



Room Service Improves Nutritional Intake and Increases Patient Satisfaction While Decreasing Food Waste and Cost

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ABSTRACT

Background Room service is a foodservice model that has been increasingly implemented across health care facilities in an effort to improve patient satisfaction and reduce food waste. In 2013, Mater Private Hospital Brisbane, Australia, was the first hospital in Australia to implement room service, with the aim of improving patient nutrition care and reducing costs.

Objective The aim of this study was to comprehensively evaluate the nutritional intake, plate waste, patient satisfaction, and patient meal costs of room service compared to a traditional foodservice model.

Design A retrospective analysis of quality-assurance data audits was undertaken to assess patient nutritional intake between a facility utilizing a traditional foodservice model and a facility utilizing room service and in a pre–post study design to assess plate waste, patient satisfaction, and patient meal costs before and after the room service implementation.

Participants Audit data were collected for eligible adult inpatients in Mater Private Hospital Brisbane and Mater Hospital Brisbane, Australia, between July 2012 and May 2015.

Main outcome measures The primary outcome measures were nutritional intake, plate waste, patient satisfaction, and patient meal costs.

Statistical analyses performed Independent samples *t*-tests and χ^2 analyses were conducted between pre and post data for continuous data and categorical data, respectively. Pearson χ^2 analysis of count data for sex and reasons for plate waste for data with counts more than five was used to determine asymptotic (two-sided) significance and *n*-1 χ^2 used for the plate waste analysis. Significance was assessed at $P < 0.05$.

Results This study reported an increased nutritional intake, improved patient satisfaction, and reduced plate waste and patient meal costs with room service compared to a traditional foodservice model. Comparison of nutritional intake between a traditional foodservice model (*n*=85) and room service (*n*=63) showed statistically significant increases with room service in both energy (1,306 kcal/day vs 1,588 kcal/day; $P=0.005$) and protein (52 g/day vs 66 g/day, $P=0.003$) intake, as well as energy and protein intake as a percentage of requirements (63% vs 75%; $P=0.024$ and 65% vs 85%; $P=0.011$, respectively). Total mean plate waste decreased from 29% (traditional foodservice model) to 12% (room service) ($P < 0.001$). Patient satisfaction ratings indicated improvement with room service across all Press Ganey meal scores: 68th to 86th percentile overall; 64th to 95th percentile for “quality of food”; and 60th to 99th percentile for “flavor of food.” Evaluated during comparable times of the year, patient meal costs decreased by 15% with room service.

Conclusions A patient-centered foodservice model, such as room service, can improve patient nutritional intake and enhance patient satisfaction in a budget constrained health care environment.

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ROOM SERVICE IS A FOODSERVICE MODEL THAT HAS been increasingly implemented across health care facilities over the past 10 years in an effort to improve patient satisfaction and reduce food waste.¹⁻³ This increasing focus to improve patient satisfaction

while providing evidence-based clinical care is expected to occur within the cost-constrained health care environment. Foodservice models are also increasingly being assessed with regard to their impact on patients' nutritional intake.^{4,5} Consequently, comprehensively measuring all key outcomes

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related to foodservice system improvements becomes important to ensure an evidence-based approach to determining optimal foodservice systems for hospitals.

As there is a paradigm shift to more personalized, patient-centered care, patient satisfaction has increasingly become a driver of high-quality care.² Foodservice quality has been linked to patient satisfaction⁶ and, in the United States, room service is increasingly being seen as the foodservice model for hospitals to meet this outcome.^{1,2}

Increasing resource restrictions within the health care system are driving facilities to scrutinize the costs of service delivery and investigate avenues for saving. The provision of food to patients and associated levels of waste are often a priority focus in cost-management strategies.^{1,7} Sources of food waste are varied and can include foodservice model design (bulk cooking and rethermalizing, long lead time forecasting, and in-advance meal ordering), missed meals due to environmental factors (hospital procedure and test scheduling), and individual patient factors (reduced appetite and other impacts of clinical symptoms and treatments, such as nausea or pain).⁷ Foodservice models that can reduce or eliminate these sources of waste are considered optimal from this cost-management perspective.

Hospital malnutrition is a well-documented clinical issue associated with adverse clinical outcomes, increased mortality and morbidity, increased hospital length of stay, and increased costs.⁸⁻¹² Poor food intake is now recognized as an independent risk factor for hospital mortality and clinical dietitians struggle with maximizing patients' nutritional intake in the health care setting.^{11,13} As a result, attention is increasingly being paid to the impact of foodservice models on patients' nutritional intake.^{9,14}

While the room service model has been recommended to improve patient satisfaction and reduce food costs and/or food waste,^{3,4,15,16} few studies have investigated the impact of a room service model on patients' nutritional intake in comparison to their nutritional requirements. The few studies that have measured nutritional intake have been limited to specific patient populations, such as the pediatric population,^{4,17} or small subgroups of the adult patient population, such as cardiac,¹⁸ and therefore, these data may have limited application across other patient populations.

Similarities between the Australian and US health care sectors are evident in the challenges faced by dietitians and foodservices in delivering high-quality, cost-effective, and evidence-based foodservice models that assist patients to maintain adequate nutritional intake within the acute care environment.^{1,2,7,11,16,17} Malnutrition prevalence rates as documented in the literature are also evidence of the ongoing challenges faced globally by dietitians in the identification, assessment, and treatment of this issue.^{8-11,13,19-21}

The aim of this study was to comprehensively evaluate patient nutritional intake, plate waste, reasons for plate waste, patient satisfaction, and patient meal costs associated with room service compared to a manual, paper menu, tray line, set mealtime traditional foodservice model. The hypothesis is that the room service model will show improvements from the traditional foodservice model in

nutritional intake, plate waste, patient satisfaction, and meal costs.

METHODS

Mater Group comprises 5 individual facilities within its South Brisbane Campus (Queensland, Australia). Within this group, Mater Private Hospital Brisbane is a 200-bed private, acute care, adult hospital and Mater Hospital Brisbane is a 126-bed public acute care adult hospital. Both Mater Private Hospital Brisbane and Mater Hospital Brisbane have a similar case mix of patients, designated by subgroup in general medical, surgical, and oncology wards. The organizations' annual malnutrition point prevalence audit data shows comparable malnutrition prevalence rates for 2016 at 24% for Mater Private Hospital Brisbane and 27% for Mater Hospital Brisbane.

In June 2013, Mater Private Hospital Brisbane became the first hospital in Australia to implement room service as a patient foodservice model. At this time, Mater Private Hospital Brisbane transitioned from a traditional foodservice model to room service, using the CBORD Room Service Choice On-Demand module.²² In the room service model, patients order meals from a new single integrated a la carte style menu anytime between 6:30 AM and 7 PM by phoning room service representatives in a central call center. Meals are prepared on demand and delivered within 45 minutes of receiving the order. The remaining facilities on the campus, including Mater Hospital Brisbane, continued using the traditional foodservice model. In this model, patients order their meals via completing a paper menu (cook fresh, 14-day cycle menu) up to 24 hours before meals, which are then collected at a set time by nutrition assistant staff. Meals are delivered at set meal times during the day: breakfast between 6:30 and 7:30 AM; lunch between 11:45 AM and 12:45 PM; and dinner between 5:00 and 6:00 PM.

Menus for both room service and traditional foodservice model were entered into the CBORD Food and Nutrition Solutions (Nutrition Service Suite and Foodservice Suite)^{23,24} and analyzed for nutritional quality and to ensure compliance to therapeutic diets and the New South Wales Agency for Clinical Innovation Nutrition Standards for Adult Inpatients and Queensland Health Nutrition Standards for Meals and Menus.^{25,26}

A retrospective analysis of nutritional intake data collected at Mater Hospital Brisbane traditional foodservice model (pre) in August 2014 and Mater Private Hospital Brisbane room service (post) in May 2015 was conducted. Audits for nutritional intake were not completed for Mater Private Hospital Brisbane before transitioning to room service in June 2013. As Mater Hospital Brisbane and Mater Private Hospital Brisbane shared the same menu, foodservice model (traditional foodservice model), and staff before Mater Private Hospital Brisbane transitioning to room service, using Mater Hospital Brisbane traditional foodservice model audit data was considered appropriate for comparison of traditional foodservice model to room service. A retrospective analysis of routinely collected quality-assurance data in a pre-post study design measured plate waste, patient satisfaction, and overall patient meal costs to enable a comparison of traditional foodservice model (pre) and room service (post) at

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