Original Research

FROM PLATE TO PATIENT: FACTORS INFLUENCING SATISFACTION AND MEAL CONSUMPTION IN HOSPITALS

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ABSTRACT

Aims: Hospital food services are essential for supporting nutritional intake during hospitalization, but incomplete meal consumption remains common. This study evaluated inpatient satisfaction with hospital food services and factors associated with meal completion at Military Hospital 105, Vietnam.

Methods: A cross-sectional study was conducted among 356 adult inpatients in Internal Medicine and Surgical wards. Data were collected through bedside interviews and medical record review. Satisfaction was assessed using a culturally adapted Vietnamese version of the Acute Care Hospital Foodservice Patient Satisfaction Questionnaire. Meal completion was defined as consumption of at least three-quarters of the meal served during the previous week. Factors associated with meal completion were examined using multivariable logistic regression.

Results: The mean age was 49.6 ± 18.8 years, 54.8% were male, and 65.4% completed at least three-quarters of hospital meals. Overall satisfaction with the quality of food services was 86.24%, and domain-specific satisfaction ranged from 75.6% to 87.4%. Staff attitude and behavior received the highest satisfaction ratings, whereas food warmth and menu variety were the least satisfactory domains. In the final model, older age (OR 0.984; p=0.012), therapeutic diet (OR 0.537; p=0.026), and additional food intake outside hospital meals (OR 0.567; p=0.048) were negatively associated with meal completion, whereas satisfaction with food warmth was positively associated (OR 3.065; p<0.001).

Conclusions: Food warmth, diet type, and outside food intake were key factors associated with meal completion. Improving meal temperature and the acceptability of therapeutic diets may enhance nutritional care during hospitalization.

Keywords: *Hospital food service, patient satisfaction, meal completion, therapeutic diet, food warmth.*

I. INTRODUCTION

Nutrition plays a vital role in the recovery and rehabilitation of hospitalized patients [1, 2]. Adequate food intake supports immune function, wound healing, and treatment tolerance [3]. However, incomplete meal consumption remains a persistent issue, influenced by meal quality, food presentation, temperature, and individual preferences [4]. Previous Vietnamese studies have reported generally moderate-to-high satisfaction with hospital meals, although dissatisfaction remains common in food-related domains such as temperature, variety, and meal choice, often leading to reduced intake and prolonged hospital stays [5-7].

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Despite increasing interest in hospital foodservice quality, little research has explored patient satisfaction with hospital food services and its relationship with meal completion in military hospital settings [4]. Military Hospital 105, with over 800 beds and 30 clinical departments, provides both standard and therapeutic diets. However, the determinants of meal completion and satisfaction within this institution remain unexplored. Therefore, this study aimed to evaluate patient satisfaction with hospital food services and identify factors associated with meal completion. The findings are expected to inform practical interventions for optimizing hospital food service and improving clinical nutrition care.

II. METHODS

2.1. Study design and participants

A descriptive cross-sectional study was conducted from May to June 2022 in the Internal Medicine and Surgical Wards of Military Hospital 105.

The sample size was calculated using the single-proportion formula with α=0.05, d=0.05, and p=0.703 (based on data from Military Hospital 108 [4]), yielding a minimum of 320 subjects. A total of 356 eligible inpatients were enrolled by convenience sampling. Inclusion criteria: patients ≥18 years old, hospitalized ≥3 days, and able to consume food orally. Patients in ICU or with severe cognitive or physical impairments were excluded.

2.2. Data Collection

Data were collected through face-to-face structured interviews and review of medical records. Patients were enrolled after at least 3 days of hospitalization to ensure sufficient exposure to routine hospital meals. Interviews were conducted at the bedside by trained research staff using a standardized questionnaire.

Before the main survey, all interviewers were trained in study procedures, participant eligibility, questionnaire administration, and medical record abstraction to ensure consistency in data collection. The questionnaire was piloted in a small group of patients and their relatives to assess clarity and feasibility before formal implementation.

The questionnaire comprised three parts. Part 1 collected demographic and clinical characteristics, including age, sex, occupation, residence, length of hospital stay, and department. Part 2 assessed meal-related variables, including meal completion during the previous week, prescribed diet type (standard or therapeutic), and intake of additional foods. Meal consumption was estimated using a Visual Analogue Scale (VAS), based on patient self-report and cross-checked with healthcare worker assessment when needed. Meal completion was defined as consumption of at least 75% of the meal served [8].

Part 3 assessed patient satisfaction with hospital meals using a modified version of the Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ) developed by Capra et al. [9], with contextual adaptation for use in a military hospital setting informed by previous studies [10]. The instrument was translated into

Vietnamese and culturally adapted for inpatient use before data collection. Adaptations included replacing "right temperature" with "warmth," substituting "forks" with "chopsticks," and adding items on meal price satisfaction and overall satisfaction with hospital meals. A pilot test was conducted before the main study. Internal consistency of the adapted questionnaire was excellent in the present study (Cronbach's alpha = 0.96). Construct validity was examined by factor analysis; items with substantial cross-loading were removed or retained as independent items based on conceptual relevance, while items not loading on any factor were excluded.

Each satisfaction item was rated on a 5-point Likert scale from 1 (very dissatisfied) to 5 (very satisfied). For regression analyses, responses were dichotomized as satisfied (scores 4–5) and dissatisfied/acceptable (scores 1–3).

2.3. Statistical Analysis

Data were analysed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as frequencies and percentages for categorical variables, and as means ± standard deviations (SD) or medians with interquartile ranges (IQR), as appropriate, for continuous variables. Meal completion was analysed as a binary outcome (completed vs. not completed), and factors associated with meal completion were examined using logistic regression analysis.

A full model was initially constructed including demographic characteristics, clinical variables, and satisfaction domains considered clinically relevant. Variables with clinical relevance and/or a p value < 0.10 in the full model were considered for retention in the adjusted model, and the optimized model retained independent predictors that improved parsimony and interpretability. Because several satisfaction domains reflected related aspects of food service quality, potential overlap among these variables was reviewed during model reduction to minimize unstable estimates. Multicollinearity was assessed using variance inflation factors (VIF), with all values < 5. Odds ratios (ORs) and 95% confidence intervals (CIs) were reported. A two-sided p value < 0.05 was considered statistically significant.

2.4. Ethical Approval

Ethical approval was obtained from the Scientific and Biomedical Research Council of Military Hospital 105 (Decision No. 455/QD-BVQY, dated 30 May 2022). All participants were informed about the study objectives and procedures and provided written informed consent before the interview. Data usage and publication were authorized by Military Hospital 105. The authors declare no conflicts of interest.

III. RESULTS

Participant characteristics

A total of 356 inpatients were included in the study (Table 1). The mean age was 49.6 ± 18.8 years, and 36.8% were aged ≥60 years. Male patients

accounted for 54.8% of the sample. Most participants were admitted to Internal Medicine wards (59.6%) and lived in Hanoi (92.1%). Regarding hospital stay, 57.3% had been hospitalized for ≤7 days, 33.7% for 7–14 days, and 9.0% for >14 days. Overall, 79.5% of patients consumed only the prescribed hospital diet, whereas 20.5% reported additional food intake from outside the hospital. Standard rice-based diets accounted for 78.4% of prescribed diets, while 21.6% of patients received therapeutic diets. Overall, 65.4% of patients reported completing at least three-quarters of the meals served during the previous week.

Table 1. *Characteristics of study participants (n=356).*

Characteristics	Frequency (n)	Proportions (%)
Internal medicine department	212	59.6
Surgical wards department	144	40.4
Age, years (mean ± SD)	49.6	18.8
Age ≥ 60 years	131	36.8
Male gender	195	54.8
Female gender	161	45.2
Occupation		
Officials/staff	67	18.8
Workers	51	14.3
Farmers	151	42.4
Retired	75	21.1
Students	12	3.4
Residence in Hanoi		
Yes	328	92.1
No	28	7.9
Length of hospital stay		
LOS ≤ 7 days	204	57.3
LOS 7-14 days	120	33.7
LOS > 14 days	32	9
Requested explanation from a doctor about the hospital diet		
Yes	152	42.7
No	204	57.3
Compliance with hospital diet		
Prescribed hospital diet only	283	79.5
Additional food intake by patient	73	20.5
Type of hospital diet		
Standard rice-based hospital diet	279	78.4
Therapeutic diet	77	21.6
Meal completion during the previous week		
Completed ≥75% of meals	233	65.4
Completed <75% of meals	123	34.6

Abbreviation: LOS, length of hospital stays.

Patient satisfaction with hospital food services

Patient satisfaction across food service domains is presented in Figure 1. Overall, satisfaction levels were high across all domains, with the proportion of satisfied patients ranging from 75.56% to 87.36%. The highest satisfaction was observed for staff attitude and behavior (87.36%), followed by overall satisfaction with the quality of food services (86.24%). High satisfaction was also reported for meal serving time (83.43%), time of food distribution (83.15%), and utensil cleanliness (83.15%). In contrast, lower satisfaction levels were observed in food-related domains. Food warmth had the lowest satisfaction rate (75.56%), followed by menu variety (79.49%) and number of dishes (81.74%). Intermediate levels of satisfaction were reported for food taste, food price, meal presentation, and food origin (approximately 82%). Overall, service-related domains tended to receive higher satisfaction ratings than food-related domains.

Factors associated with meal completion

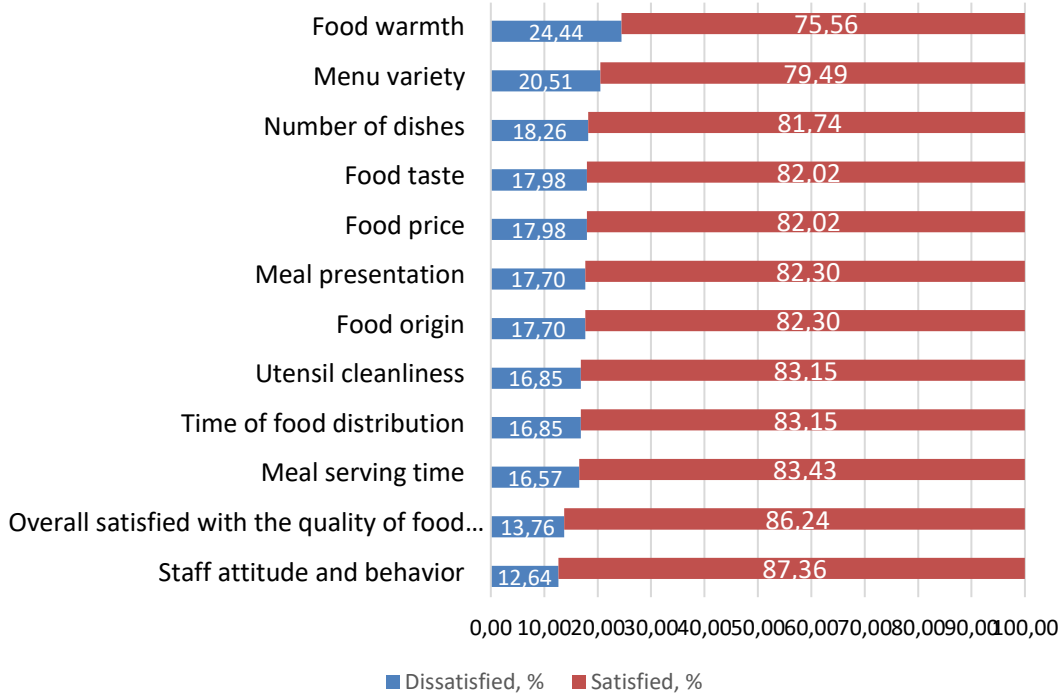

Figure 1. *Patient satisfaction with hospital food services*

After model reduction, the final optimized model identified four independent factors associated with meal completion. Older age was associated with a lower likelihood of meal completion (OR = 0.984, 95% CI: 0.972–0.997; p = 0.012). Patients receiving a therapeutic diet were less likely to complete their meals than those receiving a standard hospital diet (OR = 0.537, 95%

CI: 0.310–0.930; p = 0.026). Similarly, patients who reported additional food intake outside hospital meals had lower odds of meal completion (OR = 0.567, 95% CI: 0.323–0.994; p = 0.048). In contrast, satisfaction with food warmth was positively associated with meal completion and showed the strongest association in the final model (OR = 3.065, 95% CI: 1.833–5.126; p < 0.001). No significant multicollinearity was detected among the independent variables (all VIF values < 5).

Results of the logistic regression analyses are presented in Table 2. In the full model, older age, therapeutic diet, satisfaction with food appearance, and satisfaction with food warmth were significantly associated with meal completion, while additional food intake by the patient showed borderline significance.

Table 2. *Logistic regression models for factors associated with meal completion*

Variable	OR (95% CI)	p value
Model 1: Full model		
Age (year)	0.978 (0.959–0.997)	0.023
Male gender	1.217 (0.733–2.023)	0.448
Internal Medicine department	1.221 (0.706–2.111)	0.475
Occupation (Reference: officials/staff)	—	0.882
Worker	1.365 (0.556–3.351)	0.498
Farmer	1.142 (0.529–2.464)	0.735
Retired	1.122 (0.430–2.929)	0.814
Student	0.620 (0.144–2.668)	0.521
Residence in Hanoi	1.987 (0.794–4.971)	0.142
Length of hospital stay (Reference: LOS ≤ 7 days)	—	0.314
LOS 7-14 days	1.532 (0.878–2.672)	0.133
LOS > 14 days	1.055 (0.423–2.632)	0.909
Request Doctor’s explanation about hospital diet	1.113 (0.662–1.869)	0.687
Therapeutic diet	0.505 (0.279–0.912)	0.024
Additional food intake by patient	0.565 (0.302–1.059)	0.075
Satisfaction with hospital meals (yes vs no)		
Origin and source of food	0.509 (0.159–1.623)	0.254
Food appearance	4.477 (1.195–16.78)	0.026
Taste of food	0.759 (0.223–2.580)	0.659
Number of dishes	0.500 (0.129–1.944)	0.317
Warmth of food	3.423 (1.468–7.980)	0.004
Food sufficient in terms of variability	0.660 (0.206–2.113)	0.484
Time of food distribution	1.120 (0.332–3.776)	0.855

Variable	OR (95% CI)	p value
Cleanness of utensils	2.648 (0.770–9.109)	0.122
Price of food	1.363 (0.387–4.802)	0.630
Meal serving time	0.369 (0.091–1.491)	0.162
Attitude and behaviors of the staff	2.969 (0.713–12.36)	0.135
Overall satisfied with the quality of food services	0.457 (0.111–1.876)	0.277
Model 2: Reduced model		
Age (year)	0.983 (0.971–0.996)	0.008
Therapeutic diet	0.554 (0.318–0.964)	0.037
Additional food intake by patient	0.596 (0.338–1.053)	0.075
Food appearance	1.713 (0.831–3.535)	0.145
Warmth of food	2.307 (1.217–4.373)	0.010
Model 3: Final optimized model		
Age (year)	0.984 (0.972–0.997)	0.012
Therapeutic diet	0.537 (0.310–0.930)	0.026
Additional food intake by patient	0.567 (0.323–0.994)	0.048
Warmth of food	3.065 (1.833–5.126)	<0.001

Data are presented as odds ratios (ORs) with 95% confidence intervals (CIs).

Model 1 was the full model including all clinically relevant variables. Model 2 included variables with clinical relevance and/or $p < 0.10$ in Model 1. Model 3 retained variables with $p < 0.10$ in Model 2 to obtain the most parsimonious model. Multicollinearity was assessed using variance inflation factors (VIF), with all values < 5.

IV. DISCUSSION

Principal findings

Patient satisfaction with hospital food services was generally high in this study, with 86.24% of participants reporting satisfaction with the overall quality of hospital food services, and 65.4% completing at least three-quarters of the meals served. Staff attitude and behavior received the highest satisfaction rating, whereas food warmth and menu variety were the least satisfactory domains.

In the final multivariable model, meal completion was independently associated with younger age, receipt of a standard hospital diet, absence of additional food intake outside hospital meals, and satisfaction with food warmth. Although the effect size per year was modest, this finding suggests that older inpatients may be more vulnerable to incomplete meal consumption. Notably, satisfaction with food warmth showed the strongest association with meal completion (OR 3.07), highlighting food temperature as a potentially important target for improving inpatient dietary intake.

Comparison with previous satisfaction studies

The overall satisfaction observed in this study is consistent with previous hospital foodservice literature, where patients generally report favorable perceptions despite persistent issues in food-related domains. The Acute Care Hospital Foodservice Patient Satisfaction Questionnaire (ACHFPSQ) developed by Capra et al. has been widely validated for assessing patient satisfaction in hospital settings [9].

A systematic review by Dall'Oglio et al. showed that patient satisfaction with hospital foodservices was generally high across studies, although food-related attributes—particularly temperature, taste, flavour, texture, and menu variety—were repeatedly identified as major sources of dissatisfaction and key determinants of overall satisfaction [11]. Similarly, in a Swedish study using the Acute Care Hospital Foodservice Patient Satisfaction Questionnaire, Rapo et al. found that 80% of patients rated overall satisfaction as "good" or "very good"; items related to Staff and Service received the highest ratings, whereas food quality–related items contributed most to dissatisfaction and represented the main targets for improvement [12]. More recent evidence is consistent with this pattern. A study of patient mealtime experience also reported that food quality was perceived as the poorest aspect of hospital foodservice, especially with regard to flavour, presentation, and menu variety, highlighting these domains as priorities for quality improvement [13].

Our findings align closely with this pattern, reinforcing that interpersonal and service aspects are well perceived, whereas sensory and compositional attributes of meals remain suboptimal.

Food warmth as a key determinant of intake

The most important meal-related factor associated with meal completion in this study was food warmth. Patients satisfied with food warmth were approximately three times more likely to complete their meals. This finding is clinically significant, as food temperature is a modifiable operational factor that directly influences palatability and intake.

This result is strongly supported by previous studies. Navarro et al. demonstrated that improving meal presentation and sensory quality significantly increased food intake and reduced hospital readmission [14]. In addition, a systematic review by Osman et al. concluded that foodservice interventions targeting meal presentation, temperature, and delivery processes can significantly improve dietary intake in hospitalized patients [3]. Rinninella et al. further emphasized that improving meal quality and personalization not only enhances intake but also reduces food waste [15]. In the present study, food warmth was both the lowest-rated domain and the strongest predictor of intake, suggesting that improving temperature control during meal transport and distribution should be a priority intervention.

Therapeutic diets and outside food intake

Patients receiving therapeutic diets were significantly less likely to complete their meals. This finding is biologically plausible, as therapeutic diets often involve restrictions in salt, sugar, or texture, which may reduce palatability and familiarity.

This issue has been consistently reported in the literature. Curtis et al. found that low food intake in hospitalized patients is strongly associated with clinical and institutional factors, including diet prescriptions and mealtime barriers [16].

Similarly, the negative association between outside food intake and meal completion observed in this study reflects a well-recognized phenomenon in Asian healthcare settings. Shono et al. reported that hospital meal use in Vietnam is influenced by cultural practices, including the common habit of bringing food from home, which may reduce adherence to hospital diets [17].

Our findings extend this observation by suggesting that outside food does not simply supplement hospital meals but may compete with and replace them, thereby reducing meal completion.

Comparison with Vietnamese studies

The findings of the present study are broadly consistent with recent reports from Vietnam. Previous studies have shown generally high levels of patient satisfaction with hospital meals, ranging from approximately 79% to 90%, while also highlighting persistent dissatisfaction in food-related domains such as meal temperature, variety, and menu flexibility [5, 6]. Comparable patterns have also been observed in military hospital settings, where food temperature and menu variety were identified as important areas for improvement [4].

Taken together, these findings suggest that the main limitations of hospital food services in Vietnam are not confined to a single institution, but rather reflect broader and recurring challenges across different hospital settings. This pattern highlights the need for more systematic and structural improvements in hospital foodservice systems, particularly in relation to meal quality, temperature control, and menu planning.

Strengths, limitations, and implications

This study has several strengths. It included a relatively large inpatient sample (N = 356), used a culturally adapted and validated satisfaction instrument, and linked patient satisfaction with a clinically meaningful outcome (meal completion) using multivariable regression analysis. The dichotomization of satisfaction variables also improved interpretability and facilitated clinical application.

However, several limitations should be acknowledged. First, the cross-sectional design precludes causal inference. Second, meal completion was assessed using VAS-based estimation rather than weighed food records, which may introduce measurement bias. Third, important clinical factors such as nausea, pain, dysphagia, or fasting for procedures were not fully captured, although these are known to affect food intake. Finally, the use of convenience sampling in a single-center study may limit the generalizability of the findings.

Despite these limitations, the findings provide clear practical implications. Interventions should focus on improving food temperature control, enhancing the acceptability of therapeutic diets, and reducing reliance on outside food through better patient and caregiver education. These strategies may improve meal completion and contribute to better nutritional outcomes during hospitalization.

V. CONCLUSION

Most inpatients reported favorable satisfaction with hospital food services; however, food warmth and menu variety remained the least satisfactory aspects. Meal completion was independently associated with younger age, receipt of a standard hospital diet, absence of additional food intake outside hospital meals, and satisfaction with food warmth. Among these factors, food warmth showed the strongest association with meal completion. These findings suggest that improving temperature control during meal delivery, optimizing therapeutic diets to better match patient preferences, and reducing reliance on outside food may enhance meal completion and strengthen nutritional care during hospitalization.

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