



Relationship Between Food Taste, Acceptance and Waste Among Inpatients

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ABSTRACT

Background: Food waste is a longstanding issue in hospitals across Indonesia. Excessive food waste may contribute to inadequate nutritional intake among patients during hospitalization and hinder the recovery process.

Objective: This study aimed to determine the relationship between food taste, food acceptability, and food waste among inpatients at Ruteng Regional General Hospital.

Methods: This analytical observational study used a cross-sectional design and was conducted in March 2026 with 45 respondents. Inclusion criteria were inpatients aged ≥ 18 years, receiving regular meals or porridge, fully conscious and able to communicate, and hospitalized for at least 48 hours. Independent and dependent variables were measured simultaneously. Data were collected through interviews using questionnaires and direct weighing of leftover food from breakfast, lunch, and dinner over one day. Data were analyzed using univariate and bivariate analyses.

Results: Bivariate analysis using the chi-square test followed by Fisher's exact test showed no significant relationship between food taste and food waste ($p = 1.000$; $p > 0.05$).

Conclusions: Similarly, no significant relationship was found between food taste and food acceptability ($p = 1.000$). However, a significant relationship was found between food acceptability and food waste ($p = 0.000$; $p < 0.05$).

Keyword : food taste; food acceptability; food waste



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INTRODUCTION

Nutritional services constitute a key component of patient recovery efforts in hospitals. A primary indicator of the success of these services is a low volume of patient food waste. In accordance with Hospital Minimum Service Standards, the maximum allowable food waste is 20% of the total portion served, requiring a minimum average patient food intake of 80%¹. Food waste exceeding this limit not only indicates suboptimal fulfillment of patients' nutritional needs but also reflects a waste of the hospital's budgetary resources.

The prevalence of food waste in Indonesian hospitals varies widely, ranging from 17% to 67% depending on location and the type of service provided². Preliminary data from Ruteng Regional General Hospital for the final three months of 2025 indicate food waste levels of 40% to 44%—figures that exceed established standards. High levels of food waste can exacerbate patients' nutritional status, particularly given that approximately 20% to 60% of hospitalized patients in Indonesia are already malnourished upon admission, a condition that tends to worsen during their hospital stay³.

Food waste among hospital patients is influenced by various factors categorized as either internal or external. Internal factors include the patient's physical condition, underlying illness, changes in taste perception, and psychological state. External factors encompass the quality of food service; food flavor is frequently cited as the most significant factor influencing a patient's willingness to finish the meal served⁴. Food flavor comprises a combination of appearance, aroma, taste, texture, and temperature—all of which can influence an individual's appetite.

Previous studies have yielded mixed results regarding the impact of flavor on food waste. Some studies identify food taste as the primary cause of high food waste levels, whereas others find the opposite: significant food waste persists even when the taste is rated favorably⁵. This suggests variations in patient conditions and characteristics across different study locations. To date, there is no data specifically describing this relationship at the Ruteng Regional General Hospital. Therefore, this study was conducted to determine the relationship between food taste and food acceptability regarding the amount of food waste among inpatients at the hospital.

Based on this background, the researcher was prompted to investigate the relationship between food taste and the level of food acceptance regarding patient food waste at the Ruteng Regional General Hospital.

OBJECTIVE

To analyze the relationship between food taste and food acceptability regarding plate waste among inpatients at Ruteng Regional General Hospital.

METODE

This study employs an observational analytic design, specifically a cross-sectional design. In this design, measurements of the independent and dependent variables are taken simultaneously. The observational analytic method was selected because the study aims to evaluate the relationship between food preferences and food acceptance—specifically regarding plate waste—among hospitalized patients, without involving any specific treatments or interventions for the respondents. The cross-sectional approach enables the researcher to effectively understand the impact of the variables within a single observation period.

RESULT

Respondent Characteristics

The majority of respondents were aged between 30 and 49 years (18 individuals; 40%), were female (34 individuals; 75.6%), and underwent treatment for 3 to 4 days (32 individuals; 71%).

Table 1

Sample characteristics			
Category		n	%
Age (Years)	18 – 29 years	10	22
	30 – 49 years	18	40
	50 – 64 years	12	27
	65 – 80 years	5	11
Total		45	100.0
Gender	Male	11	24,24
	Female	34	75,76
Total		45	100.0
Length of Stay	1-2 hari	13	29
	3-4 hari	32	71
Total		45	100.0

Sample distribution by flavor profile

In general, the patients' assessment of the food taste was very positive. All respondents indicated that none of the food items were unpleasant or lacking in flavor. Specifically, 95.6% of respondents rated the staple food as very tasty, 93.4% rated the animal-based side dishes as very tasty, 91.2% rated the plant-based side dishes as very tasty, 97.8% rated the vegetables as very tasty, and 100% rated the fruit as very tasty. These results indicate that food preparation in the nutrition unit is being conducted effectively and aligns with the tastes of the majority of patients.

Table 2

Sample Distribution By Flavor Profile										
Category Food Flavor	Food Menu									
	Staple Food		Animal-Based Protein Dish		Plant-Based Protein Dish		Vegetable		Fruit	
	n	%	n	%	n	%	n	%	n	%
Not Satisfied	0	0	0	0	0	0	0	0	0	0
Somewhat Satisfied	0	0	0	0	0	0	0	0	0	0

Quite Satisfied	0	0	1	2,2	1	2,2	0	0	0	0
Satisfied	2	4,4	2	4,4	3	6,6	1	2,2	0	0
Very Satisfied	43	95,6	42	93,4	41	91,2	44	97,8	45	100
	45	100	45	100	45	100	45	100	45	100

Distribution of samples according to patient food waste

The average overall percentage of food waste was 15.6%, a figure that meets the hospital's minimum service standards. The highest level of food waste was observed in the vegetable component (31.1%, categorized as "high"), followed by animal-based protein dishes (28.9%), whereas no significant amount of fruit was left over. This is likely attributable to vegetable textures that were sometimes still tough, flavor changes resulting from a drop in serving temperature, and patients' reduced appetites due to illness.

Table 3
Distribution of samples according to patient food waste

Category Food Flavor	Food Menu									
	Staple Food		Lauk Hewani		Staple Food		Sayur		Staple Food	
	n	%	n	%	n	%	n	%	n	%
Small	35	77,8	33	71,1	35	77,8	31	68,9	45	100
Large	10	22,2	13	28,9	10	22,2	14	31,1	0	0
Total	45	100	45	100	45	100	45	100	45	100

Relationships Between Variables

Statistical test results indicate no significant relationship between the assessment of food taste and the amount of food waste ($p=1.000$). Similarly, no significant relationship was found between food taste and patient food acceptance ($p=1.000$). Conversely, a highly significant relationship was found between food acceptance and the amount of food waste ($p=0.000$), with all patients demonstrating good food acceptance producing minimal food waste.

Tabel 4
Sample Distribution By Food Taste And Food Waste

Food Taste	Leftovers		Total	
	A Little	A Lot's	n	%

	n	%	n	%	<i>p value</i>		
Taste	30	68,2	14	31,8	44	100	
Not Good	1	100	0	0	1	100	
Total	31	68,9	14	31,1	45	100	1, 000

Distribution Of The Sample According To Food Taste And Food Acceptability

Statistical test results show a p-value of 1.000 ($p > 0.05$), indicating no significant relationship between the assessment of food taste and food acceptance among inpatients. Consequently, the null hypothesis (H_0) is accepted. These results suggest that a patient's assessment of food taste does not necessarily influence food acceptance. Food acceptance can be affected by various other factors, such as the patient's health condition, appetite, prescribed diet, pre-hospitalization eating habits, menu variety, food texture, portion size, and the patient's physical and psychological state during treatment.

Tabel 5

Distribution Of The Sample According To Food Taste And Food Acceptability

Food Flavor	Food Acceptability				Total		<i>p value</i>
	Good		Not Good		n	%	
	n	%	n	%			
Good	30	68,2	14	31,8	44	100	
Not Good	1	100	0	0	1	100	
Total	31	68,9	14	31,1	45	100	1, 000

Distribution of Samples Based on Food Acceptance and Food Waste

Based on Table 6, which examines the relationship between food acceptance and food waste among inpatients, it was found that all respondents with good food acceptance—totaling 31 respondents (100%)—fell into the "low food waste" category, with no respondents falling into the "high food waste" category. Conversely, all respondents with poor food acceptance—totaling 14 respondents (100%)—fell into the "high food waste" category, with no respondents falling into the "low food waste" category. Overall, out of the 45 respondents, 31 (68.9%) were categorized as having low food waste, while 14 (31.1%) were categorized as having high food waste. The data were initially analyzed using the chi-square test; however, due to the presence of cells with an expected count of less than 5, Fisher's exact test was employed. The Fisher's exact test yielded a p-value of 0.000, which is less than α (0.05). This statistical result indicates a significant relationship between food acceptance and food waste among inpatients; consequently, the null hypothesis (H_0) was rejected.

Tabel 6

Distribution of Samples Based on Food Acceptance and Food Waste

Food Acceptance	Food Waste		Total	
	A little	Alots	n	%

	n	%	n	%	<i>p</i> <i>value</i>		
Good	31	100	0	0	31	1000	
Not Good	0	0	14	100	14	100	
Total	31	69	14	31	45	100	0,000

DISCUSSIONS

Food flavor is a key factor influencing the acceptability of served meals. It encompasses two main aspects: the food's appearance (portion size, color, presentation, and shape) when served, and its taste (aroma, seasoning, doneness, and texture) when consumed. Both aspects are equally important to consider in order to produce truly satisfying meals. Overall, the assessment of the staple food's flavor yielded excellent feedback. The majority of patients were highly satisfied with the taste. Only a small fraction rated it below the "highly satisfied" category, while no patients expressed dissatisfaction or a lack of satisfaction. This indicates that the flavor of the staple food aligned with patient preferences and was well-received. Assessments of animal-based protein dishes also garnered very positive responses; nearly all patients expressed high satisfaction with the flavor. While a small number of patients provided lower satisfaction ratings, not a single patient was dissatisfied. This demonstrates that the flavor of the animal-based dishes met expectations and was acceptable to the patients. Evaluations of plant-based protein dishes also showed high levels of satisfaction. Most patients were highly satisfied with the flavor, with only a small minority providing slightly lower ratings; no patients complained or expressed dissatisfaction. Overall, the flavor of the plant-based dishes suited patient tastes. Assessments regarding the flavor of vegetable dishes were also excellent, with the majority of patients expressing high satisfaction. No patients reported dissatisfaction with the flavor of the vegetables served, proving that the taste was well-received by all patients.

The assessment of fruit flavor yielded the most consistent and highly satisfactory results. All patients expressed a high level of satisfaction, with no ratings falling below that category; this indicates that the fruit served perfectly suited the patients' tastes and was well-received by everyone at the Ruteng Regional General Hospital (RSUD) in Manggarai Regency. The hospital employs a centralized food service system, allowing nutritionists to directly monitor the entire process—from preparation and cooking to distribution. Overall, the majority of patients responded very positively to all menu items served, including staples, animal-based protein dishes, plant-based protein dishes, vegetables, and fruit. Most patients expressed great satisfaction with the taste and quality of the food provided. Only a small number of patients rated the food below the "highly satisfied" category—particularly regarding plant-based and animal-based protein dishes—with this trend appearing more frequently among female respondents than males. Women tended to rate the taste of these protein dishes as merely "satisfactory," whereas male respondents generally found the flavor more acceptable and satisfying. This difference in response may be attributed to several factors, including variations in taste and olfactory sensitivity between men and women. Generally, women possess heightened taste sensitivity, making them more attuned to nuances in flavor, seasoning, and food texture. Additionally, long-standing differences in dietary habits and personal preferences play a role in how each group evaluates the flavor quality of the food served.

Despite differences in responses between gender groups, these findings serve as an important point for the continuous improvement of the preparation and processing of animal- and plant-based protein dishes; such improvements aim to cater to diverse tastes and enhance satisfaction among all patients, regardless of gender. These results align closely with a study by Budianingsih et al. (2025) at Bangli Regional General Hospital regarding food taste, where 31 samples (66.0%) rated the taste of the served food as satisfactory, and no patients expressed dissatisfaction or a lack of satisfaction with the meals provided. This indicates that the flavor profile of the food met the general preferences of the patients and the expected standards, and was overall well-received by all patient respondents in the study. Bivariate analysis suggests that while the food was generally considered tasty and enjoyed by patients, food waste was still observed in practice; this indicates that taste is not the sole determinant of consumption, as other

factors are also at play. Statistical analysis involved the Chi-square test; as the expected count was less than 5, the Fisher's Exact test was subsequently performed, yielding a p-value of 1.000, which is greater than α (0.05). This study demonstrates no significant association between food taste and patient food waste at Ruteng Regional General Hospital in Manggarai Regency. This contrasts with findings from Kendari City Regional General Hospital, where the Fisher's Exact test yielded a p-value of 0.005 ($< \alpha = 0.05$), indicating a significant association between food taste and food waste. This study differs from the research conducted by Diah Anggaini et al. (2017) at the Berkah Regional General Hospital (RSUD) in Pandeglang Regency, where findings indicated a relationship between food taste and plate waste for breakfast (p-value 0.017), lunch (p-value 0.008), and dinner (p-value 0.009). The absence of a relationship between food taste and plate waste in the current study is attributed to the patients' psychological condition.

Based on the analysis of the relationship between food taste and food acceptance, it is evident that the majority of patients who rated the food as tasty also responded positively regarding its acceptance. Conversely, only a small proportion of patients rated the food as tasty yet showed poor acceptance of the served meals. Among the group of patients who rated the food as unpalatable, all still reported good acceptance of the food.

Statistical analysis in this study employed the Chi-square test; however, as the expected count was less than 5, the Fisher's Exact test was subsequently used. The resulting p-value of 1.000 (greater than the α level of 0.05) indicates no significant association between food taste and food acceptance among inpatients at RSUD Ruteng. This implies that the quality of the food's taste does not directly determine the extent to which patients accept the food. These findings align with a study by Fitriah & Indrakurniawan (2025) at Kendari City General Hospital, which found no association between food taste and inpatient satisfaction ($p=1.000$). This suggests that patients' assessments of food services are influenced not only by taste but also by other factors, such as the patient's health condition, menu variety, appetite, pre-hospitalization eating habits, and psychological state during treatment. Conversely, these findings differ from those of Putu et al. (2018) at Shanti Graha General Hospital in Buleleng Regency, which demonstrated a significant association between food taste and food acceptance ($p=0.02$). The discrepancy in results is likely attributable to variations in respondent characteristics, the types of diets prescribed, clinical conditions, reduced appetite, pre-hospitalization eating habits, and psychological factors during hospitalization. This indicates that taste is not the sole factor patients consider when accepting food.

Analysis of the relationship between food acceptability and plate waste reveals that the majority of patients left only small amounts of the staple food, while a small minority left significant amounts. This indicates that, overall, the staple foods served aligned with patients' eating habits and were well-accepted. The remaining waste was likely due to reduced appetite caused by illness or textures that were unsuitable for some patients. The pattern of plate waste for animal-based protein dishes was similar to that of staple foods; most patients left only small amounts, while a small minority left large portions. However, the percentage of significant waste was slightly higher for animal-based proteins than for staple foods. This may be attributed to factors such as taste, seasoning, meat tenderness, and aroma not suiting some patients' preferences, leading them to leave portions unfinished. Regarding plant-based protein dishes, the waste pattern mirrored that of staple foods. Most patients left only small amounts, and the number of patients leaving large amounts was lower than for animal-based proteins, suggesting that plant-based dishes were generally more acceptable. Any remaining waste might have resulted from preparation methods or a lack of flavor variety. Vegetables generated the highest volume of significant plate waste compared to other menu items. Although most patients left only small amounts, the proportion of patients leaving large amounts was highest for this category. This was generally due to issues such as vegetables remaining too tough, a lack of savory flavor, serving temperatures that had dropped, or aromas that were unappealing to patients in a weakened state of health.

Unlike other menu items, no patients left significant amounts of fruit uneaten. All patients consumed the fruit served, placing them entirely in the "minimal waste" category. Fruit was the most preferred item due to its freshness, natural sweetness, and soft texture; it is gentle on the digestive system, making it ideal for patients in recovery.

Statistical analysis regarding the relationship between food acceptance and food waste reveals a clear pattern. Patients with good acceptance of the served food tended to finish their entire portions, resulting in minimal waste. Conversely, patients with poor acceptance left most of their meals uneaten, resulting in significant amounts of waste. Observations indicate that significant food waste occurred across various age groups. Specifically, there was one patient in the 18–29 age range, three in the 30–49 range, and four in the 50–69 range; the elderly group (65–80 years old) had the highest number of patients with significant waste, totaling six. This suggests a trend where the amount of food waste tends to increase with age.

In addition to age, differences were observed based on gender; significant food waste was found more frequently and in larger quantities among female patients compared to males. Regarding the treatment setting, this pattern was most prevalent in the internal medicine ward. This is likely linked to the specific illnesses, physical conditions, and eating habits of patients in that ward compared to those in other units.

Regarding the total food waste across the 45 study samples, the mean value obtained was 13.39 grams (15.60%), with a median of 6.53 grams, a mode of 0 grams, and a standard deviation of 14.764145. The minimum amount of food waste recorded was 0 grams, while the maximum was 43.87 grams. Based on the data, patient food intake is considered good, as the majority of patients left only a small amount of food waste ($\leq 20\%$). Hospital Minimum Service Standards (SPM) categorize unconsumed food waste of $\leq 20\%$ as "low" and $> 20\%$ as "high"; this indicates that nutritional services at the Ruteng Regional General Hospital (RSUD) in Manggarai Regency are operating in accordance with established minimum service standards. This situation suggests that the food served by the hospital aligns with patients' tastes, preferences, and needs, thereby enabling optimal nutritional intake. The observed level of food waste is lower than that found in a study by Dewi Sri Sumardilah (2022) at RSUD A. Yani in Metro City, where the mean food waste among inpatients reached 18.5%, despite using the same one-day data collection method. Conversely, a study by Diah Anggaini et al. (2017) at RSUD Berkah in Pandeglang Regency—conducted over two days covering breakfast, lunch, and dinner—found a higher food waste rate of 34% compared to the results at RSUD Ruteng. The chi-square test for this study revealed cells with an expected count of < 5 , necessitating the use of the Fisher's Exact Test. A p-value of 0.000 was obtained; since this is less than α (0.05), it can be concluded that there is a significant relationship between food acceptability and patient food waste. This study is supported by previous research by Nida Fadila Nuha et al. (2026), which found a relationship between food acceptability and food waste among inpatients at Panembahan Senopati Regional General Hospital (RSUD). While food acceptability is a key factor in reducing food waste, other elements—such as psychological state, reduced appetite, eating habits, and food brought in from outside the hospital—also play a role. Psychological state is one such internal factor that can influence the amount of food waste.

CONCLUSIONS

There is no significant relationship between food taste and either food waste or food acceptance among inpatients at Ruteng Regional General Hospital. However, there is a highly significant relationship between food acceptance and the amount of food waste; specifically, better food acceptance correlates with a smaller amount of food waste. The nutrition department needs to conduct periodic evaluations of all aspects of food service—extending beyond taste to include menu variety, texture, serving temperature, and portion appropriateness. Nutrition staff are encouraged to be more proactive in monitoring patients and educating them on the importance of food intake for recovery. Future research should investigate factors influencing food acceptance other than taste.

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