

Hospital Foodservice to Improve Inpatients' Food Intakes

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Reduced food intake among hospitalized patients or inpatients is often associated with adverse health consequences such as malnutrition. To improve patients' food intake, satisfaction, nutritional status, and quality of life, five intervention strategies were identified: implementing a new food service system, menu modification, multidisciplinary approaches in nutrition care, protected mealtime intervention programs, and attractive meal presentation.

Keywords: foodservice ; malnutrition ; food intake ; intervention ; hospital

1. Introduction

Reduced food intake among hospitalized patients or inpatients is often associated with adverse health consequences such as malnutrition. Malnutrition is described as a lack or excess of nutrients, imbalance in macro- and micronutrient intakes, or both, resulting in irregular body structure, function, and clinical outcomes ^[1]. Malnutrition during hospitalization is a crucial problem; approximately 32% of patients are malnourished, and 23% eat less than 25% of the provided hospital food ^[2].

Malnutrition has several negative consequences, including a weakened immune system and slower wound healing, muscle wasting, longer hospital stays, increased treatment cost and a higher mortality rate ^[3]. A study showed that a lack of physical activity and/or a lower protein intake in patients due to the lower energy intake might result in muscle atrophy during a few days of hospitalization ^[4]. A low body mass index (BMI) at admission, concurrent illnesses and infections, a lack of food intake and quality, and male sex were significant factors influencing food intake and causing malnutrition among inpatients ^[5].

There are many factors associated with inadequate food intake among inpatients, such as lack of feeding aid, inability to provide daily healthy meals, and missing meals due to clinical investigations ^[1]. A previous statistic showed that about 58% of inpatients did not consume all the foods they were served ^[6]. According to the findings, factors related to food intake during hospitalization are related to both patients' condition and the quality of the hospital food. Factors related to patients' condition include physical characteristics, such as difficulties eating and swallowing. Psychosocial factors include being alone, neglected, stress and food beliefs, while examples of hospital food quality factors are unhygienic food and delayed mealtimes. These factors were reported to be significantly associated with increased food waste ^[7]. Moreover, nutritional impact symptoms include abdominal distention, dysphagia, diarrhoea, nausea, vomiting, lethargy, low appetite, being too sick or too tired to eat and poor dentition. The other conditions, such as interruptions during mealtime, not having food when a meal is missed and refusing to eat the ordered food were highly associated with inadequate food intake during hospitalization ^[8].

Identifying and managing malnutrition is essential because inappropriate nutritional support for inpatients with malnutrition leads to a higher transfer and mortality rate, longer hospital stay, and a lower discharge rate than well-nourished patients. It is suggested that future research should concentrate on the factors that contribute to insufficient food intake and the development of effective methods for reducing the risk of malnutrition in inpatients ^[9]. Additionally, the organization of food provision in hospital could harm patients' food intake and nutritional status due to patients' dissatisfaction with hospital meals, missed diagnoses due to inaccurate nutritional screenings and assessments, and the lack of training and hospital staff awareness ^{[9][9][10]}. Hence, it is essential to include a nutritional assessment as part of the patient's clinical diagnoses. In addition, hospitals should develop systematic methods to prevent and treat malnutrition. These involve an interdisciplinary care team, such as a physician, dietitian, nurse, and pharmacist, working to develop a nutrition care plan, establish effective processes to diagnose malnourished patients and introduce comprehensive nutrition care plans ^[11].

2. Hospital Food Service Strategies to Improve Food Intakes among Inpatients

Many factors are associated with malnutrition among inpatients. One of them is a decline in food consumption because of an illness-induced loss of appetite. A study in 56 countries showed that inpatients had inadequate food intake, which was significantly associated with reduced food intake ^[12]. Other significant factors are surgical procedures, concurrent illnesses and infection, low BMI upon admission, dissatisfaction with food quality, gastrointestinal symptoms, and inability to chew and swallow ^[5]. Regardless of age, gender, marital status, employment status, or diagnosis, a high prevalence of malnutrition among inpatients was associated with a longer hospital stay ^{[13][14]}.

Nutritional intervention and strategies have significantly improved patients' food intake, satisfaction, nutritional status, and quality of life, and reduced food waste and cost ^{[15][16][17][18][19][20][21]}. A new food service system was implemented using current technology that focused on the meal-ordering system, service styles, and meal delivery. For example, the use of electronic menus (E-menus) as an alternative approach to the meal-ordering system was an effective way to obtain information about the food, contributing to greater satisfaction among inpatients ^[22]. The bedside meal-ordering system showed improved food intake and patient satisfaction compared to traditional paper menu systems ^{[16][23]}. Assistance and guidance during meal orders can increase the suitability and consistency of orders, and monitor the nutritional status of patients. The meal-ordering system also helps determine patients that are at risk of malnutrition. It indirectly improves clinical outcomes where dietary education is needed ^[24]. Regardless of the use of new technology in the meal-ordering system, simple interventions such as verbal prompts for meal-ordering have proven to be a helpful tool to improve food consumption among patients during hospitalization ^[15].

Room service is now trending in many hospital food service operations. Room service increases patient satisfaction and food intake, while reducing food waste and cost ^{[17][18]}. Meal delivery systems play an essential role in monitoring and assessing patients' food intake. Inpatients preferred the trolley system over the pre-plated meal system because the temperature was more controlled ^{[25][26][27]}. However, one study compared Bistro-style meals and pre-plated services and reported no significant differences in the patients' food intake, satisfaction, and meal quality ^[28]. In a previous study comparing the same meal distribution system between prison and hospital food service, the delivery and service system were much less consistent (delay and disruption) in hospitals than in prison due to poor communication and the demands of medical professionals ^[29].

It is crucial to ensure patients' total energy and protein intake meets the recommended requirements of the British Dietetic Association's (BDA) and Nutrition and Hydration Digest Standard ^[30]. Most of the studies implemented menu modifications and composition interventions, such as energy- and protein-enriched meals or snacks, added condiments to the menu, and provided oral nutritional supplements with a combination of high-protein and high-energy snacks to the patient when promoting food intake ^{[31][32][33][34][35][21]}. It is suggested that total energy and protein requirements can be met by offering more energy-dense menu choices and optimizing the provision of hospital, snack, and oral nutritional supplements, as clinically recommended ^[36]. The patient-centered foodservice model is suggested to result in increased food intakes and improved nutritional status, as well as increases in patient satisfaction and quality of life, and reduced food costs ^[19]. The patient-centered model definition, in theory, benefits patients by improving communication, providing effective intervention, increasing satisfaction, and obtaining patient-reported outcomes ^[37].

Multidisciplinary approaches are one of the main intervention strategies to improve patients' food intake. This interdisciplinary approach refers to active teamwork among the various healthcare team members to develop and deliver optimal care plans for inpatients ^[38]. It is a fundamental strategy to enhance the quality of food intake and patient wellbeing, decrease hospital stays, reduce costs, and support better health outcomes ^[39]. Multidisciplinary approaches to nutritional supervision are highlighted and indicated, regardless of whether they are individual, ward-based or organizational approaches, or a combination of the three. These have been reported to improve the patients' food intake, nutritional status, satisfaction, and quality of life ^{[40][41][42][43][44][45]}. Nutrition interventions to tackle malnutrition are a low-risk, cost-effective approach to improving the quality of patient care; however, they require interdisciplinary collaboration. All healthcare team members (including dietitians, nurses, and physicians) are encouraged to communicate openly across disciplines and recognize the critical role of nutrition care in improving patient outcomes ^[46].

Protected mealtimes, mealtime environment, and mealtime assistance have been proven to be successful interventions to improve overall patients' food intake. However, the effectiveness of protected mealtimes initiatives in increasing patients' food intake has yet to be proven. Palmer and Huxtable ^[10] found many aspects of protected mealtimes to be linked to inpatient food intakes, including the introduction of mealtime volunteers and assistance and a proper mealtime atmosphere, which included conditions such as time and position during mealtimes. The same finding was revealed: food

intake among elderly patients improved in the presence of meal assistants [47]. Markovski et al. [48] suggested that the dining room environment may positively impact food intake and enjoyment, potentially improving weight gain and nutritional status among elderly patients.

Furthermore, another study demonstrated that mealtime volunteers can improve mealtime treatment for adult patients or residents in institutional settings [49]. However, little well-designed research is available on mealtime volunteers or feeding assistance. By removing obstacles and creating an environment of support and personal attention during hospital mealtimes, feeding assistance is an essential technique for increasing elderly patients' food intake [50]. Although the patients may experience various side effects and discomforts resulting from their illness, they still improved their food intake. Lindman et al. [51] also proposed that educated and trained food caregivers or assistants played a vital role in multi-professional nutritional management.

In contrast, Hickson et al. [52] reported that the protected mealtimes program in inpatients did not improve nutritional intakes, noting the energy deficit as a non-significant improvement. Another study by Porter et al. [53] also showed a limited improvement in food intake after implementation of the Protected Mealtime program. System-level nutrition intervention could increase food intake among patients at risk of malnutrition through fortified meals, mid-meals and mealtime assistance [54]. Previous studies reported that protein-supplemented hospital food substantially affected total protein intake and weight-adjusted energy intake among nutritionally vulnerable patients [55].

Furthermore, the meal presentation for cancer patients was also associated with higher plate wastage [56]. Food garnishes and attractive presentation encourage patients to try the food despite low appetites after treatment. Previous studies showed that patient satisfaction with hospital meals appeared to be strongly influenced by food variety, taste, presentation, flavour, and preparation [57][58][59][60]. Thus, a broader menu, high-quality taste, specific ingredient details, and improved mealtime, delivery, and food presentation will improve patient satisfaction with hospital foodservices [58][59]. Navarro et al. [61] found that enhanced meal presentation increases food consumption and patient satisfaction and decreases food costs and readmission rates. Research conducted by the same researchers, Navarro et al. [62], to compare the use of orange (experimental) and white (control) napkins on the inpatients' meal intake showed improved patient satisfaction with hospital food service and increased food intake among patients with an orange napkin.

Moreover, implementing high-frequency food services containing protein-rich meals and attractive meal presentation led to improved protein intake at mealtimes during the day [44]. A recent study was conducted by Donnelly et al. [63] to compare the efficacy of blue versus white dishware in increasing food consumption and mitigating eating challenges among dementia residents. This systematic review concluded that the factors affecting food intake among residents living with dementia were complex. A simple intervention was insufficient to improve their dietary intake.

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