



# Impact of type, size and shape of plates on hospital patients' perceptions of the quality of meals and satisfaction with foodservices



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## ARTICLE INFO

### Article history:

Received 1 September 2017

Received in revised form

8 October 2017

Accepted 9 October 2017

Available online 10 October 2017

### Keywords:

Hospital foodservice

Patient satisfaction

Plates

Quality meals

## ABSTRACT

Hospital meals are important for supporting nutrition goals and the overall hospital experience. The aim of this study was to assess if patients' perceptions of quality attributes of hot meals were impacted by the type of plate on which the meal was served.

Eligible patients selected from medical and/or surgical wards at a 929 bed acute care hospital were randomised to receive hot meals served on either ceramic or disposable plates at eight evening meals. Patients from a multi-centre trial of pre-packaged meals where re-thermalised meals were presented on a variety of colour and shaped disposable plates were included in a second phase. Patient assessment of meal quality was undertaken using the Meal Assessment Tool (MAT)(Hannan-Jones & Capra, 2017) with data collected by interview.

In phase one, 137 eligible patients completed the MAT (response 46.8%), with results showing no significant difference in the rating of appearance, quality, expectations or satisfaction when meals were served on disposable or ceramic plates. In phase two data were collected from 6189 patients (response 47.4%). No practical difference in rating of meals was found in relation to colour and sectioning of plates, however a statistical but non-practical difference was found regarding plate shape, with meals served on oblong/rectangular plates rated more positively. Of 3078 comments made concerning the meals, 99 (3.2%) concerned the plates on which the meals were served.

This study has shown that quality, appearance and taste of meals, rather than the serving ware are important to patients. Findings suggest that attending to other quality aspects of meals may be far more important than the plate itself, and deserve attention.

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## 1. Introduction

Meals are often considered part of the “hotel services” in hospitals, and can be the focus for efficiency gains, when resources are limited (Nugent & Emmerich, 2014). However, they can, and should, also be considered part of the therapeutic services, as meals contribute to overall satisfaction with services, nutritional status and the reduction of length of stay (Allard et al., 2015; Rollins & Dobak, 2017). Issues of malnutrition in hospitals are well known (Correia, Perman, & Waitzberg, 2017; Kruiženga et al., 2016), and the importance of food provision that is consumed and enjoyed is

imperative if malnutrition is to be controlled. Meals are also an integral part of the perception of quality services overall.

Food that is not consumed not only is not nutritious, but also is costly in terms of waste and contributes to environmental issues (Dias-Ferreira, Santos, & Oliveira, 2015). For hospital foodservice administrators, solutions that require the implementation of wide scale system changes can be complex and costly, and thorough exploration of different and or new systems are vital to inform decisions.

Convenience meal systems, including those where foods are pre-plated on disposable plates (either chilled or frozen) are commonplace in foodservice sectors such as the airline industry and the ready-made home meal market, but less so in the acute care hospital setting, though use is beginning to rise, with ‘Steamplicity’ an example (Dillon, McDonald, & Jonus, 2012). These systems may present opportunities for financial savings through economies of scale, and in addition can lead to a reduction of labour

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and environmental costs, for example through reduced ware-washing. These systems also offer the potential for greater meal flexibility through increased patient meal choices, with competitive tendering opening up hospital meal provision to a greater array of food manufacturers. Increased flexibility with respect to providers of meals not only increases the opportunity to increase the range of meals offered, it can offer the opportunity of choosing “better” meals from within a single class (Balcombe, Fraser, & Harris, 2009; Kurtuluşoğlu, Can, & Tolon, 2016). Through well described meal specifications for tendering, both nutrition and quality standards of meals for general and special diets can be assured.

These new meal systems are based on using a variety of disposable tableware, in order to be economically viable. However there are perceptions among hospital professional staff that ceramic plates are “better” in terms of meal quality. In the airline industry, tableware (including plates) can be viewed as a differentiator of the meal service between client segments. For example, in the presentation of meals in premium cost airfare seats, ceramic or more sturdy and attractive melamine plates are used in comparison to the meals in lower cost airfare seats, where cardboard or plastic plates and/or food boxes are more typical.

There are several well conducted studies on how the colour of plates and flatware, and the location of food on the plate, influence perceptions of value and quality of the meal (Spence, Qian Janice & Youssef, 2017; Piqueras-Fiszman, Alcaide, Roura, & Spence, 2012; Van Ittersum & Wansink, 2012) but these have usually been conducted in the well population. The application of these findings to the unwell population is not entirely clear, as those in hospital value other aspects of foodservice.

The aim of this study was to assess if patients’ perception of quality attributes of hot meals were impacted by the type of plate on which the meal was served.

## 2. Methods

This study was a multi-method study conducted in two phases in 2013. The first phase was a randomised trial with a primary aim to test patient perception of meal quality when the same meal was served on either a ceramic or a plastic plate. The menus, meals, service and flatware were unchanged in this phase and all plates within the class of either ceramic or plastic were the same. The second phase used a large convenience sample and explored any impact on quality perception of an array of different meals, with different shapes and colours of disposable plates.

### 2.1. Phase 1 – Disposable versus ceramic plates

All patients admitted to 8 general medical and/or surgical wards in a 929 bed acute care facility (representing 25% of total beds) were identified as suitable for inclusion. Patients were excluded if they were designated ‘nil by mouth’, required non-standard diets (such as texture modified or gluten free diets), selected ‘cold’ meals (such as sandwiches or salads) or vegetarian choices, or were deemed unsuitable for interview by the nursing staff.

Observations occurred at evening meals across a 2 week period. Each day, 4 of the 8 wards on a single floor were selected for inclusion. Wards were randomised to receive the 2 standard hot meal choices on either ceramic or plastic plates. All other meals outside the study period remained on the ceramic plates (for example lunchtime meals).

The standard menu and menu management processes as well as the thermal support systems remained unchanged, although the plastic plates were not pre-heated as were the ceramic plates. To ensure safety, a temperature data logger (–40 to +125 °C) set to 30 s intervals was used to monitor ‘dummy’ meals across the meal

service period on two evenings to assess temperature losses of meals.

Assessment of meal quality was undertaken using the Meal Assessment Tool (MAT) (Hannan-Jones & Capra, 2017), within 30 min of completion of the meal, using interview method. The MAT uses a 7 point Likert scale to rate appearance, taste and quality of the meal components (protein, starch and vegetables) with a 5 point Likert scale to rate expectation and overall satisfaction, which allowed comparison with facility statistics on satisfaction with the usual service using the Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ) (Capra, Wright, Sardie, Bauer, & Askew, 2005) conducted 2 months prior. Any comments were recorded verbatim. All interviews were conducted by professional nutrition staff or nutrition students under supervision.

### 2.2. Phase 2 – Disposable plate type

A convenience sample of hospital patients included in a large multi-centre trial of pre-packaged meals was available for this study. One of the overall aims of the multi-site study was to examine the effect of the meal presentation and packaging on overall satisfaction with the meals and foodservice. Multiple facilities were included, selected to represent large (>600 beds) to small (<40 beds) hospitals, from rural, regional and metropolitan locations. All patients on unrestricted diets were eligible for inclusion in this study, with these patients served re-thermalised pre-plated meals presented on a variety of colour and shaped disposable plates. Patients in short and long term wards within the facilities were included. Full details of the facilities and recruitment are described elsewhere (Hannan-Jones & Capra, 2017). Meals were sourced from nine commercial suppliers. Meal quality was assessed via the interview method using the MAT 90 min directly after the midday or evening meals.

All patient comments made were entered and searched for specific terms relating to plate shape and colour.

### 2.3. Statistical analysis

All data were entered in a password-protected Excel™ file. The Statistical Package for the Social Sciences SPSS 23.0 (IBM Corp, 2015) was used for data analysis. All continuous variables were tested for normality, with variables transformed as required. Chi-square, Kruskal-Wallis H tests, ANOVAs, and independent T-tests were utilized to compare data. An alpha level was set at <0.05.

### 2.4. Ethics

Both studies were considered low and negligible risk, as contributors to quality improvement processes and received approval from the relevant committees from Queensland Health, NSW Department of Health as well as from the University of Queensland and the Queensland University of Technology.

## 3. Results

### 3.1. Phase one - Disposable versus ceramic plates

Across the four days of the study, occupancy in selected wards was 92%, with 293 (69%) patients provided hot meals that met the inclusion criteria. One hundred and thirty seven (137) patients completed the MAT (response rate 46.8%), with reasons for non-response being; poor cognition and unable to complete survey, missing from the ward at time of the meal, or declined inclusion.

Of the eight hot meat choices (2 each evening), four included chicken, three beef and one lamb, with one meal choice offered

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