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Organizational Factors and Healthcare Service Quality: A Multilevel Analysis in an Indonesian Hospital

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ABSTRACT

Background: Healthcare service quality reflects hospital performance and may be influenced by individual and organizational factors. This study examined the associations of transformational leadership, organizational culture, and healthcare worker performance with service quality at Dr Soehadi Prijonegoro Regional General Hospital, Sragen, using multilevel analysis.
Subjects and Method: A cross-sectional analytical observational study was conducted among 500 patients across 25 inpatient wards at Dr Soehadi Prijonegoro Regional General Hospital, Sragen. Healthcare service quality was assessed at the individual level using the SERVQUAL instrument. Transformational leadership, organizational culture, and healthcare worker performance were assessed at the ward level using the Multifactor Leadership Questionnaire (MLQ), the Organizational Culture Assessment Instrument (OCAI), and a performance assessment instrument adapted from Mathis and Jackson, respectively. Data were analysed using multilevel mixed-effects linear regression.
Results: Transformational leadership (b = −0.15; 95% CI = −0.34 to 0.30; p = 0.101), organizational culture (b = 0.06; 95% CI = −0.05 to 0.17; p = 0.313), and healthcare worker performance (b = −0.15; 95% CI = −0.57 to 0.27; p = 0.492) were not significantly associated with healthcare service quality. The intraclass correlation coefficient (ICC) was 8.63%, indicating that only a small proportion of the variation in healthcare service quality was attributable to differences between wards, whereas 91.37% of the variation was explained by individual-level factors or other unmeasured variables. A significant likelihood ratio test (LR = 18.57; p < 0.001) supported the use of multilevel analysis.
Conclusion: Transformational leadership, organizational culture, and healthcare worker performance were not significantly associated with healthcare service quality. Most variation occurred at the individual level, highlighting the need to investigate individual-level determinants of service quality.

Keywords: service quality, work performance, organizational culture, transformational leadership, multilevel analysis

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BACKGROUND

Quality of healthcare is a fundamental component of health-system performance and reflects the extent to which services are responsive to patients' needs while delivering safe, effective, and patient-centred care. Within hospitals, service quality is shaped not only by infrastructure, clinical resources, and organizational processes, but also by the way healthcare professionals interact with patients and deliver care. Patients' experiences therefore provide an important perspective from which to evaluate healthcare quality, particularly in relation to responsiveness, reliability, assurance, empathy, and the tangible aspects of service delivery. These dimensions underpin the SERVQUAL framework, which has been widely applied to assess patients' perceptions of healthcare service quality (Rauf et al., 2025). Consequently, improving hospital service quality requires attention not only to individual healthcare workers, but also to the organizational environment within which care is delivered.

Leadership represents an important organizational mechanism through which the healthcare working environment and quality of care may be shaped. Transformational leadership theory proposes that leaders influence their followers through idealised influence, inspirational motivation, intellectual stimulation, and individualised consideration, thereby encouraging individuals to move beyond immediate self-interest towards shared organizational objectives. In healthcare settings, these characteristics are particularly relevant because effective care depends on multidisciplinary collaboration, professional motivation, communication, and the capacity of staff to respond to complex and changing clinical demands. A systematic review by Ystaas et al. (2023) found that transformational leadership was positively associated with several aspects of the nursing work environment, including structural empowerment, organizational commitment, job satisfaction, and the conditions required to support safe and effective patient care. Similarly, a systematic review by Alanazi et al., (2023) identified both direct and indirect associations between nurse managers' transformational leadership behaviours and the quality of patient care. More broadly, evidence synthesised across reviews indicates that relational leadership approaches, including transformational leadership, are associated with favourable staff, organizational, and patient outcomes (Hult et al., 2023).

However, leadership operates within a broader organizational context. Organizational culture encompasses the shared values, assumptions, norms, and practices that influence how members of an organisation behave, communicate, make decisions, and respond to organizational priorities. Within healthcare organisations, culture may consequently determine whether quality improvement, collaboration, accountability, innovation, and patient-centred practices are embedded in routine care. Evidence from a systematic review of 62 studies demonstrated that positive organizational and workplace cultures were consistently associated with favourable patient outcomes, including greater patient satisfaction and lower rates of mortality, falls, and hospital-acquired infections (Braithwaite et al., 2017). These findings suggest that organizational culture is not merely a contextual characteristic of healthcare institutions but may represent an important organizational-level factor associated with how effectively healthcare professionals deliver care.

Healthcare worker performance provides a further conceptual link between organizational conditions and patients' experiences of care. Healthcare service quality ultimately depends on how organizational expectations are translated into professional behaviours and service delivery at the point of

care. Staff performance encompasses dimensions such as the quality and quantity of work, timeliness, adherence to professional responsibilities, cooperation, and the capacity to perform required tasks effectively. Leadership and organizational culture may create conditions that facilitate or constrain such performance. For example, transformational leaders may strengthen empowerment, motivation, and professional engagement, while supportive organizational cultures may facilitate communication, teamwork, and shared commitment to quality. Evidence suggests that transformational leadership can contribute to better patient safety outcomes through improvements in workplace empowerment and staff-related outcomes (Boamah et al., 2018). Accordingly, transformational leadership, organizational culture, and healthcare worker performance may be considered interrelated organizational characteristics with the potential to explain differences in patients' perceptions of healthcare service quality.

Importantly, these relationships should be understood within the hierarchical structure of hospital care. Patients are not treated within identical organizational environments; rather, they receive care within particular wards or clinical units, each of which may have different leadership practices, organizational cultures, staff characteristics, and patterns of service delivery. Patients treated within the same ward therefore share aspects of a common organizational environment, meaning that their experiences may be more similar to one another than to those of patients treated in other wards. Conventional regression approaches that assume independence between all observations may not adequately account for this clustering. Multilevel modelling provides a methodologically appropriate approach because it distinguishes variation attributable to individual-level observations from variation occurring between organizational units and enables ward-level characteristics to be examined in relation to individual patients' assessments of service quality.

Despite growing evidence linking leadership and organizational culture with staff and patient outcomes, several limitations remain. First, much of the existing literature has examined leadership, organizational culture, staff outcomes, or patient outcomes separately rather than evaluating multiple organizational characteristics simultaneously. Second, patient outcomes have received comparatively less attention than staff outcomes in the leadership literature (Hult et al., 2023). Third, much of the evidence concerning organizational culture and patient outcomes has originated from North American and European healthcare systems; Braithwaite et al. (2017), for example, reported that 84% of the studies included in their systematic review were conducted in these regions. Evidence regarding these organizational relationships in Indonesian public hospitals therefore remains comparatively limited. Finally, studies using conventional individual-level analyses may overlook the hierarchical nature of hospital data and the possibility that variation in patients' experiences of healthcare quality is partly attributable to differences between wards. Together, these limitations provide a rationale for examining healthcare service quality through a multilevel organizational perspective.

This issue is particularly relevant at Dr Soehadi Prijonegoro Regional General Hospital, Sragen, a regional public referral hospital in Central Java, Indonesia. Hospital administrative data indicate continuing patient complaints concerning staff behavior, service information, infrastructure, doctors' schedules, and waiting processes. Between January and September 2025, 77 complaints were recorded through the hospital's formal reporting mechanisms (dr. Soehadi Prijonegoro Sragen Regional Hospital, 2024).

Furthermore, the proportion of complaints submitted electronically increased from approximately 76% in 2023 to 92.8% in 2024 (Dr. Soehadi Prijonegoro Sragen Regional Hospital, 2024). Although complaint frequency alone cannot establish deficiencies in healthcare quality, the nature of these complaints indicates potentially important concerns regarding staff–patient interactions, communication, responsiveness, and consistency of service delivery. These issues warrant examination of organizational characteristics at ward level rather than focusing solely on individual healthcare workers or technical aspects of service provision.

Drawing on transformational leadership theory, organizational culture theory, and the conceptualisation of healthcare service quality captured by SERVQUAL, this study therefore addresses the following research question: to what extent are ward-level transformational leadership, organizational culture, and healthcare worker performance associated with individual patients' perceptions of healthcare service quality, and how much of the variation in service quality occurs between inpatient wards? By conceptualising patients as nested within wards, the study recognises healthcare quality as an outcome that may reflect both individual patient experiences and the organizational environments in which care is delivered. The study aimed to examine the associations between transformational leadership, organizational culture, and healthcare worker performance at ward level and patient-reported healthcare service quality at individual level using a multilevel analytical approach at Dr Soehadi Prijonegoro Regional General Hospital, Sragen, Indonesia.

SUBJECTS AND METHOD

1. Study Design

This analytical observational study employed a cross-sectional design to examine the associations between ward-level organizational characteristics and patient-reported healthcare service quality. The study used a two-level hierarchical structure, in which patients constituted level 1 and the hospital wards or service units in which they received care constituted level 2. Transformational leadership, organizational culture, and healthcare worker performance were assessed among healthcare workers and aggregated at ward level, whereas healthcare service quality was assessed at the individual patient level. This structure enabled organizational characteristics shared by patients within the same ward to be examined while accounting for the clustering of patients within wards. The study was conducted at Dr Soehadi Prijonegoro Regional General Hospital, Sragen, Central Java, Indonesia, between January and February 2026. The hospital is a regional public hospital comprising multiple clinical and supporting service units. Twenty-five units were represented in the study.

2. Population and Sample

The study involved two interconnected populations corresponding to the multilevel structure. At level 1, the target population comprised patients receiving healthcare services at Dr Soehadi Prijonegoro Regional General Hospital. The source population consisted of patients receiving services in the participating hospital units during the study period. Hospital administrative data indicated a source population of 30,502 patient encounters across the included units. At level 2, the target population comprised healthcare workers employed in the participating hospital service units, including physicians, nurses, and other clinical healthcare professionals. The thesis reports a healthcare worker population of 466.

Sampling was undertaken by hospital service unit, with allocation intended to provide representation across the participating units according to their respective patient and healthcare worker populations.

Patients were linked to the unit in which they received care, thereby creating a hierarchical dataset in which individual patients were nested within hospital units. Healthcare workers completed the organizational-level questionnaires, and individual healthcare worker scores within each unit were subsequently aggregated to generate mean ward-level scores for transformational leadership, organizational culture, and healthcare worker performance.

For healthcare workers, eligibility criteria included being actively employed in the relevant unit during the study period, having worked in the unit for at least six months, and providing informed consent. Healthcare workers who were on leave, undertaking study leave, inactive during data collection, undergoing transfer or rotation that prevented clear allocation to a primary unit, or who declined participation were excluded. Patients were eligible if they had received care in one of the participating units during the study period and were able and willing to complete the study questionnaire. Patients who were critically ill or unable to communicate effectively, and those who had received care in the respective unit for less than 24 hours or whose service unit could not be clearly identified, were excluded.

The final patient-level analytical sample comprised 500 patients nested within 25 hospital units. The resulting hierarchical dataset therefore contained 500 level-1 observations and 25 level-2 clusters.

3. Research Variables

The dependent variable was healthcare service quality, measured at the individual patient level (level 1). The independent variables were transformational leadership, organizational culture, and healthcare worker performance. These variables were measured among healthcare workers and aggregated within each hospital unit to generate ward-level characteristics (level 2). Consequently, each patient was assigned the organizational-level scores corresponding to the ward or service unit in which they received care. The independent variables should not be described simply as individual healthcare worker variables because the regression model uses their aggregated ward-level values.

4. Operational Definition

Healthcare service quality was defined as patients' perceived quality of healthcare, including tangibles, reliability, responsiveness, assurance, and empathy. It was measured at level 1 using a 15-item SERVQUAL-based questionnaire with a four-point Likert scale (score range: 15–60), with higher scores indicating better perceived service quality. The continuous total score was used in the multilevel analysis.

Transformational leadership was defined as leadership behaviours that inspire and motivate staff through idealised influence, inspirational motivation, intellectual stimulation, and individualised consideration. It was measured using a 16-item questionnaire adapted from the Multifactor Leadership Questionnaire (MLQ) on a four-point Likert scale (score range: 16–64). Higher scores indicated stronger transformational leadership, and individual scores were aggregated into mean ward-level scores.

Organizational culture referred to shared perceptions of organizational values, norms, practices, and behavioural expectations. It was assessed using a modified 24-item Organizational Culture Assessment Instrument (OCAI), covering clan, adhocracy, market, and hierarchy cultures, with a four-point Likert scale (score range: 24–96). Higher scores indicated stronger organizational culture, and individual scores were aggregated into mean ward-level scores.

Healthcare worker performance was defined as healthcare workers' perceived achievement in performing professional

responsibilities, including quality, quantity, timeliness, teamwork, initiative, and responsibility. It was measured using 15 items based on Mathis and Jackson's performance framework with a four-point Likert scale (score range: 15–60). Negative items were reverse-scored, and higher scores indicated better performance. Individual scores were aggregated into mean ward-level scores.

5. Study Instruments

Data were collected using structured self-administered questionnaires. Transformational leadership was measured using a 16-item questionnaire adapted from the Multifactor Leadership Questionnaire (MLQ) (Bass et al., 1994), organizational culture using a modified 24-item Organizational Culture Assessment Instrument (OCAI), healthcare worker performance using a 15-item questionnaire based on Mathis and Jackson (2011), and healthcare service quality using a 15-item SERVQUAL-based questionnaire. All instruments used four-point Likert scales.

The instruments were pretested among 30 healthcare workers and 30 patients. Face and content validity were assessed during instrument development, while construct validity was evaluated using item-rest correlations, with all retained items exceeding 0.30. Internal consistency was excellent, with Cronbach's α values of 0.976 for transformational leadership, 0.974 for organizational culture, 0.960 for healthcare worker performance, and 0.966 for healthcare service quality. Healthcare worker responses were aggregated into mean ward-level scores for the level-2 variables, while patient-reported healthcare service quality remained an individual level-1 outcome.

6. Data Analysis

Data were analysed using Stata version 13. Descriptive statistics included means, standard deviations (SD), minimum and maximum values for continuous variables, and frequencies and percentages for categorical variables. Given the hierarchical structure of patients nested within hospital units, multilevel mixed-effects linear regression with a random intercept for hospital unit was used. A null model was initially fitted to estimate between-ward variation and calculate the ICC. A likelihood ratio (LR) test was used to compare the multilevel model with conventional linear regression.

The full model included ward-level transformational leadership, organizational culture, and healthcare worker performance as fixed-effect predictors of individual-level healthcare service quality. Associations were reported as regression coefficients (β) with 95% confidence intervals (CIs), with statistical significance set at $p<0.05$.

7. Research Ethics

This study received ethical approval from the Health Research Ethics Committee of Dr. Soehadi Prijonegoro Sragen Regional Hospital, with ethical clearance number 296/-Etik-Crssp/II/2026. All participants provided informed consent prior to participation, and confidentiality of participant information was maintained throughout the study.

RESULTS

1. Sample Characteristics

A total of 500 patients from 25 hospital service units were included in the analysis. Of these, 262 (52.4%) were female and 238 (47.6%) were male. More than half of the participants were aged >35 years (n=256, 51.2%), while 166 (33.2%) were aged 20–35 years and 78 (15.6%) were aged <20 years.

Most participants were receiving inpatient care (n=328, 65.6%), while 172 (34.4%) were receiving outpatient services. Regarding previous hospital utilisation, 269 participants (53.8%) reported that this was their first visit, 139 (27.8%) had attended the hospital two to five times, and 92 (18.4%) had

attended more than five times. Most participants used Self-Paying National Health Insurance as their healthcare financing scheme (n= 324, 64.8%), followed by self-funded care (n=98, 19.6%) and government-subsidized national health insurance (n=78, 15.6%). Participant characteristics are presented in Table 1.

Table 1. Characteristics of the Respondents

Characteristics	Frequency	Percentage (%)
Gender		
Male	238	47.6
Female	262	52.4
Age		
< 20 years	78	15.6
20-35 years	166	33.2
> 35 years	256	51.2
Type of care		
Outpatient	172	34.4
Inpatient	328	65.6
Number of hospital visit		
Once	269	53.8
2-5 times	139	27.8
>5 times	92	18.4
Healthcare financing		
Self-paying	98	19.6
Self-Paying National Health Insurance	324	64.8
Government-Subsidized National Health Insurance	78	15.6

2. Univariate Analysis

Descriptive statistics for the study variables are presented in Table 2. At the hospital service-unit level (n=25), the mean transformational leadership score was 46.21 (SD= 1.45), with scores ranging from 43 to 49. The mean organizational culture score was 81.13 (SD= 3.48; range 73–87), while the mean healthcare worker performance score was 42.47 (SD=0.89; range 40–43). At the individual patient level (n=500), the mean healthcare service quality score was 42.12 (SD=1.68), with scores ranging from 35 to 50. The relatively small standard deviations of the three organizational-level variables indicated limited variation between hospital service units, particularly for healthcare worker performance.

Table 2. Univariate analysis of the study variables

Variables	Level	n	Mean	SD	Min.	Max.
Transformational leadership	Service unit	25	46.21	1.45	43	49
Organizational culture	Service unit	25	81.13	3.48	73	87
Healthcare worker performance	Service unit	25	42.47	0.89	40	43
Healthcare service quality	Patient	500	42.12	1.68	35	50

3. Variation in Healthcare Service Quality

The null multilevel model was fitted before the organizational-level predictors were introduced to determine whether healthcare service quality varied across hospital service units. The estimated intercept for healthcare service quality was 42.118 (SE=0.128). The between-unit variance was 0.281, while the individual-level residual variance was 2.543.

The ICC was 9.97%, indicating that approximately 9.97% of the total variation in patient-reported healthcare service quality was attributable to differences between hospital service units, while the remaining 90.03% represented within-unit variation between individual patients. The likelihood ratio test comparing the null multilevel model with an ordinary linear regression model was statistically significant (χ^2=23.30, p<0.001), providing evidence of clustering at the hospital service-unit level and supporting the use of a multilevel modelling approach.

Table 3. Null multilevel model for healthcare service quality

Model Components	Estimate
Intercept (SE)	42.118 (0.128)
Between-unit variance (σ^2u)	0.281
Individual-level residual variance (σ^2e)	2.543
ICC (%)	9.97
LR test vs linear regression	χ^2 = 23.30; p<0.001

4. Multilevel analysis of factors associated with healthcare service quality

Table 4 presents the multilevel mixed-effects linear regression examining the associations between ward-level transformational leadership, organizational culture, healthcare worker performance, and individual patient-reported healthcare service quality.

Table 4. Direct and indirect of transformational leadership on healthcare worker performance through subjective well-being and work motivation

Independent Variables	β	95% CI	p
Fixed effects			
Transformational leadership	−0.15	−0.34 to 0.30	0.101
Organizational culture	0.06	−0.05 to 0.17	0.313
Healthcare worker performance	−0.15	−0.57 to 0.27	0.492
Random effects/model statistics			
Between-unit variance	0.24		
Residual variance	2.54		
ICC	8.63%		
Log likelihood	−956.02097		
LR test	18.57		<0.001
Number of observations	500		
Number of hospital service units	25		

Transformational leadership was not significantly associated with healthcare service quality (β=−0.15; 95% CI −0.34 to 0.30; p=0.101). Similarly, organizational culture was not significantly associated with healthcare service quality (β=0.06; 95% CI −0.05 to 0.17; p=0.313). Healthcare worker performance was also not significantly associated with healthcare service quality (β=−0.15; 95% CI −0.57 to 0.27; p=0.492). All three confidence intervals included zero, indicating insufficient evidence of an independent association between these ward-level organizational characteristics and patient-reported healthcare service quality in the adjusted model.

After inclusion of the organizational-level predictors, the between-unit variance decreased to 0.24, while the residual variance remained 2.54. The resulting ICC was

8.63%, indicating that 8.63% of the residual variation in healthcare service quality was attributable to differences between hospital service units after accounting for transformational leadership, organizational culture, and healthcare worker performance. The likelihood ratio test remained statistically significant (LR=18.57, p<0.001), indicating that the multilevel model provided a better fit than an ordinary linear regression model.

DISCUSSION

The findings suggest that organizational characteristics at the hospital service-unit level may not directly determine patients' perceptions of healthcare service quality. Instead, their influence may depend on how leadership, organizational values, and staff capabilities are translated into day-to-day care processes and interactions with patients. This interpretation highlights the complexity of healthcare service quality as an outcome shaped by multiple organizational, interpersonal, and patient-level mechanisms.

Transformational leadership may influence healthcare service quality primarily through intermediate organizational and staff-related mechanisms rather than through a direct pathway. Alanazi et al. (2023) reported heterogeneous relationships between transformational leadership and quality of patient care, ranging from insignificant and weak to indirect and strong associations, with organizational culture, structural empowerment, and job satisfaction potentially influencing these relationships. Similarly, Ystaas et al. (2023) suggested that transformational leadership may affect patient outcomes through improvements in the nursing work environment, structural empowerment, organizational commitment, and job satisfaction. Gebreheat et al. (2023) also demonstrated a positive relationship between transformational leadership and nurses' job satisfaction, while Labrague (2024) identified work satisfaction as a partial mediator between transformational leadership and nurse-assessed quality of care.

These findings provide a plausible explanation for the absence of a direct relationship in the present study. Leadership practices may initially influence staff motivation, satisfaction, empowerment, teamwork, and working conditions before becoming observable in patients' experiences. Therefore, strengthening transformational leadership alone may be insufficient to improve patient-perceived quality unless leadership behaviours are translated into improvements in operational processes and patient-facing care.

A similar interpretation applies to organizational culture. Organizational values and norms may influence healthcare quality indirectly through the behaviours and working processes they promote. Almutairi et al. (2022) reported that organizational culture can influence the efficiency and effectiveness of healthcare professionals, with subsequent implications for staff performance and patient care. Carvalho et al. (2023) identified communication, leadership, job satisfaction, psychological empowerment, trust, and learning from mistakes as important components related to patient safety culture. Likewise, Pacenko et al. (2024) emphasised communication, teamwork, and active leadership as important strategies for strengthening safety culture.

Addo et al. (2026) further reported generally positive relationships between organizational climate, patient experience, and patient outcomes, while highlighting the need to clarify the mechanisms underlying these relationships. Thus, organizational culture may contribute to service quality when shared values are translated into concrete practices such as effective communication, teamwork, safety behaviours, responsiveness, and coordinated care. In the present setting,

service units operated under the same hospital governance, policies, and organizational objectives. This shared institutional environment may have produced relatively homogeneous organizational conditions across units, making their influence on differences in patient experience less apparent.

Healthcare worker performance should also be interpreted within the broader context in which care is delivered. Individual or team performance may not automatically result in better patient-perceived service quality when healthcare workers operate under constraints related to staffing, workload, resources, workflow, or coordination. Winter et al. (2021) found that staffing levels and skill mix were associated with patient-perceived quality of nursing care, while Nantsupawat et al. (2022) demonstrated that inadequate staffing and resources were associated with missed nursing care and poorer care outcomes.

Vleminckx et al. (2024) similarly identified workload, team composition, professional relationships, leadership, safety, logistics, autonomy, and task clarity as factors influencing team performance and patient outcomes. These findings indicate that staff performance should not be considered independently from the organizational environment in which healthcare workers perform their duties. Moreover, performance assessments and patient-reported service quality capture different aspects of healthcare delivery. Staff may meet institutional performance expectations while patients evaluate care based on communication, responsiveness, waiting experiences, information received, and interpersonal encounters.

The persistence of differences in patient-reported service quality across hospital units further indicates that other unit-level characteristics may be important. Guan et al. (2024) showed that patient experience is influenced by multiple individuals, interpersonal, organizational, and environmental factors. Song and Do (2024) identify staffing levels as an important structural determinant of patient experience, while Rosenbaum et al. (2024) demonstrated that changes in the nursing work environment were associated with changes in patient care experiences. Vikan et al. (2023) also reported associations between patient safety culture and adverse events, although substantial methodological and contextual heterogeneity was identified across studies.

These studies support the interpretation that patient-perceived healthcare quality emerges from interconnected structural and care-process factors rather than from isolated organizational characteristics. In the context of the present hospital, patient complaints related to staff behaviour, service information, infrastructure, doctors' schedules, and waiting processes may reflect aspects of service delivery that are not fully captured by transformational leadership, organizational culture, or healthcare worker performance. Staffing adequacy, workload, resource availability, patient safety practices, communication, workflow, and service organisation may therefore provide additional explanations for differences in patient experiences across units.

Variation in patient experiences within the same service unit should also be considered. Patients receiving care in the same organizational environment may evaluate service differently according to their expectations, previous healthcare experiences, clinical needs, type of service received, waiting time, and individual interactions with healthcare professionals. Consequently, unit-level organizational characteristics alone are unlikely to provide a complete explanation of patient-reported healthcare service quality. Future models should integrate patient-level characteristics with organizational and care-

process variables to better capture this multi-dimensional outcome.

Overall, the findings extend previous evidence by suggesting that organizational factors previously associated with workforce and patient outcomes may not necessarily translate into direct cross-level relationships with patient-reported service quality within a single hospital. Previous studies have showed the importance of transformational leadership and organizational culture for staff and patient outcomes (Boamah et al., 2018; Braithwaite et al., 2017; Ystaas et al., 2023). The present study suggests that these relationships may operate through more proximal mechanisms, such as staff satisfaction, empowerment, communication, teamwork, staffing adequacy, patient safety practices, and other care-delivery processes.

From a practical perspective, hospital quality-improvement strategies should therefore integrate leadership development and organizational culture strengthening with improvements in staffing and resource adequacy, communication, patient safety culture, responsiveness, waiting-time management, and patient-centred service delivery. Quality improvement may be more effective when organizational interventions are translated into measurable changes in frontline care processes rather than implemented as isolated managerial initiatives.

The findings should be interpreted considering several limitations. The cross-sectional design does not permit conclusions regarding temporality or causality. The study was conducted in a single hospital with a limited number of service units, which may restrict generalisability and the ability to detect unit-level relationships. Limited variation in organizational characteristics across units may also have reduced the ability to identify modest associations. Furthermore, organizational characteristics were reported by healthcare workers and aggregated at the service-unit level, whereas healthcare service quality was independently assessed by patients. Although this approach reduces common-source bias, the measures represent different perspectives on healthcare delivery. Potentially relevant factors, including staffing levels, workload, patient safety culture, communication, resource adequacy, waiting times, and individual patient characteristics, were also not included in the model. Future multicentre longitudinal studies involving a larger number of organizational units should incorporate these factors and examine potential mediating pathways linking leadership, organizational culture, healthcare worker performance, and patient-reported healthcare service quality.

AUTHOR CONTRIBUTION

ES and RGHN contributed to the conceptualization and development of the study. SSR, EPP, and EBC contributed to the study design, interpretation of findings, and critical revision of the manuscript. All authors contributed to the development and refinement of the manuscript, reviewed the final version, and approved the final manuscript for publication. All authors agreed to be accountable for all aspects of the work and to ensure the accuracy and integrity of the study.

CONFLICT OF INTEREST

The author declare that there is no conflict of interest.

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