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Food Allergy in Hospital from the Patient Perspective

**Taking a Mixed Methods approach to understand
Foodservice Management**

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Title

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Abstract

Foodservice is integral to safe, adequate and satisfactory food allergy management in the hospital setting. To date, research focused on objective measures of energy and protein provision, implementation and evaluation of food allergy guidelines and assessment of process failures leading to allergen exposure. There is a lack of focus on taking a person-centred approach to understanding the barriers and enablers to optimal food allergy management.

A mixed methods phenomenological approach was espoused at a tertiary acute care hospital in Melbourne, Victoria. Data collection techniques included 24-hr diet recall, foodservice satisfaction questionnaires and semi-structured qualitative interviews, all delivered by an Accredited Dietitian. Statistical and thematic analysis was conducted, followed by convergence of the results from each phase of the study.

Mean energy intake indicated 64% of requirements and 81% of protein requirements were met; which included external food intake to supplement the hospital diet for around half of the patients. Most patients rated their overall food service satisfaction as 'Good', with food quality being the lowest rated foodservice dimension. Addressing sensory, variety and communications aspects of foodservice were focus areas identified by the study patients. These included improving bland flavours and plain appearance, restricted menu choices and automated allergen interface between systems.

With a person-centred care focus, the study identified new findings on the views and attitudes of patients with a food allergy on foodservice management in hospital. Within the Food and Meal Science field, the study may be seen as an initial exploratory enquiry for future research on food allergy.

Keywords

Food Allergy

Nutrition

Hospital

Mixed Methods

Person Centred Care

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Preface

As a Dietitian working within the public health service in Australia for close to ten years, I feel particularly passionate about our role in highlighting risk and recommending improvements when it comes to food service and nutrition. Food allergy is one of the few areas where nutrition can be life threatening if not adequately managed, and I have been involved recently in hospital initiatives to better identify patients with a food allergy and ensure they are referred to a Dietitian. The next step following this is to ensure the food provided during their inpatient stay meets their needs, including from a nutritional and safety point of view, but most importantly from a patient perspective. This had not been explored previously, and is increasingly pertinent with improved focus on patient centred care.

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Introduction

Foodservice is integral to safe, adequate and satisfactory food allergy management in the hospital setting. Facilities have a duty of care to provide food and beverages that are safe, nutritious and appropriate to meet the diverse needs of their population (Williams, 2009). Many patients and residents are reliant on facilities to provide the majority, or all, of their meals. Unacceptable clinical risk, and/or suboptimal delivery of nutritional adequacy from the hospital menu can arise when the hospital food service is not stringently designed and monitored in relation to food allergens (Taylor & Baumert, 2010). The high-risk nature of food allergy management was tragically evident in 2015 when a Victorian adolescent died during his hospital admission, with the coroner finding that food allergen ingestion was a contributing factor (Coroner's Court of Victoria [CCV], COR 2018: 5382). For this reason, guided by federal legislation ((FSANZ), 2003), Australian hospital food service and quality standards (Australian Commission on Safety and Quality in Health Care, 2017; Department of Health and Human Service (DHHS), 2009; DHHS, 2016), as well as existing guidelines on population nutrition health (National Health and Medical Research Council, 2013), inpatient recipes and menus are devised with care.

In Australia, the National Allergy Strategy has developed resources and policy documents to support safe management of food allergies within the hospital setting (Australasian Society of Clinical Immunology and Allergy (ASCIA) and Allergy & Anaphylaxis Australia (A&AA), 2015). Despite this, there are competing priorities in terms of balancing clinical risk with potential food allergens and providing a nutritionally adequate and acceptable menu for inpatients with a food allergy. Consequently, hospital dietary provision for patients with therapeutic dietary needs including food allergy has been shown to be nutritionally inadequate (Rattray, Desbrow, & Roberts, 2017).

It is within this 'foodscape' of the hospital meal, where intrinsic and extrinsic properties such as food composition, type of food, social functions, external associations, time, frequency and pattern must be explored to best understand the foodservice system (Höijer et al, 2017). Consideration for the 'person' within the healthcare environment and its 'foodscape' is essential.

Background

Person Centred Care

Person centred care is an approach to healthcare that takes consideration for the person beyond their disease or biomedical markers alone (Ekman et al, 2011). The healthcare recipient is seen as a person within their own context, with an individual history, strengths and weaknesses, and the approach honours their dignity and autonomy during the care process. This approach has emerged in contrast to a traditional medical model where the patient is a docile target of an intervention, and instead promotes a partnership between the patient and the care providers. An important practice within person centred care is establishing the patient narrative, being the person's views regarding their life, their situation and medical condition. The patient narrative should then be interwoven into shared decision making and documentation during their health journey.

Peniamina et al (2014) took a person centred care approach to explore factors that affected patient quality of life in relation to food allergies. Four focus groups were conducted, and themes identified that included allergen-free eating issues, health care system issues, costs of having a food allergy, effects on well-being, external influences (e.g. others' lack of awareness), and internal influences (personal growth and adaptation). The study identified health care system issues as one of the factors affecting quality of life for food allergy patients, but the study was not focused on the health care system specifically.

There were no studies in the literature worldwide that took a person centred care approach to understanding food allergy management in the hospital setting. Whilst person centred care is a growing field, and is rapidly taking the place of a paternalistic, top-down medical model (Delaney, 2018), food allergy research in hospital has not yet considered this approach.

Food Allergy in Hospital

Food delivery in hospitals varies depending on the foodservice system in place. The food at the Alfred Hospital is prepared on-site in a centralised kitchen and provided on a 14-day menu cycle. Patients receive meal choices based on their 'diet code' order, which is placed by clinical staff electronically based on their therapeutic needs. Each diet code is designed and overseen by the Dietetic department, to ensure it is clinically appropriate, and a default menu grid provides an auto-order based on the diet code if the patient is

unable to make meal selections. Diet codes available include 'Allergy', 'Diabetic', 'Renal', 'High Energy High Protein' and 'Low Salt' for example. The 'Allergy' diet code is built to be devoid of the top ten allergens as per ASCIA (A&AA, 2015), with the intention of being a safe starting point for the majority of patients with a reported food allergy, prior to their assessment by a Dietitian. All patients with a food allergy should be referred to the Dietitian, as per a local clinical guideline, and the Dietitian completes an assessment within 4 business hours. The Dietitian will then complete further menu tailoring based on the individual patient's food allergy needs.

Studies investigating food allergy management, nutritional adequacy and patient satisfaction in an acute inpatient setting include a quantitative study from Australia (Rattray et al., 2017) that found therapeutic diets, including those for allergy patients, did not meet nutrient needs. Energy and protein intake was compared to the estimated energy targets of patients in the study. The study robustly identified intake inadequacy for patients receiving therapeutic diets, however the authors did not focus on allergy diets; or investigate patient satisfaction surrounding their meal service.

The literature on food allergy management in hospital settings also includes a case study of allergy management in a French hospital, described by Sergeant et al (Sergeant et al., 2003). The authors describe the operating procedure of a hospital food service, designed and overseen by the Dietetics department. The case study did not employ any quantitative methods, or qualitatively survey patients.

Another study detailed that a lack of documented procedures at the Wisconsin Children's Hospital in the United States lead to accidental exposure of allergens to food-allergy patients (Michalak, Hall, & Feuling, 2010).

Dimensions of Foodservice

Foodservice is complex, and understanding the dimensions of foodservice that shape patient experience is essential in order to promote optimal nutrition and satisfaction (Wright et al, 2006). Dimensions that influence patient perspective can include food quality, service timeliness and reliability, temperature, attitude of staff, and customisation (Dube et al, 1994).

Aspects of food quality as perceived by the patients can include sensory aspects such as taste, flavour, texture of meat and vegetables, as well as the perceived variety of the menu and the ability to choose a healthy meal (Wright et al, 2006).

A number of studies have found that food quality is the most effective predictor of patient satisfaction (Lau and Gregoire, 1998; Dube et al 1994; Williams et al, 1998).

Foodservice Satisfaction

The Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ) was developed by Capra et al (2005), building on the research of many previous patient satisfaction studies, including Dube et al (1994). See Appendix 1.

The questionnaire rates overall foodservice satisfaction on a 5-point scale of ‘Very Good’, ‘Good’, ‘Okay’, ‘Poor’ and ‘Very Poor’; which is a scale that is easy for patients to understand. The questionnaire also provides a rating for four foodservice dimensions: food quality, meal service quality, staff/service issues and the physical environment. The satisfaction for these dimensions is accrued together from the relevant questions within the survey, and coded to provide a score out of 5 based on the scale within the survey questions (Always = 5, Often = 4, Sometimes = 3, Rarely = 2, Never = 1).

This questionnaire has been validated as an accurate, reliable measure of patient foodservice satisfaction (Capra et al., 2005). The questionnaire effectively monitors food service trends (Fallon et al., 2008), however no literature exists utilising this tool or a similar one specifically for food allergy patients (Dall’Oglio et al., 2015).

Intake Assessment

There are a wide variety of methods available for assessing dietary intake in hospital, each bringing advantages and disadvantages (Castell et al, 2014). Choice of method requires consideration for the resources available and precision required. The 24-hour recall involves collection of the complete food and fluids consumed in the 24 hours prior to the survey via a direct face-to-face or telephone interview. The recall is usually conducted via interview, however, can be performed as a self-administered exercise via computer programs. Inaccuracies in reporting of energy intake via 24-hour recall method have been previously described (Bandini et al, 1990; Black et al., 1993; Schoeller, 1990;

Rothenberg, Bosaeus, & Steen, 1997), although these can be improved when collected via a trained interviewer and with supporting food and beverage composition tables (Castell et al, 2014).

In this study, a 24-hour recall was chosen given the short length of stay of patients in the acute hospital setting, and the focus on current intake rather than the habitual diet of patients. Given the principal researcher completing the diet recall was an accredited Dietitian, as well the availability of hospital recipes and food composition databases, this aided the accuracy of using this method for the study (Salvador Castell, Serra-Majem, & Ribas-Barba, 2015; Shim, Oh, & Kim, 2014).

Research Strategy and Choice of Methods

With person centred care as a guiding principle, a mixed methods approach was undertaken to explore barriers and enablers to safety, intake adequacy and foodservice satisfaction for patients with a food allergy at the Alfred Hospital, an acute tertiary public hospital in Melbourne, Australia. The target audience is patients with a food allergy, Clinical Dietitians', the Hospital Executive, Food Service Managers, the National Allergy Strategy and the Department of Health. With increased public and governmental awareness of food allergy risk, this study serves to guide future policy and governance for Australian hospitals. The target audience were chosen due to personal interest (ie. Patients with a food allergy), clinical interest (Dietitians'), as influencers on the food service (Food Service Managers), or as policy and governance leaders (Hospital Executive, Allergy Strategy and Department of Health).

This study utilised a pragmatism worldview, and a convergent mixed methods design. Mixed methods is a newer research methodology that emerged in the late 1980s through research within diverse fields including education, sociology and health sciences (Creswell, 2014, 2017). Mixed methods was chosen due to the strengths drawn by combining quantitative and qualitative data, in order to develop a deeper understanding of themes experienced by patients with a food allergy in hospital.

Literature Review

The literature used for this study has included dietetic specific guidelines and allergy specialist websites and organisations; as well as a search of the MEDLINE journal database. Inclusion criteria included articles relevant to the topic, from peer reviewed journals, published within the last 20 years. Quantitative or qualitative studies were accepted. Search terms included “food allergy”, “food service”, “hospital” and “nutrition”, resulting in 49 results. All titles were screened and only 2 relevant papers selected for relevance to be read comprehensively. A further search included “hospital food”, and “food allergy”, which resulted in 595 results. The ‘Best Match’ sort feature, which uses an enhanced relevance algorithm within the database, was utilised and the top 100 titles were reviewed. A limited number of relevant papers were identified; and therefore, relevant articles were screened for their reference lists to broaden the results available.

Ethical Considerations

Ethical issues in this mixed methods study that were considered included the following:

- The Dietetics Association of Australia Code of Professional Practice, and Statement of Ethical Practice (DAA, 2013, 2014)
- Ensuring Ethics requirements of the Alfred Health Organisation are adhered to, and ethics approval was obtained from the Alfred Health Ethics Board prior to commencing the study.
- Ensuring all gatekeepers and key personnel were included in the ethics submission. These included the Nutrition Manager, as well as the Allied Health Director, who were required to approve and endorse the research project prior to its commencement.
- Ensuring Swedish ethical regulations are adhered to, although no formal Ethical Review application was required as per the VRFS 2003:460 for this research was carried out as part of a programme of higher education.
- Ensuring consent was obtained, and patients were aware that their participation was voluntary, and could be withdrawn at any time, as per the Charter of Human Rights.

- Identifying and considering cultural and religious aspects during the study. For example, the Alfred Hospital has a large Jewish patient cohort, and their dietary requirements needed to be respected.
- Ensuring that there was no disruption on patient care – being an acute hospital, patient wellbeing is paramount.
- Respecting patients – especially during the qualitative interviews where there were potential power imbalances in relation to collecting personal information from patients, and assuring this information will not enter a public space in an identifiable manner
- Ensuring the purpose of the questions and how they will be used is discussed, avoiding leading questions and sharing of any personal viewpoints.
- Maintaining patient confidentiality during data collection, interviews, coding, and in the manuscript (such as using fictitious names).

Study Aim

In line with emerging research interest on person centred care, the study strove to advance understanding of the barriers and enablers to safe, adequate and satisfactory inpatient meal provision as perceived by patients with a food allergy.

Research Questions

1. What is the nutritional adequacy and level of patient satisfaction of the Alfred Hospital diet for patients with a food allergy?
2. What are the barriers and enablers to safe, adequate and satisfactory meal provision for inpatients, as perceived by patients with a food allergy?
3. According to food allergy patients, how can nutritional needs be better met, and foodservice satisfaction levels optimised whilst in hospital?

Material and Methods

The study ran from September to November 2018 at large leading tertiary public hospital in Melbourne, Australia. The sample drawn from here is representative of metropolitan Melbourne but could not be extrapolated nation or world-wide.

A mixed methods study design was employed to collect quantitative and qualitative data for eligible patients (Creswell, 2017). Patients for the qualitative and quantitative arms of

the study were the same, and the data collection all took place within the one encounter after consent was obtained. Due to the unpredictable nature of research within a fast-paced acute hospital setting, this ensured that both sets of data would be reflective of each other, as there was a risk consented patients would be discharged prior to a second contact and outpatient follow-up would have required extended ethics and a highly motivated patient to ensure attendance.

The quantitative data was analysed separately for group results, whilst the qualitative was thematically coded after data collection, and the results were then integrated together for a more complete understanding of the research questions, see Figure 1.

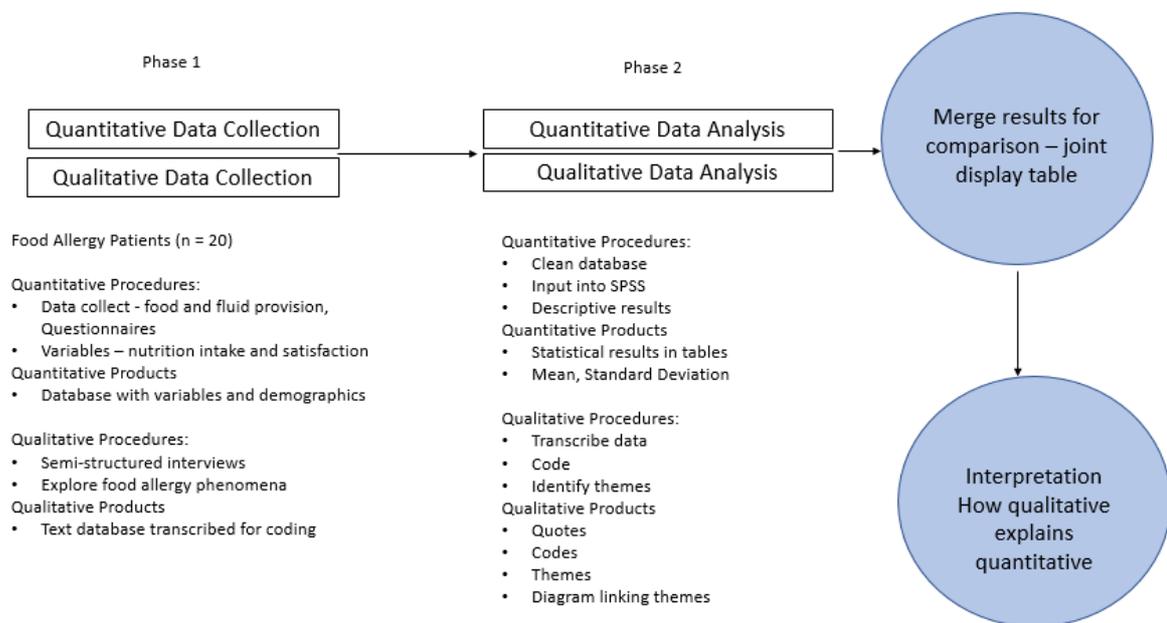


Figure 1: A Convergent Design of Alert to Food Allergies in Hospital: taking a Mixed Methods approach to understand the patient’s perspectives on barriers and enablers to management

Eligibility Criteria

Patients were eligible if they were English-speaking, able to provide informed consent, were over the age of 18 and receiving the Allergy Diet Code as an inpatient. Exclusion criteria included patients with a food intolerance rather than a confirmed food allergy,

those who had cognitive impairment, and those with acute clinical or psychiatric instability during the study period.

Sample

Convenience sampling was employed, with all eligible patients receiving an Allergy diet code during the designated study period approached for recruitment in consecutive order of admission until the sample size of twenty was achieved. The sample size reflected what was feasible within the clinical setting for the timeframe of the study., with the sample size of twenty allowing for saturation of responses into common themes during the qualitative arm of the study, aligning with other published mixed methods dietary studies (Shalit et al., 2016; Zoellner & Harris, 2017).

Recruitment took place across all medical units with the exception of intensive care and psychiatry, in order to aim for a range of nutritional states, clinical diagnoses, ages and gender to reflect the heterogeneous demographics of food allergy patients.

When approached, patients were required to sign the Patient Information and Consent Form if they consented to the study, which was reviewed and approved by the Alfred Health Ethics Board prior to the study commencement. See Appendix 2.

Data Collection

Data on the patients' food allergy/s, length of time with food allergy diagnosis, reason for admission and specific disease state, length of stay, age, gender, weight and height was collected from the consented patient's medical records, and entered into the study database in a de-identified manner.

Quantitative

One day of meal and fluid intake for each patient was estimated via a 24-hour recall delivered by the researcher (an accredited Dietitian) via a face-to-face interview. All food and fluid reported to be consumed in the 24 hours preceding the interview was then cross-checked against the electronic menu management system and hospital food composition databases to improve the quality of intake information.

All food and fluid items collated in the 24-hour recall were then input into Foodworks Software (Ltd, 2017), and total energy and protein intake, as well as energy and protein

from external food consumed was calculated for each patient. Energy and protein intake adequacy for each patient was determined by disease-specific estimated energy requirements (EER) and estimated protein requirements (EPR) using Australian best practice clinical guidelines for patients with specific disease states, based on the patient's reason for admission (Government, 2012). For patients with no specific disease state affecting metabolic requirements 100–125kJ/kg (25– 30kcal/kg) and 0.8–1.0g/kg protein was be used (Government, 2012).

The Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ) (Capra et al., 2005) was then completed with the patient, to determine their overall foodservice satisfaction whilst receiving the Allergy Diet. Raw survey data was entered into a spreadsheet, and question responses coded on a scale of 1 – 5, based on the scale within the questions on foodservice dimensions (Always = 5, Often = 4, Sometimes = 3, Rarely = 2, Never = 1).

Qualitative

Once the 24-hour recall and foodservice questionnaire had been collected, the researcher conducted short face-to-face semi-structured interviews with each patient. They took place in the patient's hospital room, and took an average of five minutes. With patient consent, interviews were recorded using 'Apple iPhone Voice Memos' application and stored only until the interviews were transcribed by the principal researcher. No identifying detail on the patients was kept.

Using an initial deductive approach, an unconstrained matrix of main categories was developed a priori, by reviewing the literature base regarding food allergy intake adequacy and satisfaction, as well as with consideration for the research questions (Elo & Kyngas, 2008). The interview questions and main categories were designed by the principal researcher of this study, in line with a 'qualitative descriptive' approach to meet the study objectives (Doyle, 2009; Colorafi & Evans, 2016). The interview questions were semi-structured and focused on exploring the predetermined categories from the patient perspective, see Appendix 3. These main categories were: sensory aspects, variety and adequacy, safety and access, and attitude to allergy.

Data Analysis

Quantitative

Statistical analysis was carried out using SPSS for Windows v24.0 (SPSS Inc). Parametric variables are reported using mean and standard deviation (SD), and median and interquartile range (IQR) for non-parametric variables after distribution was assessed for normality. Categorical variables are presented as frequency.

Comparison between categorical variables was conducted using independent t-tests for parametric, and Mann–Whitney U tests for non-parametric continuous variables; and Pearson Chi-squared test for categorical variables. Given the small sample size, comprehensive statistical analysis was limited.

Qualitative

Preparation

Transcripts were printed and read out several times, before the manifest content was initially coded into ‘meaning units’ as described by Burnard (1991). The meaning units were then documented within a spreadsheet database.

Organising and Reporting

The unconstrained matrix of main categories allowed for different sub-categories to emerge from within its bounds, in line with an inductive content analysis approach for content analysis of the meaning units (Elo & Kyngas, 2008). Codes were assigned to meaning units based on their core meaning, which were then grouped within their major categories. Codes with similar core meaning were assigned sub-categories within the main category groups. These descriptions were supported by quotes from the interviews.

The inductive content analysis was carried out by the principal researcher of this study, who immersed herself in the data and then sought final input from an accredited Dietitian colleague to reach a consensus in order to reduce bias, and improve credibility, dependability and trustworthiness (Graneheim & Lundman, 2004).

Results

In total, thirty seven patients receiving the Allergy Diet code were screened for eligibility during the study period from the twenty fourth of September to the twenty ninth of October 2018. Overall, twenty patients took part in the study, which met the target sample size. All patients approached for recruitment consented to participate in the study, with thirteen female and seven males.

Of the seventeen patients that were excluded, seven of these were due to Acute Clinical or Psychiatric instability, determined as per the Unit Dietitian caring for the patient. A further three excluded patients were in the psychiatric unit, which was excluded based on the decision during study eligibility design that interviewing patients with acute psychiatric issues deemed to be inappropriate. The excluded patients were older, with a higher proportion of female gender; however overall there were no statistical differences seen in age, gender, length of stay or medical unit for the included and excluded patients.

See Table 4 for more detail on the background data of the included patients. Excluded patient background data is provided in Appendix 4.

Quantitative results are presented first, followed by qualitative; and then the convergence into a joint display figure (Figure 3).

Quantitative

Differences between male and female patients were explored; however no statistically significant differences were seen. The focus will be on the total group results, although this gender sub-group analysis is included in the results tables for reference.

The mean estimated energy intake was 5.07 mega-joule (MJ), and protein was 62.7 grams (g). The mean estimated energy requirement met was 64.0%, and estimated protein requirement met was higher at 81.3%, see Table 1.

Table 1: Estimated nutrient intake, adequacy and provision in food allergy patients

	Total (n = 20)	Male (n = 7)	Female (n = 13)	Significance p-value
Estimated Energy Intake, MJ (mean, SD)	5.07 (2.02)	5.96 (2.43)	4.59 (1.67)	0.152
Estimated Protein Intake, g (mean, SD)	62.7 (25.9)	69.7 (29.0)	58.9 (24.4)	0.390
Estimated Energy Requirement met, % (mean, SD)	64.0 (25.9)	69.5 (31.5)	61.0 (23.1)	0.496
Estimated Protein Requirement met, % (mean, SD)	81.3 (34.5)	80.0 (30.8)	82.0 (37.6)	0.903

Eleven of the study patients (55%) reported supplementing their intake with external food, and the median energy intake provided for these patients was 1.7MJ of their total energy intake and 18.4 of their total protein intake. For these eleven patients, the median contribution from external food was 37% of their total energy and 46% of their total protein intake. See Table 2.

Table 2: External Food, and contribution to energy and protein intake

External Food Consumed, (number of patients, %)	
Yes	11 (55%)
No	9 (45%)
<i>Sub-analysis, those consuming external food: (n = 11)</i>	
Estimated Energy Provision from External Food, MJ, (median, IQR)	1.7 (1.81)
% total energy intake provided by external food (median, IQR)	37 (28)
Estimated Protein Provision from External Food, g, (median, IQR)	18.4 (37.7)
% total protein intake provided by external food (median, IQR)	46 (45)

Most patients rated their overall foodservice satisfaction as ‘Good’ (7 patients) or ‘Okay’ (5 patients) based on the ACHFPSQ (Capra et al 2005). A further 3 patients rated their satisfaction as ‘Very good’, whilst 2 and 3 patients rated their satisfaction as ‘Poor’ and ‘Very Poor’ respectively, see Figure 2.

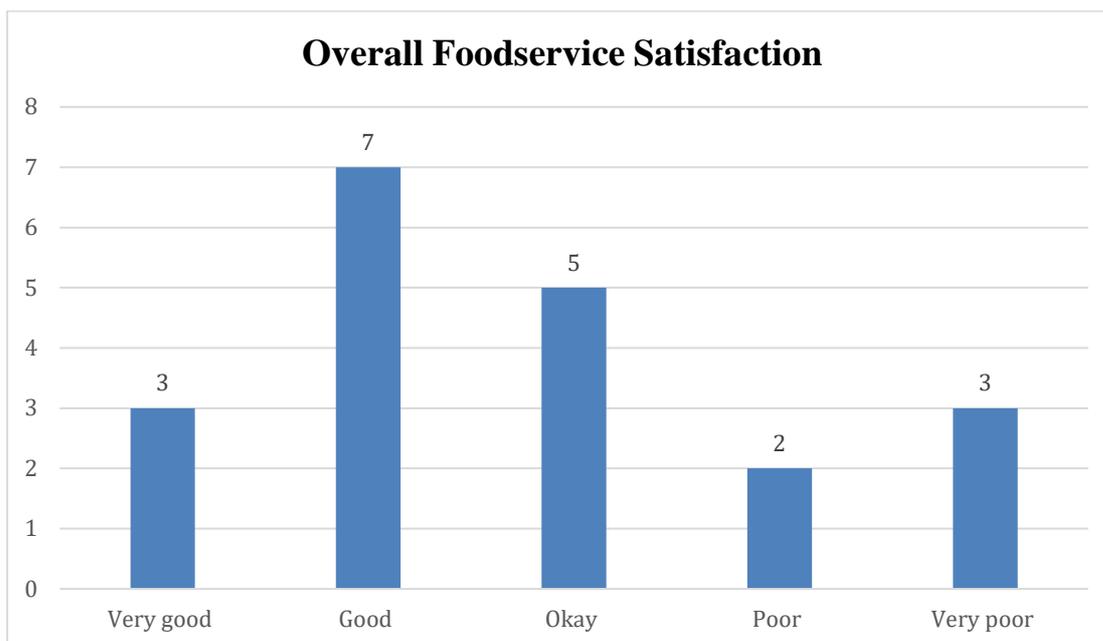


Figure 2: Foodservice Satisfaction Scores from the ACHFPSQ (Capra et al 2005)

Using the 5-point scale, the lowest rated foodservice dimension was food quality (3.00), whilst the highest rated was staff and service (4.65), see Table 3.

Due to the small sample size, bivariate correlation between foodservice satisfaction and intake adequacy was limited. When categorical variables were re-coded into two groups for level of satisfaction (Okay, Good and Very Good vs Poor and Very Poor), Mann Whitney U-test comparison with the continuous variable of energy intake adequacy did not reach significance’.

Table 3: Foodservice Dimension score Scores from ACHFPSQ (Capra et al 2005)

	Total
Food Service Dimensions Satisfaction, Factor Scores	
- Food quality (mean, SD)	3.00 (1.02)
- Meal service quality (mean, SD)	4.01 (0.83)
- Staff/Service (mean, SD)	4.65 (0.46)
- Physical environment (mean, SD)	4.55 (0.68)
- Independent statements: portion size choice; food temperature (mean, SD)	4.1 (0.71)

For the included patients, the median length of stay was 9.5 days, the mean age was 51.3, median weight and BMI were 70.8kg and 27.8kg/m² respectively. No statistically significant difference was seen between the male and female patients, although analysis of statistical significance requires consideration given the small sample size.

Food allergy type was most commonly Shellfish / Fish (11 patients), followed by Other (7), then Tree Nuts (3), Lupin / Peanuts (2), and Egg (1). Other types of allergies included Stone Fruit, Pork, Buckwheat, Coriander, Mango, Kiwi and Honey.

Four patients had more than one allergy. Most of the patients reported living with a food allergy for between 30 – 50 years (35%), with the mean age of diagnosis reported as 20 years, see Table 4.

Table 4: Age, anthropometric and clinical data in food allergy patients

	Total (n = 20)	Male (n = 7)	Female (n = 13)	Significance p-value
Age, years (mean, SD)	51.3 (21.3)	54.3 (23.2)	49.7 (21.0)	0.658
Weight, kg (median, IQR)	70.8 (29.0)	90.0 (25.0)	68.2 (32.85)	0.588
BMI, kg/m ² (median, IQR)	27.8 (6.3)	27.8 (5.92)	28.5 (8.87)	0.393
Length of Stay, days (median, IQR)	9.5 (7.0)	10.0 (9.0)	8.0 (10.0)	0.877
Food Allergy, (number of patients)				
- Tree Nuts				
- Fish / Shellfish	3			
- Lupin / Peanuts	11			
- Egg	2			
- Other	1			
	7			
Length of Time with Allergy*, (number of patients)				
< 10 years	2			
10 - 20 years	3			
20 - 30 years	2			
30 - 50 years	7			
> 50 years	3			
Unknown	3			

**For patients with more than one food allergy, the length of time since the diagnosis of their first allergy is taken as the starting point.*

There was a very heterogenous mix of admission reasons, and none of the admission diagnoses were directly related to the food allergy status of the patients, see Table 5.

Table 5: Reason for Admission in food allergy patients

	Total (n = 20)
Reason for Admission, (number of patients)	
- Oncology	4
- Respiratory	3
- Neurological	3
- Gastrological	3
- Cardiovascular	2
- Endocrine	1
- Other	4
- Relating to Food Allergy	0

Qualitative

Ten sub-categories emerged from the main categories following the inductive content analysis of the interviews, see Table 6.

Table 6: Interview Themes: Patient Perspectives on Allergy Diet, Adequacy and Satisfaction

Main Category	Sub-category
Sensory Aspects	Appearance Bland flavours – add sauces
Variety and Adequacy	Lack of choice and Repetitive 'One size fits all' approach – not individually tailored Not Healthy External Food required
Safety and Access	Communication System Issues and Process Failures
Attitude to Allergy	Lack of control Indifference

Main Category 1: Sensory Aspects:

Sensory aspects were discussed by most patients when explaining their experience of the Allergy Diet. Sub-categories of 'Appearance' and 'Bland flavours' emerged from the data. A frequent response relating to taste was expressing the food on the allergy diet was 'bland', whilst many patients described plain and unappetising appearance. Commonly, adding sauces or garnish was suggested.

'And it's quite plain in portions as well, Cause it's got no sauce or anything, Looks bland...that's the word, it's quite bland, So it's not visually appetising, Without garnish or without sauces, it just looks very plain, so it doesn't invite you to eat it, (P09)

'Perhaps make the meals look more appealing. Not look they are all dried out and reheated from last week or something'. (P01)

Main Category 2: Variety and Adequacy:

The sub-categories that emerged from the data in relation that aligned with the major theme of variety and adequacy were 'Lack of choice and Repetitive', 'One size fits all' approach – not individually tailored', 'Not Healthy', and 'External Food required'.

A majority of patients expressed frustration at the lack of choice, repetitiveness and a one-size-fits-all menu, with generic options for all allergies.

"But it's very repetitive and very restrictive. And you often find that what you have for dinner one night, you have for lunch the next day, like the same protein" (P04)

"A one size fits all approach to food allergy management is not helpful because different patients fall into different allergy categories, And to remove two thirds of the ... you know, the menu choices as a result, is not going to give an adequate nutritional outcome." (P17)

Patients who found the menu not healthy focused on lack of fresh fruit and salads.

“The tiny salad that we do get is just very minimal. I think they can do a lot better salad mixes, like tuna and salad, You know, healthier stuff”

A number of patients described resorting to external food options to supplement their intake.

“I’ve had to order external Ubereats orders..., Or get food delivery from family members” (P08)

Main Category 3: Safety and Access:

Sub-categories of ‘Communication’ and ‘System Issues and Process Failures’ were derived from the interview analysis in relation to safety and access.

On the whole patients felt safe in hospital on the allergy diet, although a small number described system failures leading to a risk experience. One patient reported their food allergy to four separate nurses, and yet received this allergen at the next meal. Communication was commonly reported as a factor relating to confidence and safety.

“Well they were quite sure that they weren’t going to give me anything that I was going to be allergic to. I don’t feel less safe in hospital (compared with at home) cause they know that I have an allergy” (P16)

“I think they’ve really really listened, I’ve had quite a few people come into my room and discuss with me what allergies I have..and what I can eat.” (P13)

“More safe...because the hospital has a responsibility, And it has procedures and policies in place...where they question you a few times, And they make sure the allergy is written down. But in my instance ...I was given fish”. (P08)

Main Category 4: Attitude to Allergy:

‘Lack of control’ and ‘Indifference’ were the sub-categories that emerged within the bounds of attitude to allergy. ‘Indifference’ is referred to as “the quality of not caring about or being interested in something or someone” as per the Cambridge Dictionary (Cambridge University Press, 2019).

A number of patients expressed feeling a lack of control over their food choices in respect to the food allergy management in hospital, with indifference reported by some patients in terms of the seriousness of their allergy.

“But I just get a bit frustrated cause I can’t just...I’m limited to what I can choose.” (P01)

“The food allergy... to be honest it hasn’t really bothered me”. (P07)

“To be honest I hadn’t really thought about it...until it was raised with me two days ago. So it’s never really bothered me...I’ve not worried about it, not thought about it”. (P12)

The convergence of the quantitative and qualitative results is displaced below in the joint display figure, see Figure 3.

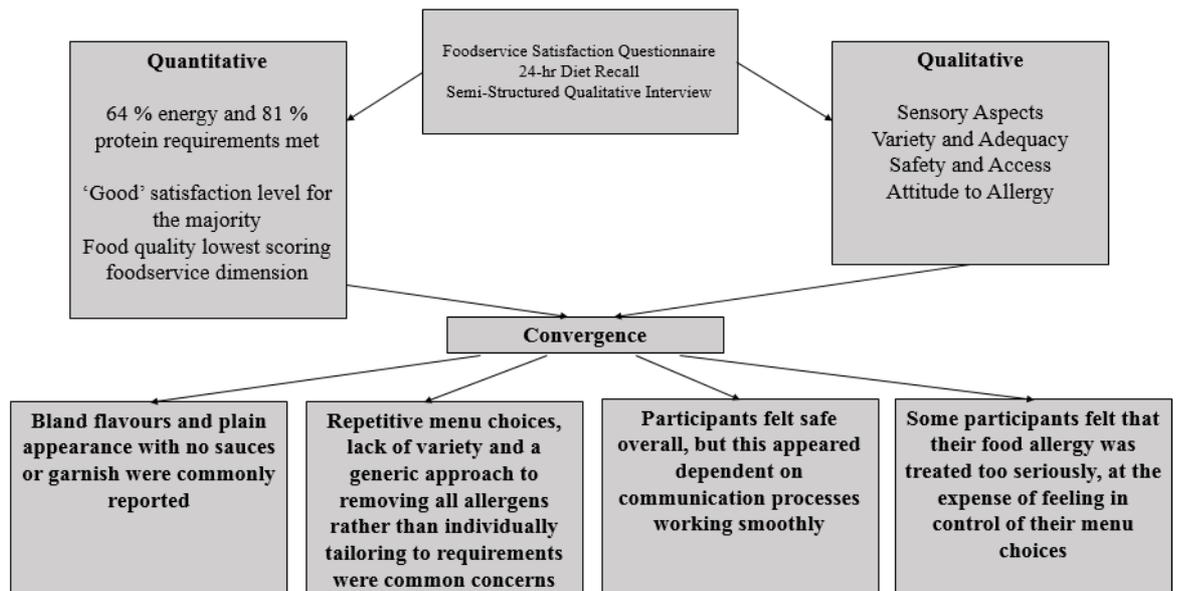


Figure 3: Convergence of Results – Joint Display Figure

Discussion

With a person centred care focus, this mixed methods study aimed to explore the barriers and enablers to safe, adequate and satisfactory inpatient meal provision for patients with a food allergy.

Nutritional Adequacy

The quantitative findings suggest that nutritional needs are not being met, with intake meeting 64% of estimated energy requirements and 81% of estimated protein requirements.

These findings align with a recent foodservice project at the study site which found 50% of energy requirements were met using a visual plate waste analysis (Cyrus, 2018). The foodservice project by Darpi et al was run across nine hospital wards, however did not focus on patients with a food allergy specifically. Previous published research has also reported intake inadequacy in hospital, with Kondrup (Kondrup, 2001) and Dupertois (Dupertuis et al, 2003) finding between 50 - 69% of hospital inpatients were underfed in their respective studies.

Previous research has highlighted that malnutrition is a prevalent and serious concern within the healthcare system, affecting up to 40% of patients (Barker, Gout, & Crowe, 2011; Chao et al, 2015; Lim et al, 2012). Local data for the study site found 55% of inpatients were classified at risk of malnutrition (Colaci & Peter, 2018). Inadequate intake is a major modifiable risk factor in the development of malnutrition, which consequently increases the risk of morbidity and mortality associated with hospitalisation (Agarwal et al, 2013; Hiesmayr et al, 2009).

Foodservice Satisfaction

Most patients rated their overall foodservice satisfaction as 'Good' or 'Okay' (7 and 5 patients respectively) according to the ACHFPSQ instrument used. The satisfaction level also aligned with the foodservice project at the study site by Darpi et al (2018), which found 72% of patients reported their satisfaction as 'Good' or 'Okay' using the same instrument.

All patients in the present study who reported their satisfaction as 'Good' were female, whilst 4 of the 5 patients who reported 'Okay' were male, although significance could not be assessed statistically due to the limited sample size. All other responses 'Very Poor', 'Poor' and 'Very Good' showed no trends across gender groups.

The factor score for food quality (3.0 out of 5) found in the present study is lower than a previously published study by Fallon et al (2008) who found a food quality score of 4.3 – 4.4 at different time points, with their study site being located at a private hospital in Queensland Australia and not specific to food allergy sufferers. The overall satisfaction found by Fallon et al (2008) was significantly higher, with 87 - 92% of patients reporting their satisfaction as 'Good' or 'Very Good', compared with only 50% in the present study. These findings suggest that inpatients at the study site are less satisfied than those at the private hospital in Fallon et al's study. Foodservice quality varies between hospitals, however there are no published studies directly comparing foodservice satisfaction in Australia. Intermittently, there have been reports in the media when standards reach unacceptable levels, such as that reported at Royal Adelaide Hospital in 2018 (Harmsen, 2018).

Safety

Communication breakdown leading to accidental allergen exposure has been previously reported in the literature, including the coroner's case (Coroner's Court of Victoria [CCV], COR 2018: 5382) and the study by Michalak et al (2010). Similarly, communication breakdown was reported by some patients in the present study, resulting in safety implications through system and process failures.

Bolster and Manias (2010) took a person centred-care approach to explore nursing and patient interactions and communications regarding medications. The contextual barriers to providing individualised, person-centred care in relation to medications were identified as multi-disciplinary communication and time constraints. For example, it was observed that there was no communication between nurses and pharmacists, despite both professions interacting individually with the patients regarding medications. Whilst the Bolster and Manias study did not focus on food allergy specifically, there could be extrapolation to similar contextual barriers to food allergy safety in that both pharmacy and nursing explore the allergy status of the patient on admission and are expected to

enter this in the electronic medical record. If pharmacy do not communicate this with the nursing staff, the patient may not be referred to the Dietitian and a safe 'Allergy' diet code ordered, as this is the responsibility of nursing and not pharmacy. The demands of the clinical context were found to contribute to time constraints in the Bolster and Manias study, and consequently impacted on the development of an individualised, person-centred approach. These same time demands could also be extrapolated to the safety barriers reported by patients in the current study, whereby allergy communication between systems broke down when required tasks such as placing the Dietitian referral or ordering the 'Allergy' diet code were not done. As the nursing staff were not interviewed or observed for this current study, it is difficult to know with certainty, however the study was carried out in the same acute tertiary hospital environment as the Bolster and Manias study.

Another study into the patient experience of nurse-patient communication (McCabe, 2004) identified that a patient-centred approach was a key component of effective communication from nurses to patients. McCabe found that task-centred nursing took away from effective communication and quality nursing care. This aligns with Bolster and Manias's findings that nurses emphasized the importance of the therapeutic, individual relationship, in understanding patient needs, expectations and preferences.

Both studies', as well as the findings of this current study, highlight the importance of fostering the person or patient-centred approach as an organisational philosophy, as opposed to the task-focused or medical model where the patient is a passive recipient of healthcare.

Despite some system and process issues, overall the majority of patients in this current study felt safe in hospital as a result of their food allergy being taken seriously and feeling listened to. Improving automated communication between medical systems and food services is an important strategy for risk mitigation, reducing reliance on a human chain of communication within a busy clinical environment. Recent progress at the study site to automate an electronic 'alert' when a patient reports a food allergy is a positive step; although there is still a requirement for manual menu tailoring until the new menu management system is completed.

Lack of Choice

The one-size-fits-all approach to the allergy menu at the study site means that patients receive a menu devoid of the top ten allergens for safety, until they are seen by a Dietitian when further menu tailoring can take place. The Nutrition Department at the study site has a business rule to see all food allergy patients within 4 hours, to minimise the time on the restrictive menu. However, additional safe menu choices remain limited given many foods may contain traces of allergens.

Restricted menu choice is likely to directly impact on intake and satisfaction if patients receive a meal they dislike, and there are no other available options. In relation to the finding of frustration with the one-size-fits-all approach to the allergy menu, it is difficult to comment on whether this is unique for the food allergy patients in the hospital, or for patients with other dietary needs as well. For example, patients requiring a texture modified diet from a dysphagia perspective are also impacted by minimal menu choices.

Lack of choice has been shown to be an important contributor to foodservice satisfaction in previous studies (West, Ouellet, & Ouellette, 2003; Wright et al, 2013), and this study has again supported the importance of addressing restricted choices as perceived by the patient in order to improve satisfaction.

Barriers and Enablers to Safety, Adequacy and Satisfaction

The qualitative findings suggest that as per the patients, addressing sensory, variety, safety and adequacy factors could begin with adding sauces and garnishes, improving menu choices, relaxing restrictive controls and improving communication and system processes.

These findings are supported by the ACHFPSQ quantitative results, which found that food quality was the lowest rated foodservice dimension. Food quality perception is influenced by a variety of factors including taste, flavour, texture, variety and perception of healthy choices (Wright, Connelly, & Capra, 2006).

Food quality improvement studies have demonstrated successful interventions to improve food quality included addressing variety by increasing the range of fresh fruits, vegetables and salads on the menu grid, and offering more soups, fish and vegetarian options; improving sensory aspects by adding sauces and garnishes prepared with garlic, herbs

and spices; and improving the perception of healthy choices by increasing lean meat options and use of healthy cooking methods (Vozenilek, 1999; Watters et al, 2003)

In addition to the similar findings of previous studies addressing foodservice satisfaction improvements, the patients in the current study highlighted their perception that restrictive menu choices on the Allergy Diet, and breakdown in communication of their food allergy were further significant contributors.

Attitude to Allergy

The present study found that indifference towards their food allergy was reported by several patients, and these patients reported greater frustration with the restricted menu choices and lack of control over their menu compared to patients who perceived no indifference. It is noted these patients were between 48 – 69 years old and had lived with the food allergy for more than 25 years, which may suggest that indifference could be associated with a longer time of living with the allergy. This indifference is a new finding not previously reported or explored in the literature, as there are no previous studies in hospital looking at food allergy management from the patient perspective. Frustration may result from patients feeling they know what to eat for their allergy, or due to lesser concern regarding the perceived threat of a potential adverse reaction if they have not experienced one for a long period. Whilst clinical safety and duty of care is paramount, taking a person centred care approach is also important to provide excellent patient care in hospital. The study site provides a legal waiver for patients to sign if they elect to self-manage their food allergy and not remain on a strict allergy diet code. It is recommended to explore the impact of the personal attitudes of food allergy sufferers on their food choices and consequent intake adequacy and risk. Research should focus on exploring whether food allergy patients who feel indifference towards their allergy are more likely to make riskier food choices, and whether their intake adequacy is higher or lower than those who do not feel indifference.

Improving Nutritional Adequacy and Satisfaction

The level of food intake, and consequent nutritional adequacy has been shown to be influenced by the quality of hospital food and food service as perceived by the patients (McLymont et al, 2003; Williams et al, 1998). The present study found intake adequacy

of 64% of energy and 81% of protein requirements, with most patients reporting their satisfaction as 'Okay' or 'Good'. Food quality was rated the poorest for the foodservice dimensions.

As per the quantitative study findings, addressing sensory and variety aspects of the food service would impact on intake adequacy based on the barriers described by patients in the qualitative phase of the study. Of note, in addition to the automated allergy alert, the study site is building a new electronic menu management system (EMMS) with advanced functionality to manage individual allergen-free needs rather than the one-size-fits-all menu. Similar EMMS are in place or being built at most hospitals worldwide, to support improved clinical safety and tailored meal provision.

To date, no other studies have used this patient-centred mixed methods approach to explore the patient perspective on foodservice satisfaction, safety and nutritional adequacy, whether for all inpatients or those with food allergies. These findings are important considering the duty of care of hospital 'foodscapes' in providing food and beverages that are safe, nutritious and appropriate for their heterogeneous populations (Williams, 2009).

Strengths and Limitations

Limitations of the study included factors associated with time and resource constraints. A small sample size of twenty patients meant that there was no capacity for meaningful sub-group analysis. Although there were no statistically significant differences observed between the gender of patients, and included and excluded patients screened, the small sample size impacts on the credibility of these comparisons between groups. Of note, all patients screened as eligible and approached for the study consented to participate, suggesting strong interest from patients in contributing to foodservice. The disadvantage of the mixed methods approach was that the resource and time required impacted on the feasibility of a larger sample size, and as a result this did not allow for regression analysis within the quantitative data set.

The advantage of using the convergent mixed methods approach was that the same patient group participated in the quantitative and qualitative arms of the study, allowing the themes identified to best link to data uncovered with the quantitative assessment of energy and protein adequacy, and the food satisfaction survey. Other advantages were that the

mixed methods provided phenomenological data acquired from the qualitative interviews, which could not be attained from quantitative methods alone; whilst the assessment of adequacy and satisfaction could not be collected in a statistically representative fashion without the quantitative arm.

One day of intake only was collected given the resource constraints of study resourcing, and the short length of stay in an acute hospital. This effects the security of intake adequacy analysis and interpretation. Utilising the Food Intake Level (FIL: energy intake divided by Basal Metabolic Rate) cut-offs as per Goldberg et al (Goldberg et al, 1991) moderate underreporting for habitual intake was suggested for the patient's in this study, However, the assessment by a Dietitian, as well as availability of hospital recipes and food composition databases aided the accuracy of using this method for the study (G. Castell et al, 2015; Shim et al., 2014). Further to this, the intake adequacy for the present study was in line with the findings of Darpi et al (2018) in their recent foodservice project at the same study site. The study from Cyrus et al (2018) supports the validity of the present study's findings for low intake levels, given the diverse factors such as disease, drug therapy and treatment are likely to acutely impact on intake in hospital (Kubrak & Jensen, 2007). Although only a 24-hour snapshot of nutritional intake, the methodology for intake analysis is in line with other hospital intake studies, such as Rattray et al (2017).

Due to the limited sample size, correlations between intake adequacy, foodservice satisfaction or nutritional status such as BMI was unable to be explored. Additionally, sub-group analysis such as stratification by BMI and medical condition was not feasible.

As these were not always available from the medical records, background variables including family situation and education level were not collected during the patient interviews in order to reduce patient burden and maintain focus on these variables collected. These would be likely to influence attitudes and beliefs regarding food allergy management and was a limitation in the study design. Given the contribution to the 'person' context in delivering person centred care, these variables should be explored in a larger study in relation to the level of indifference, satisfaction and intake.

The content analysis that was carried out was strengthened by the second researcher, improving aspects of credibility, dependability and the trustworthiness of the qualitative findings (Graneheim & Lundman, 2004). Credibility of the qualitative data was further strengthened by selecting patients via convenience sampling in order to increase the

possibility of shedding light on the research question from many aspects (Graneheim & Lundman, 2004), as compared to specifically targeting one clinical area or patient group. Ages of patients ranged from 18 to 98 years, with a spread of male and female patients, and clinical diagnoses including various oncological, respiratory, neurological, gastrological & endocrine conditions.

It is important to consider the background and skill set of the researchers, who were both Accredited Practising Dietitian's, working clinically at the study site. Given the communication that takes place between the researcher and the text in qualitative analysis (Watzlawick, Bavelas, & Jackson, 1967), the training, experience and qualifications of the researchers is important (Patton, 1990) as this will influence the interpretations drawn from the text.

Considerations

The study location of a public Melbourne metropolitan hospital limits extrapolation to other geographic and acuity settings. Further to this, the qualitative aspects of the study can only serve to offer examples and illustrations of the situation and patient views at the point in time they were taken. This is due to the small sample size, and single study location in Melbourne, limiting the scope to extrapolate these findings to other environments or points in time (Burnard, 1991).

Adult food allergy sufferers have had no prevalence distinction identified in terms of gender, ethnicity or medical diagnoses, although food allergy is a growing research area (ASCIA, 2018). A limitation of the broad medical admission criteria of the study patient's is that the view of the food, especially in terms of sensory aspects, will be impacted by their medical condition, and this could not be controlled for given the small sample size.

Relevance for the subject Food and Meal Science

The hospital environment is an important food and meal arena. Within the hospital setting, patients with a food allergy are recognised as one of the most high-risk groups in terms of mortality if strict processes are not in place. Prior to the present study, hospital meals or patient safety have been somewhat overlooked within Food and Meal Science research. Moreover, there is a paucity of literature on taking a person centred care approach for food allergy to explore nutritional adequacy, patient satisfaction and safety.

Overall, using a person centred mixed methods approach for this important study supported a novel understanding of nutritional adequacy and patient satisfaction for food allergy patients from their own perspective. This mixed methods design provided far richer data than one method alone, as the qualitative findings were analysed for convergence with the quantitative results. Considering the growing interest and importance of person centred care in healthcare, strengthening the quantitative data with quotes provides a patient narrative that can aid weight to the study findings. This may aid in communicating suggested changes to foodservice management and the hospital board members who may not come from a research or scientific background.

This study contributes to the growing research interest in both person centred care and hospital foodservice, and could serve as an initial framework for developing future research within the Food and Meal Science arena. For example, a similar methodology could be used to investigate patients with cultural food needs, such as Halal or Kosher, by taking a patient centred approach to identify barriers and enablers to adequate and satisfactory meal provision.

Conclusion

This mixed methods study found that food allergy patients did not have their nutritional needs met and were not satisfied with foodservice overall. Patients in the study perceived appearance and bland flavours, restrictive choices, communication issues and lack of control as factors affecting their food intake and satisfaction, and felt that addressing these would help to optimise the current foodservice. The study found that patient indifference to food allergy was another factor, warranting future research focus on the manner in which this indifference impacts on intake, safety and satisfaction.

To improve credibility of the results seen, a larger sample size is required in future studies. This study was the first to take a person centred care approach to understanding food allergy, and may be seen as an initial exploratory study in this important Food and Meal Science area.

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Appendix

1. Acute Hospital Foodservice Patient Satisfaction Questionnaire

Capra, S, Wright, O, Sardie, M, Bauer, J, & Askew, D. (2005). The Acute Hospital Foodservice Patient Satisfaction Questionnaire: The development of a valid and reliable tool to measure patient satisfaction with acute care hospital foodservices. *Foodservice Research International*, 16(1-2), 1-14.

Survey No:

We are improving the hospital foodservice and we need to know your opinions by completing this questionnaire. Participation in this survey is completely voluntary. Your response will not affect your care in anyway, and will remain confidential. Thank you.

1. The hospital food has been as good as I expected	Always	Often	Sometimes	Rarely	Never
2. The crockery and cutlery are chipped and/or stained	Always	Often	Sometimes	Rarely	Never
3. The staff who deliver my meals are neat and clean	Always	Often	Sometimes	Rarely	Never
4. The hospital smells stop me from enjoying my meals	Always	Often	Sometimes	Rarely	Never
5. I am able to choose a healthy meal in hospital	Always	Often	Sometimes	Rarely	Never
6. I am disturbed by the noise of finished meal trays being removed	Always	Often	Sometimes	Rarely	Never
7. The cold drinks are just the right temperature	Always	Often	Sometimes	Rarely	Never
8. I like the way the vegetables are cooked	Always	Often	Sometimes	Rarely	Never
9. The meals taste nice	Always	Often	Sometimes	Rarely	Never
10. The hot drinks are just the right temperature	Always	Often	Sometimes	Rarely	Never
11. The staff who take away my finished meal tray are friendly and polite	Always	Often	Sometimes	Rarely	Never
12. I like to be able to choose different sized meals	Always	Often	Sometimes	Rarely	Never
13. The menu has enough variety for me to choose meals that I want to eat	Always	Often	Sometimes	Rarely	Never
14. The cold foods are the right temperature	Always	Often	Sometimes	Rarely	Never
15. The staff who deliver my menus are helpful	Always	Often	Sometimes	Rarely	Never
16. The meals have excellent and distinct flavours	Always	Often	Sometimes	Rarely	Never
17. The hot foods are just the right temperature	Always	Often	Sometimes	Rarely	Never
18. The meat is tough and dry	Always	Often	Sometimes	Rarely	Never
Overall, how would you rate your satisfaction with the foodservice	Very good <input type="checkbox"/>	Good <input type="checkbox"/>	Okay <input type="checkbox"/>	Poor <input type="checkbox"/>	Very poor <input type="checkbox"/>

2. Patient Information and Consent Form



Participant Information and Consent Form

Full Project Title: **Alert to Food Allergies in Hospital: taking a Mixed Methods approach to understand barriers and enablers to management**

Principal Researcher: **Madeleine Neff**

Co-Principal Researcher: **Natalie Shalit**

1. Introduction

You are invited to take part in this research project because you have a diagnosis of a food allergy and are a patient of the Alfred Hospital for your care. The aim of this project is to investigate the factors that influence safe, adequate and satisfactory meal delivery during your inpatient stay.

This Participant Information and Consent Form tells you about the research project. It explains what is involved to help you decide if you would like to take part.

Please read this information carefully. Ask questions about anything that you don't understand or want to know more about. Before deciding whether or not to participate, you might want to talk about it with a relative, friend or your health worker.

Participation in this research is voluntary. If you don't wish to take part, you don't have to and without any explanation.

If you do decide you want to take part in this research project, you will be asked to sign the consent section. By signing it you are telling us that you:

- understand what you have read;
- consent to take part in the research project;
- consent to be involved in the procedures described;
- consent to the use of your personal and health information as described.

You will be given a copy of this Participant Information and Consent Form to keep.

2. What is the purpose of this research project?

This study aims to explore the perception of food allergy patients on which factors influence the delivery of safe, adequate and satisfactory meals whilst an inpatient at the Alfred Hospital.

Twenty participants will be requested to undertake:

- One-day food intake recall with a Dietitian
- Hospital Foodservice Patient Satisfaction Questionnaire
- Complete a one-on-one interview to explore which factors you feel most effect safe, adequate and satisfactory meal delivery.

The findings will help to support the design of the allergy menu for inpatients. This project also contributes to the Principal Researcher's post-graduate qualification through Kristianstad University in Sweden, which is a Masters in Food and Meal Science.

3. What does participation in this research project involve?

Participation in this study involves completing one interview, one diet recall and one food satisfaction questionnaire.

If you decide to take part, we will also collect information from your medical record. This information will include:

- Your medical unit and reason for admission
- Your recorded weight and height (part of the hospital admission process)
- Your age and gender
- Your food allergy/s
- Your length of stay in hospital

If you choose to participate in this study, you will be interviewed during your hospital admission, at a time that suits you. We anticipate that the entire process will take approximately 20-30 minutes to complete.

The diet recall involves clarifying what food and fluid you were provided, and how much you ate and drank on the day prior to the interview to look at the adequacy of nutrition intake on the Allergy Diet for inpatients.

The food satisfaction questionnaire asks for your rating on various aspects of the hospital foodservice, including food quality, meal service quality, staff/service issues and the physical environment.

The interview will involve questions about your opinion on the hospital foodservice in terms of food safety, meeting your nutritional needs and your satisfaction overall. We will record the interview on a digital voice recorder, so that we can accurately reflect your comments in the study outcomes.

You will not be paid for your participation in this research.

4. What are the possible benefits?

There are no direct benefits for participation in this study. However, information gathered may help us to develop a better understanding of the factors influencing foodservice for patients with a food allergy. This will help support the allergy menu design for the future.

5. What are the possible risks?

Participation in this project does not require any changes to usual practice for your stay in the hospital. The dietary and medical record information collected is part of routine practice for the Dietitian. The interview will provide additional detail to what is usually collected to aid the study findings.

If you become upset or distressed as a result of your participation in the study, the researcher is able to arrange for referral to counselling or other appropriate support. Any counselling or support will be provided by staff who are not members of the research team.

6. Do I have to take part in this research project?

Participation in any research project is voluntary. If you do not wish to take part, you do not have to. If you do decide to take part and later change your mind, you are free to withdraw from the project at a later stage. If you decide to leave the project, the researchers would like to keep the personal and health information about you that has been collected. This is to help us make sure that the results of the research can be measured properly. If you do not want us to do this, you must tell us before you withdraw from the research project.

Your decision whether to take part or not, or to take part and then withdraw, will not affect your relationship with the researchers or Alfred Health. The treatment you receive will not be affected by your decision regarding participation in this research project.

7. How will I be informed of the final results of this research project?

A summary of the overall results of the project will be prepared at the end of the study (early 2019). If you are interested in reading results of this project, you can contact the project co-ordinator who will provide you with a copy of the overall outcome. The final results of this project will also be presented at a scientific or medical conference and may be published in a scientific or medical journal. No individual participant will be identified in any of the reports or presentations of the project's results.

8. What will happen to information about me?

Any information gathered that can identify you will be treated as confidential and securely stored. It will be used only for this research project. It will be disclosed only with your permission, or in compliance with the law. In any publication and/or presentation, information will be provided in such a way that you cannot be identified, except with your permission.

During the study, data will be accessible only to the researchers. It will be securely stored in the Alfred Hospital Nutrition Department and coded in such a way that personal details cannot be identified. At the completion of this project, data will be stored in an archive for seven years,

accessible only to the Alfred Ethics Committee for auditing purposes. At the end of the data storage period, all data will be securely destroyed.

9. Can I access research information kept about me?

In accordance with relevant Australian and/or Victorian privacy and other relevant laws, you have the right to access the information collected and stored by the researchers about you. Please contact one of the researchers named at the end of this document if you would like to access your information.

Further, in accordance with regulatory guidelines, the information collected in this research project will be kept for at least seven years. You must be aware that the information may become de-identified at some point and access to information about you after this point will not be possible.

10. Is this research project approved?

The ethical aspects of this research project have been approved by the Human Research Ethics Committee of Alfred Health.

This project will be carried out according to the *National Statement on Ethical Conduct in Human Research (2007)* produced by the National Health and Medical Research Council of Australia. This statement has been developed to protect the interests of people who agree to participate in human research studies.

11. Consent

I have read, or have had this document read to me in a language that I understand, and

I understand the purposes, procedures and risks of this research project as described within it.

I have had an opportunity to ask questions and I am satisfied with the answers I have received.

I freely agree to participate in this research project, as described.

I consent to the data specified in section 3 of this Patient Information and Consent Form being collected from my medical records.

I understand that I will be given a signed copy of this document to keep.

Participant's name (printed)

Signature

Date

Declaration by researcher*: I have given a verbal explanation of the research project, its procedures and risks and I believe that the participant has understood that explanation.

Researcher's name (printed)

Signature

Date

Note: All parties signing the consent section must date their own signature.

12. Who can I contact?

The person you may need to contact will depend on the nature of your query. Therefore, please note the following:

For further information or appointments:

If you want any further information concerning this project or if you have any medical problems which may be related to your involvement in the project (for example, any side-effects), you can contact **the Principal Researcher, Ms Madeleine Neff, Accredited Practising Dietitian on phone: 9076 3063.**

For complaints:

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about being a research participant in general, then you may contact:

Complaints Officer, Office of Ethics & Research Governance, Alfred Health Email:
research@alfred.org.au,
Telephone: 9076 3619

3. Semi-Structured Interview Questions

Table 7: Semi-structured interview questions

Question	Probes
1. What do you think about the hospital allergy diet that you have been receiving?	Anything in particular that you like or dislike?
2. Are you receiving enough to eat?	Are there any specific areas of the menu not providing enough?
3. What could the hospital kitchen do to improve the food and drinks you receive?	
4. When thinking about your food allergy, do you feel more or less safe in hospital?	
5. What about in hospital when compared to eating out at a café?	
6. Do you have anything else you would like to add before we finish the interview?	

4. Excluded Patient Characteristics

Table 8: Excluded Patient Characteristics

	Excluded (n = 17)	Included (n = 20)	Significance p-value
Age, years (mean, SD)	56.2 (21.0)	51.3 (21.3)	0.485
Gender, (% female)	58.8 (n = 10)	65 (n = 13)	0.699
Length of Stay, days (median, IQR)	8.0 (18.5)	9.5 (7.0)	0.577
Medical Unit, number of patients (%)			0.173
- Respiratory	0	3	
- Medical Specialties	8	9	
- Oncology	0	3	
- Cardiac Specialties	1	1	
- Surgical	4	3	
- Trauma	1	1	
- Psychiatry	3	0	
Exclusion Criteria, number of patients (%)			
- Declined	0		
- Non-English Speaking	2		
- Intensive Care Unit	1		
- Psychiatric Unit	3		
- Palliative/Terminal	0		
- Acute Clinical or Psychiatric Instability	8		
- Admitted < 24 hours	2		
- Cognitively impaired	1		