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Determinants of Perceived Service Quality using 5Q Model and its impact on Patient Satisfaction and Patient Loyalty

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Abstract: Nepal's healthcare market has become competitive. Hospitals have known the importance of patient satisfaction and service quality and how it impacts patient retention and loyalty. However, it is still under researched. This study explores the impact of perceived service quality on patient satisfaction and its subsequent effect on patient loyalty within private healthcare organizations in Nepal. The study uses the 5Q model to examine the five core dimensions of service quality related to Quality of Object, Process, Infrastructure, Atmosphere and Interaction. Data were collected from 387 Outpatient Department patients of KIST teaching hospital aged between 22 and 65 years. Structural equation modelling was conducted using SmartPLS 4, with bootstrapping 5,000 resamples applied to assess the significance of path coefficients. The results indicate that Quality of Atmosphere, Object and Process significantly influence patient satisfaction while Quality of Interaction and Infrastructure do not show a statistically significant impact. Patient satisfaction is seen to positively affect patient loyalty, confirming its mediating role. Perceived service quality has a strong direct effect on patient satisfaction but its direct influence on patient loyalty was not supported statistically. These results provide useful information for Nepali policymakers and healthcare professionals by highlighting the aspects of service quality that successfully influence patient loyalty and satisfaction. Improvements in object quality, processes and environmental atmosphere may increase patient-centered care and enhance loyalty in patients. Future studies could expand this framework to include more public and private hospitals in order to better understand how people perceive service quality in various healthcare settings.

Keywords: Healthcare Services in Nepal, Perceived Service Quality, 5Q Model, Patient Satisfaction, Patient Loyalty

1. Introduction

The healthcare sector has grown more competitive and patient expectations have increased drastically in Nepal. The Interim Constitution of Nepal was prepared in 2006 which made some important provisions, one of which was announced that health is a fundamental human right to the people of Nepal (Ranabhat & Acharya, 2020). This recognition of health as a fundamental human right was an important step towards healthcare access and improving services. However, the quality and access of health services in Nepal is still a challenge. In low and middle income nations, the private sector is thought to offer better care and more health service facilities than the public sector and some assert that private healthcare is more efficient, responsible, and sustainable, particularly (Sah *et al.*, 2020).

This sector consists of different forms of health facilities like formal hospitals, private medical colleges, nursing homes, private physicians, clinics, community operated medical centers, private pharmacies, faith healers and their number and shares have increased rapidly in the recent years (Karkee & Kadariya, 2013). In this competitive setting, the quality of service is determined by the nature of contact patients have with the healthcare system and this in turn shapes their behaviour intentions and their satisfaction level. Service quality is typically viewed as the difference between customers' expectations and their actual experience with the service provided to them (Parasuraman *et al.*, 1985). Numerous studies conducted on patient satisfaction have shown that positive word of mouth, patient loyalty and return visits to the medical facility are seen as a function of positive service quality patients' believe (Oliver, 1999).

The 5Q model of service quality which consists of quality of atmosphere (QA), quality of interaction (QI), quality of outcome (QO), process quality of process (QP), and quality of infrastructure (Qinfra) are less frequently studied when measuring service quality in health care. These aspects are particularly important in healthcare, when patients assess not only the clinical results, but also the interpersonal relationships, the infrastructure and the overall organization. There has been increased attention towards service quality in healthcare. However, little is known regarding the operationalization of the 5Q model that measures service quality in the context of private teaching hospitals in Nepal. Few researchers have studied patient satisfaction in Nepal (Adhikari *et al.*, 2021; Rizyal, 2012) and very few have analyzed the relationship between perceived service quality, patient loyalty and patient satisfaction (Gurung, 2021). It is important for healthcare managers to recognize the aspects that influence perceived service quality to uplift patient satisfaction and encourage loyalty.

This study uses the 5Q Model to identify these crucial components that influence patient's perceptions of service quality. The main objective of the study is to investigate how perceived service quality (PSQ) influences patient satisfaction (PS) and patient loyalty (PL). The application of the 5Q service quality model in hospitals has never been studied in Nepalese perspective. Despite their relevance, there is a noticeable absence of research based on a theoretical framework. The combination of Behavioral Economics, Health Belief Model and Public Trust Theory have rarely been used in Nepalese Service quality research. This study uses these interdisciplinary models to bridge this gap. While the study focuses on one teaching institution, KIST hospital, the findings can be cautiously generalized to understand how patient satisfaction impacts the relationship between service quality and loyalty in Nepal.

2. Literature Review

2.1 Theoretical Review

This study combines Behavioural Economics, Public Trust Theory and the Health Belief Model (HBM) to understand service quality, satisfaction and loyalty in the healthcare setting. Simon (1955) gave the foundations of Behavioural Economics. He gave the concept of bounded rationality, which suggests that individuals make decisions within the limits of available information, cognitive capacity and time. By considering this theory, Kahneman and Tversky's (1979) developed Prospect Theory that demonstrated that people evaluate losses more heavily than gains. These findings show deviations from rationality and that people solely can't base their decision on rationality. Behavioural economics challenges the traditional notion of rational decision-making and emphasizes cognitive biases, emotions, and social context in decision making (Thaler & Sunstein, 2008).In healthcare, patient behaviour is influenced by many factors and not only rational factors like clinical effectiveness or proper diagnosis. It is also impacted by empathy emotional support and patient friendly atmosphere. Integrating the behavioural insights in models like the 5Q of healthcare service quality model offer a detailed understanding of patient decision-making. The Health Belief Model (HBM) given by Rosenstock (1974) offers a well-established framework for defining how specific health behaviours of individuals are influenced by perceived benefits, barriers cues to action and threats. This model comprises of 6 primary cognitive dimensions that impact the behavior, and they are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. For the case of this study, when patients receive high-quality care such as a clean, responsive, and dependable environment they are more likely to view fewer barriers to receiving care. This makes the patients more likely to be treated and return to the hospital. Quality of Process and Quality of Atmosphere are important in breaking down motivational barriers and encouraging health care utilization. Similarly, staff interaction and empathy, cleanliness and appointment ease also support patient. Public Trust Theory emphasizes the importance of institutional trust in building health-related behavior, especially where there is vulnerability on the part of the individual and information asymmetry. Dimensions of service quality such as empathy, professionalism and responsiveness from administrators establish trust. Community-based services and federal decentralization in an important aspect in Nepal and maintaining trust is essential healthcare institutions.

2.2 Conceptual review

Patient satisfaction is an important matric for assessing overall effectiveness and quality of hospital care. Satisfaction surveys and feedback can provide significant data to health managers and policymakers for assessing

present conditions, understanding quality, and developing and implementing reform plans. The concept of patient satisfaction has evolved over time with various definitions emerging from literature. It is often viewed as the degree to which patients' expectations regarding healthcare services are met.

Patient satisfaction is often defined as a positive reaction to healthcare services based on the alignment between patient expectations and their actual experiences. It encompasses emotional responses and cognitive evaluations of the care received (Vaz, 2018). A systematic review of 157 articles highlights that patient satisfaction is determined by factors such as medical care quality, communication, and socio-demographic variables like age and education. The review emphasizes that satisfaction is not only about clinical outcomes but also about interpersonal interactions and service delivery (Ferreira *et al.*, 2023). Satisfied patients are crucial as they are more likely to continue receiving medical care, adhere to the recommended course of treatment, keep up their relationship with a particular healthcare provider and refer others to the hospital (Hekkert *et al.*, 2009). Patient satisfaction affects outcomes like patient loyalty, treatment plan and general trust in the healthcare system and also acts as a stand-in for the quality of healthcare. It also affects organizational performance by influencing financial sustainability and reputation (Durmuş & Akbolat, 2020).

Loyalty is characterized as a strong desire to continue using a product of choice which results in frequent purchases of the similar items (Liu et al., 2021). Regardless of the possibility that situational variables and promotions might lead to switch behavior, loyalty is the commitment to make the same purchase repeatedly from the same brand or same-brand set of products or services in the future (Oliver, 1999). Apart from using the services, loyal patients also recommend the institution to other potential patients Therefore, loyal customers help the survival of any business during difficult market and competitive conditions (Sadeh, 2017). Loyal patients are likely to follow their treatment plan, provide good word of mouth and contribute to healthcare organizations financially (Zeithaml et al., 1996). As patient loyalty is multi-dimensional, healthcare practitioners must concentrate on providing high-quality care, relationship development and communication.

Parasuraman, Zeithaml and Berry (1988) reported service quality perception as the customer's overall assessment of a service's quality based on their experience and expectations. Perceived Service Quality is an important concept in assessing healthcare services which includes patients' assessments of the excellence and superiority of the treatment they receive. The computed disconfirmation approach based on SERVQUAL instrument proposed by Parasuraman et al. (1988) calculates the difference between a customer's expectations and the service actually performed, with both evaluated post-service. Many researchers have criticized the shortcomings of this model. They asserted that a service construct must be context-specific in addition to operational in order to be effective in real-world situations (Olorunniwo et al., 2006).

Patient satisfaction is critical to the competitiveness of healthcare institutions. It is driven by continuous improvement, responsiveness to patient requirements and improved doctor-patient interactions. Understanding the factors that are important for patient satisfaction enables physicians to learn what patient's value and how they perceive treatment quality. Zineldin (2006) expanded technical-functional and SERVQUAL quality model and devised a thorough framework called the 5Q model to measure patient satisfaction within healthcare service delivery with five dimensions namely technical quality, functional quality, infrastructure quality, interaction quality and atmosphere quality. The quality of healthcare services is influenced aby the technical and functional aspects. However, other factors such as interaction, infrastructure and atmosphere have generally been neglected by researchers despite their importance. The 5Qs model is acknowledged as an efficient tool for healthcare institutions to assess patient satisfaction and is regarded as a consistent instrument as well (Swies et al., 2017).

The 5Q model successfully highlights the varied aspects of healthcare services, including both intangible and tangible components of healthcare delivery while allowing hospitals to pinpoint definite areas to improve a patient-centered approach. 5Q model has been created exclusively for the healthcare context which is a complete method to assess service delivery quality within the hospital setting and offering a thorough framework for evaluating service quality in hospitals. According to Zineldin (2006) the 'Quality of Object' defines the precise diagnoses and treatments, fostering patient confidence in healthcare reliability as they seek precise, well-informed and accurate medical guidance and intervention. The 'Quality of Process' refers to the service delivery, enhancing efficiency and patient satisfaction. It examines the efficiency of healthcare service delivery ensuring that patients undergo well executed experience from beginning to end.

The 'Quality of Infrastructure' indicates well-maintained facilities and skilled personnel for comprehensive and uninterrupted services that are critical indicators of a trustworthy and capable healthcare provider. The 'Quality of Interaction' defines respectful, empathetic and clear communication, strengthening confidence and fostering positive patient-provider relationship and trust. The 'Quality of Atmosphere' indicates a clean, welcoming and calm environment that helps to improve patients' emotional well-being and service perception.

Extensive research in healthcare marketing has examined the 5Q service quality dimension and the relationship it has with patient satisfaction. The Quality of Object includes the accuracy and dependability of medical treatment. Zineldin (2006) argues that enhancing the quality of object directly enhances long-term satisfaction by fulfilling patients' fundamental needs and expectation of healthcare. This claim is supported by Swies *et al.*, (2017) who found a positive correlation between quality of object and patient satisfaction after looking at the responses from 324 participants across five military hospitals in Jordan. Similarly, Sharma (2017) performed a case analysis in India that supported that object quality positively impacts satisfaction. The impact of process quality on patient satisfaction has been examined in various studies and it is consistently witnessed that it is a crucial factor in determining the overall patient experience (Zarei *et al.*, 2014; Sharma, 2017; Swies *et al.*, 2017).

The results reveal that immediate and integrated care delivery influences patient satisfaction and how patients analyze the services they receive. Quality of Infrastructure focuses on the availability and effectiveness of technological and human resources. The findings of Swies (2017) and Sharma (2017) confirmed that skilled staff, modern equipment and a robust infrastructure has a positive impact on patient satisfaction. Quality Atmosphere considers environmental aspects to further improve the patient experience. Various studies have shown that clean, comfortable and good facilities positively impacts expectation and satisfaction in patients (Sharma, 2017; *Swies et al.*, 2017; Zineldin, 2006). Quality Interaction focuses on communication between patients and healthcare provider. Studies reveal that empathetic and responsive communication promotes satisfaction and leads to trust and loyalty (Sharma, 2017; Swies *et al.*, 2017; Zarei *et al.*, 2014).

Satisfied patients more likely to return to the same institution and recommend it to others. Shie *et al.*, (2022) examined the connection between service quality and patient loyalty and confirmed the mediating role of satisfaction and trust. According to another study done by Asabea Addo *et al.*,(2020) in Ghana, the relationship between service quality and outpatient loyalty is indeed mediated by patient satisfaction. Another study done by Fatima *et al.*(2018) in Private hospitals in Pakistan showed that loyalty is directly and significantly impacted by of satisfaction. Therefore, it can be concluded that patient loyalty is influenced by patient satisfaction.

According to the literature review, Figure 1 presents the conceptual framework of the study.

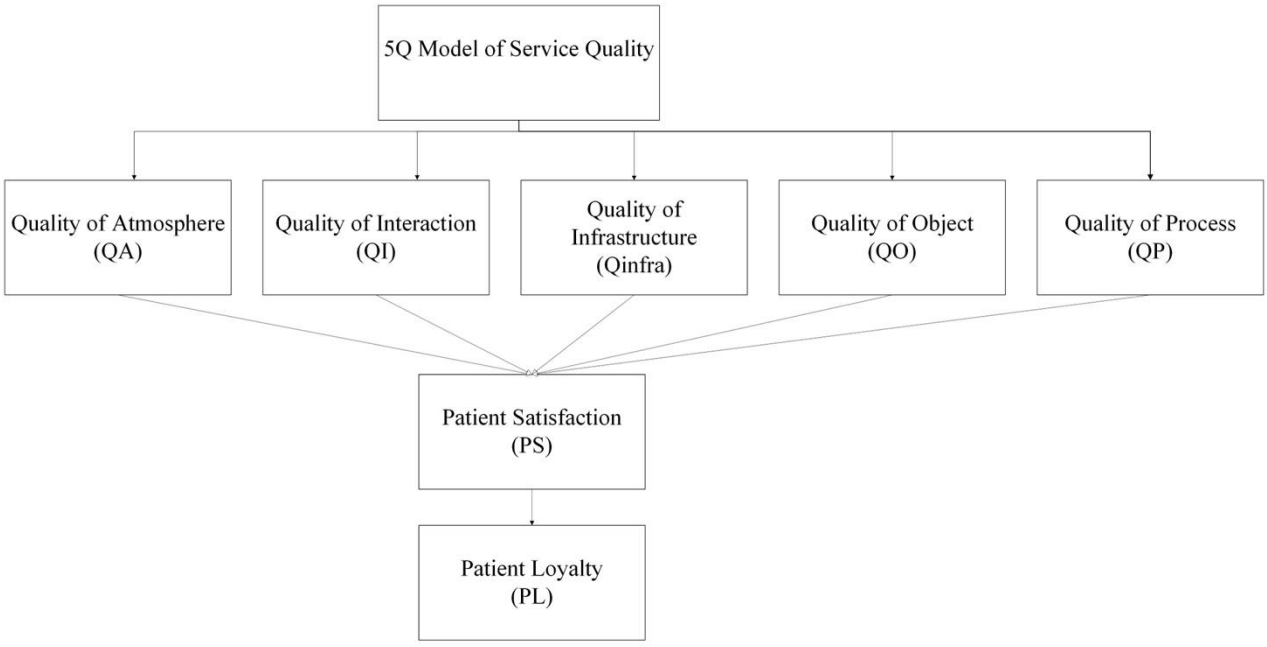

Figure 1. Conceptual Framework of the study

2.3 Hypothesis

The following are the hypothesis used for the study

H1: QA is a positively associated with PS.

H2: QI is a positively associated with PS.

H3: Qinfra is a positively associated with PS.

H4: QO is a positively associated with PS.

H5: QP is a positively associated with PS.

H6: PS is a positively associated with PL.

H7: PSQ is a positively associated with PL

H8: PSQ is a positively associated with PS.

H9: PS mediates the association between QA and PL.

H10: PS mediates the association between QI and PL

H11: PS mediates the association between Qinfra and PL

H12: PS mediates the association between QO and PL

H13: PS mediates the association between QP and PL.

H14: PS mediates the association between PSQ and PL.

3. Methodology

3.1 Study Design

This quantitative research examines the associations between perceived service quality, patient satisfaction and patient loyalty and was conducted at KIST Medical College and Teaching Hospital, a tertiary hospital affiliated with Tribhuvan University. It used a descriptive-correlational design to evaluate the associations between variables. The study utilized with SmartPLS 4, best suited for complex models and non-normal data, to examine hypotheses and draw statistically sound conclusions.

The study included 387 outpatients recruited using non-probability purposive sampling. Eligible participants were between 22 and 65 years of age, had at least three outpatient department visits within the previous year and could read and write. The participation was based on their willingness and availability and not by categorization by demographic attributes. PLS-SEM is suitable for exploring complex relationships and developing theories, even when the data is using non-random samples and non-normal data. It is ideal for understanding patterns rather than generalizing findings (Hair *et al.* 2021). The study excluded patients above 70 years and with less than three visits. The questionnaire was administered in-person by trained research assistants and online using Google Forms to accommodate wide distribution. Item clarity and dependability were enhanced with a pilot test with 52 outpatients. The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of KIST Medical College and Teaching Hospital (Ref no: 63/081/082). Informed consent was obtained, and anonymity was assured to each respondent.

Reliability was assessed for the measurement model. Instrument reliability was checked by Cronbach's Alpha. Convergent validity was established by Average Variance Extracted (AVE) values to reflect that indicators were capturing sufficient construct variance. Discriminant validity was checked by the Fornell-Larcker criterion, Heterotrait-Monotrait (HTMT) ratio and cross-loading analysis, which reflected different constructs.

Data analysis was conducted in two steps. Microsoft Excel was used for initial sorting and coding. Descriptive statistical analysis was performed using IBM SPSS Version 26 and Partial Least Squares Structural Equation Modelling (PLS-SEM) was conducted using Smart PLS. Multicollinearity was checked via Variance Inflation Factor (VIF) and Shapiro-Wilk and the Kolmogorov-Smirnov tests were used to determine the normality of data.

R-squared values measured explained variance and Standardized Root Mean Square Residual (SRMR) verified the model fit. Finally, the hypotheses were tested by bootstrapping. The study was approved by the Institutional Review Board of the hospital. Informed consent was obtained from all participants prior to data collection and the study's objectives and potential implications were clearly communicated.

3.2 Assessments of Constructs

The statements were evaluated using a 5-point Likert scale, with responses ranging from strongly disagree (1) to strongly agree (5). The perceived service quality was measured using 23 items by Zineldin (2006), where 6 items were used to measure the object variable, 3 items were used to measure the quality of process, 6, 6 and 6 items measured quality of infrastructure, quality of interaction and quality of atmosphere respectively. Patient Satisfaction in the hospital was measured with 6 items given by Picón-Berjoyo *et al.*(2016) and Patient Loyalty was measured with 6 items given by Zeithaml *et al.*(1996).

4. Results

Table 1. Demographic Characteristics of Participants

Demographic Characteristics of Respondents			
Classification	Frequency (N)	Percent (%)	Cumulative Percent (%)
Province			
Bagmati	79	20.4	20.4
`Gandaki	57	14.7	35.1
Karnali	41	10.6	45.7
Koshi	49	12.7	58.4
Lumbini	54	14	72.4
Madesh	63	16.3	88.6
Sudur Paschim	44	11.4	100
Total	387	100	
Gender			
Female	177	45.7	45.7
Male	206	53.2	99
Other	4	1	100
Total	387	100	
Age Group			
18-35	60	15.5	15.5
36-50	146	37.7	53.2
51-65	114	29.5	82.7
66+	67	17.3	100
Total	387	100	
Income per Annum			
Less than 25,000	174	45	45
25,001 – 50,000	105	27.1	72.1
Above 51,000	108	27.9	100
Total	387	100	

According to the data presented in Table 1, the highest number of respondents are from the Bagmati region (20.4%), followed by Madesh region (16.3%). Gandaki (14.7%), Karnali (10.6%) and Sudur Paschim (11.4%) regions follow respectively. On average, there is a higher percentage of male respondents i.e. 53.2%. Females are 45.7% of the sample while those who identify as "Other" make up a small portion of 1.0%.

The largest group of respondents are in the range of 36-50 years old i.e. 37.7% followed by people aged between 51-65 (29.5%), 18 -35(15.5%) and 66 years or older (17.3%) respectively.

The distribution of income shows that almost half of the respondents earn less than 25,000 (45.0%). The respondent with income range between 25,001 – 50,000 and more than 51,000 make up 27.1% and 27.9 % respectively. Table 1 shows the demographic characteristics of patients used in the study.

4.1 Normality Assessment

As shown in Table 2, the Shapiro-Wilk and Kolmogorov-Smirnov tests showed p≤ 0.05. The results of the normality test suggested that the data did not follow a normal distribution.

Table 2. Normality Assessment Results

Variable	Kolmogorov-Smirnov Test	Shapiro-Wilk Test				
	Statistic	df	Sig.	Statistic	df	Sig.
V	0.092	387	0	0.952	387	0
I	0.313	387	0	0.874	387	0
P	0.119	387	0	0.942	387	0
Infra	0.172	387	0	0.915	387	0
A	0.123	387	0	0.931	387	0
PS	0.1	387	0	0.948	387	0
BI	0.08	387	0	0.958	387	0

4.2 Measurement Model

The measurement model outlines the relationship between latent constructs and their corresponding indicator variables. It is used to examine construct reliability, convergent validity, and discriminant validity. According to Ramayah et al. (2018) three key criteria are essential in assessing a reflective measurement model and they are internal consistency reliability, convergent validity and discriminant validity. This analysis involves examining the factor loadings of reflective indicators and a minimum threshold of 0.70 is considered acceptable (Hair *et al.*, 2019).

The measurement validity test ensures that the reflective constructs Quality of Object (QO), Quality of Process (QP), Quality of Interaction (QI), Quality of Infrastructure (Qinfra), Quality of Atmosphere (QA), Patient Satisfaction (PS), and Patient Loyalty (PL) are accurately calculated by their items, confirming reliability, convergent validity and discriminant validity in the PLS-SEM model. It is also known as the outer model.

However, QA2 has a loading slightly below the 0.7 cut-off (0.696). It is retained as it has satisfactory construct reliability (Cronbach's Alpha = 0.788, Composite Reliability = 0.859) and AVE (0.605). This is in line with Hair et al.(2019) who accept loadings as low as 0.6 for exploratory research. There are also no suppression effects as VIF values are below 5 and there are no inconsistent loadings. HTMT, cross-loading analysis and Fornell-Larcker criterion all pass the recommended cut-offs (Hair *et al.*, 2017; Fornell & Larcker, 1981) and the discriminant validity is also confirmed.

The results in Table 3 show that scores of Cronbach's alpha and composite reliability for each construct are above the minimum acceptable level of 0.70. The Cronbach alpha values for all the variables QO, QP, QI, Qinfra, QA, PS and PL are 0.874, 0.716, 0.864, 0.898, 0.788, 0.902 and 0.844 respectively.

The results meet the minimum required levels which validates the reliability of the constructs. Similarly, AVE values for all constructs exceed 0.50, representing acceptable convergent validity (Hair *et al.*, 2019).

Table 3. Measurement of Construct Reliability and Convergent Validity

Construct	Item	Factor Loading	Cronbach's Alpha	CR (rho_a)	CR (rho_c)	AVE
Object Quality (QO)	QO1	0.833	0.874	0.881	0.914	0.727
	QO2	0.902				
	QO3	0.890				
	QO4	0.781				
Process Variable (QP)	QP1	0.866	0.716	0.744	0.839	0.636
	QP2	0.746				
	QP3	0.776				
Interaction Quality (QI)	QI1	0.867	0.864	0.883	0.901	0.753
	QI2	0.924				
	QI3	0.809				
Infrastructure Quality (Qinfra)	QInfra1	0.938	0.898	0.973	0.935	0.826
	QInfra2	0.908				
	QInfra3	0.880				
Atmosphere Quality (QA)	QA1	0.853	0.788	0.816	0.859	0.605
	QA2	0.696				
	QA3	0.769				
	QA4	0.787				
Patient Satisfaction (PS)	PS1	0.788	0.902	0.903	0.925	0.673
	PS2	0.856				
	PS3	0.841				
	PS4	0.830				
	PS5	0.827				
	PS6	0.775				
Patient Loyalty (PL)	PL1	0.713	0.844	0.851	0.888	0.615
	PL2	0.827				
	PL3	0.770				
	PL4	0.828				
	PL5	0.777				

4.3 Discriminant Validity

Discriminant validity was assessed using the Fornell-Larcker criterion, which requires that the square root of the Average Variance Extracted (AVE) for each construct exceeds its correlations with other constructs (Fornell & Larcker, 1981). Table 4 shows the correlation matrix for lower-order constructs (LOCs). The diagonal values representing the square roots of AVE values for QO, QP, QI, Qinfra, QA, PS and PL are 0.784, 0.82, 0.778, 0.868, 0.825, 0.853 and 0.798 respectively.

Table 5 shows similar matrix for higher-order constructs (HOCs), including PL, PS, and PSQ. The square roots of AVE for PL, PS, and P S Q are 0.784, 0.82 and 0.521 respectively.

The HTMT criterion was also established to verify discriminant validity. As reported in Tables 6 and 7, all the HTMT values were below the threshold of 0.85 suggested by Kline (2011) supporting that the constructs in the model distinct from one another.

Table 4. Fornell Larcker Criteria for Lower Order Constructs

	PL	PS	QA	QI	QInfra	QO	QP
PL	0.784						
PS	0.213	0.82					
QA	0.187	0.335	0.778				
QI	0.011	-0.077	-0.03	0.868			
QInfra	0.083	-0.069	0.095	0.545	0.825		
QO	0.094	0.436	0.091	-0.042	0.015	0.853	
QP	-0.098	0.362	0.129	-0.237	-0.169	0.208	0.798

Table 5. Fornell-Larcker criterion for Higher Order Constructs

	PL	PS	PSQ
PL	0.784		
PS	0.217	0.82	
PSQ	0.092	0.578	0.521

Table 6. HTMT results

	PL	PS	QA	QI	QInfra	QO	QP
PL							
PS	0.241						
QA	0.216	0.376					
QI	0.028	0.077	0.098				
QInfra	0.095	0.087	0.117	0.595			
QO	0.11	0.489	0.116	0.066	0.055		
QP	0.12	0.439	0.178	0.279	0.204	0.252	

Table 7. HTMT results for Higher Order Construct

	PL	PS
PL		
PS	0.241	
PSQ	0.26	0.685

4.4 Goodness-of-Fit Test

According to Hair *et al.* (2017), SRMR value below 0.08 suggests a justifiable model fit. Table 8 reports the SRMR values for the LOCs in both the saturated and estimated models which are 0.057 and 0.058, respectively. Similarly, Table 9 displays the SRMR value for HOC where the values for both models are 0.077. The SRMR values for both models are below the recommended threshold so the model fit is acceptable.

Table 8. Model fit for Lower Order Constructs

	Saturated model	Estimated model
SRMR	0.057	0.058

Table 9. Model fit for Higher Order Constructs

	Saturated model	Estimated model
SRMR	0.077	0.078

4.5 Structure model analysis

After the collinearity issues were ruled out the next step was to evaluate the significance and relevance of the relationships in the structural model. Table 10 shows the VIF values, which are all below the threshold of 3.3 indicating no multicollinearity.

Table 10. Multicollinearity Diagnostics

Variables	VIF
QO	1.052
QP	1.125
QI	1.477
QInfra	1.458
QA	1.041
PS	2.340
PL	1.899

4.6 Hypothesis Testing

The structural model was evaluated using the bootstrapping technique with 5,000 resamples to assess the significance of the path coefficients and to validate the proposed hypotheses. Figures 2 and 3 present the regression p-values, coefficients and standardized beta coefficients for both LOCs and HOCs. Even though the p-values were non-significant for QI and QInfra in the structural model, these constructs were kept intact due to their theoretical importance within the 5Q model. The measurement model results illustrate that QI and QInfra exhibit strong psychometric properties. In the case of QI, factor loadings were between 0.809 and 0.924 with a Cronbach's Alpha of 0.864, composite reliability (rho_c) of 0.901 and AVE of 0.753.

For QInfra, loadings were between 0.880 to 0.938, with a Cronbach's Alpha of 0.898, rho_c of 0.935 and AVE of 0.826. These figures are higher than the suggested ones (Cronbach's Alpha and rho_c > 0.7, AVE > 0.5) implying good convergent validity and reliability. These properties justify the decision to keep QI and QInfra as their measurement models are reliable, even if some structural paths do not show significance.

The non-significant p-values for paths with QI and QInfra could be due to aspects of the environment such as a limited sample size, suppression in the structural model or indirect effects rather than irrelevance. Retaining these constructs enables the examination of those indirect or mediated effects that are often present in-service quality models (Hair *et al.*, 2017).

For the relationship between the variables QO, QI, OP, QInfra, QA, and PS, the coefficient of determination (R^2) was determined to be 0.344. This suggests that 34.4% of the variation in PS can be explained by the constructs taken together. Furthermore, the R^2 value for the PS-PL relationship was 0.104, indicating that PS accounts for 10.4 percent of the variance in PL. Similarly, Figure 3 displays the HOCs' beta coefficients, p-values and regression coefficients. The results show that value for R^2 is 0.049 for PL, meaning that overall PSQ explains only 4.9% of the total variation in PL while the remaining 95.1% of the variation is influenced by other factors. The R^2 value for PS, on the other hand, is 0.334 meaning that overall PSQ accounts for 33.4 percent of the variation in PS, while other factors account for the remaining 66.6 percent.

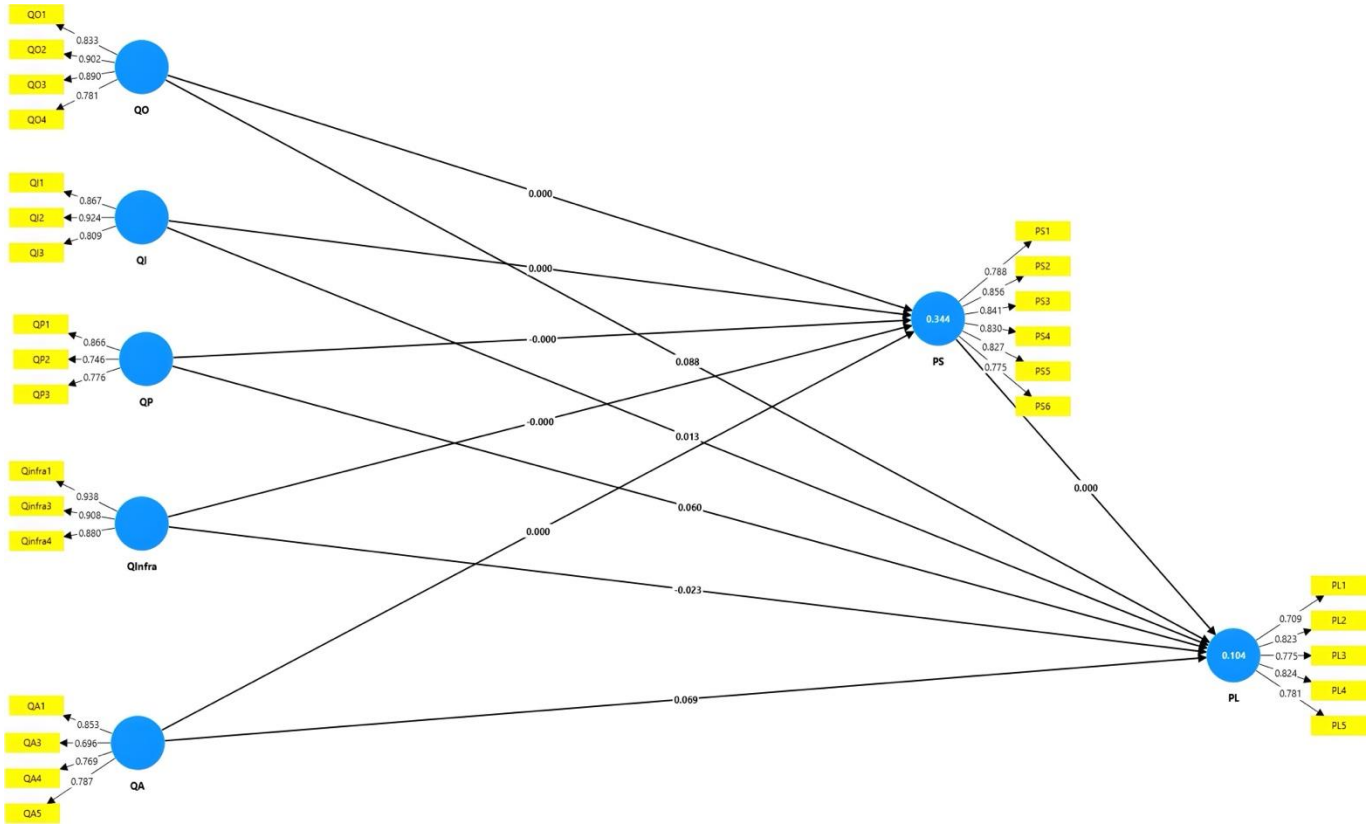

Figure 2. Structural Model Showing Path Coefficients and Significance Levels for Lower Order Constructs

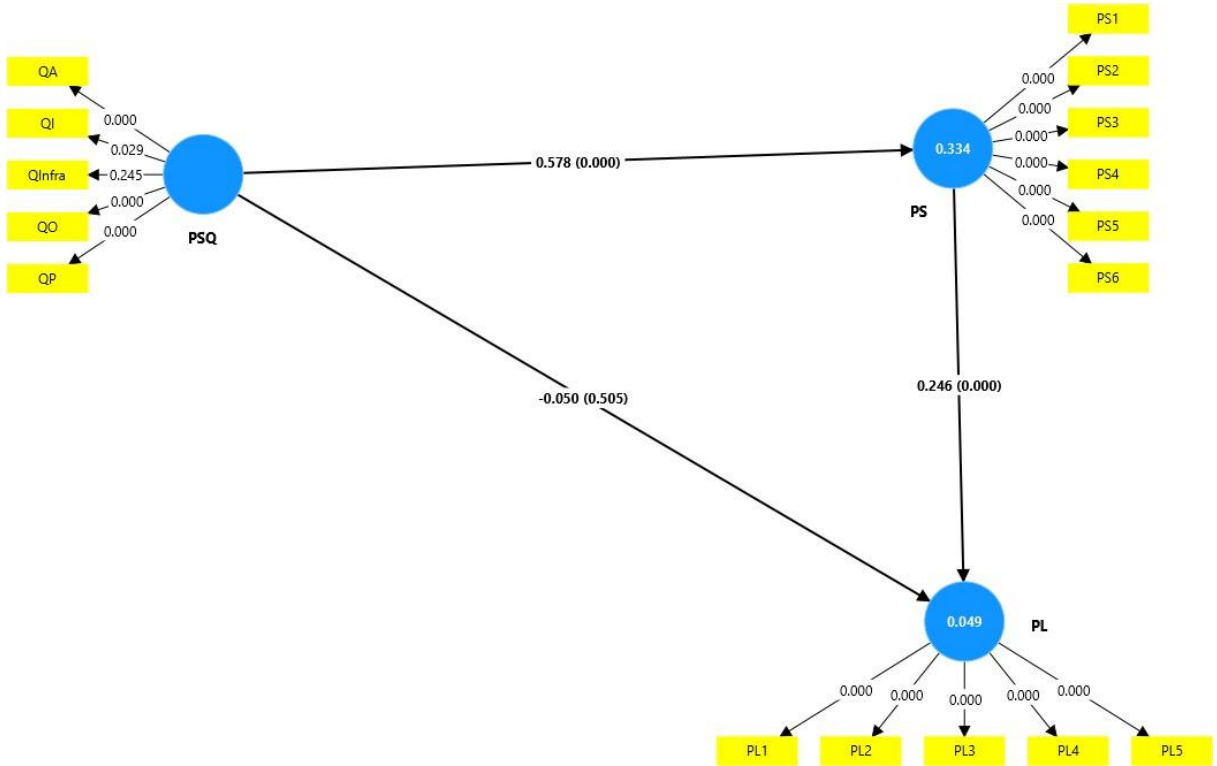

Figure 3. Structural Model Showing Path Coefficients and Significance Levels for Higher Order Constructs

The structural model was evaluated by examining the beta coefficients, standard deviation, t-values, and p-values, which determine the significance of the hypothesized relationships. The results, as presented in Table 11 and Table 12, indicate mixed support for the proposed hypotheses. Table 11 illustrates that QO (β = 0.245; p = 0.000), QP (β = 0.060, p = 0.001) and QA (β = 0.285, p = 0.000) have significant impact on PS. Hence, Hypothesis H1, H2, H5 are accepted. QI (β = 0.053; p = 0.898) and QInfra (β = -0.091; p = 0.070) is seen to have an insignificant

impact on PS. Hence, hypothesis H3 and H4 is not accepted. Hypothesis H6 shows association between PS and PL and is supported.

However, the relationship between PSQ and PL is not supported (β = 0.098, p = 0.153) and hypothesis H7 is not accepted. Finally, the association between PSQ and PS and hypothesis H8 is supported (β = 0.583; p = 0.000)

Table 11. Direct Effect and Hypothesis Testing Result

		Beta	SD	t value	p value	Hypothesis
QA -> PS	H1	0.285	0.042	6.721	0.000	Supported
QI -> PS	H2	0.053	0.061	0.898	0.369	Not Supported
QInfra -> PS	H3	-0.091	0.049	1.812	0.070	Not Supported
QO -> PS	H4	0.245	0.052	4.806	0.000	Supported
QP -> PS	H5	0.060	0.019	3.235	0.001	Supported
PS -> PL	H6	0.246	0.057	4.255	0.000	Supported
PSQ -> PL	H7	0.098	0.064	1.430	0.153	Not Supported
PSQ -> PS	H8	0.583	0.035	16.522	0.000	Supported

Table 12. Hypothesis testing for mediation effect

		Indirect effect (Beta)	SD	t value	p value	Hypothesis
QA -> PS -> PL	H9	0.07	0.02	3.373	0.001	Supported
QI -> PS -> PL	H10	0.013	0.016	0.839	0.401	Not Supported
QInfra -> PS -> PL	H11	-0.022	0.014	1.627	0.104	Not Supported
QO -> PS -> PL	H12	0.09	0.023	3.763	0	Supported
QP -> PS -> PL	H13	0.06	0.019	3.235	0.001	Supported
PSQ -> PS -> PL	H14	0.148	0.034	4.22	0	Supported

According to Table 12, the indirect effects of QA (β = 0.070, p = 0.001), QO (β = 0.090, p = 0.000), QP (β = 0.060, p = 0.001) and PSQ (β = 0.148, p = 0.000) on PS and PL are statistically significant as p-values are below the 0.05. Hypotheses H9, H12, 13, and 14 are therefore validated.

However, the p-values for QInfra (β = -0.022, p = 0.104) and QI (β = 0.013, p = 0.401) are higher than 0.05. Therefore, hypotheses H10 and H11 are not supported.

5. Discussion

The primary goal of the study was to understand how patients assess their experiences based on various services. Analyzing the existing literature, the study concentrated on the factors that were found to be essential to patients' opinions of the quality of services in healthcare settings.

The findings showed that different dimensions of service quality have a major effect on patient satisfaction, which in turn affects patient loyalty. According to the results, some aspects of service quality were positively correlated with greater patient satisfaction, but other aspects did not produce the same level of customer approval. However, it is important to improve patient satisfaction and build long-term trust in healthcare services. Ongoing evaluation and responsiveness to client feedback is mandatory for a patient-centered approach to improve quality. The healthcare providers must strategically invest in enhancing those aspects of service that patients value most. Patient satisfaction particularly is impacted by three factors namely atmosphere, object and process quality. These results are consistent with other research indicating that these aspects influence patient satisfaction in healthcare (Hoseyni *et al.*, 2019; Sharma, 2017; Swies *et al.*, 2017). The study found a positive relationship between Quality of

Atmosphere and Patient Satisfaction, which contrasts with previous findings of Sharma (2017). As anticipated, the analysis demonstrates that patient loyalty is strongly predicted by patient satisfaction.

Many studies have validated this relationship (Aladwan *et al.*, 2021;Sudarwati *et al.*, 2023). According to this research, satisfied patients are more likely to show loyalty, recommend and return to the institution for additional care in future. Additionally, perceived service quality significantly influences patient satisfaction, demonstrating that overall service perceptions play a critical role in shaping patient experiences (Aladwan *et al.*, 2021; Neupane & Devkota, 2017). However, the direct effect of perceived service quality on Patient Loyalty was not significant which is consistent with the finding of (Santoso *et al.*, 2024) and inconsistent with the finding of Maesaroh et al., (2021).

Quality in Interaction showed no association with Patient Satisfaction. The same was realized in the study done by Arab *et al.* (2012). Similarly, Quality in Infrastructure also did not show a significant relationship with patient satisfaction which is inconsistent with some previous researches (Sharma, 2017; Swies *et al.*, 2017). The findings can indicate that while interpersonal interactions and infrastructure contribute to the overall healthcare experience, they may not be primary drivers of satisfaction in this context. One possible explanation is that patients may prioritize service efficiency and care outcomes over individual staff interactions or facility infrastructure when assessing their satisfaction levels. Furthermore, some studies have suggested that quality of object may not always be a significant determinant of patient satisfaction, but the present findings contradict this, indicating its importance in shaping positive patient experiences. The results indicate that quality in atmosphere, quality in object, quality in process and patient satisfaction are significant predictors of patient loyalty. Based on the data analysis result of the study, it can be inferred that quality of interaction and quality of infrastructure is not associated with patient loyalty. This contradicts with the findings by Satyawati & Berlianto (2022). The study also found a significant relationship of atmosphere variable, process variable and object variable which aligns with the study done by Swies *et al.*, (2017) . The study also concluded that Patient Satisfaction positively impacts Patient Loyalty which has been supported Aladwan *et al.*, (2021).

The R^2 value for the relationship between PS and PL is 0.104. Here PS explains 10.4% of the changes in PL. The effect is statistically significant but the low R^2 shows that most of the variation in PL is not explained by PS alone. To improve the model, future versions could include interaction terms or moderating variables. For example, the combination of patient satisfaction with value or brand image might better explain patient loyalty. Direct effects from other factors like perceived service quality or Brand could also be tested to increase forecasting power. The low R^2 for patient loyalty recommends improvement. Future research can add more variables to better understand the drives of patient loyalty in private teaching hospitals. The model's fit was evaluated using SRMR values. For lower-order constructs, SRMR values were 0.057 and 0.058. For the higher-order construct, the SRMR was 0.077. The SRMR values are below the accepted threshold of 0.08 and indicate a good model fit.

The study findings can be considered within the context of Behavioural Economies, Health Belief Model and Public Trust Theory. The result of the study has clearly shown that cleanliness of buildings, facilities and equipment (QO), efficient processes, technical and administrative processes (QP) and warm environment, feeling of safety, patient centered environment (QA) can reduce perceived barriers. It will in turn increase the likelihood of the revisit as stated in the Health Belief Model. Although QI didn't predict patient satisfaction in this study, other factors such as QA and QO may have neutralized it by generating environmental factors or trust. This suggests that even within decentralized settings trust could be maintained through service standards. In the context of Nepal where federal structures influence healthcare delivery, creating and sustaining public trust is crucial to encourage loyalty in patients. This also aligns with behavioral economies which advocate that human behavior is not only shaped by rationality but is driven by emotions. These models present an overview of the perceived service quality and its impact on patient satisfaction and loyalty. This expands the healthcare services from just meeting patients' functional needs like diagnosis and treatment to also addressing their emotional and interpersonal needs.

This combination of theories strengthens the contribution of the study to health behavior research, especially in the healthcare of low- and medium-income countries.

This study is focused on Nepal, but the findings can be also benefit other low- and middle-income countries (LMICs). According to the World Bank (2023), lower-middle-income economies are defined as those with a Gross National Income (GNI) per capita between $1,146 and $4,515. The health consequences of inadequate

environmental conditions and the lack of standard precaution items and preventable illness and cost savings that could be achieved suggest that urgent attention and prioritization of resources are needed in many LMICs (Kronk & Bartram, 2022).

The study shows that atmosphere, process quality, and object quality are important for patient satisfaction and loyalty and 5Q model can be useful for improving healthcare services in other LMICs too. When this model is used with simple methods like patient reminder systems, easy follow-up, and communication with more empathy, it can help to make healthcare better and keep more patients in the system.

6. Conclusion

6.1 Major implication of study

The 5Q approach allows better understanding of the various factors that impact on the overall service quality. By focusing on a private teaching hospital in Nepal, the research emphasizes the roles these institutions play in the healthcare sector especially in a developing country. The study also provides important understanding about how service quality affects patients' long-term commitment to the institution by the integration of satisfaction and loyalty, which is lacking in Nepali perspective. With a large sample size of 387 respondents, the study improves the generalizability and dependability of the findings, making them more applicable in healthcare settings.

The findings of the study highlight the important aspects of service quality that affect patient satisfaction and patient loyalty providing useful information for Nepali policymakers and healthcare professionals. These insights can guide strategies and policies to improve patient-centered care and enhancing the overall quality of healthcare services. It is also equally significant for improving service delivery and patient retention. Hospitals can use these results to understand various areas for improvement and to upgrade infrastructure and optimize interactions between healthcare providers and patients. Prioritizing patient satisfaction is important as hospitals seek to establish and maintain long-term relationships with their patient and this study shows what factors are important. Healthcare institutions can improve the atmosphere of the institution by ensuring that nurses and physicians are attentive to patients' needs, providing clear information and maintaining good relationships with patients and their families. A welcoming and caring environment will most likely increase patient satisfaction and loyalty.The study results also indicate that there is a need for changes in the policy. First, service standards should focus on modern equipment, efficient processes and patient friendly environment. Nepal's Universal Health Coverage and the National Health Policy support these goals. Internal quality checks should be implemented in teaching hospitals to maintain these as the primary focus.

These results can also be useful in the Health Facility Operation and Management Guidelines and can be reviewed by the provincial and local governments. An improved atmosphere and quicker service should be the goals of their plans. These same elements should be the focus of audits and trainings. Policies that put the needs of the patient first can increase satisfaction and trust. It is important for patient-centered care in Nepal's healthcare system.

6.2 Limitation

This study focuses on a single private teaching hospital in Nepal. Therefore, the findings might not fully represent all healthcare settings in the country. The study uses a cross-sectional design, and it captures patient perceptions at just one point in time, making it difficult to observe changes over time. Furthermore, the data is from self-reported surveys so there's a chance that patients may have exaggerated or understated their satisfaction levels. The 5Q model provides a strong framework for understanding patient perceptions but it might not cover every aspect of their experiences where other factors might influence satisfaction. Lastly, in this study, all five dimensions of 5Q were treated as reflective constructs. However, QI and QInfra can be represented as formative constructs. These dimensions can jointly define the construct instead of being caused by it (Hair *et al.*, 2017). Using reflective models only can display some biasness in showing their impact on patient satisfaction. This could impact the validity of causal conclusions. The application of formative models in certain dimensions can improve the validity and reliability of the findings.

6.3 Future research

This study provides insights related to service quality, patient satisfaction and loyalty within the 5Q framework. It draws on concepts like Behavioural Economics; the Health Belief Model and Public Trust Theory.

This study offers valuable insight it highlights several dimensions for further investigation within Nepal's healthcare context. The study used cross-sectional method. Future studies should use longitudinal study to track patient satisfaction and loyalty over time. This study focused on a single private teaching hospital in Kathmandu, which narrows the general application of the findings. Future research should include more institutions, including both public and private hospitals. It is also recommended that hospitals from different geographic regions be included, as patient expectations and experiences may depend on the context.

Emotional and cognitive responses that are lacking in quantitative analysis can be captured by qualitative analysis, which is particularly important in healthcare studies. Therefore, future studies can focus on a mixed-methods approach. Introducing additional variables, such as perceived value and perceived risk could offer a better understanding of patients from a behavioural science perspective. Overall, exploring these areas will help administrators and policymakers to have a better understanding of the Nepali patient perspective and provide need-based services.

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Authors' Contributions

Both the authors equally contributed, read and approved the finale version of this work.

Does this article screen for similarity?

Yes

Conflict of Interest

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