

ASSESSMENT OF PATIENT SATISFACTION AMONG INPATIENTS IN INTENSIVE AND STEP-DOWN CARE UNITS OF A TERTIARY CARE TEACHING HOSPITAL IN JHARKHAND: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Patient satisfaction is an important patient-reported indicator of healthcare quality, particularly in intensive care units (ICUs) and step-down care units (SDUs), where severe illness, restricted communication and reliance on family attendants influence the care experience. Despite the growing emphasis on patient-centred care, comparative evidence on patient satisfaction across ICU and SDU settings in public tertiary-care hospitals of eastern India remains limited.

Objective: To measure overall and domain-specific satisfaction among eligible patients and primary attendants, compare ICU and SDU experiences, and identify independent predictors of overall patient satisfaction.

Methods: A hospital-based observational cross-sectional study was conducted in a public tertiary care teaching hospital in Ranchi, Jharkhand. Four hundred consecutive participants who had received at least 48 hours of ICU or SDU care were enrolled. A structured bilingual questionnaire comprising 34 satisfaction items distributed across eight service domains was used to assess patient satisfaction using a five-point Likert scale. The questionnaire demonstrated excellent internal consistency (Cronbach's $\alpha = 0.948$). Descriptive statistics, chi-square tests, independent-samples t tests, analysis of variance, correlation analysis and multivariable binary logistic regression were applied. Statistical significance was defined as $P < 0.05$.

Results: The mean composite satisfaction score was 96.25 (SD 13.72) out of a maximum possible score of 170, equivalent to a mean item score of 2.83 (SD 0.40). Overall, 41.5% of respondents were satisfied, 38.0% reported neutral satisfaction, and 20.5% were dissatisfied or very dissatisfied. Financial, grievance and patient-support services recorded the highest mean domain score (2.96), whereas support to attendants had the lowest score (2.58). Overall composite satisfaction did not differ significantly between ICU and SDU participants (2.82 vs. 2.84; $p = 0.741$), although significant differences were observed in admission support, hospital environment, supportive services, financial and grievance services, and attendant support. Rural residence was independently associated with higher odds of satisfaction (adjusted odds ratio 6.88, 95% CI 4.01–11.81; $p < 0.001$).

Conclusion: Satisfaction was moderate and varied substantially by service component. Clinical care and communication were perceived more favourably than attendant amenities, privacy, medicine availability and diagnostic timeliness. Structured family communication, improved attendant facilities, and routine domain-specific monitoring should be prioritised to strengthen patient-centred critical-care services. These findings provide actionable evidence to support targeted quality-improvement initiatives in critical-care services.

KEYWORDS: Patient satisfaction; intensive care unit; step-down care unit; patient experience; hospital administration; critical care; quality improvement; tertiary-care hospital.

1. INTRODUCTION

Quality in healthcare is increasingly evaluated through both technical performance and the experience of people who receive care. Effective treatment remains fundamental, but patients and families also judge whether care is timely, respectful, understandable, coordinated and responsive to their needs. Patient satisfaction therefore functions as an important patient-reported outcome and a key indicator for healthcare managers seeking to evaluate and improve service delivery.[1-5]

The conceptual basis for this assessment is well described by Donabedian's structure-process-outcome model. In critical care, structure includes staffing, beds, equipment, medicines, physical space and organisational arrangements; process includes admission, communication, monitoring, nursing response, investigations, diet, billing and grievance handling; and outcome includes perceived satisfaction, trust and willingness to recommend the hospital.[3,4] Satisfaction is not a direct substitute for clinical quality, but it captures dimensions of care that are difficult to observe through mortality, infection or length-of-stay indicators alone. Accordingly, assessing patient satisfaction alongside traditional clinical

outcome indicators provides a more comprehensive evaluation of healthcare quality, particularly in critical-care settings.[3–5]

ICUs are clinically complex and emotionally demanding environments. Patients may be ventilated, sedated, confused or otherwise unable to communicate, so primary attendants often become the principal recipients of information and may act as proxy respondents. In this setting, the clarity and regularity of updates, empathy shown by staff, involvement in decisions and availability of practical support can strongly shape the perceived quality of care.[6–10] Step-down care units provide an intermediate level of monitoring between ICU and the general ward. They can improve continuity and resource use, but patients and families may experience uncertainty during transfer, changes in staffing intensity and altered expectations about monitoring.

Studies from India and other countries consistently identify communication, professional behaviour, responsiveness, cleanliness, access to medicines and support for families as major determinants of hospital satisfaction.[11–16] Contemporary Indian ICU research similarly shows that family needs extend beyond clinical treatment to understandable information, respectful participation and a supportive physical environment.[20,25] Recent multicentre evidence has also found lower ratings for family-focused care and the ICU environment than for professional and patient care, reinforcing the need to measure clinical and non-clinical domains separately.[26] However, most previous studies have evaluated patient or family satisfaction within ICUs alone, while direct comparisons between ICU and Step-Down Care Unit (SDU) settings remain scarce, particularly in public-sector tertiary-care hospitals in eastern India.[20–27] Public tertiary-care teaching hospitals in India provide healthcare services to a large and socioeconomically diverse population, often under conditions of high patient load and limited healthcare resources. In such settings, systematic assessment of patient satisfaction serves as an important indicator of healthcare quality, patient-centred care, accountability, and hospital performance. Regular evaluation of patients' and attendants' experiences enables hospital administrators to identify service gaps, prioritize quality-improvement initiatives, optimize resource allocation, and strengthen critical-care delivery. Despite its importance, comparative evidence on patient satisfaction across ICU and Step-Down Care Unit (SDU) settings remains limited in eastern India, particularly in Jharkhand. Furthermore, few studies have simultaneously examined overall satisfaction, domain-specific experiences, and independent predictors of patient satisfaction within the same critical-care population.

The present study was undertaken at Rajendra Institute of Medical Sciences (RIMS), Ranchi, to evaluate overall and domain-specific satisfaction among eligible ICU and SDU patients or their primary attendants, compare satisfaction across the two levels of care, and identify independent demographic and service-related predictors of overall satisfaction. By simultaneously evaluating overall satisfaction, domain-specific experiences, and factors associated with satisfaction, the study addresses an important evidence gap in the evaluation of critical-care services within public tertiary-care hospitals. The findings are intended to generate locally relevant evidence to guide hospital administrators and policymakers in strengthening patient-centred quality improvement and critical-care service delivery in resource-constrained settings.

2. MATERIALS AND METHODS

2.1 Study design and reporting

A hospital-based observational cross-sectional study was conducted to assess overall and domain-specific patient satisfaction among adult patients admitted to the Intensive Care Unit (ICU) and Step-Down Care Unit (SDU), as well as their eligible primary attendants serving as proxy respondents when required. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[17]

2.2 Study setting

The study was conducted in the Intensive Care Unit (ICU) and Step-Down Care Unit (SDU) of Rajendra Institute of Medical Sciences (RIMS), Ranchi, a government tertiary-care teaching hospital providing referral services to patients from Jharkhand, and neighbouring states. The ICU and SDU deliver multidisciplinary critical and intermediate care supported by specialised nursing services, laboratory and radiology facilities, pharmacy, dietary services, and hospital administrative support.

2.3 Study duration

The study was conducted over an eight-month period after obtaining institutional administrative permission and approval from the Institutional Ethics Committee. During this period, eligible participants were recruited consecutively from the ICU and Step-Down Care Unit (SDU), and data were collected using a structured bilingual questionnaire. Data entry, verification, statistical analysis, and interpretation were performed after completion of data collection to ensure the accuracy and completeness of the dataset.

2.4 Study population and eligibility

The study population comprised adults aged 18 years or older who had remained admitted in an ICU or SDU for at least 48 hours. Patients who were clinically stable and capable of responding were interviewed directly. For patients who were unconscious, mechanically ventilated, cognitively impaired, or otherwise unable to participate, the primary attendant most closely involved in the patient's care and communication was interviewed as the proxy respondent. Individuals who declined to provide written informed consent, were clinically unstable or too distressed to participate, or had been admitted for less than 48 hours were excluded.

2.5 Sample size and sampling

The minimum required sample size was calculated using the single population proportion formula: $n = Z^2 P(1-P)/d^2$, where $Z = 1.96$ for a 95% confidence level, $P = 0.50$ (assuming maximum variability due to the absence of comparable local estimates), and $d = 0.05$ (margin of error). The calculated minimum sample size was 384 participants. To improve precision and compensate for potential incomplete responses, the final sample size was increased to 400 participants. A consecutive sampling technique was employed. All eligible participants admitted to the Intensive Care Unit (ICU) or Step-Down Care Unit (SDU) during the study period were screened for eligibility and recruited consecutively until the required sample size of 400 participants was achieved. To facilitate comparison between the two care settings, 200 participants were enrolled from the ICU and 200 from the SDU.

2.6 Data collection instrument

Data were collected using an expert-reviewed structured bilingual (English and Hindi) questionnaire containing sociodemographic and clinical variables and 34 satisfaction items. The domains were admission and administrative support, communication and information, nursing care, doctors' care, hospital environment and infrastructure, supportive and dietary services, support to attendants, and financial, grievance and patient-support services. Each item was rated from 1 (very dissatisfied) to 5 (very satisfied). The global satisfaction item and willingness to recommend the hospital were retained as separate summary outcomes. The questionnaire was developed by adapting published patient satisfaction instruments and relevant literature, followed by expert review to ensure content relevance and contextual appropriateness for ICU and SDU services.

2.7 Validity, pilot testing and reliability

The questionnaire was reviewed by faculty and subject experts for content relevance, clarity and contextual appropriateness and was pre-tested before full-scale data collection. Feedback was used to simplify wording and sequence items. The questionnaire demonstrated excellent internal consistency (Cronbach's $\alpha = 0.948$). The final questionnaire was considered appropriate for assessing patient satisfaction within the local critical care context.

2.8 Data collection procedure and quality control

Eligible participants were approached after confirmation of their clinical stability and eligibility for participation. The purpose of the study, the voluntary nature of participation and confidentiality measures were explained before obtaining written informed consent. Face-to-face interviews were conducted with eligible participants or their primary attendants when proxy responses were required. Interviews were conducted using a standardized interview protocol to ensure consistency in data collection. Completed questionnaires were checked immediately after each interview for completeness and internal consistency before coding and entry into a structured master database. Range and category checks were performed before the dataset was finalized for statistical analysis.

2.9 Variables and outcome measures

The primary outcome was overall satisfaction, assessed using both the global satisfaction item and the composite mean score of the 34 satisfaction items. Domain scores were calculated as the arithmetic mean of the corresponding questionnaire items. For association and regression analyses, global satisfaction was dichotomised as satisfied/very satisfied versus neutral/dissatisfied/very dissatisfied. Explanatory variables included age, gender, education, residence, marital status, socioeconomic status, unit, respondent type and length of stay.

2.10 Statistical analysis

Categorical variables were summarised as frequencies and percentages, whereas continuous variables were summarised using means, standard deviations (SDs), and ranges. Differences between the ICU and SDU groups were assessed using the independent-samples *t* test for continuous variables and the chi-square test for categorical variables. One-way analysis of variance (ANOVA) was used to compare continuous variables across more than two groups. Pearson's correlation coefficient was used to assess linear relationships between continuous composite satisfaction scores. A multivariable binary logistic regression model was constructed to estimate adjusted odds ratios (AORs) and 95% confidence intervals (CIs) for overall satisfaction. Variables were entered into the multivariable logistic regression model based on their conceptual relevance and the results of the bivariate analyses. Before fitting the multivariable model, key model assumptions, including multicollinearity among predictor variables, were assessed to ensure the validity of the regression estimates. Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA). All statistical tests were two-sided, and a *P* value < 0.05 was considered statistically significant.

2.11 Ethical considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee, Rajendra Institute of Medical Sciences, Ranchi (Letter No. 54 dated 21-02-2026). Written informed consent was obtained from all participants or their eligible primary attendants before enrolment. Participant confidentiality and anonymity were maintained throughout the study.

2.12 Bias reduction

Consecutive recruitment of all eligible participants minimised selection bias. Restricting enrolment to patients with at least 48 hours of ICU or SDU stay ensured adequate exposure to healthcare services before satisfaction assessment. A standardised bilingual questionnaire and a uniform interview protocol reduced measurement variability. Proxy responses

were limited to primary attendants closely involved in patient care and communication, although differences between patient and proxy perceptions could not be completely eliminated. Multivariable logistic regression was used to adjust for potential confounding by selected measured variables.

3. RESULTS

3.1 Participant characteristics

All 400 analysed participants had complete data for the primary study outcomes. The mean age was 46.81 years (SD 18.11; range 18-98), and 216 (54.0%) were male. Most participants were rural residents 267 (66.8%). The sample was equally divided between ICU and SDU; 208 (52.0%) responses were provided by patients and 192 (48.0%) by primary attendants. Mean length of stay was 8.02 days (SD 4.47).

Table 1. Baseline characteristics of study participants (n=400)

Variable	Category	n (%)
Age group (Years)	18-30	90 (22.5)
	31-45	102 (25.5)
	46-60	121 (30.2)
	>60	87 (21.8)
Gender	Male	216 (54.0)
	Female	184 (46.0)
Residence	Urban	133 (33.2)
	Rural	267 (66.8)
Marital status	Unmarried	63 (15.8)
	Married	299 (74.8)
	Widowed/Separated	38 (9.5)
Respondent	Patient	208 (52.0)
	Primary attendant	192 (48.0)
Education	Illiterate	19 (4.8)
	Primary	71 (17.8)
	Secondary	110 (27.5)
	Higher secondary	107 (26.8)
	Graduate	93 (23.2)
Socioeconomic status	Lower Class	69 (17.2)
	Upper Lower Class	106(26.5)
	Lower Middle Class	140(35.0)
	Upper Middle Class	74(18.5)
	Upper Class	11(2.8)

3.2 Clinical and study-related characteristics

Clinical and study-related characteristics are summarised in Table 2.

The sample included equal numbers of ICU and SDU participants (200 each). Responses were obtained from patients (52.0%) and primary attendants (48.0%). Overall, 202 (50.5%) respondents indicated that they would recommend the hospital.

Table 2: Clinical and study-related characteristics

Variable	Category	Frequency	Percentage
Type of unit	ICU	200	50.0
	SDU	200	50.0
Respondent	Patient	208	52.0
	Primary attendant	192	48.0
Recommend hospital	Yes	202	50.5
	No	198	49.5

3.3 Descriptive statistics

Descriptive statistics for age, hospital stay, and satisfaction scores are presented in Table 3.

The mean age of the participants was 46.81 years (SD 18.11). The mean duration of hospital stay was 8.02 days (SD 4.47). The mean composite satisfaction score was 96.25 (SD 13.72) out of a maximum possible score of 170, corresponding to a mean item score of 2.83 (SD 0.40) on a five-point Likert scale.

Table 3: Descriptive statistics of age, hospital stay and satisfaction scores

Variable	Mean	SD	Minimum	Maximum
Age (years)	46.81	18.11	18	98

Variable	Mean	SD	Minimum	Maximum
Hospital stay (days)	8.02	4.47	2	18
Composite satisfaction score (34-170)	96.25	13.72	44	127
Composite mean score (1-5)	2.83	0.40	1.29	3.74

3.4 Reliability of satisfaction scale

The internal consistency of the 34-item satisfaction scale was assessed using Cronbach's alpha. The questionnaire demonstrated excellent internal consistency (Cronbach's $\alpha = 0.948$), indicating high reliability for assessing patient satisfaction in the study population (Table 4).

Table 4: Reliability analysis of the satisfaction scale

Scale	No. of items	Cronbach's alpha	Interpretation
Patient satisfaction scale	34	0.948	Excellent internal consistency

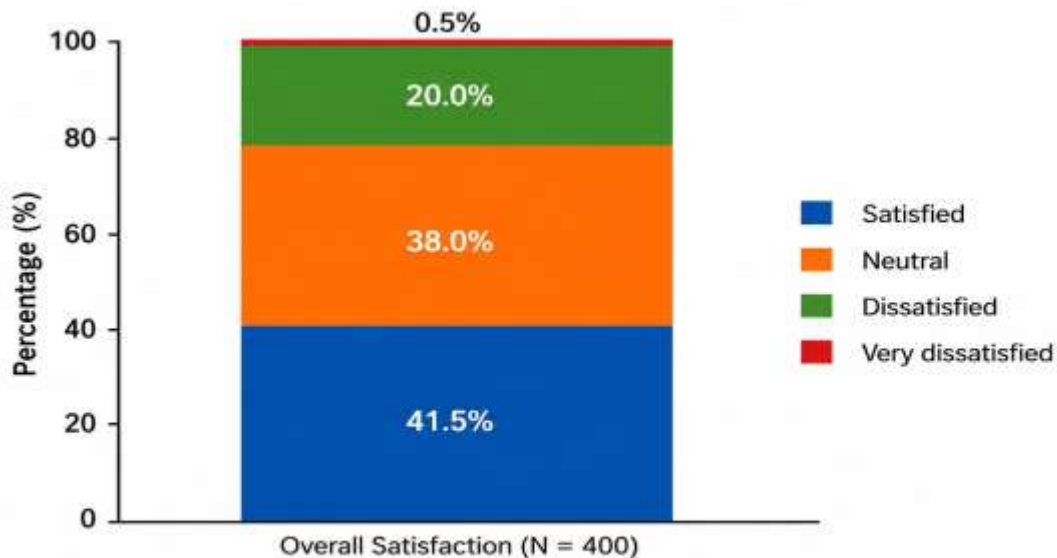
3.5 Overall and composite satisfaction

The mean composite score was 96.25 (SD 13.72) of 170, with a mean item score of 2.83 (SD 0.40). On the global item, 166 (41.5%) respondents were satisfied and 152 (38.0%) were neutral. Eighty (20.0%) were dissatisfied and two (0.5%) were very dissatisfied; no respondent selected the very satisfied category. Only 202 (50.5%) respondents indicated that they would recommend the hospital.

Table 5: Distribution of overall satisfaction category

Overall satisfaction category	Frequency	Percentage
Very Dissatisfied	2	0.5
Dissatisfied	80	20.0
Neutral	152	38.0
Satisfied	166	41.5
Very Satisfied	0	0.0

Figure 1. Overall satisfaction categories



Note: No respondent selected "Very satisfied".

Table 6: Distribution of recommendation of hospital

Would recommend hospital	Frequency	Percentage
Yes	202	50.5
No	198	49.5

Table 7: Distribution of composite mean satisfaction category

Composite mean category	Frequency	Percentage
Very dissatisfied	7	1.8
Dissatisfied	157	39.2
Neutral	225	56.2

Composite mean category	Frequency	Percentage
Satisfied	11	2.8
Very satisfied	0	0.0

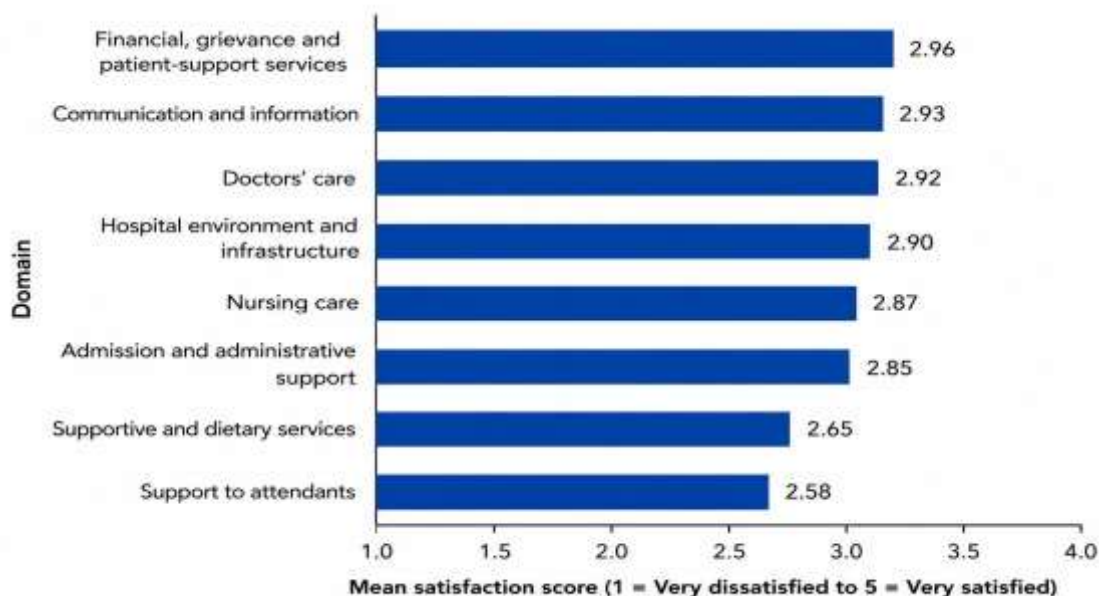
3.6 Domain-specific satisfaction

Domain-specific mean satisfaction scores ranged from 2.58 to 2.96 (Table 8). Financial, grievance and patient-support services had the highest mean score (2.96), followed by communication and information (2.93) and doctors' care (2.92). Support to attendants had the lowest mean score (2.58), followed by supportive and dietary services (2.65).

Table 8: Domain-specific mean satisfaction scores

Domain	Items	Mean	SD	Rank
Admission and administrative support	4	2.85	0.42	6
Communication and information	4	2.93	0.52	2
Nursing care	5	2.87	0.46	5
Doctors' care	4	2.92	0.48	3
Hospital environment and infrastructure	4	2.90	0.42	4
Supportive and dietary services	6	2.65	0.49	7
Support to attendants	3	2.58	0.52	8
Financial, grievance and patient-support services	4	2.96	0.53	1

Figure 2. Mean satisfaction score by domain



3.7 ICU-SDU comparisons

The overall composite mean satisfaction score was similar between the ICU and SDU groups (2.82 vs. 2.84; $P = 0.741$). However, statistically significant differences were observed across several service domains (Table 9). Participants in the SDU reported higher mean satisfaction scores for admission and administrative support, hospital environment and infrastructure, and financial, grievance, and patient-support services. In contrast, ICU participants reported higher mean scores for supportive and dietary services and support to attendants. No statistically significant differences were observed between the two units for communication and information, nursing care, or doctors' care.

Table 9: Domain-level comparison between ICU and SDU

Domain	ICU mean $\pm$ SD	SDU mean $\pm$ SD	t value	p-value
Admission/administrative support	2.77 $\pm$ 0.44	2.92 $\pm$ 0.37	-3.50	<0.001
Communication/information	2.92 $\pm$ 0.56	2.94 $\pm$ 0.48	-0.36	0.718
Nursing care	2.88 $\pm$ 0.51	2.86 $\pm$ 0.41	0.57	0.571
Doctors' care	2.92 $\pm$ 0.55	2.92 $\pm$ 0.40	-0.10	0.917
Environment/infrastructure	2.84 $\pm$ 0.52	2.95 $\pm$ 0.30	-2.43	0.015
Supportive/dietary services	2.73 $\pm$ 0.52	2.58 $\pm$ 0.45	3.10	0.002
Support to attendants	2.73 $\pm$ 0.54	2.43 $\pm$ 0.46	5.97	<0.001
Financial/grievance/patient support	2.80 $\pm$ 0.48	3.13 $\pm$ 0.53	-6.48	<0.001

3.8 Association between overall satisfaction and participants characteristics

Overall satisfaction was analysed as a binary outcome, with satisfied and very satisfied responses classified as satisfied and neutral, dissatisfied, and very dissatisfied responses classified as not satisfied. Unit type and residence were significantly associated with overall satisfaction ($P = 0.033$ and $P < 0.001$, respectively). No statistically significant associations were observed for age group, gender, education, socioeconomic status, or respondent type (Table 10).

Table 10: Association of overall satisfaction with selected socio-demographic variables

Variable	Categories compared	Chi-square	df	p-value	Interpretation
Type of unit	ICU, SDU	4.54	1	0.033	Significant
Gender	Female, Male	2.75	1	0.097	Not significant
Residence	Rural, Urban	55.85	1	<0.001	Significant
Age group	18-30, 31-45, 46-60, >60	1.47	3	0.688	Not significant
Education	Graduate, Higher secondary, Illiterate, Primary, Secondary	7.84	4	0.098	Not significant
Socioeconomic status	Lower Class, Lower Middle Class, Upper Class, Upper Lower Class, Upper Middle Class	1.23	4	0.873	Not significant
Respondent	Patient, Primary attendant	1.58	1	0.209	Not significant

3.9 Comparison of composite mean satisfaction scores

Comparison of composite mean satisfaction scores showed that residence and education were significantly associated with satisfaction (Table 11).

Rural participants had a significantly higher mean satisfaction score than urban participants (2.96 vs. 2.57; $P < 0.001$). Composite mean satisfaction scores also differed significantly across education categories ($P = 0.004$). No statistically significant differences were observed according to unit type, gender, respondent type, age group, socioeconomic status, or marital status.

Table 11: Comparison of composite mean satisfaction scores across selected variables

Variable	Statistical test	Mean scores by category	Test statistic	p-value
Type of unit	Independent t-test	ICU: 2.82; SDU: 2.84	$t=-0.33$	0.741
Gender	Independent t-test	Female: 2.86; Male: 2.80	$t=1.49$	0.138
Residence	Independent t-test	Rural: 2.96; Urban: 2.57	$t=10.74$	<0.001
Respondent	Independent t-test	Patient: 2.82; Primary attendant: 2.84	$t=-0.49$	0.624
Age group	One-way ANOVA	18-30: 2.82; 31-45: 2.81; 46-60: 2.88; >60: 2.80	$F=0.78$	0.504
Education	One-way ANOVA	Graduate: 2.75; Higher secondary: 2.85; Illiterate: 3.07; Primary: 2.91; Secondary: 2.79	$F=3.87$	0.004
Socioeconomic status	One-way ANOVA	Lower Class: 2.94; Lower Middle Class: 2.78; Upper Class: 2.81; Upper Lower Class: 2.83; Upper Middle Class: 2.81	$F=1.90$	0.110
Marital status	One-way ANOVA	Married: 2.84; Unmarried: 2.78; Widowed/Separated: 2.82	$F=0.62$	0.538

3.10 Factors associated with satisfaction

Bivariate analyses showed that unit type ($P = 0.033$) and residence ($P < 0.001$) were significantly associated with overall satisfaction, whereas age group, gender, education, socioeconomic status, and respondent type were not. Analysis of composite mean satisfaction scores demonstrated significantly higher scores among rural participants than urban participants (2.96 vs. 2.57; $P < 0.001$), with significant differences also observed across education categories ($P = 0.004$). Age ($r = 0.003$, $P = 0.948$) and length of hospital stay ($r = -0.022$, $P = 0.655$) were not significantly correlated with the composite mean satisfaction score. In the multivariable logistic regression model, rural residence remained the only independent predictor of overall satisfaction (AOR 6.88, 95% CI 4.01–11.81; $P < 0.001$). Unit type, gender, respondent type, age, and length of hospital stay were not independently associated with overall satisfaction (Figure 3).

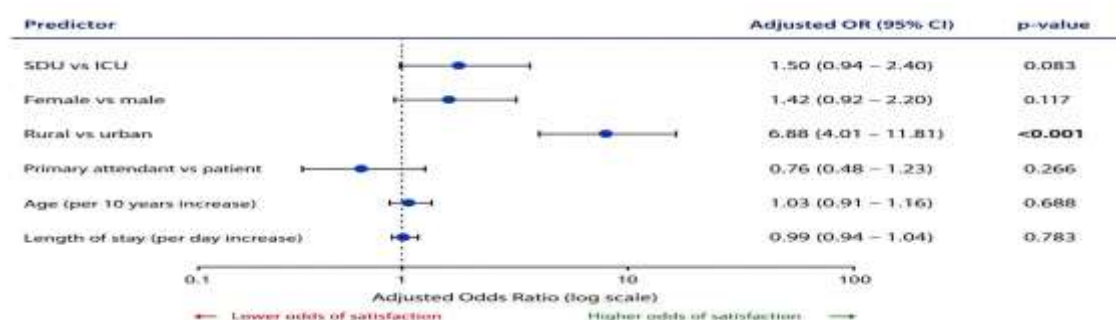


Figure 3 : Forest plot of adjusted odds ratios for global satisfaction (Logistic regression visualisation)

Table 12: Multivariable logistic regression for global satisfaction

Predictor	Adjusted OR	95% CI	p
SDU vs ICU	1.50	0.94-2.40	0.093
Female vs male	1.42	0.92-2.20	0.117
Rural vs urban	6.88	4.01-11.81	<0.001
Primary attendant vs patient	0.76	0.48-1.23	0.266
Age, per 10 years	1.03	0.91-1.16	0.688
Length of stay, days	0.99	0.94-1.04	0.783

3.11 Item-level strengths and gaps

The highest-rated satisfaction items were information on government schemes or financial assistance (mean score, 3.45), nursing care for pain and discomfort (3.33), treatment and care provided by doctors (3.27), and cleanliness of the ICU/SDU (3.25). The lowest-rated items were waiting-area facilities and seating (2.10), privacy and dignity during treatment (2.44), timeliness of laboratory and diagnostic services (2.45), availability of medicines (2.47), behaviour of the nursing staff (2.51), and empathy shown by doctors (2.53) (Table 13).

Table 13: Selected highest- and lowest-rated satisfaction items

Category	Item	Mean	SD
Higher-rated	Information on government schemes/financial assistance	3.45	0.69
Higher-rated	Nursing care for pain and discomfort	3.33	0.64
Higher-rated	Treatment and care by doctors	3.27	0.63
Higher-rated	Cleanliness and hygiene of ICU/SDU	3.25	0.75
Lower-rated	Behaviour and empathy shown by doctors	2.53	0.71
Lower-rated	Behaviour of nursing staff	2.51	0.64
Lower-rated	Availability of medicines	2.47	0.65
Lower-rated	Timeliness of laboratory/diagnostic services	2.45	0.59
Lower-rated	Privacy and dignity during treatment	2.44	0.63
Lower-rated	Waiting-area facilities and seating	2.10	0.80

4. DISCUSSION

This study evaluated patient satisfaction among patients admitted to the Intensive Care Unit (ICU) and Step-Down Care Unit (SDU) of a tertiary-care teaching hospital in eastern India. Overall satisfaction was moderate, although substantial variation was observed across different domains of care. Fewer than half of the respondents reported being satisfied on the global satisfaction item, while a large proportion expressed neutral satisfaction, suggesting opportunities for further improvement in patient-centred care. These findings highlight the need for targeted quality-improvement strategies that address both the technical and patient-centred dimensions of critical-care services.

The moderate overall satisfaction observed in the present study is broadly consistent with reports from tertiary-care hospitals in India and other low- and middle-income countries, although direct comparison should be interpreted cautiously because of differences in study settings, patient populations, survey instruments, and definitions of satisfaction. Previous studies have consistently identified effective communication, professional behaviour, responsiveness of healthcare providers, and timely service delivery as major determinants of patient satisfaction, findings that support the results of the present study. [11–16]

Communication, doctors' care, and nursing care received relatively favourable domain scores, supporting the wider literature that interpersonal confidence and responsiveness are central determinants of the hospital experience.[11–16] Indian ICU evidence has likewise emphasised the importance of information sharing, reassurance, accessibility, and respectful involvement of family members in patient care.[25] However, favourable domain averages coexisted with comparatively lower ratings for empathy-related items, indicating that technical quality of care and interpersonal aspects of care should be evaluated separately. Collectively, these findings emphasise that patient-centred communication and empathy should complement technical excellence to optimise patient and family experiences in critical-care settings.

Support to attendants was the lowest-rated domain, and waiting-area facilities were among the poorest-rated individual items. This pattern is consistent with recent ICU studies in which families rated family-focused care, the physical environment, and involvement in decision-making less favourably than professional and clinical care.[26,27] In a public referral hospital, prolonged waiting periods, overcrowding, uncertainty regarding patient prognosis, and limited amenities can substantially increase stress among family members. Improvements in seating arrangements, sanitation, drinking water facilities, signage, counselling areas, and structured family updates are therefore important components of safer, more humane, and patient-centred critical-care services. Improving these supportive services may also reduce caregiver stress and strengthen family-centred care. These improvements may also enhance trust in healthcare providers and contribute to a more positive overall hospital experience.

Differences between ICU and SDU were observed primarily at the domain level rather than in overall satisfaction. Better SDU scores for admission support and hospital environment may reflect lower procedural intensity, fewer visitation restrictions, or the relatively stable clinical condition of patients. Conversely, higher ICU scores for attendant support and supportive or dietary services may reflect more structured counselling practices and increased attention provided during periods of critical illness. Because overall composite satisfaction remained similar across both units, quality-improvement initiatives should focus on the specific operational processes requiring improvement within each unit rather than assuming

one unit consistently performs better than the other. Therefore, unit-specific quality-improvement strategies may be more effective than uniform interventions across all critical-care settings.

Rural residence remained the only independent predictor of higher satisfaction after multivariable adjustment. Sociodemographic associations with patient satisfaction have been inconsistently reported across previous studies, and this finding should not be interpreted as evidence of inherently better healthcare services for rural populations.[15] Instead, it may reflect differences in prior expectations, referral pathways, perceived affordability, healthcare accessibility, social desirability bias, or unmeasured differences in disease severity. Recent Indian research has also suggested that variations in response patterns may influence reported satisfaction among historically disadvantaged populations.[28] Future multicentre studies combining quantitative surveys with qualitative interviews are warranted to better understand this association across different healthcare settings. Further investigation is needed to determine whether these differences reflect true variations in healthcare experiences or differences in expectations and reporting behaviour.

The absence of a significant association between length of hospital stay and satisfaction suggests that prolonged admission alone did not substantially influence patient perceptions of care in the present study. Education influenced composite satisfaction scores in unadjusted analyses but not after dichotomisation of the outcome, illustrating how statistical conclusions may vary depending on outcome definition and the potential loss of information associated with categorising continuous variables. Future studies should preferentially retain continuous outcome measures, employ validated critical-care patient and family experience instruments, and consider longitudinal designs to evaluate changes in satisfaction throughout hospitalisation and following discharge. Incorporating patient-reported experience measures together with qualitative interviews may provide a more comprehensive understanding of satisfaction across the continuum of critical care.

The present study contributes to the limited body of evidence comparing patient satisfaction across ICU and Step-Down Care Unit services in eastern India. By simultaneously evaluating overall satisfaction, domain-specific experiences, and independent predictors of satisfaction, the study provides practical evidence that may assist hospital administrators in prioritising quality-improvement initiatives and optimising patient-centred critical-care services in resource-constrained public hospitals.

From a hospital administration perspective, the present findings support a focused package of quality-improvement interventions, including scheduled and documented family counselling, communication and empathy training for healthcare professionals, transparent information regarding investigations, medicines, and financial support, regular monitoring of medicine availability and diagnostic turnaround times, strengthened privacy safeguards, and minimum standards for attendant waiting facilities. Patient satisfaction data should be interpreted alongside complaints, incident reports, clinical outcomes, and periodic quality audits to obtain a comprehensive assessment of healthcare quality. Integrating domain-specific patient satisfaction indicators into routine hospital quality dashboards and Plan-Do-Study-Act (PDSA) quality-improvement cycles may facilitate continuous monitoring, evidence-based decision making, targeted corrective actions, and sustainable improvements in patient-centred critical-care services.

5. STRENGTHS AND LIMITATIONS

The present study has several strengths. Equal representation of participants from the ICU and SDU, enabled meaningful comparison between the two critical-care settings. A structured multidomain bilingual questionnaire was used to comprehensively assess patient satisfaction across multiple service domains. The inclusion of both eligible patients and primary attendants provided a broader evaluation of patient and family experiences in critical care. The relatively large sample size enhanced the precision of the findings and permitted both unit-level comparisons and multivariable analyses. Furthermore, item-level analysis identified specific operational priorities that may assist hospital administrators in planning targeted quality-improvement interventions rather than relying solely on an overall satisfaction score.

Several limitations should also be acknowledged. The single-centre cross-sectional design precludes causal inference and may limit the generalisability of the findings to other healthcare settings, particularly private hospitals and institutions with different organisational structures. Although consecutive sampling minimised selection bias by recruiting all eligible participants during the study period, some residual selection bias cannot be excluded. Patient and proxy responses represent related but not identical perspectives, and the analyses did not adjust for important clinical factors such as diagnosis, severity of illness, treatment outcomes, or previous ICU admission. Satisfaction is inherently influenced by patient expectations and may also be affected by courtesy and social-desirability bias. Although the locally adapted questionnaire demonstrated excellent internal consistency, further evaluation of its construct and criterion validity in diverse healthcare settings is warranted. Finally, dichotomisation of the global satisfaction outcome may have reduced statistical information; future studies should retain continuous outcome measures, use validated patient- and family-experience instruments, and incorporate longitudinal, qualitative or mixed-methods design to provide a more comprehensive understanding of patient satisfaction.

6. CONCLUSION

Patient and attendant satisfaction across ICU and Step-Down Care Unit (SDU) services was moderate, with similar overall composite satisfaction scores but meaningful differences across individual service domains. Communication and information, doctors' care, and nursing care were perceived relatively favourably, whereas attendant support, waiting-area facilities, medicine availability, privacy, and diagnostic timeliness emerged as priority areas requiring improvement. These findings highlight the importance of routine domain-specific patient satisfaction assessment, structured family communication, and targeted administrative interventions to strengthen patient-centred quality improvement in critical-care settings. Regular monitoring of patient satisfaction should be integrated into hospital quality-improvement programmes to support evidence-based management and continuous improvement of critical-care services.

7. Practical Recommendations

7.1 Hospital administrators and quality teams

- Establish scheduled family counselling sessions and provide documented daily clinical updates in ICU and SDU.
- Include domain-specific patient satisfaction indicators in the hospital quality dashboard and review them regularly.
- Improve waiting-area facilities by providing adequate seating, clean toilets, safe drinking water, clear signage, and accessible help-desk support for attendants.
- Regularly monitor medicine availability and turnaround times for laboratory and diagnostic services.
- Use patient complaints and feedback to implement timely corrective and preventive actions as a part of routine quality-improvement activities.

7.2 Clinical and nursing teams

- Strengthen communication, empathy, privacy and dignity through regular simulation- and feedback-based training.
- Provide clear explanations regarding treatment, investigations, unit policies and expected transitions between ICU, SDU and general ward.
- Document pain assessment, management of patient discomfort and concerns expressed by patients and their families.

7.3 Policy makers and researchers

- Promote standardised assessment of patient and family experiences across public critical-care services.
- Conduct multicentre studies across Jharkhand and eastern India using validated ICU family-experience instruments together with mixed- methods approaches.
- Evaluate whether targeted interventions improve patient satisfaction and operational performance over time.

8. Declarations

8.1 Ethics approval and consent to participate

Ethical approval was obtained from the Institutional Ethics Committee of Rajendra Institute of Medical Sciences (RIMS), Ranchi (Letter No. 54 dated 21 February 2026). Written informed consent was obtained from all participants or their eligible primary attendants before enrolment. Appropriate measures were taken to protect participants' privacy and maintain the confidentiality of the collected data.

8.2 Consent for publication

Not applicable. This manuscript does not contain any identifiable personal information.

8.3 Data availability

The de-identified datasets generated and analysed during the current study are not publicly available because of institutional and ethical restrictions. However, they are available from the corresponding author upon reasonable request, subject to approval by the institution and the Institutional Ethics Committee.

8.4 Funding

The authors received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

8.5 Competing interests

The authors declare no competing interests.

8.6 Author contributions

Conceptualisation: PS, SK, ST; Methodology: PS, SK, ST; Investigation: PS; Data curation: PS; Formal analysis: PS; Supervision: SK, ST; Writing – original draft: PS; Writing – review and editing: All authors.

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REFERENCES

1. World Health Organization. Quality health services: a planning guide. Geneva: World Health Organization; 2020.
2. Institute of Medicine. Crossing the quality chasm: a new health system for the 21st century. Washington (DC): National Academies Press; 2001.
3. Donabedian A. Evaluating the quality of medical care. *Milbank Q.* 2005;83(4):691-729.
4. Donabedian A. The quality of care. How can it be assessed? *JAMA.* 1988;260(12):1743-8.
5. Doyle C, Lennox L, Bell D. A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. *BMJ Open.* 2013;3:e001570.
6. Davidson JE, Aslakson RA, Long AC, Puntillo KA, Kross EK, Hart J, et al. Guidelines for family-centered care in the neonatal, pediatric, and adult ICU. *Crit Care Med.* 2017;45(1):103-28.
7. Stricker KH, Kimberger O, Schmidlin K, Zwahlen M, Mohr U, Rothen HU. Family satisfaction in the intensive care unit: what makes the difference? *Intensive Care Med.* 2009;35(12):2051-9.

8. Schwarzkopf D, Behrend S, Skupin H, Westermann I, Riedemann NC, Pfeifer R, et al. Family satisfaction in the intensive care unit: a quantitative and qualitative analysis. *Intensive Care Med.* 2013;39(6):1071-9.
9. Kodali S, Stametz RA, Bengier AC, Clarke DN, Layon AJ, Darer JD. Family experience with intensive care unit care: association of self-reported family conferences and family satisfaction. *J Crit Care.* 2014;29(4):641-4.
10. Harrison DA, Ferrando-Vivas P, Wright SE, McColl E, Heyland DK, Rowan KM. Psychometric assessment of the Family Satisfaction in the Intensive Care Unit questionnaire in the United Kingdom. *J Crit Care.* 2017;38:346-50.
11. Verma M, Rana K, Kankaria A, Aggarwal R. Assessment of patients' satisfaction visiting a tertiary health care institute in north India. *J Pharm Bioallied Sci.* 2020;12(3):252-61.
12. Kaur M, Bashir A, Singh T, Kumar R. Cross-sectional study of clients' satisfaction with outpatient and inpatient services of public health facilities. *J Family Med Prim Care.* 2020;9(7):3560-6.
13. Begum F, Islam JY, Ali M, Hossain MA, Shahabuddin ASM, Rahman A. Patient satisfaction level and its determinants after admission in public and private tertiary care hospitals in Bangladesh. *Front Health Serv.* 2021;1:679481.
14. Gaur BPS, Rao MV, Ramesh A, Prasad R. Patient satisfaction about services obtained from a teaching hospital. *J Family Med Prim Care.* 2020;9(1):93-8.
15. Batbaatar E, Dorjdagva J, Luvsannyam A, Savino MM, Amenta P. Determinants of patient satisfaction: a systematic review. *Perspect Public Health.* 2017;137(2):89-101.
16. Merkouris A, Ifantopoulos J, Lanara V, Lemonidou C. Patient satisfaction: a key concept for evaluating and improving nursing services. *J Nurs Manag.* 1999;7(1):19-28.
17. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening of Reporting of Observational Studies in Epidemiology statement: guidelines for reporting observational studies. *Lancet.* 2007;370(9596):1453-7.
18. Anhang Price R, Elliott MN, Zaslavsky AM, Hays RD, Lehrman WG, Rybowski L, et al. Examining the role of patient experience surveys in measuring health care quality. *Med Care Res Rev.* 2014;71(5):522-54.
19. Lam SM, So HM, Fok SK, Li SC, Ng CP, Lui WK, et al. Intensive care unit family satisfaction survey. *Hong Kong Med J.* 2015;21(5):435-43.
20. Garg SK. Patients' family satisfaction in intensive care unit: a leap forward. *Indian J Crit Care Med.* 2022;26(2):161-3.
21. Camões J, Tintim Lobato C, Carvalho D, Gomes E, Araújo R. Family satisfaction in intensive care during the COVID-19 pandemic using the FS-ICU24 questionnaire. *Acta Med Port.* 2022;35(12):859-65.
22. Arofiati F, Nurhayati N, Suharyanto S. The family satisfaction on nursing services at the intensive care unit. *Open Access Maced J Med Sci.* 2021;9(T4):1-5.
23. Tajareeramuang P, Chittawatnanarat K, Dodek P, Heyland DK, Chanayat P, Inchai J, et al. Validity and reliability of a Thai version of Family Satisfaction with Care in the Intensive Care Unit Survey. *J Med Assoc Thai.* 2016;99 Suppl 1:S1-8.
24. Kumari R, Idris MZ, Bhushan V, Khanna A, Agarwal M, Singh SK. Study on patient satisfaction in government allopathic health facilities of Lucknow district, India. *Indian J Community Med.* 2009;34(1):35-42.
25. Atri V, Bhatt MT, Chaudhuri S, Mitra A, Maddani SS, Ravindranath S. Family's perceived needs and satisfaction with intensive care services: a questionnaire-based prospective observational study. *Indian J Crit Care Med.* 2024;28(5):483-94. doi:10.5005/jp-journals-10071-24621.
26. Liyew TM, Mersha AT, Admassie BM, Arefayne NR. Family satisfaction with care provided in intensive care unit: a multi-center, cross-sectional study. *Patient Relat Outcome Meas.* 2024;15:105-119.
27. Shbeer A, Alzahrani A, Alharthi M, et al. Assessment of satisfaction levels among families of patients admitted to intensive care units. *Cureus.* 2024;16(10):e71021.
28. Woskie L, Kalita A, Bose B, Chakraborty A, Gupta K, Yip W. Patient satisfaction and value- based purchasing in hospitals, Odisha, India. *Bull World Health Organ.* 2024;102(7):509-520. doi:10.2471/BLT.24.290519.

Supplementary File 1. STROBE reporting checklist (cross-sectional study)

STROBE Item	ItemNo.	Location in manuscript
Title and abstract	1	Title; Structured abstract
Background/rationale	2	Introduction, paragraphs 1-5
Objectives	3	Final paragraph of the Introduction.
Study Design	4	Methods , Section 2.1
Study Setting	5	Methods, Section 2.2
Study Duration	6	Methods, Section 2.3
Participants	7	Methods, Sections 2.4-2.5 (eligibility criteria, sample size, and sampling technique)
Variables	8	Methods, Section 2.9
Data sources/measurement	9	Methods, Sections 2.6-2.8
Bias	10	Methods, Section 2.12
Study size	11	Methods, Section 2.5
Quantitative variables	12	Methods, Section 2.9 and 2.10
Statistical methods	13	Methods, Section 2.10
Participants/results	14	Results, Section 3.1

Descriptive data	15	Results, Tables 1-3
Outcome data	16	Results ,Sections 3.5-3.7; Tables 5-9
Main results	17	Results, Sections 3.8-3.10; Tables 10-12
Other analyses	18	Results, Section 3.11; Table 13
Key results	19	Discussion, first paragraph .
Limitations	20	Section 5 (Strengths and Limitations)
Interpretation	21	Section 4 (Discussion)
Generalisability	22	Section 5 (Strengths and Limitations)
Funding	23	Declarations, Section 8.4

Abbreviation : STROBE = Strengthening the Reporting of Observational Studies in Epidemiology.