



Bridging Service Quality Gaps in Hospital Nutrition Service: An Integrated SERVQUAL and Kano Model Analysis

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Abstract

Background: Hospital nutrition services support patient recovery and healthcare quality; however, unmet service attributes still cause dissatisfaction. Although service quality has been widely studied, the integration of SERVQUAL and the Kano Model for evaluating hospital nutrition services remains limited.

Objective: This study aimed to assess patient satisfaction with hospital nutrition services in West Java by applying an integrated *SERVQUAL* and *Kano Model* approach to identify service quality gaps and prioritize areas for improvement.

Methods: A cross-sectional quantitative study with a descriptive-analytical design was conducted involving 99 hospitalized patients receiving nutrition services at a hospital in West Java. Participants were selected using purposive sampling and had received nutrition services for at least two days. Data were collected using *SERVQUAL* and *Kano Model* questionnaires. *SERVQUAL* analysis measured the gap between patients' perceptions and expectations across five service quality dimensions, while the *Kano Model* classified service attributes according to their influence on patient satisfaction.

Results: All *SERVQUAL* dimensions showed negative gap scores, indicating that patients' expectations exceeded their perceptions of the nutrition service. The largest gaps were observed in the assurance (Gap = -0.90), responsiveness (Gap = -0.88), and empathy (Gap = -0.87) dimensions, suggesting that these areas should be prioritized for service quality improvement. Kano analysis revealed that most service attributes were classified as attractive and one-dimensional, indicating that improvements in menu quality, food presentation, staff friendliness, and service responsiveness have the greatest potential to enhance patient satisfaction.

Conclusion: The integration of *SERVQUAL* and the *Kano Model* effectively identifies priority areas for enhancing hospital nutrition services, particularly in the reliability and responsiveness dimensions. This integrated approach provides a systematic framework for improving service quality based on patient expectations and satisfaction determinants.

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INTRODUCTION

Hospital nutrition services are a crucial component of healthcare delivery, supporting patient recovery, maintaining nutritional status, and improving the overall quality of hospital care (Rollins & Dobak, 2018). These services are not limited to merely providing food to patients but also include dietary appropriateness, meal timeliness, food quality, food safety, timely food distribution, and nutrition-related services delivered by nutrition staff to patients (Kementerian

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Kesehatan RI, 2013). High-quality nutrition services can increase patient satisfaction and contribute to the success of medical therapy during hospitalization (McCray et al., 2018). Conversely, suboptimal services may lead to patient dissatisfaction and increased hospital food waste, resulting in inefficient operational costs (Semedi et al., 2013). The urgency of improving hospital nutrition service quality is underscored by empirical evidence (Rahmi et al., 2025).

Globally, studies have reported that 20–50% of hospitalized patients experience some degree of malnutrition, which is often exacerbated by inadequate nutritional service delivery, insufficient dietary assessment, and ineffective patient–staff communication (Menyawi et al., 2025; Rollins & Dobak, 2018). In the Indonesian hospital context, national surveys indicate that hospital food waste rates may reach 20–40% of total food served, reflecting a substantial gap between patients’ nutritional needs and actual service delivery (Semedi et al., 2013). Patient satisfaction scores for hospital nutrition services consistently remain lower than those for other clinical services, further highlighting the critical need for systematic, evidence-based service quality evaluation and improvement frameworks (McCray et al., 2018).

Patient satisfaction is an important indicator for evaluating healthcare service quality, including hospital nutrition services (Ekaterina et al., 2017). According to Parasuraman (1988), service quality can be measured using the SERVQUAL method, which compares customer perceptions and expectations regarding the services received. SERVQUAL consists of five main dimensions: tangibles, reliability, responsiveness, assurance, and empathy. In hospital nutrition services, the reliability dimension relates to the accuracy of diet types and the timeliness of meal distribution, whereas responsiveness refers to the ability of nutrition staff to respond quickly and appropriately to patient needs (Baskiewicz, 2025). When patient perceptions are lower than their expectations, a negative service quality gap occurs, indicating that the delivered service does not meet patient expectations.

In addition to measuring service quality using SERVQUAL, identifying service attributes that most strongly influence patient satisfaction is essential. One notable approach is the Kano Model developed by (Kano et al., 1984). This model classifies service attributes into several categories, including must-be, one-dimensional, attractive, and indifferent attributes. Must-be attributes represent basic requirements that must be fulfilled to prevent patient dissatisfaction. One-dimensional attributes indicate that higher service quality leads to higher patient satisfaction. Meanwhile, attractive attributes can significantly increase satisfaction, although their absence does not necessarily result in dissatisfaction.

The integration of SERVQUAL and the Kano Model provides a more comprehensive understanding of service quality while enabling the prioritization of attributes requiring improvement. The methodological advantage of combining these approaches lies in their complementary analytical contributions: SERVQUAL quantifies the magnitude of service quality gaps across dimensions but does not distinguish the relative satisfaction impact of each deficient attribute, whereas the Kano Model classifies the satisfaction impact category of each attribute but does not measure the severity of existing gaps. Their integration enables a differentiated prioritization framework by identifying attributes that simultaneously exhibit substantial quality gaps and high satisfaction impacts, thereby directing improvement efforts toward areas with the greatest potential to enhance patient satisfaction.

Several previous studies have demonstrated that hospital nutrition service quality is significantly associated with patient satisfaction (Rollins & Dobak, 2018). A study by Sumiati (2023) showed that the reliability and responsiveness dimensions influence patient satisfaction with hospital nutrition services. Dewi (2022) also found that hospital food service quality is associated with meal waste and hospital cost efficiency. Furthermore, Jiang (2023) demonstrated that the integration of SERVQUAL and the Kano Model is effective in identifying priority service attributes influencing customer satisfaction. However, research investigating the integration of SERVQUAL and the Kano Model in hospital nutrition services remains limited, particularly in regional hospitals. A critical review of previous literature reveals two major methodological limitations. First, most studies on hospital nutrition service quality have applied either SERVQUAL or the Kano Model independently, limiting their analytical capabilities.

SERVQUAL-based studies Sumiati (2023) identified service quality gaps across dimensions but could not differentiate the satisfaction impact of individual attributes within each

dimension, resulting in less differentiated priority recommendations. Kano Model-based classified satisfaction impact categories but could not rank attributes according to gap severity, making it difficult to determine which attributes simultaneously represented high-impact factors and significant quality deficiencies. Second, the limited studies integrating methods were conducted primarily in general service or manufacturing contexts rather than specifically in hospital nutrition service settings, leaving the empirical applicability of the integrated framework for hospital nutrition service evaluation insufficiently explored. This dual gap, methodological dependence on single-instrument approaches and the limited contextual application of integrated SERVQUAL–Kano analysis in hospital nutrition services, represents the primary research gap addressed by this study.

A hospital in West Java provides nutrition services for inpatients. Based on initial observations and service evaluations, several issues were identified, including delayed meal distribution, limited menu variety, food tastes that did not meet patient preferences, and inadequate communication between nutrition staff and patients. Furthermore, the high rate of meal waste indicates that hospital nutrition services have not fully aligned with patient needs and expectations. This condition demonstrates the necessity of a comprehensive evaluation of nutrition service quality to determine priority attributes for improvement. Therefore, this study aims to analyze patient satisfaction with nutrition services at a hospital in West Java using the SERVQUAL method and the Kano Model.

The findings are expected to provide an overview of service quality gaps and identify priority attributes requiring improvement to enhance patient satisfaction with hospital nutrition services. Initial institutional data from the hospital indicated a food waste rate of approximately 25–30% of total meals served, suggesting that a substantial proportion of meals provided did not correspond with patient needs, preferences, or clinical dietary requirements. These institutional quality indicators further support the need for systematic service quality evaluation. The scientific novelty of this study lies in the application of the integrated SERVQUAL–Kano framework specifically within a hospital nutrition service context in a regional hospital setting, which remains empirically underexplored. This integration extends previous research by enabling simultaneous service gap measurement and satisfaction impact classification, providing hospital nutrition managers with a dual-perspective prioritization framework that generates more actionable improvement strategies than either instrument applied independently.

METHOD

This study employed a quantitative approach with a descriptive-analytical design to analyze patient satisfaction with hospital nutrition services in West Java using the SERVQUAL and Kano Model methods. The quantitative approach was used to measure the gap between patient perceptions and expectations regarding service quality and to identify service attributes that should be prioritized for improvement. Specifically, this study utilized a cross-sectional evaluative survey design conducted from January to March 2026.

Within this design, SERVQUAL and Kano Model analyses were integrated through a sequential analytical framework: (1) SERVQUAL gap analysis was initially performed to quantify the magnitude of service quality gaps across the five dimensions and individual service attributes; (2) Kano Model classification was subsequently applied to determine the satisfaction impact category of each service attribute; and (3) integration was achieved by cross-mapping the severity of each attribute's gap (from SERVQUAL) with its satisfaction impact category (from Kano), generating a prioritized improvement matrix. Attributes demonstrating both large negative SERVQUAL gaps and One-Dimensional or Attractive Kano classifications were designated as Tier 1 (highest priority) for improvement interventions.

The study was conducted in a hospital nutrition service facility in West Java, with the study population consisting of all patients receiving hospital food services. Purposive sampling was applied, with respondent criteria including patients who had received hospital food services for at least two days, were able to communicate effectively, and were willing to participate in the study. The explicit inclusion criteria were: (1) inpatient status with a hospitalization duration of at least two days; (2) receipt of hospital nutrition services throughout the hospitalization period;

(3) ability to communicate and complete the questionnaire independently; and (4) willingness to participate by signing informed consent.

The exclusion criteria were: (1) patients with documented cognitive impairment or decreased consciousness; (2) patients admitted to intensive care units; and (3) patients unable to complete the questionnaire due to physical limitations. A total of 110 questionnaires were distributed, of which 99 were returned and fulfilled the completeness criteria, resulting in a final sample of 99 patients (response rate = 90%). This sample size was considered adequate for descriptive-analytical purposes based on the study design (Semedi et al., 2013). Data collection was conducted from January to March 2026. Ethical approval was obtained from the relevant institutional review board prior to data collection, and all participants provided written informed consent. Data analysis was performed using SPSS version 26.0.

Data were collected using the SERVQUAL questionnaire and the Kano Model questionnaire. The SERVQUAL questionnaire was used to measure patient perceptions and expectations of service quality based on five dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1988). Assessments were conducted using a five-point Likert scale. Subsequently, the Kano questionnaire was administered to identify service attribute categories based on their influence on patient satisfaction, consisting of Must-Be, One-Dimensional, Attractive, and Indifferent categories (Kano et al., 1984).

SERVQUAL data analysis was performed by calculating the gap between patient perceptions and expectations for each service attribute. The gap score was obtained by subtracting the expectation score from the perception score. A negative gap indicated that service quality had not fulfilled patient expectations, whereas a positive gap indicated that service quality had met or exceeded expectations (Parasuraman et al., 1988).

The SERVQUAL questionnaire consisted of 23 items across five dimensions, assessed using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) for both perception and expectation measurements. The gap score for each item was calculated using the following formula: $\text{Gap} = \text{Perception Score} - \text{Expectation Score}$. Dimension-level gap scores were calculated as the mean of item-level gap scores within each dimension. Instrument reliability was confirmed through Cronbach's alpha testing ($\alpha = 0.847$ for the perception scale and $\alpha = 0.863$ for the expectation scale, both exceeding the minimum acceptable threshold of 0.70), while validity was confirmed through Pearson correlation coefficients exceeding $r = 0.30$ at $p < 0.05$ for all items. Dimension-level gap scores were ranked to identify priority areas requiring improvement, with more negative gap scores indicating greater service quality deficiencies.

Kano analysis was conducted by classifying respondents' answers using the Kano evaluation table. The classification results were used to determine service attributes requiring priority improvement in hospital nutrition service quality. Integration of SERVQUAL and Kano results was performed to identify service attributes associated with substantial service quality gaps and significant effects on patient satisfaction. The findings provide a basis for developing strategies to improve nutrition service quality in hospitals in West Java. The Kano questionnaire consisted of paired functional and dysfunctional questions for each of eight service attributes (P1–P8, defined below). Each response was cross-tabulated using the standard Kano evaluation table Berger (1993) to classify each attribute into one of five categories: Attractive (A), One-Dimensional (O), Must-Be (M), Indifferent (I), or Reverse (R).

The dominant category for each attribute was determined based on the highest frequency among all respondent classifications. Better and Worse satisfaction coefficients were calculated using the following formulas: $\text{Better Coefficient} = (A + O)/(A + O + M + I)$, representing the potential to generate satisfaction when an attribute is fulfilled; $\text{Worse Coefficient} = -(O + M)/(A + O + M + I)$, representing the potential for dissatisfaction when an attribute is absent. Attributes were prioritized based on the integration of SERVQUAL gap scores and Kano categories: attributes with gap scores below the dimension mean and classified as One-Dimensional or Attractive were designated as the highest priority (Tier 1); attributes with moderate gaps and Attractive classifications were categorized as medium priority (Tier 2); and attributes classified as Indifferent were considered lower priority regardless of gap scores. The eight Kano service attributes (P1–P8) represented the following aspects: P1 = menu variety (food type diversity); P2 = food appearance and presentation; P3 = food taste and flavor acceptability; P4 = food

distribution timeliness; P5 = nutrition staff friendliness; P6 = staff responsiveness to complaints; P7 = dietary information provision and explanation; and P8 = dietary personalization and adaptation to patient needs.

RESULT AND DISCUSSION

Results

Table 1. Respondent Characteristics

No	Characteristics	Group	Frequency (n)	Percentage (%)
1	Gender	Male	43	43.4 %
		Female	56	56.5 %
2	Age	< 20	7	7 %
		20–35	42	42.4 %
		36–50	35	35,3 %
		> 50	15	15.1 %
3	Type of diet given	Regular Diet	34	34.3 %
		Low-Salt Diet	20	20.2 %
		Diabetes Diet (DM)	18	18.2 %
		High-Protein Diet	15	15.2 %
		Low-Fat Diet	12	12.1 %
4	Length of Treatment	≤ 3 days	40	40.4 %
		> 3 days	59	59.6 %

Respondent characteristics in this study included gender, age, type of diet provided, and length of hospital stay. These characteristics were used to provide a general overview of the profile of patients receiving nutrition services at a hospital in West Java. The results showed that most respondents were female rather than male. This finding indicates that female patients were more likely to utilize patient services during the study period. Based on age group, many respondents were within the productive adult age range, indicating that patients of productive age continued to dominate the utilization of hospital health and nutrition services. These demographic characteristics may meaningfully influence patients' perceptions of nutrition service quality.

Productive-age patients (20–50 years) tend to have higher service expectations than elderly patients because they are generally more familiar with diverse food options and service standards outside hospital settings, potentially explaining the elevated expectations in the reliability and responsiveness dimensions observed in the SERVQUAL findings. Female patients, who constituted most respondents, have been shown in previous studies to evaluate healthcare service quality more critically, particularly in interpersonal dimensions such as empathy and communication, which aligns with the relatively smaller gaps observed in the empathy dimension compared with the reliability and responsiveness dimensions.

Furthermore, based on length of stay, most respondents were hospitalized for more than two days, suggesting that they had sufficient experience to assess hospital nutrition services. These diverse patient backgrounds provide a representative overview of patient satisfaction with nutrition services at hospitals in West Java. Patients hospitalized for more than two days (59.6%) experienced repeated exposure to nutrition services across multiple meal cycles, providing a stronger experiential basis for evaluating satisfaction.

This group was more likely to identify inconsistencies in dietary appropriateness, meal delivery schedules, and staff responsiveness, corresponding with the largest SERVQUAL gaps observed in the reliability (–0.81) and responsiveness (–0.88) dimensions. The diverse distribution of diet types (including regular, low-sodium, diabetic, high-protein, and low-fat diets) reflects the heterogeneous clinical nutritional requirements of the patient population. This finding highlights the complexity of maintaining standardized nutrition service quality across different therapeutic dietary regimens and emphasizes the importance of personalized nutrition service delivery.

Table 2. SERVQUAL Gap Analysis of Hospital Nutrition Service Quality

No	X Variable Questions	Fact		Expectation		GAP Expectations Reality
		Total	Average	Total	Average	
EPISTEMIC VALUE/ASSURANCE DIMENSION (GUARANTEE & COMPETENCE)						
1	The nutrition staff clearly explained the nutritional content of the food.	337	3.4	428	4.32	-0.92
2	The nutrition staff had good knowledge of the patient's diet.	352	3.56	428	4.32	-0.77
3	The nutrition staff provided accurate information about the type of diet, its nutritional content, and the medical reasons for administering the food.	340	3.43	439	4.43	-1
4	I felt safe consuming the food provided by the hospital.	347	3.51	431	4.35	-0.85
QUANTITY PER DIMENSION		344	3.5	431.5	4.4	-0.9
CONDITIONAL VALUE/DIMENSION OF RESPONSIVENESS						
5	I feel the nutrition staff responds quickly to food-related complaints.	352	3.56	440	4.44	-0.89
6	I feel the nutrition staff are willing to help if a patient has special needs/diets.	344	3.47	435	4.39	-0.92
7	I feel menu or diet changes are handled quickly.	342	3.45	441	4.45	-1
8	I feel the nutrition staff are easy to reach when needed.	356	3.6	428	4.32	-0.73
QUANTITY PER DIMENSION		348.5	3.52	436	4.4	-0.88
EMOTIONAL VALUE/EMPATHY DIMENSION						
9	The nutrition staff was friendly and caring towards the patients.	353	3.57	439	4.43	-0.87
10	I felt well-treated and appreciated by the nutrition staff.	355	3.59	443	4.47	-0.89
11	The nutrition staff understood my dietary needs and preferences.	355	3.59	439	4.43	-0.85
12	The nutrition staff was willing to listen to my concerns about food.	358	3.62	442	4.46	-0.85
13	The nutrition staff was understanding of my situation when providing care.	351	3.55	440	4.44	-0.9
QUANTITY PER DIMENSION		354.4	3.58	440.6	4.45	-0.87
FUNCTIONAL VALUE/DIMENSION OF RELIABILITY						
14	The food provided is appropriate for my diet and health condition.	345	3.48	433	4.37	-0.89
15	The portion sizes provided are appropriate for my needs.	349	3.53	431	4.35	-0.83
16	The meal schedule is always on time.	364	3.68	433	4.37	-0.7
17	The nutrition staff consistently serves meals according to the patient's diet and monitors the patient's food intake.	348	3.52	430	4.34	-0.83
QUANTITY PER DIMENSION		351.5	3.55	431.75	4.36	-0.81
SOCIAL VALUE/TANGIBLE DIMENSION (PHYSICAL EVIDENCE)						
18	The food served appears clean and attractive.	393	3.97	442	4.46	-0.49
19	The serving utensils (trays, plates, spoons) are clean and presentable.	393	3.97	438	4.42	-0.45
20	The nutrition staff's uniforms and appearance appear clean and neat.	400	4.04	441	4.45	-0.41
21	Diet brochures/menus are available and easy for patients to read.	319	3.22	449	4.54	-1.31
22	The food appears to be varied (animal protein, carbohydrates, vegetable protein, and fruit).	355	3.59	434	4.38	-0.8
23	The food provided is tailored to individual preferences, and there is little leftover.	338	3.41	436	4.4	-0.99
QUANTITY PER DIMENSION		366.3	3.7	440	4.4	-0.7

The SERVQUAL analysis results show that all dimensions of nutrition service in hospitals in West Java still have negative gap scores. This indicates that the quality of services received by patients does not fully meet their expectations. According to Parasuraman (1988), a negative score indicates a gap between customer perceptions and expectations regarding the services received, suggesting that the service is suboptimal in meeting patient needs. Based on the average gap scores, the dimensions can be prioritized as follows: assurance (−0.90), responsiveness (−0.88), empathy (−0.87), reliability (−0.81), and tangibles (−0.70). The assurance dimension exhibited the largest gap, suggesting that patients perceived shortcomings in staff communication, professional competence, and the provision of dietary information. Because assurance reflects patients' confidence in the knowledge, professionalism, and credibility of healthcare providers (Parasuraman et al., 1988), this finding indicates that nutrition staff should strengthen communication regarding dietary goals and nutritional therapy to enhance patients' understanding and confidence in the prescribed diet. These findings are consistent with Khikmawati & Wardana (2020), who reported that staff competence, effective communication, and the ability to provide clear information are important determinants of patient satisfaction with nutrition services.

The responsiveness dimension also showed a significant negative gap. This indicates that patients still expect increased speed and responsiveness from staff in response to needs and complaints regarding hospital food service. A slow response can lead to patients feeling underserved during treatment. According to Parasuraman et al. (1988), responsiveness relates to staff willingness to assist customers and provide prompt and appropriate service. The results are consistent with those of Sumiati et al. (2023), who showed that responsiveness is one of the dimensions most influencing patient satisfaction with hospital nutrition service. Furthermore, Dewi & Djokusujono (2022) found that poor-quality hospital food service can increase patient food waste and reduce hospital service efficiency.

The empathy dimension indicates that the nutrition staff provided attention to patients, but personalized service was not optimal. In general, empathy reflects the staff ability to understand the individual needs and conditions of patients. Patient-centered care can improve comfort and foster a better relationship with healthcare professionals. These results support Tessem (2018), who stated that service quality, including personalized attention to customers, influences satisfaction and loyalty.

Within the reliability dimension, the findings revealed a considerable service quality gap, particularly regarding the appropriateness of prescribed diets and the timeliness of meal delivery. These results indicate that patients did not consistently perceive the nutrition services as meeting the expected standards of accuracy and reliability. This finding is consistent with Tessem (2018) who identified reliability as a fundamental determinant of customer satisfaction because it reflects a service provider's ability to deliver services accurately and consistently. In the context of hospital nutrition services, inappropriate diet provision may affect not only patient satisfaction but also patients' clinical outcomes.

In the tangibles dimension, patients still believe that food appearance, menu variety, and presentation need improvement. Physical evidence of service is the first aspect patients assess before evaluating other service qualities. Unappealing food presentation reduces patient appetite and leads to increased hospital food waste. These results are supported by Semedi et al. (2013), who stated that the quality of hospital food is related to the level of patient food consumption and changes in nutritional status during treatment.

Overall, the SERVQUAL analysis results indicate that nutrition service in hospital in West Java still requires improvement in several key aspects, particularly assurance and responsiveness. These results reinforce previous studies stating that the quality of hospital food service is closely related to patient satisfaction. Therefore, hospital nutrition service needs to improve the timeliness of food distribution, the suitability of patient diets, menu variety, and staff responsiveness to ensure that the quality of nutrition service better aligns with patient expectations.

The Kano questionnaire was developed from the SERVQUAL instrument by selecting eight service attributes that were considered most relevant to hospital nutrition services. The selection

process was conducted through expert judgment involving hospital nutrition managers to ensure that the attributes reflected the most critical and actionable aspects of the hospital's current service conditions. This expert-based selection approach has been adopted in previous SERVQUAL–Kano integration studies, where key service attributes are identified prior to Kano classification to facilitate more focused service improvement planning (Supangkat & Savitri, 2024; Tan & Pawitra, 2001).

Table 3: Mapping of SERVQUAL Attributes to the Selected Kano Service Attributes

Kano Attribute	Derived SERVQUAL Dimension	Rationale for Selection
P1 – Timeliness of meal delivery	Reliability	Key performance indicator for hospital nutrition service quality
P2 – Diet appropriateness	Reliability	Reflects the accuracy of diet provision according to patients' medical conditions
P3 – Food taste and quality	Empathy	Represents patients' dining experience and satisfaction
P4 – Friendly and communicative staff	Empathy	Reflects the quality of staff–patient interaction
P5 – Menu flexibility	Empathy	Represents individualized nutrition services
P6 – Nutrition education	Assurance	Reflects professional competence and patient confidence
P7 – Continuity of nutrition care	Empathy	Demonstrates ongoing attention to patients after discharge
P8 – Outpatient nutrition consultation	Assurance	Supports continuity of nutrition care beyond hospitalization

Kano Model

Table 3: Kano Model Result

Variable	Attractive (A)	One Dimensional (O)	Must Be (M)	Indifferent (I)	Dominant Category
P1	36	33	9	19	Attractive (A)
P2	29	31	7	31	One Dimensional (O)
P3	36	25	0	33	Attractive (A)
P4	34	40	0	16	One Dimensional (O)
P5	41	23	0	26	Attractive (A)
P6	41	25	0	20	Attractive (A)
P7	31	20	0	43	Indifferent (I)
P8	33	17	0	43	Indifferent (I)

The Kano analysis results show that most nutrition service attributes fall into the attractive and one-dimensional categories. P1, P3, P5, and P6 fall into the attractive category, indicating that improvements in these attributes can significantly increase patient satisfaction, even though these are not always the patient primary expectation. According to Kano et al. (1984), attractive attributes are factors that add value to service, thereby enhancing patients' experiences with hospital service. Nofirza & Indrayani (2020) also showed that attractive service attributes

significantly influence customer satisfaction by creating a better-than-expected impression of service. Khikmawati & Wardana (2020) also found that attributes related to comfort and additional service quality can enhance patients' positive perceptions of hospital service. In the context of nutrition service, attributes such as menu variety, food taste, and food appearance can be differentiating factors that increase patient satisfaction.

To further evaluate the influence of each service attribute on patient satisfaction, the Customer Satisfaction Coefficients (Better and Worse) were calculated based on the Kano category frequencies following Berger et al. (1993). The Better coefficient (CS+) was calculated as $(A + O)/(A + O + M + I)$, representing the extent to which fulfilling an attribute increases patient satisfaction. The Worse coefficient (CS-) was calculated as $-(O + M)/(A + O + M + I)$, representing the extent to which the absence or poor performance of an attribute contributes to patient dissatisfaction. These coefficients were subsequently used to construct the Better–Worse diagram and prioritize service improvement initiatives.

Based on the results, attributes P2 and P4 fall into the one-dimensional category, implying that better service quality directly increases patient satisfaction. According to Kano et al. (1984), one-dimensional attributes are the most sensitive to patient satisfaction because the relationship between service quality and satisfaction is linear. In hospital nutrition service, factors such as the timeliness of food distribution and staff friendliness are significant determinants of patient satisfaction. This result is consistent with Sumiati et al. (2023), who found that service timeliness and staff responsiveness are significantly related to patient satisfaction with hospital nutrition service.

Attributes P7 and P8 are categorized as indifferent, indicating that their presence does not significantly impact patient satisfaction or dissatisfaction. According to Berger et al., (1993), indifferent attributes are less noticed by customers, hence their presence does not significantly influence satisfaction levels. Attributes in this category are not a top priority for improving service quality.

Overall, the results of the Kano analysis indicate that priorities for improving nutritional service in hospital in West Java should focus on the attractive and one-dimensional attributes, as these two categories have the greatest influence on increasing patient satisfaction. Previous studies have also shown that integrating the Kano Model into hospital service evaluation can help hospital identify the most prioritized service attributes to develop and improve service quality and patient satisfaction.

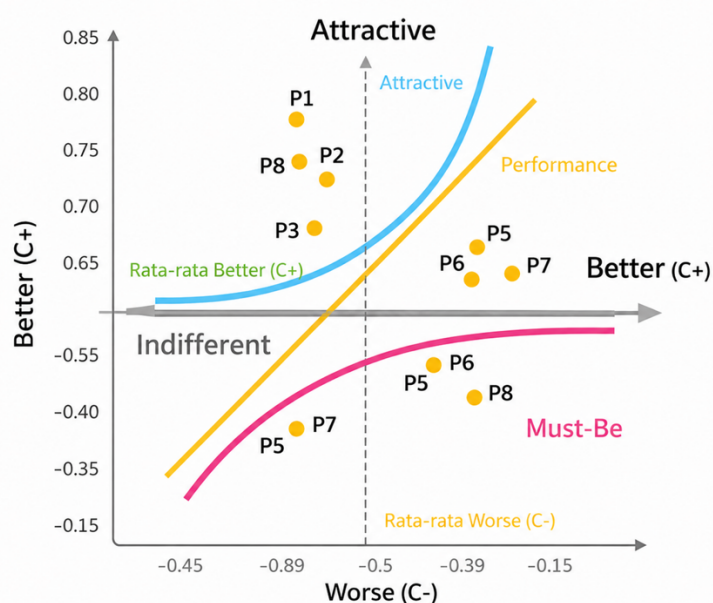


Figure 1. Better–Worse Kano Mapping of Hospital Nutrition Service Attributes

Attributes with higher Better coefficients indicate greater potential to increase patient satisfaction when fulfilled, whereas attributes with larger negative Worse coefficients indicate greater potential to generate dissatisfaction when not fulfilled.

Discussion

The Better–Worse Kano mapping indicates that most nutrition service attributes are concentrated in the attractive and one-dimensional categories, suggesting that improvements in these attributes are likely to produce the greatest increase in patient satisfaction. The predominance of attractive attributes indicates that patients perceive nutrition services as more than simply receiving meals during hospitalization. Attributes related to menu quality, food presentation, food taste, and staff interaction create additional value that enhances the overall patient experience beyond basic service expectations. Therefore, improving these attributes provides hospitals with an opportunity to differentiate the quality of their nutrition services while increasing patient satisfaction. These findings are consistent with previous studies showing that attractive attributes contribute to positive service experiences by creating value beyond patients' basic expectations (Khikmawati & Wardana, 2020; Nofirza & Indrayani, 2020).

The one-dimensional attributes demonstrate that improvements in service performance directly translate into higher patient satisfaction. In this study, attributes associated with timely meal distribution and staff responsiveness were classified in this category, indicating that patients closely associate these aspects with the quality of hospital nutrition services. Conversely, must-be attributes represent fundamental service requirements that patients naturally expect. Although these attributes do not substantially increase satisfaction when fulfilled, failure to meet them may lead to considerable dissatisfaction. This finding suggests that hospitals should first ensure that essential service standards are consistently achieved before investing additional resources in enhancing attractive attributes. These interpretations are consistent with the Kano Model, which proposes that one-dimensional attributes have a linear relationship with customer satisfaction, whereas must-be attributes represent basic expectations that primarily prevent dissatisfaction when fulfilled (Kano et al., 1984). This prioritization strategy is also supported by Adebajo et al., (2016), who demonstrated that distinguishing between performance-enhancing and basic service attributes enables organizations to allocate improvement resources more effectively and achieve greater gains in service quality and customer satisfaction.

The integrated SERVQUAL and Kano analysis provides deeper insights into service improvement priorities than either method alone. While SERVQUAL identified service dimensions with the largest quality gaps, the Kano Model distinguished which service attributes have the greatest influence on patient satisfaction. The combined analysis revealed that several attributes with negative SERVQUAL gaps, particularly timely food distribution and staff responsiveness, were also classified as one-dimensional attributes. This finding indicates that improving these attributes is likely to produce immediate gains in patient satisfaction because patients directly associate better service performance with higher service quality.

In contrast, attributes such as menu variety, food taste, and food presentation were classified as attractive attributes. Although patients do not necessarily expect these attributes as basic requirements, improvements in these areas can substantially enhance patients' overall hospital experience and create a level of satisfaction beyond their initial expectations. These findings reinforce the importance of balancing compliance with basic nutrition service standards and developing value-added services that improve patients' perceptions of care. Similar conclusions were reported by Nofirza & Indrayani (2020), who found that integrating SERVQUAL and the Kano Model provides a more effective basis for prioritizing service quality improvements.

Must-be attributes, including dietary suitability and food hygiene, represent essential service requirements that hospitals must consistently fulfill. Failure to meet these basic expectations is likely to generate dissatisfaction regardless of improvements in other service attributes. This finding emphasizes that quality improvement initiatives should first ensure consistent compliance with fundamental nutrition service standards before allocating resources to enhancing attractive attributes. Similar observations have been reported by Menyawi et al. (2025) and Mardianingsih et al. (2020), who identified dietary suitability, food hygiene, and timely meal delivery as critical determinants of perceived nutrition service quality.

Attributes classified as indifferent exhibited relatively low Better and Worse coefficients, indicating that their presence or absence had minimal influence on patients' overall satisfaction. This suggests that respondents considered these attributes less important when evaluating hospital nutrition services compared with attributes related to service responsiveness, food quality, and menu presentation. Consequently, although these attributes should continue to meet acceptable service standards, they are unlikely to generate substantial improvements in patient satisfaction and therefore should receive lower priority when resources for quality improvement are limited.

Overall, the integrated SERVQUAL and Kano approach offers a practical decision-making framework for hospital managers. Rather than merely identifying service deficiencies, the combined analysis enables managers to prioritize improvement initiatives according to both the magnitude of service quality gaps and the potential impact of each attribute on patient satisfaction. This approach supports more efficient resource allocation and facilitates the development of patient-centered strategies for improving hospital nutrition services.

CONCLUSION

In conclusion, this study makes two important contributions to the literature. First, it demonstrates that integrating SERVQUAL and the Kano Model provides a more comprehensive evaluation of hospital nutrition services than using either method independently. Second, it provides empirical evidence from a regional hospital in Indonesia, extending the application of this integrated framework to the context of hospital nutrition services.

This study was conducted in a single hospital using a quantitative cross-sectional design, which may limit the generalizability of the findings. Future studies are encouraged to validate this integrated SERVQUAL–Kano framework across different hospitals and regions, incorporate qualitative approaches to explore patients' experiences in greater depth, and examine additional factors such as patient experience, nutritional outcomes, digital health services, and organizational characteristics that may influence satisfaction with hospital nutrition services.

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AUTHOR CONTRIBUTION STATEMENT

Dr. Hera Laxmi Devi Septiani, S.Sos., M.Si., M.Comn., conceptualized the study, developed the theoretical framework, supervised the research process, and served as the corresponding author. Shofia Salsabila conducted the data collection and performed the statistical analysis. Dr. Henry M.P. Siahaan, S.H., S.P., M.M., contributed to the literature review, validation, editing, and proofreading of the manuscript. All authors contributed to the preparation of the manuscript, interpretation of the findings, and approved the final version of the manuscript prior to submission.

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