⁸.

Cognition was significantly different across departments, with MMSE scores lowest in MOP (median 26, a score consistent with a diagnosis of mild dementia) and highest in GM (median 29, a score considered to represent normal cognition). This is unsurprising, given that participants in MOP were significantly older than those in GM, and therefore would be more likely to have a diagnosis of dementia. In a study of 500 Polish patients admitted to a geriatric ward, the median MMSE was lower than in our participants, at 24/30²¹⁹. Participants in this study were not required to give informed consent to participate. In our study, as previously discussed, patients with dementia were likely to be under-represented because of the need for informed consent. Therefore, our scores cannot be taken to be representative of the department populations as a whole, although the trend of lowest scores in MOP and highest scores in GM is likely to be genuine.

Geriatric Depression Scale scores demonstrated that there was no evidence of widespread depression, with median scores (3-4) below the score of five that is suggestive of a diagnosis of depression. This is helpful in clarifying that the poor appetite experienced by our study population was not simply due to low mood. In the above mentioned study of Polish inpatients, the median GDS score was higher, at five²¹⁹, signifying that depression was more common in their study population when compared to ours. This may be a genuine difference in the study

populations, but also raises the possibility that depressed patients would be more likely to decline to participate and therefore could have been under-represented in our sample.

The median Barthel scores of our participants in the medical departments of MOP, AMU and GM (90, 92 and 90 respectively) were higher than that reported by other studies. In comparable studies of older acute medical inpatients, median Barthel scores have ranged from 68 to 89²¹⁹⁻²²². It is not clear why our participant population should have higher Barthel scores than in previously published literature, but it demonstrates a greater level of physical ability than in other cohorts. Median Barthel scores were significantly lower in women, which is consistent with a previous Italian study of 1380 male and female inpatients over the age of 65 years²²².

In T&O, the median Barthel score was significantly lower, at 70. Despite this, PASE scores, which reflect participant's physical activity prior to their admission to hospital, were higher in T&O than in MOP or AMU. This is likely to be a reflection of the fact that participants in T&O were limited in their current abilities by their acute fracture, but that prior to admission they were more active; this corresponds with the fact that these participants had significantly less comorbidity than those in other departments. PASE scores have not previously been reported in a cohort of hospital inpatients, so comparisons cannot be made between our population and other studies.

Frailty indices demonstrated that approximately half of participants were frail when using the Fried frailty scale and approximately a third using the FRAIL scale. This is largely consistent with previous published literature, where the prevalence of frailty using the Fried frailty scale has been reported as 54-56% in geriatric units^{219,223}. The FRAIL scale has not been widely used in hospital inpatients, and the only study reporting the prevalence of frailty using the FRAIL scale reported a prevalence of 62%, considerably higher than that found in our population²²³. However, it is difficult to draw any conclusions from this, given the lack of other comparable studies.

There were no significant differences in the prevalence of frailty between departments using either scale, and the trends between departments were not consistent. For example, participants in GM had the lowest prevalence of frailty using the Fried frailty scale, but the highest prevalence using the FRAIL scale. The converse of this was also true, with participants in MOP having the highest prevalence of frailty using Fried, but the lowest prevalence using the FRAIL scale. This clearly demonstrates that the two scales are identifying different cohorts of patients as frail. Several studies have examined the prevalence of frailty using both scales, with some finding that results were comparable, and others finding a considerable difference. Two community based studies found both Fried and FRAIL gave similar prevalence estimates: of 6.3% and 6.4%²²⁴ and 2.6% and 2.5%²⁰⁹. Similarly, in one hospital based cohort, comparable figures of 56% with Fried and 62% with FRAIL were reported²²³. However, two further community based studies found a notable difference between the scales: in one, the prevalence of frailty using Fried was 48%, yet only 14% with FRAIL²²⁵. In another, Fried classified 11% as frail and FRAIL only 6%²⁰⁶. This latter study is also the only published literature where agreement between the scales has been examined; it was reported as

fair ($\kappa = 0.46$), despite the almost two-fold difference in prevalence reported. Thus, our study is not the only one in which the Fried frailty scale and FRAIL scale produce significantly different prevalence estimates. The difference in the scales identifies reasons why they may not produce similar results. Both scales include similar items on weight loss and fatigue. However, the Fried frailty uses objective measures of physical strength (grip strength and gait speed), whilst the FRAIL scale uses participant's self-reported mobility (ability to walk 100 yards and ability to climb stairs). Objective measures may identify poor functioning that a patient may not report, or a patient may over-estimate their abilities when self-reporting. In addition, the FRAIL scale incorporates an item on comorbidity, which is not represented in the Fried frailty scale, again highlighting a key difference between the scales. Given that the Fried frailty scale currently has the widest use and validation in hospital cohorts, it would seem prudent to consider it as providing the most accurate estimate of the prevalence of frailty in our study.

Low grip strength was found in nearly two thirds of our participants, and was significantly more common in MOP and T&O. Participants in MOP were older than in other departments, and therefore it could be expected that there would be a higher prevalence of lower grip strength. In T&O, the most common presenting complaint was a fall and fracture, and it is logical that patients who are more likely to fall and sustain a fracture are more likely to have low grip strength, although it is interesting to note that these participants had a lower level of chronic comorbidity despite this lower grip strength. Other studies have reported a similarly high prevalence of low grip strength in hospital inpatients. A study of patients admitted to a geriatric unit in Poland found that 74% had low grip strength²¹⁹, although the cut-off values used were slightly different than in our study ($< 18\text{kg}$ for women and $< 30\text{kg}$ for men, compared to our cut-off values as shown in Table 11). Another study found that low grip strength (using values of $< 16.7\text{kg}$ for women and $< 28.2\text{kg}$ for men) was almost universal (prevalence 96%) in female medical inpatients of all ages, although the prevalence in men was more comparable to our participant population, at 74%²²⁶.

Length of stay was significantly different across departments, with the shortest length of stay being in AMU. This is as expected, because of the hospital policy of keeping short stay patients (expected admission of < 48 hours) in AMU, rather than admitting them to a ward. Therefore, by definition, the vast majority of patients admitted to the wards would be expected to stay longer than 48 hours. The longer length of stay seen in MOP and T&O corresponds with the fact that these were the participants who were least likely to be discharged home with the same care arrangements as on admission. In MOP, this was predominantly due to an increase in care or a new long-term placement, which is likely to be indicative of a decline in function associated with a more severe illness thereby necessitating a longer hospital stay. In T&O, discharge to an inpatient rehabilitation facility or inter-hospital transfer were more common. The increased need for inpatient rehabilitation is expected, given that most participants had sustained a fracture, and inter-hospital transfers were common because the hospital's location, on the south coast, means that patients from outside the area are frequently on holiday in the area when they sustain a fracture. In

addition to this, the hospital is a major trauma centre, with patients admitted from across the region for treatment. If these patients cannot be discharged home without the need for further support, they are repatriated to their local hospital in order for local rehabilitation or care arrangements to be made. Both inpatient rehabilitation and inter-hospital transfers may lead to an increased length of stay whilst participants waited for beds to become available.

6-month mortality in our participants was 15%, which is comparable to other published literature, with 6-month mortality of participants admitted to geriatric units reported as 16-28%^{223,227,228}. This did not significantly differ across the departments, although it is unlikely that a significant difference would have been identified even if it existed given the small participant numbers (only 29 deaths in total). The median number of readmissions was only one in each department; it may have been expected to be higher given the 6-month mortality rate seen. Several reasons may account for this. The clinicians working within MOP are proactive about advanced care planning for patients who are admitted to the hospital and are anticipated to be in the last year of their life. This often involves providing additional care in the community and avoiding readmission to hospital. Furthermore, in T&O, patients who were not resident in the area (i.e. on holiday when sustaining their fracture) would not be readmitted to our hospital, as they would have returned to their local area. These factors may have influenced this lower than expected readmission rate.

5.2.2 Characterisation of Dietary Intake and Nutritional Indices

465 participants had their dietary intake measured across the four hospital departments, 286 of whom were men and 179 of whom were women. There were fewer participants in GM (64) compared with MOP (126), AMU (137) and T&O (138) due to the patient population of this department: the two GM wards admitted general medical patients under the age of 80 years and therefore had a lower proportion of patients who met the eligibility criteria for the study.

The age of participants reflected this, with the median age of participants in GM consistently lowest of all four departments. The median age was consistently highest in MOP, where patients over the age of 80 years were preferentially admitted. There was a statistically significant difference in the age of all male participants between lunchtime and suppertime measurements (84 years versus 86 years, $p = 0.003$), but it is unlikely that this difference of two years had any clinical significance.

BMI measurements and MUST scores were suggestive of a lower prevalence of malnutrition in patients in AMU than in the other departments. In both men at suppertime and women at lunch and suppertime, median body mass index was highest in AMU and, in all groups, MUST scores demonstrated the lowest proportion of participants at risk of malnutrition in AMU. These findings are in keeping with the trend seen in fully characterised patients. The study was not powered to detect these differences, and this consistent trend suggests that sample sizes may have been too small to detect statistical significance. The prevalence of malnutrition is likely to be lower in AMU because

there are a greater proportion of patients who have been admitted for a short stay, and who are being imminently discharged. Given that malnutrition frequently develops during hospital admissions^{37,38}, and that malnourished patients are more likely to stay longer in hospital^{37,56}, any ward with a high proportion of patients who are expected to have a short hospital stay is likely to have a lower prevalence of malnutrition. Oral nutritional supplement prescriptions were broadly in accordance with the risk of malnutrition in most groups of patients, with the notable exception of both men and women in AMU on days when suppertime intake was measured, where ONS prescriptions were considerably less than would be expected given the malnutrition risk. At suppertime, the proportion of male participants at risk of malnutrition in AMU was 14%, yet only 3% were prescribed ONS. The corresponding figures in women were 21% and 6%. This discrepancy may be accounted for by the fact that new patients admitted to AMU in the afternoon may have been identified as at risk of malnutrition by MUST, but not yet had this acted on so early in their admission.

The prevalence of confusion was 55% in male participants and 44% in female participants. Estimates of the prevalence of dementia in acute hospital inpatients vary widely, with one systematic review of studies including inpatients over the age of 55 years finding prevalence estimates ranged between 13% and 63%²²⁹. In addition to this, the prevalence of delirium in older hospital inpatients has also been estimated at 13-31%²³⁰⁻²³². Our findings, of 55% and 44%, are in keeping with the higher estimates in this literature. No consistent trends were seen in the prevalence of confusion either depending on the mealtime or the study department; this could be due to a genuine lack of difference or as a result of the small sample sizes.

In both male and female participants, 44% required some form of assistance with their meals. This figure is slightly lower than has been reported in literature previously: in one study of 46 patients on a geriatric ward, 70% required assistance⁹⁵, and another study of 48 patients on two medical wards found that 58% required some assistance⁹⁶. The reason for this difference is not clear, but both these studies had small sample sizes, which may be a relevant factor. There were no significant differences in the amount or type of help required in each hospital department, indicating that there was a high level of need across all four hospital departments.

Protein and energy intakes frequently did not meet nutritional requirements. The British Dietetic Association recommend that, in hospitalised patients, lunch and suppertime both provide 30% of the daily requirements. In a nutritionally well patient, this equates to 16.8g protein for men and 13.5g for women and a calorie intake of 543-765kcal. In nutritionally vulnerable patients, these requirements are 18.0-22.5g protein and 675-788kcal⁶⁷. Male participants only met their protein requirements in MOP at lunchtime (where median intake was 21.0g), and never met the energy requirement. Female participants met the protein requirements in GM at lunchtime (intake was 16.6g), but also never met the calorie requirement. Although our measurements relate to only one meal per day, it is unlikely that participants would make up the energy and protein deficit with the other meals and snacks provided to

them during the day. This is of considerable clinical significance, as 27% of participants were known to be at risk of malnutrition, and would require even greater protein and calorie intakes. Male participants had higher protein and energy intakes than female participants (median 15.1g, compared with 12.7g protein and median 378kcal, compared with 299kcal); this is consistently reported in published literature^{65,70,233}.

In male participants, protein intake was significantly greater and energy intake non-significantly greater at lunchtime when compared to suppertime. In female participants, protein intake at lunchtime was non-significantly greater than at suppertime, although calorie intake was similar. It was evident from mealtime observations that older inpatients were more likely to order a main meal at lunchtime and a lighter meal in the evening, which would account for these differences. In future planning of a mealtime assistance programme, it would therefore be beneficial to prioritise the lunchtime meal session so that the meal at which maximum energy and protein are available is the meal in which patients are provided with the most assistance.

Male participants in MOP had the highest protein and calorie intakes at both lunchtime and suppertime. The difference in calorie intake at suppertime was not of statistical significance, but this may be due to the fact that the sample size was small. This finding is somewhat surprising, given that the measured factors that can negatively affect intake (i.e. risk of malnutrition, presence of confusion, need for assistance and use of a modified texture diet) were either not significantly different, or most prevalent in MOP. The reason for this unexpected finding is not clear from mealtime observations, although it is possible that unmeasured factors, such as patient acuity, had an impact. It is also possible that negative factors in other departments played a role. In AMU, mealtimes were not infrequently disrupted by health professional contact, scheduled investigations, ward moves and planned discharges. These interruptions were more prevalent and less avoidable on AMU because patients who had recently been admitted to hospital required greater intervention in terms of review by health professionals and urgent investigations, and the bed pressure on the unit meant ward moves or discharges could not always be scheduled around mealtimes. In T&O, dietary intake may have been affected in some participants by a recent operation. Although patients who were nil by mouth or in theatre at the time of the meal would not have been included in the dietary intake measurements, patients who had recently returned from theatre would have been if they were served a meal. It is plausible that this could negatively affect their appetite.

In direct contrast to men, women in MOP ate the least, although this was a sample of only five women at lunchtime, and so cannot be considered to be representative of the female patient population in MOP.

5.2.3 Comparison of Characterised Patient Population and Dietary Intake Participants

Dietary intake participants were older than those who were recruited and fully characterised in the study. Although this difference was only of statistical significance in men in MOP, a non-significant trend was seen in all

departments for men and women. This difference probably reflects the fact that a higher prevalence of delirium and dementia in older patients meant they were less likely to be able to give informed consent to take part in the study.

When compared with fully characterised patients, median BMI was lower and proportion of patients at risk of malnutrition was higher in all groups of dietary intake participants, apart from women in GM. None of these findings were statistically significant, but this overall trend is plausible. As previously discussed, confused and acutely unwell patients are more at risk of malnutrition^{78,88,218}, and would have been under-represented in the fully characterised participants due to the need for informed consent. The proportion of patients at risk of malnutrition in the dietary intake sample is much closer to the proportion identified by the UK BAPEN screening survey (27% of those aged over 65 years)³⁴, which suggests that the proportion of patients at risk of malnutrition in our hospital is similar to that nationally.

5.2.4 Experiences of Hospital Mealtimes

Eight patients and seven staff members took part in semi-structured interviews and nine volunteers participated in a focus group, reflecting experiences from all four hospital departments.

Barriers to dietary intake was the dominant theme amongst patients, staff and volunteers when considering the contextual factors that related to experiences of hospital mealtimes.

Despite the hospital's policy of protected mealtimes, both patients and volunteers recognised incidences where interruptions had occurred during mealtimes and the negative effect this had on patient's dietary intake. Both of these findings are in keeping with previous literature on the subject: interruptions during mealtimes are known to be associated with a reduction in dietary intake¹⁰¹ and two large studies of protected mealtimes both found that introduction of a protected mealtimes policy did not reduce mealtime interruptions^{111,113}.

The organisational aspects of hospital catering, such as timing and correct serving of meals, were frequently cited by staff and volunteers as a significant issue. Both of these have been cited as problems in previous qualitative research examining hospital mealtimes^{79,81}. Although patients did recognise issues relating to the organisation of the catering, they were more likely to feel that some problems were unavoidable and simply a reflection of the size of the service that the catering staff had to deliver. Again, this is consistent with previous reports, where patients were seen to complain about hospital catering less frequently than staff⁸¹, or were more apt to consider organisational problems as an expected consequence of the constraints of mass catering⁷⁹. This may reflect genuine feeling amongst the patient population, or may be due to a greater reticence to complain about the problem.

Food presentation and quality were cited as a problem by staff and volunteers, although volunteers did recognise occasions when the food appeared appetising. Of interest, patients were divided in their views about hospital food, with some unhappy with the quality and taste, whilst others expressing satisfaction with them. This may relate to patients' expectations of hospital catering: similar to the organisational aspects, some patients did not appear to have

high expectations of the quality of the hospital food, and therefore were not disappointed by it. Lack of dissatisfaction with food due to low expectations has been cited previously in qualitative research⁷⁹. This study also reported that food quality is not as dominant a factor in poor dietary intake in hospitals as is widely assumed, a finding that has been echoed by other studies in the area^{78,80}.

Poor appetite was recognised as a problem, particularly by patients, but also by staff and volunteers. For some, this resulted from their acute illness, whereas, for others, it was a long-term problem. The frequent reporting of poor appetite by interview participants corresponds with the low SNAQ scores of the patients who were recruited to characterise each hospital department, as well as findings from wider literature, where poor appetite has been reported to occur in up to 60% hospital inpatients^{84,85}, and is known to independently predict poor oral intake⁸⁷.

Insufficient mealtime assistance was commented upon by patients, staff and volunteers. Staff commonly framed the problem as patients' food going cold before they could be assisted, whereas patients and volunteers simply described the problem as the nurses not having enough time to help everyone who needed assistance. All groups of participants made reference to other activities nursing staff were expected to be performing at mealtimes. This problem of insufficient mealtime assistance has been widely reported in both observational and qualitative research^{79,81,82,85,94-96}, and competing priorities for nursing time is a recurring theme in this research^{81,96}.

The experiences described by patients, staff and volunteers were broadly similar across all hospital departments, with all themes represented in each department. Although poor appetite was only identified by staff and volunteers in AMU and MOP, it was identified as a problem by patients in all departments, and therefore, this does not suggest that poor appetite was a problem specific to these two departments.

5.2.5 Summary of Discussion: Defining the Context

Significant differences were noted between participants across hospital departments, with poorer physical health and functional ability more common in MOP. In GM, levels of comorbidity were still high, but participants had a better functional ability, presumably because of their younger age and greater ability to compensate for their comorbidity. Participants in T&O appeared to be a cohort who were less comorbid in general, but had a higher current level of functional impairment, probably due to having sustained an acute fracture.

The 465 participants whose dietary intake was measured inevitably differed from those who were able to give full informed consent to take part in the study, being older and more at risk of malnutrition. Approximately half were confused, which would have made them ineligible to give informed consent to be fully characterised. It was important to be able to include these patients to a limited extent and measure their dietary intake as this gives a true representation of the ward population. Nearly half of these participants required some form of mealtime assistance. Energy and protein intakes were frequently insufficient, particularly given the fact that more than a quarter of

participants were at risk of malnutrition. Male participants in MOP consumed the most protein at lunchtime and suppertime; the reason for this is unclear and may reflect multiple different factors.

Four main barriers to dietary intake were described by patients, staff and volunteers in the interviews and focus group: mealtime interruptions, the hospital catering system, poor appetite and lack of sufficient mealtime assistance. These issues were common to all four hospital departments and all have been widely reported in existing research surrounding hospital mealtimes.

5.3 Implementation of Trained Volunteer Mealtime Assistants

5.3.1 Adoption

5.3.1.1 Volunteer Recruitment and Training

Of the 131 people who expressed an interest in becoming a mealtime assistant, 49% (64 volunteers) completed the training and began volunteering. This finding is consistent with previous experience in the pilot study, the Southampton Mealtime Assistance Study (SMAS), where the proportion of potential volunteers who completed training and volunteered was also 49%¹³⁴. Published literature describing other volunteer programmes does not frequently report this proportion, but, where the figure has been reported, the proportion is lower than in our experience. One US study of volunteers recruited to promote mammography in rural communities found that only 15-17% of volunteers who expressed an interest in the role actually completed the training process¹⁴⁸. Another study of volunteers engaging in reminiscence and creative activities with palliative care patients found that 27% completed the training¹⁵⁶. Neither report describes in detail the processes of volunteer recruitment and training. In our study, each potential volunteer was contacted three times to take up the opportunity to attend training, which was available on a monthly basis. If potential volunteers were not pursued as many times, or if training sessions were less readily available, this could account for the lower proportion of potential volunteers completing training in these two programmes. These unknown differences make it difficult to directly compare our recruitment proportion with those of other volunteer programmes. Furthermore, the general lack of reporting of these figures makes it difficult to draw any definitive conclusions on whether our experience is truly different to others'.

Of the 55 potential volunteers who did not begin volunteering, the majority (60%) withdrew before even attending a training session. A variety of reasons were given (including other commitments, issues surrounding occupational health clearance and choice of alternative volunteering), but, in the majority of cases, this reflected an inability to make contact with the volunteer after their details had been provided by the volunteer office. The process of attempting to make contact with these volunteers did involve some administrative time, but this was minor in

comparison with volunteers who progressed further in the process, and did not represent a significant waste of resource.

Twenty potential volunteers attended the half-day training session and then did not progress any further. This group required a greater investment of time and resource, in terms of the organisation and provision of training, but also in further administrative time and cost, as they were actively encouraged through the volunteer clearance processes, including an occupational health check and a Disclosure Barring Service (DBS) check. Withdrawal of volunteers at this point therefore represented a greater loss of resource to the trust and research team. However, the maximal investment of resource was provided to volunteers who completed their competency assessment (as this involved at least 90 minutes of one-to-one time). Because of this, volunteers were strongly encouraged to only attend their competency assessment when it was clear that they were committed to ongoing volunteering (i.e. by identifying a specific day and mealtime when they were available to volunteer from that week onwards). This approach meant that only two volunteers attended their competency assessment but did not begin volunteering, meaning that the waste of resource was minimised as far as possible at this point.

Although the overall proportion of volunteers who completed training and began volunteering was the same in SMAS, there were differences in where potential volunteers discontinued the process. In SMAS, more volunteers withdrew before attending any training (70% compared with 60% in our study). However, less volunteers withdrew after the half day training session (20% compared with 36% in our study). These figures suggest that, when compared with SMAS, we had greater success at encouraging volunteers to attend the half day training session, but that this success did not correspond to an overall increase in the proportion of volunteers completing the training programme and becoming active. At the outset of the study, we adopted a strategy of proactively encouraging potential volunteers to attend half day training, in the belief that attending training would maintain interest in the role and encourage continued progress through the training and clearance process. However, comparison of our findings with SMAS suggest that this was not a successful approach, and that this simply led to a greater loss of volunteers after the training session was attended. This was confirmed by our experience as the study progressed: potential volunteers who required constant prompting to progress through the training and clearance processes frequently did not become active volunteers or stopped volunteering after only a few sessions. This was important for us to recognise, and would be key in future planning of a similar programme, as it suggests that investing considerable time and effort in encouraging reluctant volunteers does not improve volunteer numbers and probably represents a misuse of resource that could be better spent elsewhere.

Of all volunteers who completed the full training programme, 97% began volunteering, a higher figure than has been reported in other volunteer programmes. In one study, where volunteers were trained to provide peer support for patients with post-partum depression, 85% who completed training actually began volunteering¹³⁹. The

corresponding figure in a study of volunteers in falls prevention was 88%¹³⁸, and in a study where volunteers assisted with reminiscence activities, the figure was only 50%¹⁵⁶. The higher proportion in our study when compared with these other programmes probably reflects our previously discussed strategy, where the competency session was only arranged once a volunteer specified a day and time on which they were able to commit to ongoing volunteering.

The reason for withdrawing from the volunteer training process was only known for 45% of potential volunteers. The remaining 55% could not be contacted to ascertain the reason for discontinuing. The most common reason cited by volunteers who responded was the pressure of other time commitments, either work, study or personal. Failure to gain the required clearances was a problem for 6 of the 55 volunteers who did not begin volunteering (11%). This is reassuring, because gaining occupational health and Disclosure Barring Service clearances requires an investment of time and money on the hospital's behalf, and the small proportion of volunteers who do not achieve these clearances means this investment is not being wasted.

The median time between a volunteer expressing an interest in the programme and attending the half day training session was 31 days, and between attending the training session and competency session was 26 days. However, there were significant delays for some volunteers, with one volunteer attending training more than a year after first expressing an interest, and another volunteer not completing their competency assessment until more than 6 months after their training session.

Data were not formally collected on the reasons for delays, but one of the most common experiences was difficulty contacting volunteers to arrange attendance; this was a problem when attempting to book volunteers on training sessions and when trying to organise competency sessions for volunteers who had completed the first part of their training.

Another common problem was volunteers failing to attend training after having booked a session. This issue predominantly arose at the half-day training session; it was rare for volunteers to arrange a competency session and then fail to attend. We attempted to minimise this problem by sending reminders about training sessions, but this did not eradicate the problem. Volunteers who failed to attend training were offered further training sessions, which naturally led to an increase in the delay between initial contact and training attendance.

Following their attendance at the half day training, a frequent cause of delay was ensuring a volunteer gained the required clearances to begin working on the ward. This was particularly a problem for the Disclosure Barring Service check; the hospital applied for this on the volunteer's behalf, but the confirmation of clearance was sent directly to the volunteer, who was then required to bring the form in to the volunteer office for verification. This process had to be actively managed for some volunteers, with regular contact to establish when the clearance had been received and to remind them to bring the certificate in for verification before the competency session could be

arranged. This problem is not unique to our hospital; delays as a result of DBS clearance have been reported as a problem by other UK based volunteer programmes¹⁴⁵.

Our experience was that volunteers who encountered the greatest delays were more likely to withdraw before completing the training programme. This appeared to be partly because enthusiastic volunteers would lose interest in the role if the process did not move quickly, but also because the less enthusiastic volunteers required repeated contact to move through the process, which led to greater delays. This became clear as the study progressed, and led us to define processes for making contact with potential volunteers, to ensure that those who were engaged with the training and clearance process did not lose interest as a result of excess delays, but also to ensure that excess time was not spent on volunteers who were not engaged in the process.

5.3.1.2 Volunteer Characteristics

All volunteers who became active mealtime assistants completed a volunteer profile, meaning the characteristics of the entire volunteer workforce were known. The vast majority of volunteers were women, which is consistent with the volunteer workforce in SMAS¹³⁴, but also as reported more widely in other volunteer literature^{135,136,138,149,156,234}. Three quarters of volunteers were white, which is representative of the demographics of the local population, 78% of whom are white²³⁵, but also corresponds with other volunteering literature, where it is consistently reported that the majority of volunteers are white^{135,136,138,139,234}.

The median age of our volunteers was 22 years, which is considerably younger than reported in SMAS, where the median age was 61-70 years¹³⁴. This cohort in SMAS is more typical of that reported by other healthcare volunteer programmes, where older volunteers predominate¹³⁵⁻¹³⁸. Volunteers in our study were younger than this because we recruited a high proportion of students (45%). This was a deliberate recruitment strategy utilised to recruit large numbers of volunteers within a relatively short space of time and achieved partly by visiting local sixth form colleges to give talks on volunteering.

As a consequence of the predominance of students in our volunteer workforce, the proportion of retired volunteers in our study was only 17%. This contrasts with SMAS, where 59% of volunteers were retired¹³⁴. However, there is evidence that retired volunteers, previously considered the backbone of the volunteering workforce, are becoming proportionally less common as people work for longer and younger and unemployed people take up volunteering to gain experience and improve their job prospects¹⁴⁶. The proportion of employed volunteers in our study was also lower than is commonly reported, at 19%; in other volunteer literature, employed volunteers comprise 38-71% of the workforce^{134,136,137,139}. This lower proportion of employed volunteers probably reflects the higher proportion of students.

Within our volunteer cohort, home and car ownership were ascertained as a proxy for social class. 28% of volunteers were home owners and 51% were car owners. However, although the use of these indicators has been

reported previously²¹¹, the high proportion of our volunteers who were students makes them hard to interpret in our cohort. Social class has not been routinely reported in other volunteer literature, although some studies have reported volunteers' annual income^{139,234}. This will also be affected by a volunteers' age and employment status, and annual income cannot be compared with car or home ownership, so it is difficult to draw any definite conclusions about the social class of our volunteers and the typicality of this compared to other volunteer cohorts.

Despite a majority of volunteers being car owners, the most common method of transport to the hospital was by public transport. This may well reflect the challenges of parking upon the hospital site, where space is limited and significant queues can often be encountered, particularly for volunteers attending lunchtime sessions. Parking was a common cause of complaint for volunteers who drove to the hospital. Although the use of public transport avoided this issue, some evening volunteers found it unreliable in rush hour traffic, meaning they could be late for their session. The voluntary services department attempted to mitigate these issues as far as possible by paying reasonable travel expenses or parking fees. There was no direct evidence that the ease of getting to the hospital influenced volunteers' when deciding to take up or continue volunteering, but it is possible that it may have been a one of several factors that indirectly contributed to these decisions.

The education and qualifications of our volunteer cohort reflected the high proportion of students recruited, with 45% still in education. Of the volunteers who had completed their education, 42% had gone on to further education beyond the age of 16 years. Although level of education is not frequently reported in volunteer literature, when it is, the proportion of volunteers with higher level education is greater than in our cohort, at 60-80%^{136,139,234}. The reason for this difference is not clear; it may be a reflection of the demographics of the local population, but as all our volunteers completed the training programme and passed their competency assessments, this lower level of formal education did not have any significant impact on our study.

The majority of volunteers (57%) had previous volunteering experience, and, for the most part, this was in a healthcare setting. In SMAS, only 24% of volunteers had previous experience¹³⁴. The greater proportion of younger volunteers in our study may explain the higher proportion of previous experience than in SMAS, because volunteering is strongly encouraged by colleges and universities, meaning that younger volunteers are more likely to have volunteered previously. Most volunteers (66%) also had healthcare experience, either in a formal or informal role. This proportion was not dissimilar to SMAS, where 55% had previous healthcare experience¹³⁴.

The most common reason for volunteering in our cohort was the desire to gain experience before pursuing a healthcare career, which was cited by 63% of volunteers. The next most common motivation was a desire to help, reported by 22%. Previous literature has reported that volunteer motivation differs with volunteers age, with older volunteers more likely to be motivated by altruism, and younger volunteers more likely to be motivated by personal gain (such as gaining experience)¹⁴². Given that our volunteers were predominantly younger, this corresponds with

our findings. Although altruism was less common in our volunteers, for volunteers where it was the dominant motivation, it originated from personal experience of the hospital in the majority. Other volunteer programmes where volunteers provide direct patient contact have also found personal experience to be a dominant motivation^{139,236}.

Approximately half of our volunteers (54%) were unaware of the mealtime assistant role when they decided to volunteer at the hospital, and heard about it from the preliminary interview conducted by the volunteer services manager. The remainder of volunteers were aware of the role before attending this interview, and had specifically come to the hospital to volunteer as a mealtime assistant.

Approximately one fifth of volunteers (22%) were recruited via talks given by the volunteer services manager and myself at sixth form colleges and universities. Within the 15-month study period, this represented a time commitment of 5 half days and was therefore both effective and time efficient as a recruitment strategy. The timing of these talks was key, with the most successful time to recruit students being in September. This coincided with the beginning of a new school year, when motivation for volunteering appeared to be at a peak, and also gave time for the students to complete the necessary paperwork and training before they reached the exam period.

Direct marketing of the mealtime assistant role was also successful in volunteer recruitment, with 17% citing this as how they became aware of the role. These volunteers variously reported seeing the banners and posters situated around the hospital, reading an article in the volunteer newsletter, and using the hospital website. None of the volunteers reported having seen the postcards that were produced and sited in all the major food outlets in the hospital. Our experience indicates that banners and posters are cost effective as recruitment tools, but that postcards are not. Use of local media has previously been reported to be a successful method of recruitment, both in SMAS and in other volunteer literature^{134,136,139}. Considerable effort was made in our study to engage the local paper in promotion, but despite initially promising contact with local journalists, no media coverage was obtained. If we had been able to obtain this coverage, volunteer recruitment may have been enhanced.

Volunteer Characteristics by Hospital Department

Subgroup analysis of volunteer characteristics between departments was performed to identify any differences that might influence implementation or volunteer activity. It was anticipated that differences would be seen because of the fluctuation in recruitment of student volunteers over the study period. Recruitment of students was lowest in the summer months, due to exams and summer holidays, and this coincided with the introduction of volunteers in GM. Therefore, volunteers in GM were less likely to be students, and consequently, were older, more commonly married than single and more commonly retired. GM volunteers were also less likely to have GCSE level education as their current qualification, previous healthcare volunteering experience, prior student work experience, and be

volunteering because of an interest in a healthcare career; all of these are traits associated with student volunteers and therefore in keeping with the lower proportion of student volunteers in this department.

The proportion of students was relatively similar in MOP, AMU and T&O. Although the introduction of volunteers into MOP also began in the summer months, students recruited later on in the year were utilised to back fill any gaps in MOP, meaning that the proportion of students increased as the study went on. Despite these differences being anticipated and observed between GM and the other hospital departments, only the differences in marital status and current educational qualification were of statistical significance, probably because of the small sample size of volunteers.

Differences in ethnic background were of borderline significance between departments, with more ethnic diversity in GM than the other hospital departments. The reason for this difference is not clear from the data collected or observations made during the study and therefore may be a chance finding.

Volunteer Characteristics by Volunteer Age

There were significant differences between volunteers under the age of 25 years and over the age of 25 years, many of which were predictable. For example, all volunteers under the age of 25 years were single, more were students and fewer were employed, none were home owners, fewer were car owners and consequently, more used public transport to get to the hospital. These findings reflect the differences that would be expected when comparing younger and older members of society. Differences in educational attainment were also as expected: no younger volunteers had left education before the age of 16 years (in accordance with the current legal requirements); GCSE level education was predominant (in keeping with the median age of this group of 18 years), and the vast majority were still in full time education (reflecting the high proportion of students).

Younger volunteers were more likely to have volunteered previously (mainly in healthcare settings), but less likely to have healthcare experience. The greater prevalence of prior volunteering experience is likely to reflect the increasing national drive, encouraged by schools and colleges, to involve young people in volunteering. Additionally, interest in a healthcare was the overriding motivation for younger volunteers to volunteer, in keeping with evidence described previously¹⁴². It is probable that volunteers who are interested in pursuing a healthcare career will have sought out opportunities to volunteer in healthcare previously.

Volunteer Characteristics by Level of Experience

When comparing volunteers depending on their level of experience, it was noticeable that more experienced volunteers were older and more likely to be retired, compared with less experienced volunteers, who were younger and more likely to be students (although these findings were not of statistically significance). To some extent, this may have been influenced by the fact that the majority of students were recruited from the middle of the study period onwards, although most recruited during this period would have had sufficient time to complete 12 volunteer

sessions. Our experience during the study was that older volunteers were more likely to attend regularly and continue volunteering for longer when compared with younger volunteers. This is in keeping with other published work, which has found that older, retired volunteers tend to be more successful^{150,151}.

Volunteers who were more experienced were less likely to have volunteered previously than those who were less experienced; this finding was of borderline significance ($p = 0.053$), and is likely to reflect the fact that more experienced volunteers were older (as our older volunteers were less likely to have previous volunteering experience). This contrasts with other published literature, where volunteers with previous experience have been found to stay volunteering for longer^{150,153}. However, one of these studies looked specifically at older volunteers, and, therefore, the differing demographic of our volunteers is likely to be one reason for the difference in our findings.

The motivation for volunteering also differed between less and more experienced volunteers (although not statistically significantly so). Less experienced volunteers were more likely to be interested in a healthcare career, and more experienced volunteers were more likely to be volunteering due to altruistic reasons. Being motivated by altruism has previously been associated with a longer duration of volunteering^{150,151}; in contrast, students motivated by an interest in healthcare have previously been noted to volunteer for a shorter duration of time¹⁴⁶. Our findings are in accordance with this.

5.3.1.3 Summary

In summary, volunteer mealtime assistants were successfully adopted in all four departments in this study. Some differences were identified between volunteers in each department, but this did not appear to affect adoption.

5.3.2 Feasibility

5.3.2.1 Volunteer Sessions Delivered

The median number of volunteer sessions completed by any individual volunteer was eight. Since more experienced volunteers reported that they felt twelve sessions were needed to feel fully established in their role, this demonstrates that more than half of volunteers did not reach this milestone, which may in itself contribute to volunteers discontinuing the role early. Furthermore, eight sessions does not meet the time commitment of 6 months that is asked of all volunteers when they begin volunteering at the trust.

The median attendance percentage of all volunteers was 75%. Non-attendances included planned absences for holidays or during exam periods, as well as those where a volunteer did not give a reason for their absence. Attendance percentages of volunteers have not been reported in any other volunteer literature, therefore no comparisons can be drawn with other programmes. Although a median attendance percentage of 75% is probably reasonable given that this includes planned absences, it does need to be considered in planning of programmes in the

future. Encouragingly, there were some volunteers who exceeded their agreed commitment and attended more sessions than they were timetabled to.

Volunteer Sessions Delivered by Hospital Department

The number of volunteer sessions delivered was highest in MOP, followed by AMU, T&O and then GM. This is the order in which volunteers were introduced to the hospital, and therefore is as expected. The median number of sessions delivered by any individual volunteer was not statistically significantly different between departments, but was noticeably lower in GM (4.5), when compared to MOP, AMU and T&O (7-9). Volunteers in GM also had a significantly higher attendance percentage (median 100%). This signifies that volunteers had less time to deliver higher number of sessions because of the shorter duration of the study in GM, not because they were less likely to attend. The higher attendance percentage can also be explained by the shorter duration of volunteering, with volunteers being committed to full attendance early on in their volunteering, and attendance percentage then starting to diminish with time.

The median and interquartile ranges for the number of sessions delivered in MOP, AMU and T&O were very similar, as were attendance percentages (67-78%). This appears to demonstrate that, in terms of sessions attended, volunteer behaviour was comparable between these departments. Volunteers were present in MOP for nearly twice as long as in T&O (68 weeks compared with 35 weeks), yet the similarity in sessions attended and attendance percentage signifies that, by 35 weeks, volunteer behaviour had reached a steady state.

Volunteer Sessions Delivered by Volunteer Age

Older volunteers delivered a greater number of volunteer sessions, both in terms of total sessions delivered (despite there being less older volunteers), and in terms of the median number delivered by an individual volunteer. Attendance percentage was also higher in older volunteers when compared with younger volunteers. Although these findings were not statistically significant, they correspond with the fact that more experienced volunteers were likely to be older, and also with pre-existing evidence that older volunteers are more successful^{150,151}. When revisiting the characteristics of our volunteers, altruism was a more common motivation for volunteering in older volunteers, and this has been shown to be associated with more successful volunteers^{150,151}. However, two characteristics that were more prevalent in our younger volunteers have also been associated with more successful volunteers: a higher level of education^{152,153} and previous volunteering experience^{150,153}. Our findings therefore suggest that being older and altruistically motivated were factors more associated with longer volunteering than having a higher level of education or previous volunteering experience.

Volunteer Sessions Delivered by Level of Experience

By definition, more experienced volunteers had delivered a higher number of sessions than less experienced volunteers. However, there was no evidence that less experienced volunteers were less likely to attend their volunteering sessions, with attendance percentages very similar between the two subgroups (76% and 71%).

5.3.2.2 Volunteer Activity

Volunteer activity (as recorded by the volunteers themselves) was known for 77% of sessions delivered. Caution needs to be applied in drawing definitive conclusions about volunteer activity, because not only was it not recorded in 23% of sessions, but the results were also dependent upon what activities each individual volunteer chose to record. All volunteers were given the same training on completing the activity sheets, with this discussed at the classroom teaching session, revised at the competency session and reinforced on any further encounters with a volunteer. Despite this, different volunteers may have taken different approaches in recording their activity, with some choosing to record every interaction they made in one session, whilst others may have chosen to record only the interactions they considered most relevant (e.g. feeding). Discussions with volunteers during informal ward encounters or at regular volunteer meetings revealed that volunteers frequently under-recorded activity, particularly activities such as cleaning tables, rearranging meal trays and opening food packages. It is therefore possible, that, although activity was only recorded for 77% of volunteer sessions, total volunteer activity during the study period was greater than the data presented.

Despite these issues with the way this data was recorded, it was the most pragmatic way to do so. Although external observation of each volunteer session by a member of the research team would have provided more accurate data, the team was not staffed to be able to provide this level of cover. Furthermore, direct observation of the volunteers may have led them to behave differently to how they would if a researcher was not present.

Analysis of activity recorded demonstrated that feeding was most commonly recorded and social interaction least commonly recorded. This may be a representation of the true activity volunteers performed, but also may have been influenced by the activities volunteers considering it more important to record. Although the role of the mealtime assistant encompassed more than just feeding patients, findings from the focus group demonstrated that volunteers considered this the central tenet of their role, and it is likely that this was preferentially recorded. In contrast, many volunteers appeared to consider social interaction with patients as normal behaviour, which may have led to under-recording of this as a separate “activity”.

Volunteer Activity by Hospital Department

The greatest amount of activity (637 patient interactions) and the highest number of patients assisted per session were recorded in AMU. This is likely to be because the number of beds in AMU (48) was higher than that in any of

the other wards (14-34). This meant that there was a greater volume of patients who required help, but also that the time between the first and last patients being served their meals was greater than on any of the other wards, with volunteers having time to assist more patients. For example, in MOP, T&O and GM, it was unlikely that a volunteer would have time to feed more than one patient per session, because by the time this patient had finished eating, all other patients on the ward would have also finished their meals. However, on AMU, if a volunteer fed a patient who was served their meal early in the session, it was likely that meals would still be being served once this patient had finished, and therefore another patient could be fed. Analysis of patient characteristics in each hospital department did not demonstrate any clear differences in the level of dependency of patients in AMU that would account for the greater assistance.

The least amount of activity (138 patient interactions) was recorded in GM, which is likely to reflect the fact that volunteers were introduced to this department last, and therefore had less time to accumulate activity (only 19 weeks). In addition, only one volunteer was present per session in GM.

Feeding accounted for a greater proportion of recorded interactions in MOP than in any other department (56% compared with 34-35%), yet, when examining a typical ward session, the number of patients fed across departments did not statistically significantly differ. The number of patients fed in typical sessions in MOP, T&O and GM were similar (0.9-1.2), but this figure in AMU was slightly higher, at 1.4. Although this is not of statistical significance, it is probably clinically significant and likely reflects the factors discussed above. Similarly, social interaction as the sole activity represented a greater proportion of interactions recorded in T&O and GM when compared to MOP and AMU (14% and 13% compared with 2% and 8%), yet, in a typical volunteer session in AMU, T&O and GM, there was no apparent difference, with 0.3-0.5 patients benefiting from social interaction alone. This figure was lower in MOP, at 0.0 ($p = 0.028$), but the clinical significance of this is likely to be limited, particularly given that social interaction may have been under-reported.

In AMU and T&O, preparation was recorded more frequently, with an associated statistically and clinically significant difference in the number of patients assisted in a typical session (1.3 and 1.1 compared with 0.3 and 0.6 for MOP and GM). This may be explained by the fact that volunteers in AMU and T&O were younger than those in MOP and GM, and younger volunteers were more likely to record preparation as an activity. It may also be a reflection of differing needs of patients in these departments.

In MOP, less patients were helped in a typical volunteer session (1.7 compared with 2.6-3.8). Although this was not a statistically significant difference, there are several possible factors that may have contributed to this. Ward A was the smallest ward (14 beds) and patients were in 3-bedded bays, whereas, in other wards, the bays were predominantly 6-bedded. Many volunteers chose to work in one specific bay rather than move through the ward, and therefore, those volunteers working on Ward A would have had a smaller number of patients to assist. Additionally,

patients in MOP had a greater number of comorbidities, a lower MMSE score and were more likely to have low grip strength. All of these factors may suggest a greater level of dependency, which could in turn lead to more time being required to assist these patients, with the consequence that fewer patients could be helped per mealtime session.

These significant differences in activity recorded in each department directly contrasts with the lack of difference between departments in the assistance observed to be provided during mealtimes where dietary intake was measured. For example, volunteers recorded feeding as the most common activity in MOP (56% of all recorded activity), yet feeding was consistently less common than preparation in observed mealtimes in MOP. There are several reasons why the activity recorded by volunteers and that observed by the research team may differ. The first is that activity recorded by volunteers was done over 655 mealtimes, whereas only 32 mealtimes were directly observed by the research team (and only sixteen of these observations occurred following the introduction of the volunteers). This small sample size of observed mealtimes may mean these observations are not representative. In addition, as previously discussed, it is likely volunteers did not record all the activity they undertook at a given session, particularly activity which may have been very quick to perform (e.g. opening a packet of cutlery or taking the lid off a yoghurt), which would have been captured in mealtime observations, and therefore lead to a discrepancy between the two.

Despite the significant differences in volunteer characteristics between hospital departments discussed previously (greater ethnic diversity in T&O and GM, more married volunteers in GM and a higher level of current education in GM), there did not appear to be any correlation with any differences in volunteer activity recorded across departments.

Volunteer Activity by Volunteer Age

In comparing younger and older volunteers, there were significant differences in the proportion of each different activity recorded. Social interaction and encouragement were more commonly recorded in older volunteers, whilst preparation was more commonly recorded in younger volunteers. However, when examining a typical volunteer session, the difference in the number of patients engaged in social interaction and encouraged by younger and older volunteers was not of clinical significance (0.2 patients per session engaged in social interaction for both younger and older volunteers and 0.3 patients encouraged per session by younger volunteers and 0.4 by older volunteers). There was a more noticeable and potentially clinically significant difference in the number of patients assisted with preparation (1.0 patients in a typical younger volunteer session and 0.6 patients in a typical older volunteer session), but this was not of statistical significance. Overall, there did not seem to be a statistically and clinically significant difference between the activity recorded by younger versus older volunteers, demonstrating that the multiple differences between characteristics of the two groups did not affect the activity they carried out in a mealtime session.

Volunteer Activity by Level of Experience

Comparison between less and more experienced volunteers demonstrated a statistically significant difference in the proportion of different activity recorded, with less experienced volunteers more commonly recording assisting food to the mouth and less commonly recording preparation, although the absolute differences were small (14% versus 8% and 23% versus 29%) and probably not of clinical significance. When analysing typical volunteer sessions, there were no statistically or clinically significant differences between the activity recorded by a less experienced or more experienced volunteer. Therefore, differences in volunteer motivation and previous experience between the less and more experienced volunteers did not appear to have any impact on their activity.

5.3.2.3 Summary

The study demonstrated that was feasible for volunteers to be trained as mealtime assistants. Although there were some subtle differences in volunteer activity between departments, volunteers were successfully introduced and active in each of the four hospital departments. The median number of sessions completed per volunteer was lower than anticipated, given the trust's expectation of a minimum commitment of 6 months of volunteering, and it is important this is anticipated in the future planning of a similar programme.

5.3.3 Sustainability

5.3.3.1 Volunteer Retention

Throughout the study period, 48% volunteers left their role; this figure is similar to that of SMAS, where 41% of volunteers left during the one year study period¹³⁴. It is estimated that 31% of middle aged US volunteers stop volunteering every year¹⁵⁴, and other published reports of healthcare volunteering programmes have also reported a lower rate of volunteer discontinuation, of 23-32%^{136,138}. The volunteer roles in these programmes were substantially different to ours, involving providing dietary advice in one and providing exercise support in the other. Furthermore, it is not clear in either report what the time commitment required was, and this may have affected volunteer retention. It is therefore difficult to directly compare our rate of volunteer discontinuation and the reasons for this with other volunteer programmes on the information available. Nevertheless, 48% represents a considerable volunteer turnover, which must be considered in planning a similar programme in the future.

The most common reason volunteers gave for leaving our programme was time pressure due to other commitments. This is in accordance with literature from other volunteer programmes, where alternative commitments are frequently cited as the reason for discontinuing volunteering^{136,144,149}.

Volunteers moving out of the area was another common reason for discontinuation. This is not frequently described in other volunteer literature, but is likely to be more prevalent in our volunteers because of the high proportion of students recruited. Students studying at local universities would move back to their home location once

their course had finished, and students at local sixth form colleges would move away to university at the end of their college studies. This is an inherent disadvantage in recruiting student volunteers: they are predominantly a transient volunteer population, and therefore this needs to be planned for, with yearly recruitment of students required to maintain the volunteer population.

A small number of volunteers ($n = 3$) stopped volunteering due to disruption on the wards on which they were volunteering. For two volunteers, this disruption was the relocation of a ward (due to planned refurbishment) and a subsequent change in staff. Informal conversations with these volunteers after they had left revealed that they felt that, having spent several weeks becoming established on their current ward, they did not wish to change and restart the process of becoming established in another ward environment. Although this represented a small proportion of volunteers lost (9%), this is significant because it could be considered avoidable. Advance planning to avoid placing volunteers on a ward where a relocation was planned, or better information / support for volunteers about the ward move could have prevented their loss to the programme.

Volunteer Retention by Hospital Department

There were no significant differences in the reasons given for leaving the role between the hospital departments. This may be due to a genuine lack of significance, but the small sample size ($n = 32$) is also likely to be contributory. This small sample size may also explain the lack of statistical significance in the proportion of volunteers who left in each department, despite noticeable differences (with twice as many volunteers leaving in MOP and AMU compared with T&O, and three times as many compared with GM). These findings probably reflect the duration of the study in each department- because volunteers were introduced in MOP and AMU towards the beginning of the study, volunteers were more likely to leave than in T&O or GM.

Volunteer Retention by Volunteer Age

When examining the reasons for leaving the programme in younger and older volunteers, there were statistically significant differences. These are fully in keeping with what would be expected: younger volunteers were more likely to move away (as many were students) and discontinue volunteering due to study commitments, whilst older volunteers were more likely to discontinue due to work commitments. All three volunteers who left due to ward disruption were older volunteers; it is not clear whether this is of genuine significance, given the small sample size. Age was not a determinant of the likelihood of a volunteer to discontinue their role, demonstrated by the similar proportion of younger and older volunteers leaving during the study period.

Volunteer Retention by Level of Experience

The decision to discontinue volunteering was as common in less experienced volunteers as it was in more experienced volunteers. However, there were some differences observed in the reasons volunteers gave (although

they did not reach statistical significance). Other commitments were cited more commonly by less experienced volunteers (55% compared with 18%). This probably reflects the fact that volunteers quickly identified they had insufficient time in their schedule to commit to volunteering and therefore did not continue the programme. Two of the three volunteers who left due to ward disruption had delivered more than 12 volunteer sessions. This may reflect that these volunteers had had the time to become established in the ward environment, and therefore the disruption would have affected them more than volunteers who had been volunteering for less time.

5.3.3.2 Summary

The implementation of trained volunteer mealtime assistants is sustainable, but a high turnover of volunteers (50% in 15 months) was demonstrated, similar to in the prior feasibility study¹³⁴. This is re-iterated by the median number of volunteer sessions completed being eight. In order to implement a successful volunteer programme, this turnover needs to be planned for, with regular ongoing training sessions to maintain volunteer numbers. A small, but potentially avoidable loss of volunteers occurred due to changes in the ward environment, demonstrating that minimising disruption to volunteers could have a role in improving sustainability.

5.3.4 Acceptability

5.3.4.1 Experiences of Trained Volunteer Mealtime Assistants

Volunteers recognised three elements to their role: preparation, feeding and socialisation, and of these, considered feeding, and strategies to increase dietary intake as their key skill. Volunteers had often developed strategies to encourage as much dietary intake as possible, and staff recognised that volunteers could be more successful in this than they could, a finding that was also recognised in SMAS²³⁷ and has been anecdotally reported in another volunteer programme¹⁷⁹. Preparation was seen as important to allow patients to maintain their independence with eating, which again mirrors the findings of SMAS²³⁷. Socialisation was seen as crucial by volunteers, but was particularly appreciated by staff, who felt this had a positive impact on patients. Other volunteer mealtime assistant programmes have also reported socialisation as a key benefit of the introduction of volunteers^{178,180,181}.

One staff member felt that younger volunteers were less likely to engage with patients than the older volunteers, but this view was not echoed by any other staff member or volunteer. When examining volunteer activity, social interaction and encouragement accounted for a statistically significantly greater proportion of activity of older volunteers, but this did not appear to correspond to a clinically significant difference in a typical volunteer session. It may be that there were some differences in the behaviour of younger and older volunteers that were noticeable to staff, but were not identified by the data collected about volunteer activity due to differences in how volunteers chose to record this data.

Patients who had encountered the volunteers were all positive about their experiences, and those who had not seen the volunteers were supportive of the concept of the programme and recognised the need for additional support for the nursing staff. Likewise, staff were universally positive about the impact the volunteers had had on the wards. This reflects the experience of other volunteer mealtime assistant programmes where patient and staff feedback has been sought: all have reported positive feedback^{167,176–181}. One patient and one staff member in MOP reported the importance of ensuring that volunteers were adequately trained and supervised in their role, but no concerns were raised about the activity of volunteers once they were working on the ward.

Volunteers themselves considered that one of the greatest difficulties in their role was forming a relationship with a patient who then subsequently deteriorated. Nevertheless, volunteers found their role rewarding and gained great satisfaction from patient contact and building relationships with patients. This dichotomy, of the challenge of dealing with patient deterioration and death, yet gaining satisfaction from patient interaction has also been described by volunteers working within a hospice setting^{238,239}.

Volunteer recruitment and retention was recognised as a key challenge to the programme by ward staff. This is in accordance with the noteworthy turnover of volunteers in the study, with 48% leaving during the study period. This problem is widely acknowledged in volunteer literature, and has been recognised by volunteer managers as the biggest challenge of their role¹⁴⁶.

In contrast to these recognised problems with volunteer retention, volunteers taking part in the focus group felt it was crucial to be able to dedicate time to volunteering and expressed great commitment for the role. Focus group volunteers also predominantly described altruistic motivations for volunteering, in contrast to the data collected from volunteer profiles, where an interest in a healthcare career was the over-riding motivation. These disparities are likely to reflect the fact that the sample of volunteers who agreed to participate in the focus group were the subgroup of volunteers who were more committed to volunteering and more experienced. This theory is corroborated by the fact that more experienced volunteers are more likely to describe altruistic motivations, both in our study and in other published research^{150,151}. Although less committed volunteers were probably under-represented in the findings of this qualitative study, this is likely to be unavoidable, as it would be difficult to arrange a focus group specifically with this cohort of volunteers. Volunteers who feel established in their role are likely to be able to better characterise their role and typical mealtime assistant experiences, but it would also have been of benefit to understand the experiences of less established volunteers, as this may have identified important factors surrounding volunteer retention.

5.3.4.2 Summary

Trained volunteer mealtime assistants were found to be acceptable to both patients and staff, with no negative feedback reported about the activity of volunteers on the wards. Volunteers, although they recognised challenges within the role, enjoyed their experiences and were positive about the mealtime assistant programme.

5.3.5 Implementation Cost

Implementation of trained volunteer mealtime assistants cost £5,746 over the 15-month study period. Once this cost was taken into account, the programme was estimated to have saved the trust between £17,131 and £32,359, depending on the seniority of the staff released by volunteers assisting and feeding. The range of calculations made accounted for a differing proportion of healthcare assistants and Band 5 nursing staff being released. However, during observation on the wards, housekeepers (Band 2) and senior nursing staff (Band 6 and 7) were also seen to feed patients at times. In addition, each volunteer mealtime was not directly observed in order to record a direct measure of staff time released over the study period. Therefore, the costs presented here can only be an estimate, based on the most typical scenarios. The potential cost saved in a volunteer feeding programme has never been reported before, and so our cost analysis cannot be directly compared with any other study. Despite this, the potential costs saved are significant, and demonstrate that the cost of training and implementing trained volunteer mealtime assistants is likely to be more than offset by the costs released by their work.

5.3.6 Summary of Discussion: Implementation of Trained Volunteer Mealtime Assistants

Mealtime assistants were successfully adopted in all four hospital departments. 49% of all volunteers expressing an interest in becoming a mealtime assistant completed the training, similar to findings from SMAS. This loss of potential volunteers led to waste of some time and resource, but several strategies were engaged to minimise this. Our experience was that volunteers who needed repeated reminders to attend training or complete the required paperwork frequently did not become active. As a result, mid-way through the study, we standardised the process of contacting volunteers, including defining a number of attempts to contact any one volunteer. The greatest expenditure of time for the research team was the competency assessment, and the policy of only booking a competency assessment for a volunteer who could commit to a specific time appeared to be successful in minimising the number of volunteers who did not become active after completing their competency assessment.

Several strategies proved successful in recruiting volunteers. College and university talks represented a relatively minimal investment of time with a reasonable recruitment rate. Similarly, banners and posters situated around the hospital were successful, although postcards in hospital food outlets were not. However, the majority of our volunteers were signposted to the mealtime assistant role by the hospital voluntary services manager. Underpinning

this was an excellent cooperative relationship between the research team and the voluntary services department, with both teams committed to the recruitment of mealtime assistants for the study.

The requirement for volunteers to undergo standard hospital checks did introduce delay in the recruitment and training process. However, these checks are mandatory and we were unable to identify a simple way to mitigate these delays, which introduced the potential for volunteer losses due to waning interest in the role.

Due to our successful recruitment strategy within colleges and universities, students comprised a greater proportion of our volunteer population than has been reported by other volunteer programmes. This was an advantage within the study because relatively large numbers of volunteers could be recruited in a short space of time. However, there may be some disadvantages to recruiting predominantly younger volunteers: on average, they attended fewer sessions and had a lower attendance percentage. Although these findings were not of statistical significance, they do correspond with pre-existing literature that reports that older volunteers continue volunteering for longer^{151,152,154}.

This known difference in the success of older volunteers was why data on younger and older volunteers were examined separately. There were multiple differences in the characteristics of the two groups, most of which would be expected, such as younger volunteers being less likely to be married, more likely to be in education and more likely to be living with their parents. However, it was interesting to note that younger volunteers were more likely to have a higher level of education and have volunteered previously, both characteristics associated with staying volunteering for longer^{150,152,153}. The increased frequency of these characteristics did not appear to translate to differences in feasibility, sustainability or acceptability, with little clinically and statistically significant differences between younger and older volunteers, although there was a suggestion from the qualitative data that younger volunteers exhibited different behaviours to older volunteers.

Comparison of volunteer characteristics between departments did demonstrate some differences, with volunteers in GM more likely to be married and to have a higher level of current education than those in other departments. This was probably a reflection of the lower proportion of students in GM. Analysing attendance across departments revealed a lower number of sessions were attended in GM, but that volunteers had a higher attendance percentage. However, it is more likely that these differences were due to the short study period in GM rather than any volunteer characteristics. In other departments, non-significant differences in characteristics (such as less male volunteers in T&O and higher median age of volunteers in MOP and GM) did not appear to have any obvious effect on adoption, feasibility or sustainability; although there were significant differences the activities volunteers recorded, these did not appear to be associated with any observed differences in volunteer characteristics. Differences observed in the total number of sessions attended, total number of patients assisted and sustainability leaving their role probably all reflect the duration of volunteering in each department, rather than relating to volunteer differences. This lack of

observed effect of volunteer characteristics may reflect a genuine lack of effect, or may be related to our relatively small sample size of volunteers, with a maximum of only 21 volunteers in each subgroup.

Staff and volunteers identified preparation, feeding and socialisation as the three main roles of the mealtime assistant, and volunteers also talked about improving dietary intake as a key part of their role. Recorded volunteer activity significantly differed between departments, but this was in contrast to activity observed during dietary intake measurements, which did not significantly differ between departments. Variations in and under-recording of activity by volunteers may account for this. Differences in patient participants between departments did not appear to correspond to any differences in activity recorded.

Experienced mealtime assistants were more likely to be older and motivated by altruism than less experienced mealtime assistants, which are again both associated with longer duration of volunteering^{150,151}. Despite this, attendance percentage, and the sustainability did not differ between the two groups, suggesting that either our sample size was too small to identify a difference, or that these factors were not relevant in our volunteer population. Differences were noted in activity between less and more experienced volunteers, but these were probably not of clinical significance.

Volunteers typically attended 75% of the sessions they were timetabled for, and a median of eight sessions in total. This is below the expectation set out by the voluntary services department, and also less than 12 sessions that more experienced volunteers felt were necessary to become fully established in the role. However, some volunteers attended more sessions than they were timetabled for, and highest number of sessions attended by one volunteer was 109, demonstrating that some volunteers were highly active and motivated to continue. Volunteer retention was identified as an issue by ward staff and the turnover of volunteers was high, with 48% of volunteers leaving during the study period. Reasonable attempts were made by the research team to provide ongoing support for the volunteers, with a team member “checking in” on volunteers in their initial two to three weeks following their competency assessment. In addition, more than two unexpected consecutive non-attendances were followed up in an attempt to sustain volunteers in their role. The success of these strategies in preventing volunteers from leaving the programme was not certain, as they were adopted from the outset of the study. However, more intensive support and follow up of volunteers would not have been practical either within the resources of our study or in implementation of the study by a hospital trust without research involvement.

Patients and staff found mealtime assistants acceptable and were overwhelmingly positive about the programme; none had any negative experiences relating to the volunteers. Volunteers themselves described some challenges of being a mealtime assistant, but, overall enjoyed the role and gained a great deal of personal satisfaction from their work.

Estimated costs demonstrated the implementation of the programme to be cost effective.

5.4 Limitations

There were several limitations to this study. The patients recruited to characterise the patient population in each hospital department had to give written consent to participate in the study, and therefore patients who were confused would not have been able to participate. It was decided not to seek proxy consent for confused patients because it was unlikely they would have been able to meaningfully participate in many of the assessments. Similarly, patients who were acutely unwell may have felt too unwell to participate in the assessments due to the time commitment required (approximately one hour). This under-representation of unwell and confused patients means that the characterised patient population would not have been representative of the entire department population. This limitation was acknowledged at the outset of the study and confused and unwell participants were included in the dietary intake measurement and a limited comparison of the two participant populations was made to try and characterise the potential differences between them. In addition, although the characterised population may not have been completely representative of the whole department population, the characterised populations were still comparable across departments, as representing the “best” patients in those areas.

The measurement of dietary intake was of one mealtime per day rather than an entire day’s intake. This decision was taken because the intensive time and personnel commitment required to accurately measure the dietary intake of all patients on the ward at one mealtime could not have been supported across an entire day on 32 different occasions to adequately characterise all four departments. This does mean that definitive conclusions about the adequacy of the patients’ daily nutritional intake cannot be made, with the possibility existing that patients ate greater amounts at the two mealtimes that were not observed. However, this does not seem likely, given that protein and calorie intakes at both lunch and supper times were found to be insufficient.

Volunteer attendance and activity was self-reported, with volunteer activity relating to 60/65 (92%) volunteers and 655/846 (77%) sessions. Not only was data missing from these volunteers and sessions, but there is also the possibility that individual volunteers reported their activity differently. Attempts were made to minimise this possibility, by instructing volunteers on how to complete activity forms at the half day training session, as well as at the competency session (with a real-life demonstration from the trainer) and by reiterating the importance of completing forms and how to do this at each other volunteer encounter. Within the context of 846 volunteer sessions across the 15-month study period, it would not have been practical to directly observe volunteer activity at each session and therefore self-reported activity was the most pragmatic way to collect the data.

The sample sizes for patient and staff interviews and volunteer focus group were relatively small. However, patients and staff were purposively selected to be those who would provide the richest data to maximise information power. Despite the sample size, data saturation was reached, with no new themes identified following the analysis of

the first five patient and staff interviews. Within the volunteer sample, the views of less active and committed volunteers were likely to be under-represented. However, by definition, it was difficult to engage these volunteers in a focus group or interview. As previously acknowledged, the fact that I carried out the interviews and focus group myself, and was known to the staff and volunteer participants may have introduced a bias to the qualitative data. However, it is also likely that my depth of experience of the study would have allowed me to explore the issues raised by patients, staff and volunteers more fully than an independent qualitative researcher.

Finally, calculations relating to cost savings are estimates only, as it would not have been possible to accurately record both the actual time and staff members released by volunteer assistance. An estimate of staff time saved was made from mealtime observations and a range of estimates were provided to account for potential differences in staff members providing the mealtime care based upon our observations, but this was not measured directly.

5.5 Conclusions and Future Recommendations

In conclusion, this was a mixed methods study examining the implementation of trained volunteer mealtime assistants across four departments of one large UK teaching hospital. Volunteers were adopted in all four departments, with a total of 64 volunteers successfully trained during the study. It was feasible to implement the programme and, during 846 volunteer sessions, 1721 patients were assisted. The retention of volunteers at the end of the study period was 52%, demonstrating that the programme is sustainable, but that effort does need to be focussed on regular training to account for this turnover. Finally, the implementation was acceptable to all patients, staff and volunteers who participated in qualitative data collection.

On the basis of this study, the following recommendations would be made for another hospital trust in the implementation of trained volunteer mealtime assistants:

- The need for mealtime assistance is present in a variety of different hospital departments and differences in the patient population does not necessitate differences in the recruitment or training of volunteers
- Close communication and excellent working relationships between the mealtime assistant programme co-ordinator and volunteering office are essential
- Twice as many potential volunteers need to be identified in order to achieve the required number of volunteers, due to a 50% “drop-out” rate through the training process
- The expenditure of time and resource in training potential volunteers who do not become active can be minimised by only arranging one-to-one competency sessions when a volunteer is able to commit to a regular volunteering slot
- A defined process for contacting and following up volunteers who do not respond to contact or fail to attend training means that resource is not wasted on “reluctant volunteers” who are unlikely to achieve their volunteering potential
- Students are a valuable source of volunteers and can be recruited effectively via college and university talks, but the nature of their studies and lifestyle means that they are a transient volunteering population; plans need to be in place to regularly recruit further students
- Volunteers can be expected to attend an average of 75% of the sessions they are scheduled for
- Ongoing support and assistance needs to be available for volunteers once training has been completed; disruption to the volunteering ward environment needs to be minimised wherever possible
- A turnover of 50% of volunteers every 15 months can be expected and so training sessions need to occur on a regular basis to maintain volunteer numbers

- The training of volunteers does require upfront cost, but these costs are more than saved by the time volunteers release from paid staff
- Despite the inherent challenges, staff and patients very much value volunteers and the work they do, and volunteers find their role rewarding

Following on from this study, there are several areas of future research that are of interest:

- Extending the coverage of mealtime assistants to weekend working. Within this study, only a few volunteers expressed an interest in weekend working, and there was concern from the research team that these volunteers would be less well supported due to the differential staffing at the weekend. It is also possible that the need for weekend volunteers may be less, with more relatives available on the wards to help. It would be beneficial to explore these issues to determine if weekend working would be of benefit, and if it can be successfully implemented.
- Evaluating the impact of volunteer mealtime assistants on the dietary intake of hospital inpatients. As identified by the systematic review in this thesis, there is currently inconsistent evidence from very small studies about the effect of volunteers on dietary intake. A larger study with robust methodology would help to clarify this. Any effect on dietary intake would then need to be considered in terms of its clinical consequences.
- Detailed evaluation of the cost-effectiveness of a volunteer mealtime assistant programme. This could be done through direct observation of mealtimes before and after the introduction of volunteers, so that the time spent by staff (and their seniority) could be accurately recorded. Any effect of volunteers on dietary intake and the clinical consequences of this could also be factored in to the cost analysis.
- Extending the mealtime assistant role to patients with stable dysphagia, for example long term dysphagia following a stroke. Within this study, it was originally planned to train volunteers to work within the stroke unit, but on further scoping of the situation it was found that the majority of patients who needed feeding also had dysphagia. However, for many patients this was a stable situation and they were likely to be discharged to appropriate care environments with those recommendations in place. It would therefore be helpful to investigate if volunteers can be safely trained to assist in this circumstance.
- The use of volunteers trained to administer and support long term enteral feeding (e.g. patients with percutaneous endoscopic gastrostomies); currently relatives are able to be trained to perform this role, and therefore the use of volunteers is plausible. In areas such as stroke units, where long term enteral feeding is common, volunteers could potentially have a significant impact on the workload of staff if they were able to support this role.
- Training volunteers for additional patient care roles within the hospital. Considering support specifically for older hospitalised patients, volunteers could be trained to encourage sedentary patients to mobilise, to assist

patients with dementia or confusion in re-orientation activities or to help facilitate discharges, with a “welcome home” service. The first of these suggestions (training volunteers to encourage patients to mobilise) is currently under study in our hospital.

- Implementation of a volunteer mealtime assistance programme with community settings, such as residential or nursing homes. There are currently small studies and reports of volunteers performing this role in the community, but a larger study looking at how to successfully implement a larger programme in residential care, and the differences between this and the hospital setting would be of interest.

APPENDICES

Appendix 1: Volunteer Training PowerPoint



TODAY'S TRAINING

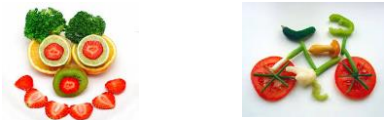
Welcome and introduction
Nutrition and malnutrition
Dysphagia
Practical
Tea and coffee break
Being an MTA

WHY DID YOU DECIDE TO VOLUNTEER WITH US?

THE SOUTHAMPTON MEALTIME ASSISTANCE STUDY

- MTAs were first introduced on G level in 2010 as part of a research study
- The study proved MTAs improved the standard of mealtime care
- Following on from this, the hospital wants to increase the number of MTAs and have them available in lots of different departments
- No other hospital in the UK or internationally has done this on such a large scale
- This is the subject of a new research project, so you are pioneering change!

NUTRITION AND HEALTH



THE IDEAL HEALTHY DIET



NUTRITION IN OLDER ADULTS: DO OLDER PEOPLE IN HOSPITAL NEED A DIFFERENT DIET?



NOT NECESSARILY..

- ◉ Most patients just need to eat a normal, balanced diet
- ◉ Some patients may eat a softer diet or have their food puréed
- ◉ Some patients may be diabetic and so have a reduced amount of sugar in their diet
- ◉ Some patients will be malnourished

MALNUTRITION IN HOSPITALS

- ◉ Malnutrition develops when a person lacks essential nutrients. This could be:
 - Protein
 - Energy (calories)
 - Vitamins and minerals
- ◉ All patients admitted to hospital are screened for malnutrition
- ◉ In 2011, 28% of over 65s admitted to hospital in the UK were at risk of malnutrition
- ◉ In 2007, it was estimated that malnutrition cost the NHS £13 billion- it is probably more now!

MALNUTRITION CAN LEAD TO

- ◉ Reduced muscle strength and lack of energy
- ◉ Longer time to for wounds to heal
- ◉ Pressure ulcers
- ◉ Increased risk of infections
- ◉ Longer recovery time from any illness
- ◉ Low mood

WHY MIGHT MALNUTRITION BE MORE COMMON IN OLDER PEOPLE?

- Poor appetite
- Changes in taste buds
- Longer time taken to eat and fatigue
- Difficulty opening packages
- Difficulty cutting up food or feeding themselves
- Less social interaction
- Unfamiliar hospital environment
- Problems with dentures
- Difficulty swallowing

TREATING MALNUTRITION

- Nutritional supplements
- Non-prescribed:
 - Build-up shakes (vanilla, chocolate, strawberry and banana)
 - Build-up soups (Vegetable, chicken, tomato, leek and potato)
- This can be found in the ward kitchen and can be given to any patient who isn't eating well



TREATING MALNUTRITION

- Nutritional supplements
- Prescribed: Forticreme, fortisip, fortijuice and fresubin



- This are prescribed by doctors and dieticians. They are also in the ward kitchen but aren't for general use

TREATING MALNUTRITION

- More food!
- Offer patients the higher calorie options
- Anything the patient can eat is a good thing (even if it seems like an unhealthy option)

Yes please	Not so important
Build up soups	Normal hospital soup
Dinners with cream or cheese sauces	Sandwiches and salads
Puddings with custard	Jelly
Full fat yoghurt	Low fat or diet options

HOSPITAL MENU

- Medirest are the company that supply food to the hospital
- The food arrives in individual patient portions and is heated once it gets to the wards
- The main menu is available on the ward and the symbols next to each item give extra information:
 - E** High energy
 - H** Healthy eating option
 - V** Vegetarian
 - GF** Gluten free
 - LS** Low salt
 - S** Softer options
- Diabetic patients should generally pick **H** choices

SPECIAL MENUS

- In addition to the normal menu, several special menus are available on request:
 - Kosher, Halal and Asian Vegetarian
 - Vegan
 - Cancer Care and Cystic Fibrosis additional menus
 - Renal diets
 - Allergy menus (eg milk, egg, nuts, wheat)

DYSPHAGIA

- Dysphagia is the medical term for swallowing difficulty
- It may be caused by a range of medical conditions, including:
 - Stroke
 - Head injury
 - Dementia
 - Parkinson's disease
 - Lung conditions and breathing difficulties
 - Infections
- However, some older people will have difficulty swallowing when they are unwell with any illness

WHAT ARE THE CONSEQUENCES OF DYSPHAGIA?

- Patients are at higher risk of food or drink going down the wrong way and into the lungs
- This can lead to:
 - Coughing and choking
 - Chest infections, breathing difficulties and pneumonia
 - Dehydration and malnutrition

HOW IS DYSPHAGIA IDENTIFIED?

- Most of the time, dysphagia will have been identified by the nurses, patient or relatives
- Common signs might be:
 - Coughing after swallowing
 - Double swallowing
 - Effortful swallowing
 - Food pocketing in the cheeks
 - Bubbly voice or sounding chesty after eating
 - Food or fluid coming back through the nose
 - Choking
 - Shortness of breath
 - Face changing colour

HOW IS DYPHAGIA MANAGED?

- The patient will be assessed by a member of the speech and language team, who test them with a variety of food and drink textures and decide what is safest
- Drinks can have thickener added
- Food texture is modified:
 - Purée B: smooth and runny
 - Purée C: smooth and thicker
 - Soft E: soft and fork mashable



University Hospital Southampton

Modified Texture

SLT Care Plan in Place: ☐

Please check SLT and/or nursing care plan and diet grid for food and fluid restrictions

e.g. thin/thickened fluids, puree diet or positioning

Check any medication restrictions with nurse in charge

Patient Name:
Date:

V.3 04/12

Patients with dysphagia
are fed by the trained
nursing staff- not by you
as volunteers

You only need to be able to
identify them so you know
not to feed them!

HOW DOES IT FEEL TO BE FED?

Practical Scenarios

FEEDING TIPS: POSITIONING

- The safest position for feeding is:
 - Sat fully upright in the bed or in a chair
 - Sitting up straight
 - Head/chin tilted slightly forward
- Think about your position too
 - Sit at the same level as the patient OR
 - Raise the bed so it is at your standing height
 - Towering over the patient is not ideal!

FEEDING TIPS: ENVIRONMENT

- Ideally a calm, relaxed environment
- Turn off radios or TVs if causing a distraction
- If a patient is easily distracted, half drawing the curtain may help

FEEDING TIPS: SUPPORTING PATIENTS

- Encourage patients to do as much as they can for themselves
- Make sure patients have their teeth in!
- Describe food positively
- Move food within the patient's reach
- Open packages and cut up food first
- Some patients may just need help getting food on the spoon/fork and be able to feed themselves

FEEDING TIPS: FEEDING

- Spoons are often easier to use than forks
- Offer smaller mouthfuls than you would normally choose for yourself, particularly if dealing with liquids (eg soup)
- Make sure that the patient's mouth is empty before offering another mouthful
- Take it slowly- eating can be tiring for unwell people

HOW A HOSPITAL WARD WORKS

WARD STAFF



- Purple = matron
- In charge of a whole department
- Generally not involved in the day-to-day running of the ward



- Navy blue = Sister or charge nurse
- Usually in charge of the ward and the person to ask about who to help

WARD STAFF



- Sky blue = staff nurse
- Will be in charge of a bay of patients and know most about those specific patients
- Often busy doing medication rounds during mealtimes



- Light blue = health care assistant
- Helps trained nurses with tasks such as washing, taking patients to the toilet and feeding
- Can help with re-positioning

WARD STAFF



- Lilac = housekeeper
- Often acts as mealtime co-ordinator, checking all patients get the correct meal
- Best person to ask for meal related queries

BED SIGNS: IMPORTANT TO RECOGNISE

- **Nil By Mouth:** No food, fluid or medication by mouth
- **Modified Texture:** for patients with difficulty swallowing, e.g. thickened fluids, puree or soft diet; these patients should only be fed by nursing staff
- **Nutrition Plan in Place:** for patients whose nutrition is being monitored, e.g. red tray; even more important to make sure food chart completed
- **Restricted Fluids:** for patients whose fluid intake is restricted; don't change water jugs or give patient extra drinks

BED SIGNS: FOR INFORMATION ONLY

- **Special Menu** e.g. diabetic, gluten free
- **Diet Restrictions** e.g. allergies, light, low residue
- **Patient Choice** e.g. vegetarian, Halal, alternative

ROLE OF THE MTA

WHEN YOU ARRIVE

- Wear your MTA polo shirt
- Sign in at reception
- Go up to the ward
- Wash hands
- Find the MTA folder and sign in
- Report to the nurse in charge or housekeeper (depending on the ward) to see where you are most needed
- Check the bed signs in the bay you have been allocated
- Say hello to the patients in the bay, offer to clean tables and wash hands
- Identify any patients who may need repositioning and ask staff to help
- Move tables within reach
- Wait for food to arrive
- After meal, complete food record chart of any patient you have helped
- Report back to the nurse in the bay before you go home

FOOD RECORD CHARTS

- A record of a patient's food and fluid intake
- Found in the folder at the end of each patient's bed
- Anyone who knows what the patient has eaten can complete them
- Really helpful so that dieticians and doctors can assess a patient's intake accurately
- Includes: all food, all drinks, all supplements
- Check with nurse in the bay if you can't find a food chart in a patient's notes

ROLE OF THE MTA

- Preparing patients and the area for meals
- Checking patients position during meals
- Cutting up food, opening packets
- Encouraging patients to eat
- Feeding patients
- Completing food record charts
- Reporting any concerns or worries to the nurse in charge
- Social interaction with the patients- this is often the part they value the most

NOT THE ROLE OF THE MTA

- Re-positioning or moving patients (although you can use the bed controls)
- Reheating food
- Helping patients take medication
- Cleaning teeth (although you can if you don't mind)
- Taking patients to the toilet

PATIENTS YOU SHOULD NOT FEED

- Those who have dysphagia, identified by:
 - Modified texture sign above the bed
 - Thickener by the bedside
 - 'Ready-meal' container
 - Informed by staff
- Those who are too drowsy
- Those who are lying flat and can't be repositioned
- Those who are aggressive or threatening (very few patients)
- Those in side rooms

WHAT DO YOU DO IF SOMEONE REFUSES TO EAT?

WHAT HAPPENS NEXT?

- Volunteer office requests your references
- Once the office has received your references, they send your DBS form away
- DBS form comes back to you and not us- so you need to let us know once it comes through and show it to the volunteer office
- Arrange a competency assessment with me- we will arrange this on the ward and day you would like to volunteer
- Pass your competency assessment
- Collect your MTA t-shirt

- Report sickness to Fiona, Beth or the ward
- Pre-planned absences can be recorded on the MTA register

CONTACT DETAILS

- Fiona Rossiter, MTA trainer
email f.rossiter@soton.ac.uk
telephone 02381 206134
- Beth Giddins, MTA admin
email beth.giddins@uhs.nhs.uk
telephone 02381 206132
- Kim Sutton, Volunteer Service Office
email kim.sutton@uhs.nhs.uk
telephone 02380 794688

Appendix 2: Study Documentation

Appendix 2.1: Ethical Approval



NRES Committee London - Chelsea
Research Ethics Committee (REC) Bristol Centre
Level 3, Block B
Whitefriars
Lewins Mead
Bristol
BS1 2NT

31 July 2014

Dr Helen C Roberts
Senior Lecturer in Geriatric Medicine
University of Southampton
Academic Geriatric Medicine
Southampton General Hospital
Tremona Rd
Southampton
SO16 6YD

Dear Dr Roberts

Study title:	The Southampton Mealtime Assistance Roll-out Trial (SMART)
REC reference:	14/LO/1363
IRAS project ID:	148210

Thank you for your letter of 30 July 2014, responding to the Proportionate Review Sub-Committee's request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved by the sub-committee.

We plan to publish your research summary wording for the above study on the NRES website, together with your contact details, unless you expressly withhold permission to do so. Publication will be no earlier than three months from the date of this favourable opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to withhold permission to publish, please contact the REC Manager Miss Gemma Oakes, nrescommittee.london-chelsea@nhs.net.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact Catherine Blewett (catherineblewett@nhs.net), the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" above).

Approved documents

The documents reviewed and approved by the Committee are:

<i>Document</i>	<i>Version</i>	<i>Date</i>
Evidence of Sponsor insurance or indemnity (non-NHS Sponsors only) [University of Southampton Indemnity]	1	11 July 2014
GP/consultant information sheets or letters	1	30 July 2014
GP/consultant information sheets or letters [Consultant letter]	1	01 July 2014
Interview schedules or topic guides for participants [Topic	1	01 July 2014
IRAS Checklist XML [Checklist_11072014]		11 July 2014
Letter from sponsor [Letter of sponsorship]	1	11 July 2014
Other [Poster for display during dietary intake measurement]	2	30 July 2014
Participant consent form [Consent form relatives, staff and volunteers]	1	01 July 2014
Participant consent form [Consent form- patients]	2	30 July 2014
Participant information sheet (PIS) [Participant information sheet- patients and relatives]	2	30 July 2014
Participant information sheet (PIS) [Participant information sheet- staff]	1	01 July 2014
Participant information sheet (PIS) [Participant information sheet- volunteers]	1	01 July 2014
REC Application Form [REC_Form_11072014]		11 July 2014
Referee's report or other scientific critique report [Peer review	1	01 July 2014
Referee's report or other scientific critique report [Peer review-	1	01 July 2014
Referee's report or other scientific critique report [Peer review	1	01 July 2014
Research protocol or project proposal [Protocol]	1	01 July 2014
Summary CV for Chief Investigator (CI) [HCR CV May 2014]	1	02 May 2014
Summary CV for student [FR CV]		01 July 2014
Validated questionnaire [Cardiovascular health study scale for frailty]		
Validated questionnaire [Simplified nutritional appetite questionnaire]		
Validated questionnaire [Frail Scale]		
Validated questionnaire [Geriatric depression scale]		
Validated questionnaire [Modified Barthel index]		
Validated questionnaire [Physical activity scale for the elderly]		
Validated questionnaire [Mini mental state examination]		

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document “After ethical review – guidance for researchers” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators

Notification of serious breaches of the protocol
Progress and safety reports
Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:
<http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance>

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at <http://www.hra.nhs.uk/hra-training/>

14/LO/1363

Please quote this number on all correspondence

With the Committee's best wishes for the success of this project.

Yours sincerely



pp Dr Shelley Dolan
Chair

Email: nrescommittee.london-chelsea@nhs.net

Enclosures: *"After ethical review – guidance for researchers" [SL-AR2]*

Copy to: *Mrs Hope Howard, hope.howard@uhs.nhs.uk*

University Hospital Southampton NHS Foundation Trust

Please reply to:

Research and Development SGH
Level E, Laboratory & Pathology
Block, SCBR
MP 138
Southampton University Hospitals
NHS Foundation Trust
023 8120 5078
023 8120 8678
sharon.atwill@uhs.nhs.uk

Telephone:

Fax:

E-mail:

Dr Fiona Rossiter
Academic Geriatric Medicine
Southampton General Hospital
Tremona Road
Southampton
SO16 6YD
07 August 2014

Dear Dr Rossiter

ID: RHM MED1203 The Southampton Mealtime Assistance Roll-out Trial (SMART)

EudraCT:

Thank you for submitting all the required documentation for Trust R&D approval. I write to inform you that your study has full UHS R&D approval. Please find attached the Conditions of Trust R&D approval which you are obliged to adhere to.

Please note that according to the 70-day benchmark you should aim to recruit your first patient by 16 October 2014.

You are required to keep copies of all your essential documents relating to this study. Please download a copy of the relevant Investigator Site File template from the R&D website: <http://www.uhs.nhs.uk/Research/For-investigators/Sitefile.aspx>.

Your project is subject to R&D monitoring and you will be contacted by our office to arrange this.

Please note: A condition of approval is that any changes need to be timeously notified to the R&D office. This includes providing copies of:

- . All NRES substantial amendments and favourable opinions;
- . All Serious Adverse Events (SAEs);
- . NRES Annual Progress Reports;
- . Annual MHRA Safety Reports;
- . NRES End of Study Declaration;
- . Notifications of significant breaches of GCP or protocol

Please quote the above RHM No. On any correspondence with our office.

Should you, or any of your team, require training in any of the policies and procedures required to ensure compliance with the conditions of approval, please refer to the R&D Training website <http://www.uhs.nhs.uk/Research/For-investigators/Mandatory-training-governance-and-safety-managementUMandatory-training-governance-and-safety-management.aspx> for an up-to-date calendar of training events.

Yours sincerely



Sharon Atwill

Research Governance Officer

Appendix for R&D approval letter dated: 07 August 2014

RHM MED1203

Study Title: The Southampton Mealtime Assistance Roll-out Trial (SMART)

The following documents have been reviewed as part of the R&D approval.

Document	Version	Date
Protocol	1 n.a.	01 July 2014
IRAS Form - SSI Form		06 August 2014
Participant Information Sheet - Patient/Relative	2	30 July 2014
Participant Information Sheet - Mealtime Assistants	1	01 July 2014
Participant Information Sheet - Staff	1	01 July 2014
Informed Consent Form - Patient	2	30 July 2014
Informed Consent Form - Staff, Volunteers, Relatives	1	01 July 2014
Sponsor letter	n.a.	09 July 2014
CV - Dr F Rossiter	n.a.	03 June 2014
CV - Dr H Roberts	n.a.	30 May 2014
REC approval letter	n.a.	31 July 2014
Questionnaire - Physical Activity Scale	n.a.	Undated
Questionnaire - Mini Mental State	n.a.	Undated
Questionnaire - Modified Barthel Index	n.a.	Undated
Questionnaire - Geriatric Depression Scale	n.a.	Undated
Questionnaire - Frail Scale	n.a.	Undated
Questionnaire - Cardiovascular Health Study for Frailty	n.a.	Undated
Questionnaire - Simplified Nutritional Appetite	n.a.	Undated
Interview Topic Guide	1	01 July 2014
Advertisement	2	30 July 2014
GP Letter	1	30 July 2014
Consultant Letter	1	01 July 2014
University of Southampton Insurance	n.a.	06 August 2014

Appendix 2.3: Patient and Relatives Information Sheet

A research study to evaluate the use of mealtime assistants across University Hospital Southampton

LREC number: 14/LO/1363

We would like to invite you to take part in a research study. Before you decide we would like you to read the following information in order for you to understand why the research is being done and what it will involve.

Part 1 tells you the purpose of this study and what will happen to you if you take part.

Part 2 gives you more detailed information about the conduct of the study.

Take time to decide whether or not you wish to take part.

PART ONE

What is the purpose of the study?

The aim of this study is to see if volunteers helping as mealtime assistants can be introduced in several different departments of University Hospital Southampton. We want to know if this approach is practical and if patients and staff find it helpful. Additionally, we would like to assess whether the volunteers affect the food choices and amount that patients eat.

Why have I been chosen?

You are being asked to take part in this study because you are an inpatient on one of the wards that is a part of this study and we are asking all patients over 70 years of age admitted to these wards if they are happy to participate.

Do I have to take part?

No, it is up to you to decide whether or not to take part. If you do, you will be asked to sign a consent form. You are still free to withdraw at any time and you do not have to give us any reason why. A decision to withdraw at any time, or a decision not to take part, will not affect the standard of care you receive.

What will happen to me if I take part?

If you agree to take part in this study, we would like to collect a variety of data about your health, activity and lifestyle, as well as information about your discharge from hospital, when it occurs. This will be done by asking you some questions and conducting some simple tests, as detailed below.

1. Use of your routinely collected hospital information

We would like to collect existing data from your medical records (both paper and computer records), which would have been obtained when you were admitted to hospital. This would include blood test results, weight, height, nutrition score, previous and current illnesses, medications and information about how you manage at home. We would also talk to your nurse about the amount of help you are having at the moment.

2. Questionnaires

We would like to ask you some questions about your appetite, activity, memory and concentration. One of these questionnaires asks about your mood and feelings. If you find these questions upsetting or your answers suggest that you are suffering with depression, we will talk to you about whether you would like to have further support from our psychology team. The questionnaires will take about 30-40 minutes to answer in total.

Additionally, we hope to interview a few patients or relatives from each ward for around 30 minutes (either on the ward or in a private room, according to their choice) about their views on mealtimes and nutrition in hospital in more depth. The interviews will be audio-taped so that we can analyse the results in more detail.

3. Body measurements

If you agree we would also like to conduct some simple tests for which you can remain clothed, and which take about 15-20 minutes to measure. These are:

- a) your strength, measured by asking you to grip a measuring handle with your hands
- b) the composition of muscle and water in your body, using a quick and simple test called bio-impedance, which involves placing a sticker on your hand and foot, to pick up small electrical messages from your body (rather like an ECG heart tracing).
- c) the time it takes you to walk a short distance using your normal walking aids

4. Activity monitoring

We hope to measure your current activity in hospital. This is done by asking you to wear a device called an accelerometer. This is worn on your wrist and is very similar in size and weight to a watch. It is able to record information about how active you are whilst it is in place. It can be worn during all your normal daily activities, including sleeping and showering. The accelerometer can collect information for up to one week. However, it can be removed at any time, for example, if you were discharged from hospital.

Expenses and Payment

There is no payment for participants in this study.

Are there any risks or disadvantages associated with taking part?

There are no risks for those patients agreeing to the use of routine data, answering questionnaires, assessment of well-being or grip strength. Body composition cannot be measured on individuals who have a pace maker or similar electronic device. We will not be taking new blood samples, simply collecting the results of blood tests you have already had taken. These assessments will take about an hour in total, and we realise this is a time commitment for you to make.

The individual interviews will be anonymised. This will be an additional task lasting around 30 minutes, and patients or relatives will be invited to consent to this specifically.

What are the possible benefits of taking part?

There are benefits from participating in a research study in terms of rigorous clinical assessment e.g. you and your clinical team will have information about your health and body composition that would not be part of your usual care. The information that is obtained during this study will allow us to determine if there is any benefit to specific

meal time assistance and then make recommendations to improve future patient care. The Catering User Group is very supportive of this initiative.

What happens when the research study stops?

If the study is successful, we hope to be able to continue to expand the use of mealtime assistants in the hospital.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. More detailed information on this is given in part two of the sheet.

Will my taking part in the study be kept confidential?

Yes, we will follow ethical and legal practice and all information about you will be handled in confidence. The details are included in Part 2.

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART TWO

What if new information becomes available?

Sometimes we get new information about the intervention being studied. If this happens, a member of the research team will tell you and discuss whether you would like to continue in the study. If you decide not to continue in the study your care will continue as usual on the ward. If you decide to continue in the study we may ask you to sign an updated consent form. If at any time the research team consider it to be in your best interest to withdraw from the study, this would be discussed with you and your care would continue as usual on the ward. If for any reason the research study stopped we would inform you.

What will happen if I don't want to carry on with the study?

You can let us know at any time if you do not wish to participate in the study. No further assessments would be made but we would like to retain the use of anonymised routine data and any data already collected which would be important for the overall study results. Similarly, it would be important for this study to be able to record patient outcomes such as date of hospital discharge available from the hospital Patient Administration system.

What if there is a problem?

If you have any cause for concern regarding your participation in the trial, please contact one of the researchers in the first instance (see contact details at the end of this sheet). If this is unsatisfactory, they will be able to direct you to an alternative person who will be able to help.

If you have a complaint which cannot be resolved by these measures, you may wish to complain formally. You can do this through the NHS Complaints Procedure. Details can be obtained from University Hospital Southampton NHS Foundation Trust. University Hospital Southampton sponsors this study and provides indemnity against clinical negligence during the study.

Will my taking part in this study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. The researchers carrying out this study will have access to your information and we will inform your Hospital Consultant and your GP that you are participating in the study.

What will happen to the data collected about me?

The data we collect about you will be stored securely in our research unit. The paperwork with information that can identify you (such as your name and date of birth) is limited to the consent form you sign and a list of people involved in the study. Any other information we keep about you will have your name and date of birth removed from it so that you can't be recognised by it. When we analyse the results, your data will be used anonymously. Our procedures for handling, processing, storing and destroying data relating to your participation in the study are compliant with the Data Protection Act 1998. In accordance with this Hospital's regulations we are required to keep your data securely for 10 years.

Those people who take part in interviews will have the interview recorded. Although quotes from the interviews may be published, they will be anonymised so that you cannot be identified from anything that has been said.

For the purposes of monitoring research there is a possibility that the hospital's Research and Development department will audit the data that we have collected. Your data may be used in future studies by our research team looking at the characteristics of older people in hospital. If this happens, your data will be used anonymously so you cannot be identified. Any new research studies using your data will be authorised by the local research ethics committee.

What will happen to the results of the research study?

The results of the research will be published in medical scientific journals. Research staff may also present the results at conferences and local meetings, and on the hospital web-site where it would be available to members of the public. You will not be identified in any report produced.

Who is organising and funding the research?

This research is being funded by the National Institute of Health Research, part of the Department of Health.

Who has reviewed the study?

This study has been reviewed and approved by the London-Chelsea Research Ethics Committee and by the research and development team at University Hospital Southampton NHS Trust.

This information sheet is for you to keep. If you are interested in participating in this study, please speak to your nurse who will contact the research team. Thank you very much for reading this information and considering taking part in the study. For any further information please contact either:

Dr Fiona Rossiter
Academic Clinical Fellow in Geriatric Medicine
f.rossiter@soton.ac.uk
023 8120 6134

Dr Helen Roberts
Senior Lecturer in Geriatric Medicine
hcr@soton.ac.uk
023 8120 4354

Appendix 2.4: Staff Information Sheet

A Research Study to evaluate the use of mealtime assistance across University Hospital Southampton

LREC number: 14/LO/1363

We would like to invite you to take part in a research study. Before you decide we would like you to read the following information in order for you to understand why the research is being done and what it will involve.

Part 1 tells you the purpose of this study and what will happen to you if you take part.

Part 2 gives you more detailed information about the conduct of the study.

Take time to decide whether or not you wish to take part.

PART ONE

What is the purpose of the study?

The aim of this study is to see if volunteers helping as mealtime assistants can be introduced across several different departments of University Hospital Southampton. We want to know if this approach is practical and if patients and staff find it helpful. Additionally, we would like to assess the differences in food choice and dietary intake between these different departments.

Mealtime assistance means help provided by volunteers during mealtimes. The volunteers will have completed a training programme and receive ongoing support from the hospitals speech therapy and dietetic department. The study is taking place in five different departments of UHS and two wards will take part in each department. Volunteers are being introduced into each department in 3 month periods.

The patients suitable for assistance will be identified by one of the nursing staff on duty. The volunteers will be available to help patients over the age of 70 years. They will assist as needed, for example by making sure the patient can reach their food or by feeding them if needed. They will encourage as much independence as possible and will only assist if the patient is happy and it is safe for this to happen.

Why have I been chosen?

You are being asked to take part in this study because you are a member of the clinical team on one of the wards involved in this study and we would value your opinion on issues relevant to the study that has been described above.

Do I have to take part?

No, it is up to you to decide whether or not to take part. If you do, you will be asked to sign a consent form. You are still free to withdraw at any time and without giving a reason. This will impact in no way upon your work situation.

What will happen to me if I take part?

You will be invited to attend a focus group lasting no more than one hour, along with 6 - 10 of your work colleagues. The discussion will be led by a researcher, who will ask open questions and aim to include all participants' in the discussion. The discussion will

be aimed at obtaining your experiences and views of mealtime assistance and the challenges and difficulties faced when providing good nutritional care on a ward. The time required for you to take part in this project has been agreed by senior managers in your work place. The focus group will be audio-taped to aid data analysis.

Expenses and Payment

There is no payment for participants in this study.

Are there any risks or disadvantages associated with taking part?

There are no known risks with taking part in this research.

What are the possible benefits of taking part?

We anticipate that staff will wish to record their views on nutrition in hospital. The information that is obtained during this study will allow us to determine if there is any benefit to specific meal time assistance and then make recommendations to improve future patient care. The Catering User Group is very supportive of this initiative.

What happens when the research study stops?

If the study is successful, we hope to be able to continue to expand the use of mealtime assistants in the hospital.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. More detailed information on this is given in part two of the sheet.

Will my taking part in the study be kept confidential?

Yes, we will follow ethical and legal practice and all information about you will be handled in confidence. The details are included in Part 2.

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART TWO

What if new information becomes available?

Sometimes we get new information about the intervention being studied. If this happens, a member of the research team will tell you and discuss whether you would like to continue in the study. If you decide not to continue in the study it will not affect any aspect of your experience at work, and if you do decide to continue in the study you will need to sign an updated consent form. If for any reason the research study stopped we would inform you.

What will happen if I don't want to carry on with the study?

You can let us know at any time if you do not wish to participate further in the study. No further information will be collected but we would like to use any information that we have obtained from you up to this point. Being able to do this would be important for the study results.

What if there is a problem?

If you have any cause for concern regarding your participation in this study, please contact one of the researchers in the first instance (see contact details at the end of this sheet). If this is unsatisfactory, they will be able to direct you to an alternative person who will be able to help.

If you have a complaint, which cannot be resolved by these measures, you may wish to complain formally. You can do this through the NHS Complaints Procedure. Details can be obtained from University Hospital Southampton NHS Foundation Trust. University Hospital Southampton sponsors this study and provides indemnity against clinical negligence during the study.

Will my taking part in this study be kept confidential?

Within the focus group a verbal agreement will be made to maintain confidentiality amongst the participants regarding any issues discussed.

All information which is collected from you during the course of the research will be kept strictly confidential. Only the researchers carrying out this study will have access to this information. All data that we collect from you will be stored on a password protected anonymous database or in a locked drawer in a secure room for paper copies. In the analysis of results, your data will be used anonymously and non-attributable to any individual. Our procedures for handling, processing, storing and destroying data relating to your participation in the study are compliant with the Data Protection Act 1998. In accordance with the hospital's regulations we are required to keep your data secure for 10 years. For the purposes of monitoring research there is a possibility that the hospital's Research and Development department will audit the data that we have collected.

What will happen to the results of the research study?

The results of the research will be published in medical scientific journals. Research staff may also present the results at conferences and local meetings, the volunteer newsletter and the hospital web-site. You will not be identified in any report produced.

Who is organising and funding the research?

This research is being funded by the National Institute of Health Research and is one of several projects that form a collaboration between the University of Southampton and UHS.

Who has reviewed the study?

This study was given a favourable ethical opinion for conduct in the NHS by the local Research Ethics Committee, and has been reviewed by the research and development team at University Hospital Southampton NHS Trust.

This information sheet is for you to keep. If you are interested please contact Fiona Rossiter via the details below, return the reply slip to the address on the slip, or speak to the person who gave you this sheet. If you decide to take part you will be given a copy of the consent form, which you sign when you agree to participate in the study. Thank you very much for reading this information and considering taking part in the study. For any further information please contact:

Dr Fiona Rossiter
Academic Clinical Fellow
Email : f.rossiter@soton.ac.uk
Tel: 023 8120 6134
Academic Geriatric Medicine, SGH

.....
A research study to evaluate the use of mealtime assistance across University Hospital Southampton

I would like further information on this study

Name..... Date.....

Telephone number

Please return to:
Fiona Rossiter,
Academic Geriatric Medicine,
Mailpoint 807,
Southampton General Hospital,
SO16 6YD.

Appendix 2.5: Mealtime Assistant Information Sheet

A research study to evaluate the use of mealtime assistance across University Hospital Southampton

LREC number: 14/LO/1363

We would like to invite you to take part in a research study. Before you decide we would like you to read the following information in order for you to understand why the research is being done and what it will involve.

Part 1 tells you the purpose of this study and what will happen to you if you take part.

Part 2 gives you more detailed information about the conduct of the study.

Take time to decide whether or not you wish to take part.

PART ONE

What is the purpose of the study?

The aim of this study is to see if volunteers helping as mealtime assistants can be introduced across several different departments of University Hospital Southampton (UHS). We want to know if this approach is practical and if patients and staff find it helpful. Additionally, we would like to assess the food choices and amount that patients eat in each of the departments before and after the volunteers are introduced.

The study is taking place in five different departments of UHS and two wards will take part in each department. Each department will be involved in the study for 3 months.

Why have I been chosen?

You are being asked to take part in this study because you are a member of the team of trained mealtime assistants and we would value your views about the experience of being involved in this study.

Do I have to take part?

No, it is up to you to decide whether or not to take part. If you do, you will be asked to sign a consent form. You are still free to withdraw at any time and without giving a reason. A decision to withdraw at any time, or a decision not to take part, will not affect your role as a hospital volunteer.

What will happen to me if I take part?

You will be invited to attend one or two focus groups lasting no more than one hour with 6 – 10 of your volunteer colleagues to discuss your experiences and views on mealtime assistance. The discussion will be led by a researcher. The time required for you to take part in this project has been agreed by the voluntary services manager. The focus groups will be tape-recorded to aid data collection, but all contributions will be anonymised and non-attributable to any individual.

Expenses and Payment

There is no payment for participants in this study.

Are there any risks or disadvantages associated with taking part?

There are no risks associated with taking part, but we recognise that this will be an additional task lasting up to one hour.

What are the possible benefits of taking part?

The information that is obtained during this study will allow us to determine if there is any benefit to specific meal time assistance and then make recommendations to improve future patient care.

What happens when the research study stops?

If the study is successful, we hope to be able to continue to expand the use of mealtime assistants in the hospital.

What if there is a problem?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. More detailed information on this is given in part two of the sheet.

Will my taking part in the study be kept confidential?

Yes, we will follow ethical and legal practice and all information about you will be handled in confidence. The details are included in Part 2.

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART TWO

What if new information becomes available?

Sometimes we get new information about the intervention being studied. If this happens, a member of the research team will tell you and discuss whether you would like to continue in the study. If for any reason the research study stopped we would inform you.

What will happen if I don't want to carry on with the study?

You can let us know at any time if you do not wish to participate further in the study. No further information will be collected but we would like to use any information that we have obtained from you up to this point. Being able to do this would be important for the study results.

What if there is a problem?

If you have any cause for concern regarding your participation in the trial, please contact one of the researchers in the first instance (see contact details at the end of this sheet). If this is unsatisfactory, they will be able to direct you to an alternative person who will be able to help.

If you have a complaint which cannot be resolved by these measures, you may wish to complain formally. You can do this through the NHS Complaints Procedure. Details can be obtained from University Hospital Southampton NHS Foundation Trust. University Hospital Southampton sponsors this study and provides indemnity against clinical negligence during the study.

Will my taking part in this study be kept confidential?

Within the focus group a verbal agreement will be made to maintain confidentiality amongst the participants regarding any issues discussed. All information which is collected about you during the course of the research will be kept strictly confidential. All data that we collect from you will be stored on a password protected anonymous database or in a locked drawer in a secure room for paper copies.

Any other information about you will have your name removed so that you cannot be recognised from it. In the analysis of results, your data will be used anonymously. Our procedures for handling, processing, storing and destroying data relating to your participation in the study are compliant with the Data Protection Act 1998. In accordance with the hospital's regulations we are required to keep your data secure for 10 years. For the purposes of monitoring research there is a possibility that the hospitals Research and Development department may audit the data that we have collected.

What will happen to the results of the research study?

The results of the research will be published in medical scientific journals. Research staff may also present the results at conferences and local meetings, in the volunteer newsletter and on the hospital web-site. You will not be identified in any report produced.

Who is organising and funding the research?

This research is being funded by the National Institute of Health Research, part of the Department of Health.

Who has reviewed the study?

This study was given a favourable ethical opinion for conduct in the NHS by the local Research Ethics Committee, and has been reviewed by the research and development team at University Hospital Southampton NHS Trust.

This information sheet is for you to keep. If you are interested please contact Fiona Rossiter via the details below, return the reply slip to the address on the slip, or speak to the person who gave you this sheet. If you decide to take part you will be given a copy of the consent form, which you sign when you agree to participate in the study. Thank you very much for reading this information and considering taking part in the study. For any further information please contact:

Dr Fiona Rossiter
Academic Clinical Fellow
Email: f.rossiter@soton.ac.uk
Tel: 023 8120 6134
Academic Geriatric Medicine

.....

A research study to evaluate the use of mealtime assistance across University Hospital Southampton

I would like further information on this study

Name..... Date.....

Telephone number

Please return to: Fiona Rossiter,
Academic Geriatric Medicine,
Mailpoint 807,
Southampton General Hospital,
SO16 6YD.

Appendix 2.6: Patient Consent Form

A research study to evaluate the use of volunteer mealtime assistants across University Hospital Southampton

LREC number: 14/LO/1363
Participant ID:
Chief Investigator: Dr Helen Roberts
Principal Investigator: Dr Fiona Rossiter

Thank you for reading the information about our research project. If you would like to take part, please read and sign this form.

PLEASE INITIAL THE BOXES IF YOU AGREE WITH EACH SECTION:

1.	I have read the information sheet version.....dated for the above study and have been given a copy to keep. I have been able to ask questions about the study and I understand why the research is being done. I have been informed about any risks or inconveniences involved and the conditions under which the study is to be conducted.	<input type="checkbox"/>
2.	I understand that I can withdraw from the study at any time without my medical treatment or legal rights being affected.	<input type="checkbox"/>
3.	I agree that if I withdraw from this study, all data that has been collected up to this point can still be used, in an anonymised form in the final analysis.	<input type="checkbox"/>
4.	I agree to my Consultant and my GP being informed of my participation in this study.	<input type="checkbox"/>
5.	I understand that relevant sections of my medical notes and data collected during the study may be looked at by responsible individuals from the research team, from regulatory authorities or from the NHS trust where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.	<input type="checkbox"/>
6.	I agree for someone from the research team to look at my records to obtain the information as described in the "use of your routinely collected hospital information part" of the information sheet.	<input type="checkbox"/>
7.	I agree to participate in the questionnaires assessment, as outlined in the information sheet.	<input type="checkbox"/>
8.	I agree to participate in the body measurements assessment, as outlined in the information sheet.	<input type="checkbox"/>
9.	I agree to have my activity recorded by a GeneActiv monitor (an accelerometer worn on the wrist) for up to seven days during my hospital admission and the results being used by the research team.	<input type="checkbox"/>
10.	I agree to my interview being audio taped and I understand that transcripts of my interview will be anonymised and any quotations will be non-attributable.	<input type="checkbox"/>
11.	I understand that the data collected about me may be used to support research in the future, and that my data may be shared anonymously with other researchers	<input type="checkbox"/>

.....
Name Signature Date

.....
Person taking consent Signature Date

.....
Researcher Signature Date

Original for site file/researcher, one copy for participant

Appendix 2.7: Staff and Volunteer Consent Form

**A research study to evaluate the use of volunteer mealtime assistants across
University Hospital Southampton**

LREC number: 14/LO/1363
Participant ID:
Chief Investigator: Dr Helen Roberts
Principal Investigator: Dr Fiona Rossiter

Thank you for reading the information about our research project. If you would like to take part, please read and sign this form.

PLEASE INITIAL THE BOXES IF YOU AGREE WITH EACH SECTION:

1.	I have read the information sheet version.....dated for the above study and have been given a copy to keep. I have been able to ask questions about the study and I understand why the research is being done. I have been informed about any risks or inconveniences involved and the conditions under which the study is to be conducted.	<input type="checkbox"/>
2.	I understand that I can withdraw from the study at any time without my work situation or my legal rights being affected. I agree that all data that has been collected up to this point can still be used, in an anonymised form in the final analysis.	<input type="checkbox"/>
3.	I agree to my interview/focus group being audio-taped and I understand that transcripts of the interview/focus group will be anonymised and any quotations will be non-attributable.	<input type="checkbox"/>
4.	I agree to the Research team contacting me at a later date to see if I want to participate again in this study.	<input type="checkbox"/>
5.	I understand that the data collected about me may be used to support research in the future, and that my data may be shared anonymously with other researchers	<input type="checkbox"/>
6.	I agree to participate in this study.	<input type="checkbox"/>

..... Name Signature Date
..... Person taking consent Signature Date
..... Researcher Signature Date

Appendix 2.8A: Data Collection Booklet for Characterised Participants

Date Information Collected:

d	d	m	m	y	y

Gender:

Male = 0 Female = 1

Date of Birth:

d	d	m	m	y	y

Date of Admission:

d	d	m	m	y	y

SOCIAL CIRCUMSTANCES

Marital status:

Single = 1
 Married = 2
 Divorced or separated = 3
 Widowed = 4
 Cohabiting = 5

Usual Residence:

Private home living alone = 1
 Private home living with friends or relatives = 2
 Sheltered accommodation = 3
 Residential/Rest Home = 4
 Nursing Home = 5

Care prior to admission:

No = 0
 Formal provision = 1
 Informal provision = 2

Community nursing team	<input type="text"/>
Sitting service	<input type="text"/>
Meal provision	<input type="text"/>
Personal care	<input type="text"/>
Shopping	<input type="text"/>
Cleaning	<input type="text"/>

Tobacco and alcohol consumption:

Smoking Never = 1 Ex = 2 Current = 3

Cigarette pack years

--	--	--

Alcohol units per week

--	--

MEDICAL HISTORY

Primary Diagnosis:

Code:

--	--	--	--

Active Co-Morbidities:

No = 0

Yes = 1

Code

*Hypertension

--

0	7	0	1
---	---	---	---

*Diabetes: type 1/type 2 (circle as appropriate)

--

--	--	--	--

Without end-organ damage ⁽¹⁾

--

With end organ damage ⁽²⁾

--

*Myocardial infarction ⁽¹⁾

--

0	7	0	4
---	---	---	---

*Angina

--

0	7	0	3
---	---	---	---

*Congestive heart failure ⁽¹⁾

--

0	7	1	0
---	---	---	---

*Stroke or TIA ⁽¹⁾ (circle as appropriate)

--

--	--	--	--

Hemiplegia ⁽²⁾

--

*Asthma

--

1	1	0	3
---	---	---	---

*Chronic lung disease ⁽¹⁾

--

--	--	--	--

*Cancer: specify site

--

--	--	--	--

Without metastases ⁽²⁾

--

With metastases ⁽⁶⁾

--

Liver disease: specify type

--

--	--	--	--

No portal hypertension or complications ⁽¹⁾

--

With complications ⁽³⁾

--

Peripheral vascular disease ⁽¹⁾

--

0	7	0	9
---	---	---	---

Peptic ulcer disease ⁽¹⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Kidney disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe: creat >265, dialysis, transplant) ⁽²⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
*Arthritis: specify type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>									
Dementia ⁽¹⁾ : specify type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>									
Connective tissue disease ⁽¹⁾ : specify type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>									
Leukaemia or lymphoma ⁽²⁾ : specify type	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>									
HIV or AIDS ⁽⁶⁾	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comorbidities

Code

1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Use additional comorbidity continuation sheet if needed and attach to booklet

Number of additional comorbidity sheets used ☐

Charlson Comorbidity Index

Comorbidity Score (total scores in brackets)	<input type="checkbox"/>	<input type="checkbox"/>
Age Score (1 point for each decade starting at 50 years)	<input type="checkbox"/>	<input type="checkbox"/>
Total Score	<input type="checkbox"/>	<input type="checkbox"/>

Current regular medications:

Medication name

Code

1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

Use additional medication continuation sheet if needed and attach to booklet

Number of additional continuation sheets used

QUESTIONNAIRES

Simplified Nutritional Appetite Questionnaire

--	--

Mini Mental State Examination

--	--

Geriatric Depression Scale

--	--

Barthel Index

--	--

Physical Activity Scale in the Elderly

--	--

Fried Frailty Scale

--	--

FRAIL Scale

--	--

Grip Strength

2 measurements on both sides

Alternate hands, starting with the right

Record to nearest 1kg

Right Measurement 1

--	--

Measurement 2

--	--

Left Measurement 1

--	--

Measurement 2

--	--

Hand dominance Right = 1 Left = 2 Both = 3

--

NUTRITIONAL INDICES

Height, Weight and Body Mass Index

Date Assessed:

d	d	m	m	y	y

Height (cm)

--	--	--

Weight (kg)

			•	
--	--	--	---	--

BMI (kgm⁻²)

		•	
--	--	---	--

MUST Score

Date Assessed:

d	d	m	m	y	y

Total MUST Score

--

DISCHARGE DATA

Date Information Collected:

d	d	m	m	y	y

Date of Discharge:

d	d	m	m	y	y

Length of Stay (days):

--	--	--

Was participant being discharged to their usual residence? No = 0 Yes = 1 ☐

If no, what is the new discharge destination?

Private home living alone = 1
Private home living with friends or relatives = 2
Sheltered accommodation = 3
Residential/Rest Home = 4
Nursing Home = 5
Another hospital = 6
Patient Died = 7

☐

Was a new care package offered? No = 0 Yes = 1 ☐

Was a new care package accepted? No = 0 Yes = 1 ☐

Is new informal care being arranged? No = 0 Yes = 1 ☐

Care on Discharge

No = 0
Formal provision = 1
Informal provision = 2

Community nursing team	<input type="checkbox"/>
Sitting service	<input type="checkbox"/>
Meal provision	<input type="checkbox"/>
Personal care	<input type="checkbox"/>
Shopping	<input type="checkbox"/>
Cleaning	<input type="checkbox"/>
Community therapy	<input type="checkbox"/>

Appendix 2.8B: Data Collection Sheet for Dietary Intake Participants (Demographic Data and Nutritional Indices)

Ward, bay and bed	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Date Dietary Intake Measured	<input type="text" value="d"/>	<input type="text" value="d"/>	<input type="text" value="m"/>	<input type="text" value="m"/>	<input type="text" value="y"/>	<input type="text" value="y"/>
Date This Data Collection Sheet Completed	<input type="text" value="d"/>	<input type="text" value="d"/>	<input type="text" value="m"/>	<input type="text" value="m"/>	<input type="text" value="y"/>	<input type="text" value="y"/>
Date of birth	<input type="text" value="d"/>	<input type="text" value="d"/>	<input type="text" value="m"/>	<input type="text" value="m"/>	<input type="text" value="y"/>	<input type="text" value="y"/>
Sex	Male = 0	Female = 1	<input type="text"/>			
Primary diagnosis	<hr/>					
Height (cm)	<input type="text"/>			<input type="text"/>	<input type="text"/>	<input type="text"/>
Date recorded	<input type="text" value="d"/>	<input type="text" value="d"/>	<input type="text" value="m"/>	<input type="text" value="m"/>	<input type="text" value="y"/>	<input type="text" value="y"/>
Reported = 0	Measured = 1	<input type="text"/>				
Weight (kg)	<input type="text"/>	<input type="text"/>	<input type="text"/>	.	<input type="text"/>	<input type="text"/>
Date recorded	<input type="text" value="d"/>	<input type="text" value="d"/>	<input type="text" value="m"/>	<input type="text" value="m"/>	<input type="text" value="y"/>	<input type="text" value="y"/>
Reported = 0	Measured = 1	<input type="text"/>				
Calculated BMI	<input type="text"/>	<input type="text"/>	.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Malnutrition Universal Screening Tool score	<input type="text"/>					
Date recorded	<input type="text" value="d"/>	<input type="text" value="d"/>	<input type="text" value="m"/>	<input type="text" value="m"/>	<input type="text" value="y"/>	<input type="text" value="y"/>
Level of confusion	<input type="text"/>					
None = 0						
Mild = 1						
Moderate = 2						
Severe = 3						
Unknown = 9						
Level of mealtime assistance received	<input type="text"/>					
Prescribed sip-feeds?	No = 0	Yes = 1	<input type="text"/>			
Eats soft diet?	No = 0	Yes = 1	<input type="text"/>			

Appendix 2.8C: Data Collection Sheet Dietary Intake Participants (Dietary Intake Consumed)

Date:

Ward:

Bay:

Bed

Identifier:

Meal/dessert served:

Full description of item	Weight of item in served meal (g)	Weight of leftover item (g)	Comments

Appendix 2.8D: Data Collection Sheet Dietary Intake Participants (Mealtime Assistance)

Date:

Ward:

Bay:

Bed	Identifier					Assistance Code	
Refused assistance						<input type="checkbox"/>	9
No assistance needed						<input type="checkbox"/>	0
Encouragement						<input type="checkbox"/>	1
Support and preparation (eg opening packets, cutting food, re-organising tray)						<input type="checkbox"/>	2
Assisting patient getting food/drink to mouth but with patient holding cutlery or cup						<input type="checkbox"/>	3
Feeding patient						<input type="checkbox"/>	4
Other comments:							
Bed	Identifier					Assistance Code	
Refused assistance						<input type="checkbox"/>	9
No assistance needed						<input type="checkbox"/>	0
Encouragement						<input type="checkbox"/>	1
Support and preparation (eg opening packets, cutting food, re-organising tray)						<input type="checkbox"/>	2
Assisting patient getting food/drink to mouth but with patient holding cutlery or cup						<input type="checkbox"/>	3
Feeding patient						<input type="checkbox"/>	4
Other comments:							
Bed	Identifier					Assistance Code	
Refused assistance						<input type="checkbox"/>	9
No assistance needed						<input type="checkbox"/>	0
Encouragement						<input type="checkbox"/>	1
Support and preparation (eg opening packets, cutting food, re-organising tray)						<input type="checkbox"/>	2
Assisting patient getting food/drink to mouth but with patient holding cutlery or cup						<input type="checkbox"/>	3
Feeding patient						<input type="checkbox"/>	4
Other comments:							
Bed	Identifier					Assistance Code	
Refused assistance						<input type="checkbox"/>	9
No assistance needed						<input type="checkbox"/>	0
Encouragement						<input type="checkbox"/>	1
Support and preparation (eg opening packets, cutting food, re-organising tray)						<input type="checkbox"/>	2
Assisting patient getting food/drink to mouth but with patient holding cutlery or cup						<input type="checkbox"/>	3
Feeding patient						<input type="checkbox"/>	4
Other comments:							
Bed	Identifier					Assistance Code	
Refused assistance						<input type="checkbox"/>	9
No assistance needed						<input type="checkbox"/>	0
Encouragement						<input type="checkbox"/>	1
Support and preparation (eg opening packets, cutting food, re-organising tray)						<input type="checkbox"/>	2
Assisting patient getting food/drink to mouth but with patient holding cutlery or cup						<input type="checkbox"/>	3
Feeding patient						<input type="checkbox"/>	4
Other comments:							

Appendix 3: Scientific Output

Appendix 3.1: Papers

The impact of trained volunteer mealtime assistants on dietary intake and satisfaction with mealtime care in adult hospital inpatients: a systematic review

Howson FFA, Sayer AA, Roberts HC. Journal of Nutrition, Health & Aging 2017; 21(9):1038-1049. doi: 10.1007/s12603-016-0847-2.

Mealtime assistance may increase the energy and protein intake of hospitalised older patients

Roberts HC, Rossiter FF. Evidence Based Nursing 2016; 19(3):95. doi: 10.1136/ebnurs-2015-102291

Benefit of using volunteers for mealtime assistance

Rossiter FFA, Roberts HC. Nursing Times 2015; 111(12): 22-23

Appendix 3.2: Abstracts

The impact of trained mealtime volunteer assistants for older in-patients

Howson FFA, Robinson S, Cooper C, Ballinger C, Sayer AA, Roberts HC.

Age & Ageing 2017; 46(Suppl2):ii15–ii16. doi.org/10.1093/ageing/afx111.47

The impact of trained volunteer mealtime assistants on dietary intake and satisfaction with mealtime care in adult hospital inpatients: a systematic review

Howson FFA, Sayer AA, Roberts HC. Age & Ageing 2017; 46(suppl1):i35–i38. doi.org/10.1093/ageing/afx068.138

The assessment of frailty in acute hospitals: a comparison of the Fried frailty score, the FRAIL scale and grip strength measurement

Rossiter FFA, Culliford DJ, Sayer AA, Roberts HC. Age & Ageing 2016; 45(suppl1):i16.

doi:10.1093/ageing/afw031.02

Appendix 3.3: Presentations

The Southampton Mealtimes Assistance Roll-out Trial (SMART): Feasibility and acceptability of implementing trained volunteer mealtimes assistants across Southampton General Hospital

Wessex Nutrition Conference, Wessex Academic Health Science Network; 2015

The Southampton Mealtimes Assistance Roll-out Trial (SMART)

Wessex British Geriatrics Society; 2015

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