



# Comparative analysis of food service satisfaction and nutritional adequacy between private hospitals and academic hospitals in patients with non-communicable diseases

*Perbedaan Kepuasan layanan makanan dan kecukupan gizi antara rumah sakit swasta dan rumah sakit pendidikan pada pasien penyakit tidak menular*

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## Abstract

Nutritional services in hospitals aim to provide meals with high nutritional value, safety, appropriate quantity, quality, and satisfactory service. This study aimed to analyze and compare food service satisfaction and nutritional adequacy among patients with noncommunicable diseases (NCDs) in private and academic hospitals. The study was conducted at the UNS Hospital and YARSI Hospital from October to December. Employing a comparative cross-sectional study design, we included 50 patients with NCD, 25 general (private) hospitals, and 25 teaching hospitals. Satisfaction with food services was assessed using a validated food service satisfaction questionnaire, whereas nutritional adequacy was evaluated using the Comstock questionnaire. Nutrient intake data were processed using the NutriSurvey software. The Mann-Whitney U test was used for the statistical analysis. Our findings revealed significant differences in all food service satisfaction indicators ( $p < 0.005$ ), except for waitstaff friendliness ( $p = 0.077$ ). There were also significant differences in energy, fiber, macronutrient, and micronutrient adequacy levels, except for vitamin C intake, between patients in private and academic hospitals ( $p < 0.005$ ). In conclusion, the level of food services and nutritional adequacy differed significantly between private public and academic hospitals.

**Keywords:** Food service satisfaction, nutritional adequacy, hospitals

## Abstrak

Pelayanan gizi merupakan komponen esensial dalam layanan kesehatan rumah sakit, bertujuan untuk menyediakan makanan dengan nilai gizi yang tinggi, keamanan terjamin, jumlah sesuai kebutuhan, bermutu, serta pelayanan yang memuaskan. Studi ini bertujuan untuk menganalisis kepuasan pelayanan makanan dan kecukupan gizi pada pasien dengan penyakit tidak menular (PTM) di rumah sakit umum swasta dan rumah sakit pendidikan. Penelitian ini menggunakan pendekatan studi komparatif dengan desain potong lintang. Sampel melibatkan 25 pasien PTM di rumah sakit umum swasta dan 25 pasien di rumah sakit pendidikan. Data kepuasan makan didapat dari kuesioner kepuasan pelayanan makan. Pengukuran kecukupan gizi dinilai menggunakan kuesioner Comstock yang selanjutnya data asupan diolah dengan menggunakan nutrisurvey. Data dianalisis dengan uji Mann

Whitney. Hasil penelitian menunjukkan terdapat perbedaan yang signifikan pada semua indikator kepuasan pelayanan makanan ( $p < 0,005$ ) kecuali keramahan pramusaji ( $p = 0,077$ ). Terdapat perbedaan signifikan pada tingkat kecukupan energy, serat, zat gizi makro dan mikro kecuali asupan vitamin C antara RS Umum Swasta dan RS Pendidikan ( $p < 0,005$ ). Kesimpulannya tingkat layanan makan dan kecukupan gizi antara RS Umum Swasta dan RS Pendidikan menunjukkan perbedaan yang signifikan

**Kata Kunci:** Kepuasan pelayanan makanan, kecukupan gizi, rumah sakit

## Introduction

Hospitals are healthcare facilities that offer comprehensive medical services to patients, including inpatient, outpatient, and emergency care (Dhani, 2018). The aim of nutrition services is to improve or increase the nutrition, food, and dietetics of communities, groups, individuals, or clients to achieve an optimal health status in healthy or sick conditions (Mozaffarian et al., 2018). Nutrition service activities include collection, processing, analysis, conclusions, recommendations, implementation, and evaluation of nutrition, food, and dietetics (Alfiana et al., 2023). The target of hospital health services is not only the patient, but also the patient's family, so it is called a complete health service (Hannawa et al., 2022).

The level of service satisfaction at the hospital may be influenced by the perceptions of the patients during treatment (Tangdilambi et al., 2019). According to Pretirose and Muafi (2021), patient satisfaction with the hospital serves as evidence of its provision of excellent and high-quality healthcare services. Patient satisfaction refers to the subjective experience of contentment or enjoyment resulting from the delivery of healthcare services as evaluated by the patient. Patient satisfaction can influence the way patients perceive and evaluate the healthcare services offered by the hospital. To ensure that people who fall ill would choose to seek medical services from hospitals that are renowned for their exceptional level of care (Pretirose & Muafi, 2021). Patient satisfaction is a crucial metric for measuring the efficacy of food delivery services (Purwantiningrum & Susanto, 2021). The level of patient satisfaction regarding the structure of hospital menus has an impact on the number of meals consumed and amount of food waste. Food waste is a determinant of the effectiveness of food services; therefore, hospital food service activities can be assessed using food waste as an

indicator (Hoteit et al., 2024). The objective of hospital food organizations is to ensure the provision of food with optimal quality, safety, quantity, and nutritional value in accordance with patient requirements (Osman et al., 2021)

The quality and quantity of hospital food are crucial components of the healing process in the hospital setting (Suhermi et al., 2019). When a meal possesses an exceptional flavor profile, a visually pleasing appearance, and a presentation that not only stimulates the patient's appetite, but also expedites the recovery process, it is deemed to be of satisfactory quality (de Figueiredo Muniz et al., 2023). In addition to medical treatment, the recovery of patients requires proper nutritional intake and the consumption of food that has been adjusted to their needs to achieve optimal healing. This is because quantity and quality of nutrients provided by the nutrition department have been carefully calculated for its quantity and quality of nutrients (Wibowo, et al., 2018). Patients require a diet tailored to their specific condition or requirement. Inadequate or imbalanced dietary intake can adversely affect a patient's nutritional status, resulting in malnutrition (Fiaccadori et al., 2021). The primary aim of nutritional services is to facilitate patient recovery, prolong hospitalization, and minimize the financial burden associated with medical interventions (Braun et al., 2021).

Hospitals are categorized into different types based on their ownership and management, such as government, private, and academic hospitals. Private hospitals operate through foundations that are established with social and economic objectives. An academic hospital is a medical facility that serves as an authorized educational institution for training and educating healthcare professionals (Supriyatining Sih, 2002). Health services are undergoing advancements to meet the challenges of globalization, which necessitates intense competition between commercial and

public hospitals. Most of the demand for healthcare services is found in private hospital facilities. This is because private hospitals provide more comfortable medical care and facilities. Factors that influence patient satisfaction in public and private hospitals include age, socioeconomic status, sex, education level, occupation, and quality of service providers (Christiani et al., 2024). The novelty of this study is that it compares satisfaction in terms of food service and nutritional adequacy in non-communicable disease patients in private and academic hospitals.

Based on the information provided, the researcher aimed to analyze differences in food service satisfaction and nutritional adequacy in non-communicable disease patients in private and academic hospitals.

## Methods

The research method was a comparative study with an independent cross-sectional sample design. After calculation using the Slovin formula with a total of 50 patients per day, the research sample size was 25 people per group. The total sample in this study comprised 50 individuals (25 patients in general hospitals and 25 patients in hospitals). Purposive sampling was used. The research inclusion criterion was that the respondent be willing to be a research sample. The respondent was a patient with a non-communicable disease; the patient was not an ICU patient, and respondents were aged 17-65 years. The exclusion criterion for the study was respondents who had received permission to go home from a doctor on the day of the study.

The research was carried out at the Surakarta Islamic Hospital (YARSIS), a private general hospital, and the Universitas Sebelas Maret Hospital, an academic hospital. The reason for choosing a hospital is that it has criteria for providing patient meals independently (not self-managed or catering), is in the same area, and has the same type of hospital; therefore, it is considered to have the same characteristics.

The variables used in this study were satisfaction with food services and nutritional adequacy. Dining satisfaction was obtained using the interview method with a food service satisfaction questionnaire consisting of 40

questions categorized into six indicators: punctuality, menu variety, menu appearance, taste, cleanliness, and staff appearance. The level of satisfaction was assessed using a 1-4 Likert scale, with interpretations of 1 being very dissatisfied, 2 being dissatisfied, 3 being satisfied, and 4 being very satisfied. The research questionnaire used was previously validated. Nutritional adequacy was assessed using the Comstock questionnaire, which was then processed using nutrisurvey intake data. The results of the calculation of food waste per day were converted into food intake data.

Data were processed using Mann-Whitney test statistics because they were not normal or homogeneous. The level of statistical significance was set at 95%. The duration of this study was two months, specifically from November to December. This research received ethical clearance permit number 231/UN27.06.11/KEP/EC/2023, issued by the Research Ethics Committee of the Faculty of Medicine, Sebelas Maret University.

## Result and Discussion

### Respondent Characteristics

Based on the results of the analysis in Table 1 regarding patient characteristics, the largest age group in private hospitals was 21-30 years at 56% and 31-49 years at 24%. The largest age group of patients in academic hospitals was 21-30 years (28%), followed by those aged > 50 years (52%). Internal factors that influence satisfaction include age, sex, education, and other factors inherent to patients (Purwantiningrum & Susanto, 2021).

Most patients in private and academic hospitals fall within the age range of 21-30 years. The adult group included individuals in this age range. Patient age can influence the degree of satisfaction with the services provided by a health facility. According to Arifin et al. (2019), there is a relationship between age and satisfaction. According to a previous report, 35% of young patients expressed dissatisfaction with their health facilities. Individual satisfaction levels are contingent on the effects of the environment and specific societal groups (Hidayati et al., 2014). Each patient desires uniformity in food services and receives services that fulfill their expectations (Romadloni & Setianto, 2022). Patients desire both

attention and affection; they expect health personnel, particularly doctors and nurses, to listen to complaints (Eninurkhatun et al., 2017).

Most patients in private and academic hospitals were women. Male and female patients have the same desires in terms of satisfaction and demand the same thing, namely getting services that meet expectations and are maximal (Romadloni & Setianto, 2022). Statements of service satisfaction between men and women are relatively similar when assessing the level of satisfaction (Hidayati et al., 2014). The highest education level of most of the patients in this study was middle school and high school. Patients with a low level of education tend to feel satisfied more quickly than those with a higher education (Rizal & Riza, 2014).

**Table 1.** Patient characteristics based on age, gender, education, occupation

Variable	Private Hospital		Academic Hospital	
	n	%	n	%
Age (Years)				
≤ 20	2	8	2	8
21-30	14	56	7	28
31-49	6	24	3	12
≥ 50	3	12	13	52
Gender				
Man	5	20	11	44
Women	20	80	14	56
Education				
Not studying	2	8	2	8
Elementary school	0	0	9	36
Junior High School	3	12	2	8
Senior High School	13	52	8	32
College	7	28	4	16
Work				
Doesn't work	3	12	8	32
Housewife	7	28	5	20
Self-employed	9	36	6	24
Private sector employee	4	16	5	20
Civil servants	2	8	1	4

**Table 2.** Patient characteristics based on nutritional status

Variable	Private Hospital		Academic Hospital	
	n	%	n	%
Malnutrition	9	36	5	10
Good Nutrition	15	60	18	36
More Nutrition	1	4	2	4

The results of previous research show that patients with low education will feel satisfied with the services provided, that the services provided by the hospital are of maximum standard service, and that respondents with less education tend to accept more because they do not know what they need, as long as they get well that's enough. However, in contrast, patients with who have higher education will place higher demands on services and tend to criticize if the service does not meet expectations (Roza, 2014)

Most of the work of patients in private public hospitals is self-employed, whereas in academic hospitals, they are unemployed. The unemployed patients included both students and retirees. Based on previous research, there is no relationship between work and the level of service satisfaction at BUN Kosambi Tangerang Hospital. The research results at the hospital were mostly non-PNS employees, with a percentage of 50% (Azzahra et al., 2023).

The results of the characteristics of patient nutritional status between private public hospitals and educational hospitals showed that the majority of the patients' nutritional status was in the good nutrition category (Table 2). Both hospitals still had patients with poor nutritional status. In line with the research by Ibrahim et al. (2017), satisfaction with nutritional services in hospitals had a significant relationship with changes in nutritional status. The nutritional status of hospitalized patients can be affected by low energy intake, length of hospital stay, infections, and special diets, all of which are associated with a higher risk of in-hospital malnutrition. Patients with low energy intake are 2,4 times more likely to experience malnutrition than patients with sufficient energy intake. Patients with a length of stay of ≥ 7 days were eight times more likely to experience malnutrition than those with a length of stay of <7 days. Patients with infectious diseases are three times less likely to experience malnutrition than those with noncommunicable diseases (Kusumayanti et al., 2018).

**Differences in Satisfaction Levels of Meal Services in Private Hospitals and Academic Hospitals**

Both hospitals have a centralized food distribution system, in which food portions for patients are prepared in a single location. Each

patient was given a menu pattern or label for the dining utensils. Every patient was given dining utensils marked with a defined menu pattern. The allocation of patient meals occurred three times daily, as well as 30 min prior to the attendant's delivery to each individual patient in their respective rooms. Both hospitals follow a menu cycle that spans 10 days. The meal times at academic hospitals were categorized into three time periods: breakfast (06.00–07.00 WIB), lunch (11.00–12.00 WIB), and afternoon meal (17.00–18.00 WIB). The meal delivery schedule of the private Hospital consists of breakfast from 6.30 to 07.00 WIB, lunch from 11.30 to 12.00 WIB, and dinner from 16.30 to 17.30 WIB.

The tray service provides food to patients in academic hospitals. A tray service refers to the provision of food to patients using a tray or

similar container. In academic hospitals, the cutlery used is of the VIP variety and served on a plate equipped with a spoon. The food serving in treatment class 3 was made from melamine, whereas that in treatment class 2 was made from stainless steel. The class 1 treatments were made of plastic. Food serving in private hospitals for class 1 treatment is made of ceramic, whereas classes 2 and 3 use tableware made from melamine.

The results in Table 3 show that there are differences in satisfaction with food services, indicators of meal times, appearance of food, taste of food, cleanliness of equipment and food, and variations in food menus at public, private, and academic hospitals ( $p=0,000$ ). However, there was no significant difference in waiter friendliness between the two hospitals ( $p=0,077$ ).

**Table 3.** Differences in food service satisfaction in public private hospitals and academic hospitals

Indicator	Private Hospitals		Academic Hospitals		p
	Median	Min-Max	Median	Min-Max	
Eating time	10	9-12	9	8-9	0,000
Food Appearance	24	21-28	21	20-21	0,000
Taste of food	21	21-28	21	19-21	0,000
Waiter Friendliness	32	29-40	36	33-36	0,077
Equipment and Food Cleanliness	32	27-36	27	26-27	0,000
Food Menu Variations	12	12-16	12	8-12	0,000

The mealtime variable includes indicators of appropriate breakfast time, lunch time, and dinner time set by hospital management. The median value of mealtime satisfaction in private public hospitals was higher, with a minimum score of 9 and a maximum score of 12. In line with research by Rochmawati et al. (2022) conducted at a private public hospital (RSI UNISMA), 77,8% of patients expressed satisfaction with indicators of punctuality of mealtimes. Based on research Widosari and Widiyaningsih (2017) found a significant relationship between the timeliness of food delivery and the level of food service satisfaction in their research conducted at the Dr. Soeradji Titonegoro Hospital. Punctuality in feeding patients can avoid entry of food from outside the hospital.

Food appearance standards that must be considered consist of fresh colored vegetables served, food texture that is easy to digest, neat and attractive food shape, vegetable portions according to the patient's needs, approximately

$\frac{3}{4}$  of a cup, side-dish portions according to the size and needs of the patient, and food presentation. This is closed, and the presentation of food arouses appetite. The median value shows that private public hospitals are higher than educational hospitals. This finding was based on a previous study by Azizah et al. (2020). The level of satisfaction with food appearance indicators in halal-certified hospitals was higher than in hospitals that had not been halal-certified. The appearance of food can influence a patient's appetite, which is influenced by several factors such as the shape of the food on the plate or the color combination of the food. The appearance of food can be evaluated using the sense of sight, which can then determine the patient's perception of the food. The attractive appearance of food reduces food waste (Yuliantini, 2018).

Respondents' assessments of the taste of food in both hospitals showed the same median result, namely 21; however, in the private public hospital, 21 was the minimum assessment

number, whereas the maximum number was in the education hospital. According to Mariasih et al. (2023), nutrition services at the Wisma Prashanti Tabanan General Hospital show that the majority of patients expressed satisfaction (80,1%) with indicators of the appearance and taste of food. The patient's appetite can be influenced by the taste of the food; therefore, when the taste of the food is poor, it affects the rest of the food (Fluitman et al., 2021). Other research states that there is a significant relationship between the taste of food and food waste at Teluk Kuantan Regional Hospital. As many as 72,2% of patients stated that the taste was good with a lot of leftover food, and 81,3% of patients stated that the taste was good with little leftover food (Oktaviani et al., 2023). Taste perception and sensitivity varies from person to person. Age, sex, genetics, nutritional knowledge, health status, and culture may influence an individual's taste perception and sensitivity (Gupta et al., 2018).

The friendliness of the waiter should be considered as an indicator of nutritional services. There was no significant difference in the food satisfaction indicators of waiter friendliness between the private and educational hospitals. This means that the patients in both hospitals rated the waiters as friendly. The waiter friendliness variable consists of the level of speed and accuracy when providing service, politeness, insight and knowledge of the waiter, cleanliness, and neatness of the waiter. Respondents' assessment of the waiter's friendliness indicator obtained a higher median value in academic hospitals, namely, 36, the same as the maximum value. An interesting finding regarding this variable is that the maximum rating in private public hospitals had a higher difference of 40. Based on research results in halal-certified and non-certified hospitals, halal shows differences in the level of patient satisfaction with nutritional services based on the friendliness of the waiters (Azizah et al., 2020). Another study stated that the majority of patients expressed satisfaction with the aspect of assessing the real form (tangibles) amounting to 74,3%; in the reliability aspect, satisfaction was 40,9%; and in the assurance aspect, satisfaction was 50,8% (Nuryani et al., 2020).

Evidently, the two hospitals differed substantially in terms of patient satisfaction

regarding the hygiene of food and equipment. Food-serving indicators, covered plates, spoons, bowls, glasses, eating tissue, and drinking glasses; rice that is pristine and white; staff that serves side dishes and vegetables in a sanitary environment; and complete meals are examples of equipment and food cleanliness variables. Findings from the Islamic hospital Arafah Rembang indicate that the cleanliness of food utensils affects patient satisfaction with nutritional services (Noor et al., 2018).

The results of this study indicated that there was no difference in the indicators of waiter friendliness between hospitals. The nature of each individual waiter could influence the level of friendliness in serving food. Based on at the Sultan Agung Hospital, it was stated that there were several respondents who expressed dissatisfaction with the service provided by the staff, as they were unresponsive in fulfilling patient requests and lacked extensive knowledge about the food being served (Azizah et al., 2020). Another study reported that 84% of waiters served food in a friendly manner, whereas 16% expressed dissatisfaction (Nurhamidah et al., 2019).

Furthermore, research conducted at the RSUD under the supervision of Dr. Suwondo Kendal found that 98,2% of patients expressed satisfaction with the cleanliness of their dining utensils (Dipura et al. 2017). Bacterial contamination of food can occur when food service managers neglect the implementation of adequate hygiene practices for food equipment (Akanele et al. 2016). Food container materials that are simple to clean, such as ceramics and stainless steel, can aid in the maintenance of cleanliness and hygiene of dining implements. After using food containers, they were washed in three distinct compartments: the drying and draining section, washing, cleansing, disinfection tubing, and emptying compartment (Siregar et al., 2018).

The indicator of food menu variation comprises the variety of vegetables and side dishes offered, presentation of vegetables that differ from those served previously, and adequacy of food for individuals with specific medical conditions. The correlation between variations in the use of culinary ingredients and patient satisfaction is substantial (Tanuwijaya et al. 2019). Based on the research findings, a significant proportion of

patients (81%) indicated contentment with an assortment of vegetable and animal side dishes and vegetables. Based on research Azizah et al. (2020) found a difference in patient satisfaction regarding food variety between halal-certified and non-halal-certified hospitals. Hospitals with halal certification had an average satisfaction score of 14,12 for culinary variations, while hospitals without halal certification had an average score of 12. In part, the variety of food available influences the degree of patient satisfaction with nutritional services.

Research conducted in hospitals in Ethiopia revealed that 33,6% of patients expressed satisfaction with the hospital's culinary services as a whole, encompassing a variety of available dishes (Teka et al., 2022). Hospitals can reduce food waste by offering patients various options. An assortment of foods may induce appetite in the patient, resulting in depletion of the provided provisions. One strategy for combating appetite-reducing tediums is to offer an assortment of foods (Tanuwijaya et al., 2019).

### Differences in Nutritional Adequacy of Patients in Private General Hospitals and Academic Hospitals

Based on the results in Table 4, there were no significant differences in energy and macronutrient adequacy (protein, fat, and carbohydrates) between private public hospitals and academic hospitals. The standard of ingredients used to make menu portions in accordance with hospital nutrition service guidelines influenced the absence of differences. According to Rochmawati et al.(2022), there is no significant relationship between the level of patient satisfaction and the adequacy of the patient's energy, protein, fat, and carbohydrate needs at the RSI UNISMA. Furthermore, no significant differences in the adequacy of micronutrients, except for vitamin C, were found between private public and academic hospitals. The type of fruit served in the food menu influenced the difference in vitamin C nutritional adequacy between the two hospitals. Several factors can influence vitamin C content including pH, temperature, metal catalysts, enzymes, and other external factors that can cause damage to vitamin C (Herbig & Renard, 2017).

**Table 4.** Differences in nutritional adequacy of patients in private general hospitals and academic hospitals

Variable	Private Hospitals		Academic Hospitals		p
	Mean	SD	Mean	SD	
Energy Intake	1631,72	343,73	1527,85	397,11	0,502
Protein Intake	70,36	15,18	64,79	19,82	0,344
Fat Intake	51,17	11,82	52,22	17,82	0,061
Carbohydrate Intake	213,81	62,85	205,04	63,72	0,786
Fiber Intake	10,19	3,09	9,84	3,63	0,970
Sodium Intake	819,34	590,49	721,23	523,05	0,537
Potassium Intake	1402,67	417,05	1356,24	441,11	0,704
Vitamin C Intake	68,85	24,59	29,55	22,60	0,000
Calcium Intake	491,22	229,85	351,23	197,10	0,025
Magnesium Intake	291,50	77,67	268,18	88,13	0,306
Iron Intake	13,93	6,53	11,76	4,03	0,165
Zinc Intake	6,32	1,47	6,44	2,29	0,825

The degree of sufficiency of macronutrients and micronutrients is contingent on a patient's appetite and health conditions. During the research period, a number of patients failed to consume the entire portion of the food provided, particularly animal-side dishes. Consequently, some patients may lack sufficient protein intake (Carreiro et al. 2016). Various internal factors originating from patients affect adherence to patient food intake in healthcare facilities

(Kontogianni et al., 2020). These internal factors include patient preferences, eating habits, symptoms of nausea and vomiting, headaches, weakness, and flavor disorders.

### Conclusion

There are differences in food service satisfaction in terms of meal times, food

appearance, food taste, cleanliness of equipment, and food as well as variations in food menus between private public hospitals and academic hospitals. All patients involved in this study rated their food service satisfaction as satisfied or very satisfied. There were no differences in energy, protein, fat, carbohydrate, fiber, sodium, potassium, magnesium, iron, or zinc intake between the private public hospitals and academic hospitals.

Therefore, there is a need to control drug use and avoid selecting subjects who experience swallowing disorders or decreased appetite, because these factors influence the patient's nutritional intake and adequacy.

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