

Service Quality Factors Associated with Patient Satisfaction in the Inpatient Installation of Stella Maris General Hospital, South Nias Regency, Year 2025

Faktor-Faktor Mutu Pelayanan yang Berhubungan dengan Kepuasan Pasien di Instalasi Rawat Inap RSU Stella Maris Kabupaten Nias Selatan Tahun 2025

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Abstract

Patient-reported service evaluations provide a basis for improving inpatient care. This analytical cross-sectional study examined associations between five SERVQUAL dimensions and patient satisfaction at Stella Maris General Hospital, South Nias Regency, Indonesia. A purposive sample of 115 respondents completed a structured questionnaire. Associations were assessed using Pearson's chi-square tests and exploratory Firth penalized logistic regression. Overall, 59 respondents (51.3%) were satisfied. All five dimensions were associated with satisfaction in unadjusted analyses (all $p < 0.001$). Satisfaction ranged from 90.2% to 100.0% among respondents with high service-quality ratings, compared with 1.8% to 7.4% among those with low ratings. The dimensions were strongly correlated ($r = 0.808-0.966$). Adjusted odds ratios ranged from 1.53 to 11.11, and all 95% confidence intervals included 1. The adjusted odds ratios were 6.55 (95% CI 0.040–184.08) for responsiveness and 1.53 (95% CI 0.008–46.66) for tangibles. A sensitivity analysis restricted to 77 respondents with a recorded stay of at least two days yielded the same pattern. Favorable ratings across all five dimensions were associated with inpatient satisfaction, whereas the adjusted analysis did not identify an independently dominant dimension. The findings support an integrated approach to service improvement encompassing timely assistance, consistent care, effective communication, and the ward environment.

Keywords: SERVQUAL; patient satisfaction; inpatient care; service quality; penalized logistic regression

Abstrak

Penilaian pasien terhadap pelayanan menjadi dasar bagi peningkatan mutu pelayanan rawat inap. Penelitian potong lintang analitik ini menganalisis hubungan lima dimensi SERVQUAL dengan kepuasan pasien di RSU Stella Maris, Kabupaten Nias Selatan, Indonesia. Sebanyak 115 responden dipilih secara purposif dan mengisi kuesioner terstruktur. Hubungan antarvariabel dianalisis menggunakan uji chi-kuadrat Pearson dan regresi logistik berpenalti Firth secara eksploratif. Sebanyak 59 responden (51,3%) merasa puas. Kelima dimensi berhubungan dengan kepuasan pada analisis tanpa penyesuaian (seluruh $p < 0,001$). Proporsi kepuasan berkisar antara 90,2% dan 100,0% pada responden dengan penilaian mutu pelayanan tinggi, dibandingkan dengan 1,8% hingga 7,4% pada responden dengan penilaian rendah. Korelasi antardimensi tergolong kuat ($r = 0,808-0,966$). Odds ratio tersesuaikan berkisar antara 1,53 dan 11,11, dan seluruh interval kepercayaan 95% mencakup 1. Odds ratio tersesuaikan untuk daya tanggap adalah 6,55 (IK 95% 0,040–184,08), sedangkan untuk bukti fisik sebesar 1,53 (IK 95% 0,008–46,66). Analisis sensitivitas pada 77 responden dengan lama rawat tercatat sedikitnya dua hari menunjukkan pola yang sama. Penilaian yang baik pada kelima dimensi berhubungan dengan kepuasan pasien rawat inap, sedangkan analisis tersesuaikan tidak mengidentifikasi dimensi yang dominan secara independen. Temuan ini mendukung peningkatan mutu secara terpadu yang mencakup ketepatan waktu bantuan, konsistensi pelayanan, komunikasi efektif, dan lingkungan bangsal.

Kata kunci: SERVQUAL; kepuasan pasien; pelayanan rawat inap; mutu pelayanan; regresi logistik berpenalti



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Introduction

Patient satisfaction captures patients' evaluations of healthcare and complements measures of clinical safety and effectiveness. Assessment of both care delivery and the patient experience is therefore central to quality improvement [1,2]. In Indonesia, Minister of Health Regulation No. 30 of 2022 includes patient satisfaction among the national quality indicators. Its hospital indicator is a survey-derived index with a target of at least 76.61, rather than the proportion of respondents classified as satisfied using a study-specific questionnaire threshold [3]. This distinction provides the context for interpreting local survey findings.

The SERVQUAL framework comprises five dimensions of perceived service quality: tangibles, reliability, responsiveness, assurance, and empathy [4]. In inpatient care, these dimensions encompass the ward environment, consistency of service delivery, timely assistance, confidence in staff, and individualized attention. Patient expectations and perceived performance contribute to the overall evaluation of the service encounter [5,6]. The servicescape framework complements this perspective by examining the physical surroundings in which care is delivered [7]. Together, these frameworks support an assessment of both environmental and interpersonal aspects of inpatient services.

Evidence from different healthcare settings demonstrates associations between perceived service quality and patient satisfaction, with variation in the relative contribution of individual dimensions. An Indonesian inpatient study using multiple linear regression reported the largest SERVQUAL coefficient for empathy [8]. A public tertiary-hospital study in Kerala also identified an association between perceived healthcare quality and satisfaction [9], while a six-hospital study in Jordan identified patient and hospital characteristics associated with satisfaction with nursing care [10]. Differences in measurement and service context underscore the value of examining these relationships within individual hospitals.

Stella Maris General Hospital is a type D, non-BLU/BLUD hospital serving Teluk Dalam and surrounding communities in South Nias Regency. Examining inpatient experiences in this setting contributes evidence relevant to local service planning. This study assessed the associations of tangibles, reliability, responsiveness, assurance, and empathy with patient satisfaction and examined their adjusted associations in a model containing all five dimensions. Its contribution lies in evaluating the dimensions together within a specific hospital context and distinguishing their unadjusted relationships from their independent statistical associations.

Methods

Study design and setting

This analytical cross-sectional study was conducted in the inpatient unit of Stella Maris General Hospital, South Nias Regency, Indonesia. Service-quality perceptions and patient satisfaction were assessed during the same hospitalization to examine their contemporaneous associations. Reporting was organized with reference to the STROBE statement for observational studies [11].

Participants and sample size

Participants were recruited by purposive sampling. The recruitment protocol specified inpatients aged at least 17 years, or otherwise able to make their own decisions, who were conscious, clinically stable, able to communicate, willing to provide informed consent, and had received at least 48 hours of inpatient care.

Assistance from an accompanying family member was permitted when a patient could not complete the questionnaire independently. Exclusion criteria comprised critical or unstable illness, severe cognitive or communication impairment, strict infectious isolation, refusal to participate, and discharge or transfer before 48 hours.

Hospital administrative records covering a six-month period in 2025 provided a reference population of 2,070 inpatient encounters, equivalent to an average of 345 encounters per month. The sample-size expression $n = N/(1 + Ne^2)$, with $N = 2,070$ and $e = 0.10$, gives 95.39, rounded upward to 96. The study included 115 respondents. Recruitment was nonprobabilistic; the planning calculation therefore did not establish a population-based margin of sampling error.

Questionnaire and operational definitions

Data were collected through guided interviews using a structured, SERVQUAL-based questionnaire. Each service-quality dimension contained six statements, and patient satisfaction was assessed using eight statements (Table 1). The instrument measured perceived service performance rather than paired expectation-perception gaps. It was therefore a contextual adaptation of the SERVQUAL framework [4,12].

Table 1. Questionnaire content and classification thresholds.

Measure	Items	Questionnaire content	Threshold ¹
Tangibles	6	Room/bathroom cleanliness, bed comfort, visible equipment, ward environment, and staff appearance.	High: ≥ 12 ; low: < 12
Reliability	6	Procedural consistency, medication timing, examinations, medical information, and physician rounds.	High: ≥ 12 ; low: < 12
Responsiveness	6	Prompt responses to calls and complaints, readiness to assist, and timely service.	High: ≥ 12 ; low: < 12
Assurance	6	Courtesy, perceived safety, competence, clear answers, and trust.	High: ≥ 12 ; low: < 12
Empathy	6	Attention, friendliness, understanding, patience, personal care, and comfort.	High: ≥ 12 ; low: < 12
Patient satisfaction	8	Satisfaction with the environment, doctors, nurses, information, administration, food, expectations, and overall care.	Satisfied: ≥ 16 ; dissatisfied: < 16

¹ Thresholds correspond to the specified 0–4 scoring protocol: 0–24 points for each service-quality dimension and 0–32 points for patient satisfaction. Scores equal to the threshold belong to the high or satisfied category.

The specified scoring protocol assigned values from 0 to 4 to responses ranging from strongly disagree to strongly agree. Service-quality scores of at least 12 were classified as high and scores below 12 as low. Satisfaction scores of at least 16 were classified as satisfied and scores below 16 as dissatisfied. Analyses used the recorded binary classifications; category membership was not changed during reanalysis.

Statistical analysis

Respondent-level categorical data were checked against the frequency distributions and cross-tabulations. The service-quality and satisfaction variables contained no missing categorical values. Participant characteristics and questionnaire classifications were summarized as frequencies and percentages. Pearson's chi-square tests assessed unadjusted associations, with two-sided Fisher's exact tests used as sensitivity checks. Crude odds ratios compared the odds of satisfaction between high- and low-rating groups. Approximate 95% confidence intervals were calculated on the log-odds-ratio scale for tables with four nonzero cells; no continuity correction was applied.

Maximum-likelihood logistic estimation did not converge. An exploratory multivariable reanalysis therefore used Firth's penalized likelihood to obtain finite estimates in the presence of separation [13,14]. Satisfaction was coded as 1 and dissatisfaction as 0; high and low ratings were coded as 1 and 0, respectively. All five service-quality dimensions were entered simultaneously without stepwise elimination. Adjusted odds ratios were reported with profile penalized-likelihood 95% confidence intervals and two-sided penalized likelihood-ratio p-values. Each association was adjusted for the other four service-quality dimensions; demographic and clinical covariates were not included.

Pairwise correlations and variance inflation factors were used to assess relationships among the predictors. An exploratory model added a tangibles $\times$ responsiveness interaction term. A separate sensitivity

analysis included only respondents with a recorded stay of at least two days, excluding 38 records and retaining 77. The interaction and duration-restricted analyses were post hoc. All tests were two-sided, with a significance threshold of 0.05.

Ethical considerations

Participation was voluntary and required informed consent. The participant information sheet explained that responses would remain confidential and would be used for research purposes. Statistical analyses used coded records without patient names, contact details, or clinical photographs.

Results and Discussion

Participant characteristics and service-quality ratings

The sample comprised 115 respondents, including 58 men (50.4%) and 57 women (49.6%). The medium education category accounted for the largest proportion (44.3%), and 57.4% of respondents were employed. Class II was the most frequent room category (41.7%). Recorded stays were less than two days for 38 respondents (33.0%), two to five days for 52 (45.2%), and longer than five days for 25 (21.7%) (Table 2).

Table 2. Participant characteristics (n = 115).

Characteristic	Category	n	%
Sex	Male	58	50.4
	Female	57	49.6
Education	High	28	24.3
	Medium	51	44.3
	Low	36	31.3
Employment	Employed	66	57.4
	Not employed	49	42.6
Length of stay	<2 days	38	33.0
	2–5 days	52	45.2
	>5 days	25	21.7
Room category	Class III	42	36.5
	Class II	48	41.7
	Class I	18	15.7
	VIP	7	6.1

High ratings were reported for tangibles by 61 respondents (53.0%), reliability by 59 (51.3%), responsiveness by 60 (52.2%), assurance by 58 (50.4%), and empathy by 60 (52.2%). Overall, 59 respondents (51.3%) were classified as satisfied and 56 (48.7%) as dissatisfied.

Unadjusted associations with satisfaction

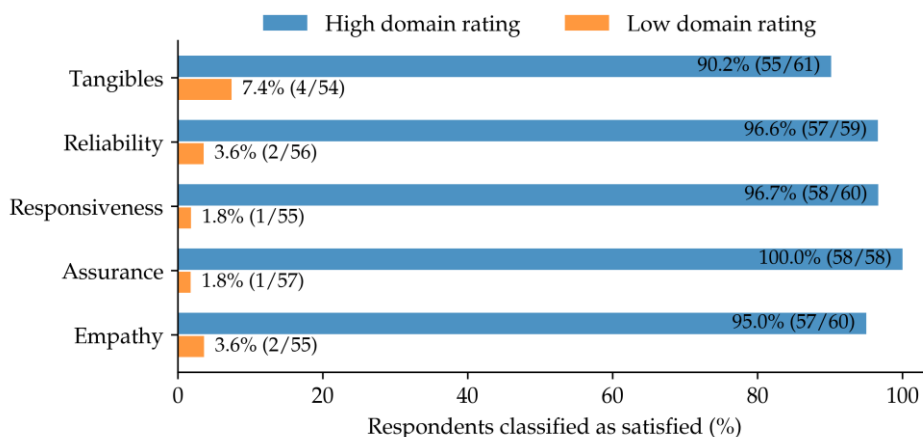


Figure 1. Satisfaction by service-quality rating. Labels indicate the percentage satisfied and the number satisfied/total respondents within each high- or low-rating group. Comparisons are unadjusted.

All five service-quality dimensions were associated with satisfaction in the unadjusted analyses (Table 3; all Pearson and Fisher $p < 0.001$). Expected cell counts exceeded five in every Pearson test. Among respondents with high tangibles ratings, 55 of 61 (90.2%) were satisfied, compared with 4 of 54 (7.4%) with low ratings. The corresponding proportions for high versus low ratings were 96.6% versus 3.6% for reliability, 96.7% versus 1.8% for responsiveness, 100.0% versus 1.8% for assurance, and 95.0% versus 3.6% for empathy (Figure 1).

Table 3. Service-quality ratings and satisfaction: unadjusted associations (n = 115).

Dimension	Rating	Satisfied, n (%)	Dissatisfied, n (%)	Crude OR (95% CI)	p-value ²
Tangibles	High	55 (90.2)	6 (9.8)	114.58 (30.55–429.74)	<0.001
	Low	4 (7.4)	50 (92.6)	1 (reference)	
Reliability	High	57 (96.6)	2 (3.4)	769.50 (104.66–5,657.68)	<0.001
	Low	2 (3.6)	54 (96.4)	1 (reference)	
Responsiveness	High	58 (96.7)	2 (3.3)	1,566.00 (138.01–17,769.26)	<0.001
	Low	1 (1.8)	54 (98.2)	1 (reference)	
Assurance	High	58 (100.0)	0 (0.0)	Unbounded ¹	<0.001
	Low	1 (1.8)	56 (98.2)	1 (reference)	
Empathy	High	57 (95.0)	3 (5.0)	503.50 (80.94–3,132.17)	<0.001
	Low	2 (3.6)	53 (96.4)	1 (reference)	

Percentages are calculated within each rating category. OR, odds ratio for satisfaction; CI, confidence interval. Confidence intervals are approximate log-Wald intervals. ¹ The uncorrected OR is unbounded because the high-assurance/dissatisfied cell contains no observations. ² Pearson's chi-square test; two-sided Fisher's exact tests also yielded $p < 0.001$ for every dimension.

Crude odds ratios were large and accompanied by wide confidence intervals. For assurance, all 58 respondents with high ratings were satisfied, whereas 56 of 57 respondents with low ratings were dissatisfied. The resulting zero cell produced an unbounded uncorrected odds ratio, reflecting the near-complete correspondence between the assurance and satisfaction categories.

Exploratory adjusted associations and sensitivity analyses

Correlations among the five dimensions ranged from 0.808 to 0.966, and variance inflation factors ranged from 3.63 for tangibles to 33.35 for assurance. The Firth model yielded adjusted odds ratios of 1.53 for tangibles, 6.12 for reliability, 6.55 for responsiveness, 11.11 for assurance, and 4.75 for empathy (Table 4). All 95% confidence intervals included 1, and none of the domain-specific adjusted associations reached statistical significance.

Table 4. Exploratory five-domain Firth penalized logistic regression for satisfaction (n = 115).

Dimension	B	Adjusted OR	95% CI ¹	p-value ²	VIF
Tangibles	0.427	1.53	0.008–46.66	0.830	3.63
Reliability	1.811	6.12	0.025–197.33	0.428	10.13
Responsiveness	1.879	6.55	0.040–184.08	0.355	14.94
Assurance	2.408	11.11	0.035–27,511.87	0.436	33.35
Empathy	1.558	4.75	0.024–120.74	0.455	7.63

Low ratings are the reference category. The outcome is satisfied = 1 and dissatisfied = 0. Each estimate is adjusted for the other four service-quality dimensions. B, log-odds coefficient; OR, odds ratio; CI, confidence interval; VIF, variance inflation factor. ¹ Profile penalized-likelihood interval. ² Penalized likelihood-ratio test. Estimates are from the exploratory reanalysis.

The tangibles × responsiveness interaction was not statistically significant ($p = 0.413$). In the sensitivity analysis of 77 respondents with a recorded stay of at least two days, adjusted odds ratios ranged from 0.94 to 8.45, and all 95% confidence intervals included 1. Figure 2 presents the sample-planning context and the two analysis sets.

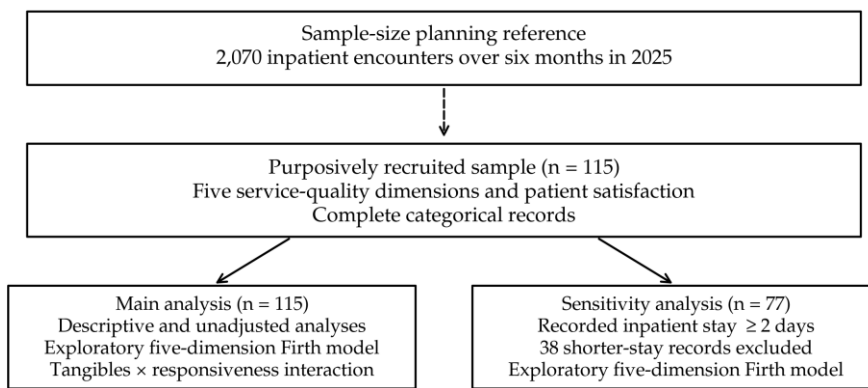


Figure 2. Sample-planning context and analysis sets. The dashed connector indicates the administrative reference used for sample-size planning; solid connectors show allocation of the study records to the main and sensitivity analyses.

Interpretation in relation to the literature

Favorable ratings across all five service-quality dimensions were associated with inpatient satisfaction. After mutual adjustment, however, none of the dimensions showed a statistically significant independent association. The marked correlations among predictors and wide confidence intervals indicate that the dataset contained limited information for separating their individual contributions. The findings therefore support a multidimensional interpretation of the inpatient experience rather than a ranking of dimensions based on the largest point estimate. Lack of statistical significance in the adjusted model does not establish the absence of a clinically relevant association.

Tangibles represent the physical setting in which inpatient care is experienced, including cleanliness, comfort, equipment, and staff appearance. Their association with satisfaction is consistent with the servicescape perspective on the relationship between physical surroundings and service evaluation [6,7]. Nevertheless, six respondents with high tangibles ratings were dissatisfied, while four with low ratings were satisfied. These responses demonstrate that evaluations of the physical environment and overall satisfaction are related but not interchangeable. The survey did not assess the individual reasons for these discordant evaluations.

Reliability and responsiveness reflect complementary aspects of service delivery: consistency of care and timely assistance. Both were strongly associated with satisfaction before adjustment, but their independent associations were imprecisely estimated in the joint model. In contrast, Rahmatia and colleagues reported the largest coefficient for empathy in an Indonesian inpatient study using linear regression [8]. Interpretation of this contrast requires attention to outcome measurement and model specification: a linear regression coefficient describes a different quantity from an odds ratio for a dichotomized outcome. The two studies therefore provide evidence about related service dimensions without establishing a common hierarchy of importance.

Assurance and empathy encompass confidence in staff, respectful communication, and individualized attention. The near-complete correspondence between assurance and satisfaction in this sample generated separation in conventional logistic estimation. This distribution concerns the relationship between binary categories and does not establish a ceiling effect in the underlying questionnaire scores. In a separate patient survey, Hojat and colleagues found associations between perceived physician empathy, satisfaction, and interpersonal trust [15]. These findings place the observed associations within a broader literature on interpersonal care, while the shared item content and interview setting remain relevant measurement considerations.

The association between perceived quality and satisfaction also accords with findings from the public tertiary hospital in Kerala [9]. The Jordanian multisite study additionally identified relationships with education, insurance, room occupancy, and hospital sector [10]. The present analysis adjusted only for the five service-quality dimensions and consequently did not account for these broader patient and organizational characteristics. Its contribution is therefore a hospital-specific assessment rather than a causal explanation applicable across healthcare settings.

Implications for inpatient service improvement

The findings support coordinated evaluation of the ward environment, service reliability, timely assistance, and communication. An operational improvement program could combine monitoring of request-to-response times with regular checks of room cleanliness, bathroom condition, bed function, and maintenance completion. Response-time indicators should distinguish the acknowledgement of a request from the delivery of assistance and account for clinical urgency. Monthly review of median and 90th-percentile response times, alongside weekly environmental checks, would provide measurable indicators for an initial three-month improvement cycle. These activities represent proposed service-improvement measures, not interventions tested in this study.

Communication is an integral component of this approach. Clear explanations of procedures and daily care, together with opportunities for patients and families to ask questions, provide practical targets for improvement. Ayre and colleagues examined the iterative development and end-user testing of a tool to improve the health literacy of written patient information [16]. Shortell and colleagues examined hospital performance in relation to the implementation of lean management, distinguishing implementation from adoption alone [17]. Their findings provide complementary perspectives on the design and implementation of service improvements.

Evaluation of improvement activities should use a consistent scoring protocol, retain item-level responses, and consider patient feedback alongside operational and clinical indicators. A fixed measurement approach would permit comparison across survey rounds without changes in category thresholds obscuring the results. Multicenter longitudinal studies, complemented by qualitative interviews, are needed to examine changes in satisfaction over time and clarify how patient characteristics, expectations, and local service conditions contribute to the inpatient experience.

The single-center, cross-sectional design and purposive recruitment limit generalizability and preclude causal inference. Guided interviews during hospitalization are susceptible to social-desirability, interviewer, and recall bias. The protocol permitted family assistance, but the dataset did not distinguish assisted from unassisted responses. In addition, 38 records indicated stays of less than two days despite the 48-hour eligibility criterion. The duration-restricted sensitivity analysis addressed this discrepancy analytically but did not resolve the underlying recruitment inconsistency.

Analyses were restricted to categorized responses, limiting assessment of score distributions, alternative cut-points, and item-level psychometric performance. The questionnaire response key and scoring protocol used different numerical scales, and the assurance section repeated a safety-related statement. These features restrict verification of category assignment and construct validity. Dichotomization also reduces information and makes findings sensitive to the classification thresholds [18]. Shared questionnaire content and collection of predictors and satisfaction in the same interview introduce potential common-method bias.

Firth penalization provided finite estimates under separation but did not eliminate collinearity or the imprecision of domain-specific associations [14]. The interaction and restricted-sample analyses were exploratory. Demographic and clinical confounding, clinical outcomes, and changes in satisfaction after discharge were not assessed. These limitations constrain interpretation of the adjusted estimates and the transferability of the findings.

Conclusions

Tangibles, reliability, responsiveness, assurance, and empathy were each associated with inpatient satisfaction at Stella Maris General Hospital in unadjusted analyses. The exploratory adjusted analysis did not identify an independently dominant dimension, with substantial intercorrelation and wide confidence intervals limiting the separation of domain-specific associations. The findings support coordinated improvement of the ward environment, consistency of care, timely assistance, and patient communication, evaluated through repeated patient-experience surveys and operational indicators.

Declaration of No Conflict of Interest

The author declares that there is no conflict of interest associated with this research. The entire research process, from study design, data collection, and analysis to the writing of this article, was conducted independently without any influence, pressure, or interest from any other party.

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