

Determinants of Patient Satisfaction Across Oncology Hospitals in Bangalore: A PLS-SEM Analysis of SERVQUAL Dimensions

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Abstract

Patient satisfaction has become a critical indicator of healthcare quality, particularly in oncology settings where prolonged treatment, emotional vulnerability, and repeated institutional interactions shape patient experiences. This study examines the determinants of patient satisfaction across oncology hospitals in Bangalore using the SERVQUAL framework and Partial Least Squares Structural Equation Modeling (PLS-SEM). A quantitative cross-sectional design was adopted, collecting data from cancer patients and primary attendants through a structured questionnaire measuring Tangibility, Reliability, Responsiveness, Assurance, Empathy, and overall Patient Satisfaction. Data were analyzed using SmartPLS 4 through measurement model validation, bootstrapping, and Importance–Performance Map Analysis (IPMA). The findings reveal that Empathy, Assurance, and Reliability exert the strongest positive influence on patient satisfaction, while Tangibility and Responsiveness demonstrate relatively weaker effects. Comparative analysis across hospital types and treatment units further highlights contextual variation in service perceptions. The study provides evidence-based insights for strengthening patient-centered oncology service delivery across heterogeneous healthcare environments.

Keywords: SERVQUAL, Patient Satisfaction, Structural Equation Modeling (SEM), Healthcare Service Quality, Oncology Care, Bangalore Hospital

1. Introduction

1.1 Background of the Study

Patients walk into vastly different healthcare environments—some technologically advanced and digitally integrated, others operating under heavy patient volume and resource constraints. Yet across these institutional settings, one question remains central to the patient experience: “Did I feel seen, safe, and supported?”

In oncology care, service quality extends beyond clinical treatment outcomes. Patients undergoing cancer treatment often experience prolonged emotional, psychological, and physical stress, making communication quality, trust, empathy, and reliability critical components of healthcare evaluation. Historically, healthcare performance was assessed primarily through clinical indicators such as mortality rates, treatment success, and procedural accuracy. While these remain essential, they capture only one dimension of healthcare quality. Prior oncology research has shown that patient satisfaction is not merely a reputational measure but is associated with patient experience, care continuity, and broader healthcare outcomes (Lis, Rodeghier, & Gupta, 2009).

Over time, healthcare systems have increasingly shifted toward patient-centered care models, recognizing that patient satisfaction is shaped not only by medical outcomes but also by how care is delivered. Patients evaluate healthcare experiences through repeated interactions with doctors, nurses, administrative staff, and institutional systems. In oncology settings, where treatment journeys are lengthy and emotionally demanding, these experiential dimensions become particularly significant (Derisi et al., 2020; Singh & Sidhu, 2023).

The SERVQUAL framework developed by Parasuraman, Zeithaml, and Berry (1988) provides a structured approach to evaluating service quality through five dimensions: Tangibility, Reliability, Responsiveness, Assurance, and Empathy. In oncology care, these dimensions take on deeper meaning:

- Assurance reflects confidence in healthcare professionals and treatment processes.
- Empathy represents emotional understanding and compassionate care.
- Reliability and Responsiveness influence continuity of treatment and institutional trust.
- Tangibility reflects perceptions of safety, professionalism, and environmental quality.

Prior healthcare studies have applied SERVQUAL to evaluate service quality and satisfaction in hospitals, with findings frequently emphasizing the importance of assurance, reliability, empathy, and responsiveness in shaping patient perceptions (Baseri et al., 2020; Nadiri & Hussain, 2016). In oncology settings specifically, expectation–perception gaps have been observed across service quality dimensions, indicating the need for deeper analysis of patient experience (Derisi et al., 2020; Singh & Sidhu, 2023).

Bangalore’s oncology healthcare ecosystem includes government hospitals, private specialty centers, and NABH-accredited institutions operating under different service delivery conditions. As a result, patient satisfaction may vary across institutional environments, treatment units, and patient experiences. Another important aspect of oncology care is the role of attendants and caregivers. In the Indian healthcare context, attendants frequently participate in decision-making, logistics, emotional support, and treatment coordination. Their experiences often shape or reinforce overall patient perceptions of healthcare quality (Kumar, Singh, & Patel, 2022).

To examine these multidimensional relationships, the present study applies Partial Least Squares Structural Equation Modeling (PLS-SEM), which allows simultaneous assessment of latent service quality constructs and their influence on Patient Satisfaction. PLS-SEM is appropriate for predictive, variance-based modeling where latent constructs are measured through multiple indicators (Hair, Hult, Ringle, & Sarstedt, 2022). The study therefore moves beyond isolated institutional feedback toward a broader understanding of how service quality dimensions shape satisfaction across heterogeneous oncology settings in Bangalore.

1.2 Research Problem

Despite major advancements in medical technology and oncology treatment systems, clinical excellence alone does not guarantee patient satisfaction. Hospitals continue to invest heavily in infrastructure, diagnostic facilities, and treatment capabilities; however, the experiential dimensions of care—such as communication quality, emotional support, responsiveness, and institutional trust—are often under-evaluated.

In oncology care, where patients experience prolonged treatment cycles and emotional vulnerability, even minor service delivery failures can significantly influence satisfaction. Existing evaluation systems frequently rely on descriptive feedback or institution-specific satisfaction scores that fail to capture the structural relationships between service quality dimensions and overall patient satisfaction across heterogeneous healthcare settings. This limitation is consistent with earlier concerns that service quality studies often remain descriptive unless supported by stronger theoretical and analytical models (Parasuraman et al., 1988; Hair et al., 2022).

Accordingly, the present study examines how the five SERVQUAL dimensions influence patient satisfaction across multiple oncology hospitals in Bangalore using PLS-SEM.

1.3 Research Gap

Existing healthcare service quality studies reveal several important gaps within oncology research.

First, many SERVQUAL studies continue to rely on regression analysis or expectation–perception gap analysis, treating service quality dimensions as independent observed variables rather than latent constructs (Derisi et al., 2020; Singh & Sidhu, 2023). Such approaches may not fully account for measurement error or the latent nature of service quality perceptions.

Second, the application of Structural Equation Modeling (SEM) within Indian oncology settings remains comparatively limited, particularly in studies involving multiple healthcare institutions. PLS-SEM provides a useful approach for estimating relationships among latent constructs in predictive healthcare service research (Hair et al., 2022; Henseler, Ringle, & Sarstedt, 2015).

Third, there is limited research examining whether service quality dimensions demonstrate similar influence across different hospital environments such as public, private, and NABH-accredited oncology institutions.

Fourth, most studies focus exclusively on patient responses while overlooking the role of attendants and caregivers, despite their active involvement in oncology treatment processes in India (Kumar et al., 2022).

Finally, limited research integrates SERVQUAL with Expectation-Confirmation Theory (ECT) to explain how healthcare service perceptions translate into patient satisfaction. ECT suggests that satisfaction is formed when perceived performance confirms or exceeds expectations (Oliver, 1980), making it relevant for understanding oncology patient satisfaction.

The present study addresses these gaps by examining service quality and patient satisfaction across multiple oncology hospitals in Bangalore using a PLS-SEM framework grounded in SERVQUAL and ECT.

1.4 Research Objectives

The study was conducted with the following objectives:

1. To assess patient and attendant perceptions of the five SERVQUAL dimensions across oncology hospitals in Bangalore.
2. To examine the structural relationships between SERVQUAL dimensions and Patient Satisfaction using PLS-SEM.
3. To identify the most significant determinants of Patient Satisfaction across heterogeneous oncology care settings.

1.5 Research Questions and Hypotheses

The study is guided by the following research question:

Which dimensions of service quality most strongly influence patient satisfaction across oncology hospitals in Bangalore?

Based on SERVQUAL theory, Expectation-Confirmation Theory, and prior healthcare service quality literature, the following hypotheses were proposed (Parasuraman et al., 1988; Oliver, 1980; Baseri et al., 2020; Singh & Sidhu, 2023):

- **H₁:** Tangibles exhibits a positive standardized structural relationship with Patient Satisfaction ($\beta > 0$, $p < .05$).
- **H₂:** Reliability exhibits a positive standardized structural relationship with Patient Satisfaction ($\beta > 0$, $p < .05$).
- **H₃:** Responsiveness exhibits a positive standardized structural relationship with Patient Satisfaction ($\beta > 0$, $p < .05$).
- **H₄:** Assurance exhibits a positive standardized structural relationship with Patient Satisfaction ($\beta > 0$, $p < .05$).
- **H₅:** Empathy exhibits a positive standardized structural relationship with Patient Satisfaction ($\beta > 0$, $p < .05$).
- **H₆ [Exploratory]:** Financials exhibits a positive standardized structural relationship with Patient Satisfaction (if included; $\beta > 0$, $p < .05$).

1.6 Significance of the Study

Theoretical Significance

This study grounds the SERVQUAL model in Expectation-Confirmation Theory (ECT) (Oliver, 1980), testing whether the "confirmation" of service in heterogeneous Indian oncology settings follows consistent psychological rules. It advances methodological rigor by employing **PLS-SEM with invariance testing and clustering controls**, demonstrating how partitioning measurement error and validating construct equivalence across sites strengthens inference in multi-institutional research. In doing so, it shifts the literature from descriptive, single-site snapshots to structurally validated, cross-context models.

Managerial Significance

For healthcare networks, hospital administrators, and quality councils, this study provides a **high-precision diagnostic map**. Instead of applying one-size-fits-all satisfaction initiatives, leadership can use the Path Coefficients (β) and invariance results to differentiate:

If This Construct Shows Strongest & Most Stable β	Then Prioritize This Network-Wide Intervention
Assurance	Standardized communication protocols, trust-building training, clinician-patient dialogue frameworks
Reliability	Cross-site digital scheduling integration, error-reduction systems, billing transparency upgrades
Empathy	Frontline staff emotional intelligence programs, time-allocation reforms, empathy "champion" networks
Responsiveness	Network-wide query-resolution SLAs, centralized helpdesk implementation, escalation pathway clarity
Tangibles	Baseline facility maintenance standards, environmental signaling of safety, wayfinding optimization

This evidence-based approach enables targeted, scalable quality improvement that respects institutional diversity while elevating baseline patient experience across networks.

Policy Relevance

Findings can inform state-level cancer care initiatives and accreditation bodies (e.g., NABH, JCI) by highlighting which SERVQUAL dimensions most consistently predict satisfaction across public, private, and specialty models. This supports the development of standardized, context-aware service quality benchmarks for oncology care delivery in India.

1.7 Scope and Delimitations

Scope

The narrative of this study is focused strictly on the **non-clinical service quality** across heterogeneous oncology care settings in Bangalore. While clinical outcomes are paramount, they are outside the scope of this particular inquiry. The study is defined by the following boundaries:

- **Population:** Adult cancer patients (≥ 18 years) and their primary attendants receiving care across 3–4 oncology facilities, stratified by ownership type (public, private, specialty) and accreditation status.

- **Design:** Quantitative, cross-sectional, explanatory study based on self-reported perceptual data—a multi-site "snapshot" in time.
- **Constructs:** Five core SERVQUAL latent constructs (Tangibles, Reliability, Responsiveness, Assurance, Empathy); Financials included only if pilot testing and theoretical justification support its relevance.
- **Methodology:** PLS-SEM with reflective measurement models; bootstrapped significance testing (5,000 resamples); model fit assessed via SRMR, R^2 , f^2 , and Q^2 ; clustering controlled via MLR estimator or two-level SEM; configural/metric invariance tested prior to pooled analysis.
- **Units of Analysis:** Combined patient-attendant responses across outpatient, inpatient, and chemotherapy units to capture the dyadic nature of oncology care navigation.

Delimitations

The study acknowledges the following boundaries:

- **Multi-site, cross-sectional design:** Limits causal inference over time; longitudinal tracking is recommended for future research.
- **Perceptual data:** Self-reported responses may be influenced by social desirability bias, recall error, or transient emotional states. Procedural remedies (anonymity, varied scale anchors, randomized item order) and statistical tests (Harman's single-factor test) will be applied to mitigate common method variance.
- **Non-clinical focus:** Clinical outcomes (e.g., treatment response, survival) are not directly analyzed; the study examines experiential service quality as a distinct but complementary dimension of care.
- **Sample distribution:** Variation in respondent volume across sites may require post-stratification weighting or multi-group analysis if pooling assumptions are not met.

2. Literature Review and Theoretical Framework

If the previous section framed the problem as experienced across varying institutional walls—patients asking the same universal question (“Did I feel seen, safe, and supported?”) in vastly different facilities—this section unpacks the problem as understood across contexts. It asks a sharper and more demanding question: when patients across heterogeneous oncology settings say they are “satisfied,” are they evaluating the same things, in the same way, for the same reasons?

The answer, as the literature reveals, is both yes and no. Yes, because certain dimensions of service quality—trust, clarity, compassion, and dependability—appear universally important in moments of vulnerability. No, because the relative importance assigned to each dimension can shift across institutional environments, resource conditions, patient expectations, and cultural settings.

This section therefore builds a layered understanding of patient satisfaction in oncology care by grounding the study in two complementary theoretical anchors, examining how prior research has conceptualized service quality across healthcare settings, and justifying the analytical relevance of PLS-SEM in modeling multidimensional service quality relationships.

2.1 Theoretical Anchors: Gap Theory and Expectation-Confirmation in Heterogeneous Settings

At the foundation of this study lies a central premise: service quality is not evaluated only through what hospitals deliver, but through how patients perceive that delivery relative to what they expected.

Parasuraman, Zeithaml, and Berry (1988) conceptualized this idea through SERVQUAL and Gap Theory, defining service quality as the difference between expectations and perceptions across five dimensions: Tangibility, Reliability, Responsiveness, Assurance, and Empathy. In healthcare settings, this gap becomes particularly important because patients often evaluate care under conditions of uncertainty, fear, and emotional vulnerability.

Within oncology care, expectations are rarely uniform. Patients entering public hospitals may prioritize accessibility and procedural efficiency, while patients entering private specialty centers may place greater emphasis on communication quality, emotional support, and personalized attention. Across all institutional settings, however, patients expect competence, safety, and trustworthiness.

Expectation-Confirmation Theory (ECT) proposed by Oliver (1980) further explains how these evaluations translate into satisfaction. According to ECT, satisfaction emerges when perceived performance confirms or exceeds prior expectations. Negative disconfirmation occurs when healthcare experiences fall below what patients psychologically anticipated.

In oncology settings, these expectations extend beyond medical treatment itself. Patients often expect emotional reassurance, continuity of care, empathy from staff, and confidence in institutional systems. Therefore, satisfaction becomes both a cognitive evaluation and an emotional response shaped by repeated interactions throughout the treatment journey.

By integrating SERVQUAL with Expectation-Confirmation Theory, the present study establishes a theoretical framework that explains both what patients evaluate and how those evaluations become satisfaction judgments across heterogeneous oncology environments.

2.2 Service Quality in Oncology Care

Service quality within oncology settings is multidimensional and psychologically sensitive. Unlike many other healthcare contexts, cancer treatment often involves prolonged treatment cycles, repeated hospital visits, emotional distress, and uncertainty regarding outcomes. As a result, patients evaluate healthcare systems not only through technical competence but also through the emotional and interpersonal quality of care.

The five SERVQUAL dimensions therefore acquire deeper contextual meaning in oncology settings:

- **Assurance as a Universal Anchor:** Across settings, staff competence, clear communication, and professional confidence consistently predict satisfaction in high-acuity care (Baseri et al., 2020; Derisi et al., 2020). However, the *expression* of assurance may differ: in public settings, it may manifest as procedural transparency; in private settings, as personalized prognostic dialogue.
- **Empathy as a Contextual Amplifier:** Compassionate listening and individualized attention buffer psychological isolation across contexts (Singh & Sidhu, 2023). Yet its relative weight may increase in settings where clinical technology is perceived as standardized, making human connection the primary differentiator.
- **Reliability as Systemic Trust:** Accuracy in scheduling, medication, records, and billing is foundational. Operational errors breed "administrative anxiety" universally, but the tolerance threshold may be lower in settings where patients have paid premium fees or traveled long distances.
- **Responsiveness as Attentiveness Signaling:** Prompt replies and visible staff availability signal respect for patient urgency (Cai et al., 2025). In high-volume public settings, responsiveness may be judged against systemic constraints; in private settings, against service-level promises.
- **Tangibility as Symbolic Communication:** Clean facilities, modern equipment, and organized spaces communicate safety and professionalism. Their symbolic weight may be higher in settings where patients lack other cues of institutional credibility.

Empirical studies reinforce this contextual modulation. Oncology-focused SERVQUAL analyses frequently report Assurance and Reliability as dominant predictors in high-acuity settings, while Empathy and Tangibility demonstrate stronger effects in private or patient-choice-driven environments (Al-Dweik et al., 2021; Ferreira et al., 2023). Gap-analysis studies further reveal that negative gaps persist across all dimensions, but their magnitude and patient tolerance vary by institutional type and patient socioeconomic status.

Service quality in oncology, therefore, is best understood not as a static hierarchy, but as a dynamic system of signals whose interpretive weight shifts across institutional contexts.

The literature therefore suggests that service quality in oncology care cannot be understood as a purely operational construct. It functions simultaneously as a technical, emotional, relational, and institutional experience.

2.3 Universal Drivers and Contextual Variation

The academic conversation surrounding SERVQUAL in heterogeneous healthcare settings reveals a central tension: Which dimensions generalize across contexts, and which are context-bound?

- **The Case for Universal Drivers:** Derisi et al. (2020) and Baseri et al. (2020) found that Assurance and Reliability consistently predicted satisfaction across diverse oncology wards, suggesting these dimensions tap into fundamental human needs for trust and predictability under uncertainty.
- **The Case for Contextual Modulation:** Conversely, South Asian private healthcare studies suggest that when clinical expertise is perceived as baseline, Empathy, Responsiveness, and Tangibility become primary differentiators (Nadiri & Hussain, 2016; Singh & Sidhu, 2023). In these contexts, the "human" and "environmental" dimensions carry disproportionate weight.

This tension is not a contradiction; it is an invitation to test for measurement invariance and structural consistency across settings. Rather than assuming dimensions mean the same thing everywhere, rigorous cross-context research asks: *Do patients in different institutional environments interpret "Assurance" or "Empathy" in conceptually equivalent ways?*

Contemporary methodological literature recommends treating SERVQUAL dimensions as conceptually distinct but empirically correlated latent constructs, while explicitly testing whether their measurement properties and structural relationships hold across groups (Hair et al., 2022; Henseler et al., 2015). This study adopts that position. Each dimension will be modeled as a parallel predictor of patient satisfaction, with covariances estimated to capture perceptual overlap, and configural/metric invariance tested to ensure cross-context construct equivalence before pooling or comparing structural paths.

2.4 The Indian Oncology Context and the Patient–Attendant Dynamic

The Indian healthcare environment introduces additional contextual complexities into oncology service quality evaluation.

First, oncology treatment in India frequently involves active family participation. Attendants and caregivers often coordinate appointments, manage administrative procedures, provide emotional support, and participate in treatment decisions. As a result, the healthcare experience becomes a shared or dyadic experience rather than an exclusively individual one.

Kumar, Singh, and Patel (2022) observed that caregivers in oncology settings significantly influence perceptions of communication quality, institutional trust, and continuity of care. While patients may evaluate emotional support and clinical reassurance more directly, attendants frequently become primary evaluators of responsiveness, administrative reliability, and institutional coordination.

Second, institutional heterogeneity remains a defining characteristic of urban healthcare systems such as Bangalore. Public oncology hospitals often operate under resource pressure and high patient volume, while private and accredited specialty hospitals may offer comparatively structured service systems and personalized care experiences.

These institutional differences may shape how patients interpret service quality dimensions and form satisfaction judgments. Accordingly, the present study treats institutional variation not as statistical noise but as an important contextual feature of oncology healthcare evaluation.

2.5 Why PLS-SEM?

The multidimensional and latent nature of healthcare service quality requires analytical approaches capable of modeling complex relationships simultaneously.

Traditional regression approaches frequently treat service quality dimensions as directly observable and independent variables. However, constructs such as Assurance, Empathy, or Reliability cannot be measured directly; they are inferred through multiple observed indicators.

Partial Least Squares Structural Equation Modeling (PLS-SEM) provides several advantages for this type of research:

1. It models latent constructs using multiple indicators while accounting for measurement error.
2. It allows simultaneous estimation of multiple structural relationships.
3. It is appropriate for predictive healthcare research involving moderate sample sizes.
4. It accommodates complex service quality models involving multiple interrelated dimensions.

Hair, Hult, Ringle, and Sarstedt (2022) identify PLS-SEM as particularly useful for predictive and exploratory service quality research where the primary objective is identifying key drivers of an endogenous construct such as Patient Satisfaction.

In addition, discriminant validity assessment procedures such as the HTMT criterion (Henseler, Ringle, & Sarstedt, 2015) improve construct reliability by ensuring conceptual distinctiveness among service quality dimensions.

Accordingly, the present study employs PLS-SEM to estimate the structural influence of SERVQUAL dimensions on Patient Satisfaction across heterogeneous oncology hospitals in Bangalore.

2.6 Conceptual Framework and Hypothesis Development

Drawing from SERVQUAL theory, Expectation-Confirmation Theory, and prior healthcare service quality literature, the conceptual model positions Patient Satisfaction as the cumulative outcome of multiple service quality evaluations.

The study models Tangibility, Reliability, Responsiveness, Assurance, and Empathy as parallel latent predictors of Patient Satisfaction.

The following hypotheses were proposed:

- **H₁:** Tangibility has a positive relationship with Patient Satisfaction.
- **H₂:** Reliability has a positive relationship with Patient Satisfaction.
- **H₃:** Responsiveness has a positive relationship with Patient Satisfaction.
- **H₄:** Assurance has a positive relationship with Patient Satisfaction.
- **H₅:** Empathy has a positive relationship with Patient Satisfaction.

The conceptual framework assumes that while these dimensions remain conceptually distinct, they may also exhibit natural perceptual overlap within healthcare experiences. Accordingly, the constructs are treated as correlated latent dimensions without imposing unsupported causal mediation pathways.

This framework allows the study to identify which service quality dimensions most strongly shape Patient Satisfaction across heterogeneous oncology settings in Bangalore.

3. Research Methodology

If the previous section mapped the theoretical terrain across heterogeneous oncology settings, this section translates that terrain into a measurable research framework. It addresses the operational question: how can latent perceptions of service quality be captured across institutional environments without conflating measurement error, contextual variation, and structural relationships?

This section outlines the research design, sampling strategy, instrument development process, data collection procedures, ethical considerations, and analytical framework used in the study. The methodology was designed specifically for multi-site oncology service research and aligned with Partial Least Squares Structural Equation Modeling (PLS-SEM) practices appropriate for predictive healthcare research.

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3.1 Research Design

The study employed a quantitative, cross-sectional, explanatory research design with multi-site comparative capability. The cross-sectional approach enabled the collection of patient and attendant perceptions at a single point in time across different oncology hospitals in Bangalore.

The explanatory orientation moved beyond descriptive satisfaction measurement to examine how multiple latent service quality dimensions simultaneously influence Patient Satisfaction. The design was therefore predictive and variance-oriented, making it appropriate for PLS-SEM analysis.

The study focused specifically on identifying the relative influence of Tangibility, Reliability, Responsiveness, Assurance, and Empathy on Patient Satisfaction across heterogeneous oncology settings.

3.2 Study Settings

Data collection was conducted across selected oncology hospitals in Bangalore representing institutional diversity within the city's healthcare ecosystem. The participating institutions included:

- government oncology facilities,
- NABH-accredited institutions,
- private specialty oncology centers,
- and independent cancer hospitals.

The hospitals differed in ownership structure, patient volume, administrative systems, and service delivery environments. This institutional variation was treated as an analytical feature rather than statistical noise, enabling the study to examine whether service quality perceptions remained stable across different healthcare settings.

Data were collected from outpatient departments (OPD), inpatient wards, chemotherapy units, and radiation units to ensure representation across multiple treatment touchpoints.

3.3 Population and Sampling Strategy

Target Population

The target population consisted of adult cancer patients (18 years and above) receiving oncology treatment in participating hospitals, along with their primary attendants or caregivers.

The inclusion of attendants reflected the collaborative nature of oncology care within the Indian healthcare context, where family members frequently participate in treatment coordination, communication, and emotional support.

Sampling Technique

A non-probability purposive sampling method with institutional and service-unit stratification was adopted.

Respondents were selected based on:

- availability during data collection,
- willingness to participate,
- ability to provide informed consent,
- and recent experience with oncology services.

Stratification ensured representation across:

- hospital types,
- outpatient and inpatient settings,
- chemotherapy units,
- and radiation units.

Sample Size

The final study included approximately 200 valid responses distributed across participating oncology hospitals.

The sample size was considered adequate for PLS-SEM analysis because:

- the study involved multiple latent constructs measured through reflective indicators,
- PLS-SEM performs effectively with moderate sample sizes,
- and the sample exceeded the minimum threshold recommended for predictive structural modeling (Hair et al., 2022).

Inclusion Criteria:

Adults ≥ 18 years, confirmed cancer diagnosis, able to comprehend English/Kannada/Hindi, and having received at least one service encounter at the participating facility within the past 30 days.

Exclusion Criteria:

Patients in critical or acute palliative distress, individuals with cognitive impairment preventing informed consent, and those declining participation.

3.4 Instrument Development and Cross-Site Calibration

The survey instrument is a standardized diagnostic tool designed to operationalize latent constructs consistently across institutional contexts.

Scale Adaptation:

Items were adapted from established SERVQUAL scales (Parasuraman et al., 1988; Nadiri & Hussain, 2016) and recent Indian oncology studies (Singh & Sidhu, 2023; Cai et al., 2025). Wording was carefully decontextualized to avoid site-specific references (e.g., “this hospital” instead of facility names) while preserving psychometric integrity.

Response Format:

A 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) is applied uniformly across all constructs to minimize cognitive friction and maintain cross-site comparability.

Construct Operationalization:

- Tangibles (4 items) Facility cleanliness, equipment condition, staff presentation, informational material clarity.
- Reliability (4 items) Schedule adherence, record accuracy, error-free service delivery, consistent problem resolution.
- Responsiveness (4 items) Prompt assistance, staff availability, timely communication, service delivery speed.
- Assurance (4 items) Perceived competence, professional courtesy, safety confidence, knowledge clarity.
- Empathy (4 items) Individualized attention, emotional understanding, patient-centered flexibility, genuine concern.
- Patient Satisfaction (4 items) Overall care rating, expectation confirmation, recommendation intent, perceived value alignment.

Cross-Site Pilot Testing & Validation:

A pilot study was conducted prior to the final survey administration to evaluate:

- clarity of wording,
- contextual appropriateness,
- completion time,
- and response consistency.

Minor wording refinements were made following pilot feedback.

Content validity was assessed through expert review involving healthcare researchers and professionals familiar with oncology service environments.

3.5 Data Collection Procedure

Data collection was conducted through both paper-based and digital survey administration methods.

Questionnaires were administered during natural waiting periods such as:

- pre-consultation waiting,
- post-treatment observation,
- inpatient stay,
- and follow-up visits.

Participation was voluntary, and respondents were informed that:

- responses would remain anonymous,
- participation would not affect treatment,
- and the data would be used solely for academic research purposes.

Each completed response was assigned a unique identification code to preserve anonymity while enabling institutional grouping during analysis.

3.6 Ethical Considerations and Common Method Bias Mitigation

The study adhered to standard healthcare research ethics principles.

Participants provided informed consent prior to questionnaire administration. Confidentiality and anonymity were maintained throughout the study.

No personally identifiable clinical information was collected.

Participants retained the right to withdraw from the study at any stage without consequence.

The study also incorporated procedural safeguards to reduce common method bias, including:

- anonymity assurance,
- separation of demographic and construct sections,
- and standardized response scaling.

3.7 Data Analysis Strategy: PLS-SEM with Cross-Context Rigor

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4 (Ringle, Wende, & Becker, 2024). The analytical workflow was designed to examine the structural relationships between SERVQUAL dimensions and Patient Satisfaction across heterogeneous oncology settings in Bangalore while maintaining construct reliability and predictive validity.

The analysis followed a four-stage PLS-SEM framework, combining descriptive analysis, reflective measurement assessment, structural modeling, and contextual comparative interpretation.

Stage 1: Preliminary Data Screening and Descriptive Analysis

The first stage focused on data preparation and descriptive assessment. Survey responses were screened for completeness, coding consistency, and response validity prior to model estimation.

Descriptive statistical analysis was conducted to summarize:

- respondent characteristics,
- hospital distribution,
- treatment-stage composition,
- visit frequency,
- and unit-wise representation.

Mean and standard deviation values were computed for all SERVQUAL constructs and Patient Satisfaction across:

- hospital categories,
- treatment units,
- age groups,
- treatment stages,
- and visit frequency categories.

This stage provided contextual insight into how service quality perceptions varied across heterogeneous oncology environments before structural estimation.

Stage 2: Measurement Model Validation The reflective measurement model was evaluated using established PLS-SEM criteria:

- **Indicator reliability:** Outer loadings ≥ 0.70 retained; items 0.40–0.70 kept only if Composite Reliability (CR) and Average Variance Extracted (AVE) thresholds were met.

- **Internal consistency:** CR and Cronbach's $\alpha \geq 0.70$ for all constructs. Threshold values above 0.70 were considered acceptable for internal consistency (Hair et al., 2022).
- **Convergent validity:** AVE ≥ 0.50 .
- **Discriminant validity:** Heterotrait-Monotrait (HTMT) ratios < 0.90 across all construct pairs.

Stage 3: Structural Model Estimation With measurement validity confirmed, structural relationships were tested:

- **Collinearity assessment:** Inner Variance Inflation Factors (VIF) < 5.0 confirmed predictor independence.
- **Path coefficients:** Standardized β estimated via PLS algorithm; significance tested using 5,000 bootstrap resamples (two-tailed, 95% bias-corrected confidence intervals).
- **Clustering control:** Site-level nesting was addressed via stratified sampling and post-hoc MGA verification rather than complex cluster-robust estimators, appropriate for the Student Version's analytical scope.
- **Model diagnostics:** Explanatory power (R^2), effect sizes (f^2), predictive relevance (Q^2 via blindfolding), and approximate fit (SRMR < 0.08) were reported.

Stage 4: Importance-Performance Mapping Importance-Performance Map Analysis (IPMA) was conducted to translate structural findings into managerial priorities. IPMA plots each SERVQUAL dimension by:

- **Importance:** Total effect on satisfaction (β)
- **Performance:** Mean latent variable score (1–5 Likert scale)

This identifies quadrants for strategic action: high-importance/low-performance gaps (urgent improvement), high-importance/high-performance strengths (maintain excellence), and low-priority areas.

Analytical Principles

- SERVQUAL dimensions were modeled as parallel latent predictors of satisfaction, with covariances estimated to reflect perceptual overlap.
- No causal mediation pathways were imposed without theoretical justification.
- All analyses prioritized cross-context validity: invariance testing preceded pooling, and MGA results informed whether findings generalized or required contextual qualification.
- Common method bias was assessed procedurally (anonymity, item randomization) and statistically (Harman's single-factor test, full collinearity VIFs).

This workflow balanced methodological rigor with practical constraints, ensuring that structural interpretations rested on validated measurement foundations while remaining actionable for heterogeneous healthcare networks.

3.8 Variables and Operationalization Summary

Variable Type	Construct	Measurement Approach	Items	Scale
IV	Tangibles	Reflective latent	4	5-point Likert
	Reliability	Reflective latent	5	5-point Likert
	Responsiveness	Reflective latent	4	5-point Likert

	Assurance	Reflective latent	4	5-point Likert
	Empathy	Reflective latent	4	5-point Likert
DV	Patient Satisfaction	Reflective latent	4	5-point Likert
Contextual Covariates	Institutional Type, Role, Treatment Stage, Visit Frequency	Observed categorical/continuous	4	Categorical/Numerical

Note: All latent constructs are modeled reflectively. Institutional type and site identifiers serve as clustering controls and MGA grouping variables to test structural generalizability.

1. Data Analysis and Interpretation

The present study examined the influence of service quality dimensions on patient satisfaction in oncology hospitals in Bangalore using the SERVQUAL framework and Partial Least Squares Structural Equation Modeling (PLS-SEM). The analysis was carried out using SmartPLS 4. The constructs included Tangibility (TAN), Reliability (REL), Responsiveness (RES), Assurance (ASSU), Empathy (EMP), and Patient Satisfaction (SAT). The SmartPLS algorithm and bootstrapping procedures were used to assess the measurement and structural models.

4.1 Descriptive Statistics

Descriptive statistics were computed to understand respondents' perceptions regarding oncology healthcare services. Mean and standard deviation values indicate the central tendency and dispersion of responses across different dimensions.

Table 4.1 Overall Mean and Standard Deviation

Construct	Mean	Standard Deviation
Tangibility	3.81	0.33
Reliability	3.93	0.18
Responsiveness	3.94	0.17
Assurance	4.72	0.42
Empathy	4.16	0.28
Patient Satisfaction	4.28	0.36

The results indicate that respondents perceived Assurance most positively (Mean = 4.72), followed by Empathy (Mean = 4.16). Tangibility recorded the lowest mean score (Mean = 3.81), suggesting relatively lower satisfaction with physical infrastructure and tangible aspects of service delivery.

4.2 Contextual Comparative Analysis

4.2.1 Hospital-wise Comparative Analysis

Hospital-wise analysis revealed variations in patient perceptions across oncology institutions.

Hospital	TAN	REL	RES	ASSU	EMP	SAT
GOVT_ONC	3.31	3.76	3.76	4.08	4.00	4.02
NABH_INST	4.00	4.00	4.00	4.99	4.57	4.79
PVT_CARE	4.00	4.00	4.00	5.00	4.06	4.31
SCH	3.94	3.97	3.98	4.81	4.00	4.01

NABH-accredited institutions reported the highest satisfaction levels (Mean SAT = 4.79), indicating stronger service quality performance. Government oncology centers reported comparatively lower perceptions in Tangibility and Responsiveness dimensions.

4.2.2 Treatment Unit-wise Analysis

Unit	TAN	REL	RES	ASSU	EMP	SAT
Chemotherapy	3.98	3.98	3.99	4.86	4.03	4.04
Inpatient Ward	3.94	3.96	3.97	4.92	4.00	4.23
Outpatient (OPD)	3.35	3.79	3.79	4.13	4.01	4.03
Radiation	4.00	4.00	4.00	4.99	4.60	4.85

Radiation therapy units demonstrated the highest patient satisfaction (Mean SAT = 4.85), while OPD services showed comparatively lower satisfaction levels, particularly in Tangibility and Responsiveness.

4.2.3 Treatment Stage Analysis

Patients undergoing ongoing treatment reported comparatively higher empathy perceptions and overall satisfaction than newly diagnosed and follow-up patients.

Stage	SAT Mean
Follow-up	4.00
Newly Diagnosed	4.25
Ongoing Treatment	4.43

This indicates that prolonged interaction with healthcare providers may strengthen trust and emotional support perceptions.

4.3 Correlation Analysis

Pearson correlation analysis was conducted to examine the relationships among the study constructs.

Table 4.2 Correlation Matrix

Variables	TAN	REL	RES	ASSU	EMP	SAT
Tangibility	1					
Reliability	0.660	1				
Responsiveness	0.669	0.787	1			
Assurance	0.780	0.649	0.657	1		
Empathy	0.327	0.215	0.217	0.374	1	
Satisfaction	0.448	0.294	0.298	0.512	0.959	1

The findings reveal a strong positive correlation between Empathy and Patient Satisfaction ($r = 0.959$), indicating that emotional care and personalized attention significantly influence oncology patient experiences. Assurance also demonstrated a moderate positive relationship with satisfaction ($r = 0.512$).

4.4 Measurement Model Assessment

The measurement model was evaluated using reliability and validity indicators including factor loadings, Composite Reliability (CR), Average Variance Extracted (AVE), Cronbach's Alpha, and HTMT ratio.

The HTMT values were below the threshold level of 0.90, confirming discriminant validity among constructs. The constructs also satisfied internal consistency reliability requirements.

During the measurement model assessment, indicator reliability was evaluated using outer loadings. Two indicators, namely TAN2 and RES1, demonstrated comparatively weak contribution and conceptual redundancy within their respective constructs. Consistent with PLS-SEM measurement refinement guidelines, these indicators were removed to improve construct reliability, convergent validity, and overall model stability. The revised model demonstrated satisfactory reliability and validity measures across all remaining indicators.

4.5 Structural Model Assessment

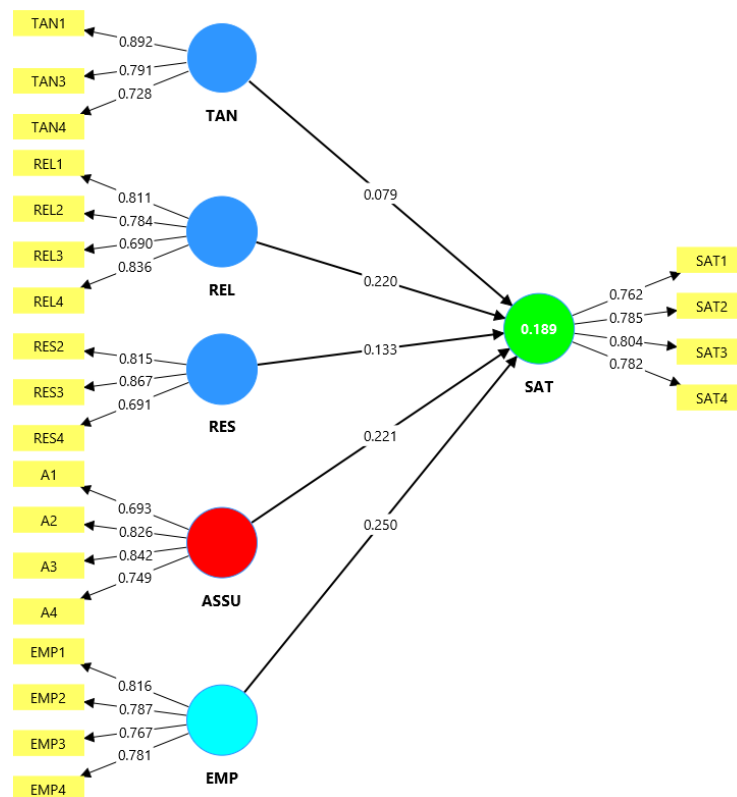
The structural model was analyzed using bootstrapping procedures in SmartPLS. The path coefficients, t-values, and p-values are presented below.

Table 4.3 Structural Path Coefficients

Hypothesis	Path	β	t-value	p-value	Result
H1	ASSU $\rightarrow$ SAT	0.221	3.312	0.001	Supported
H2	EMP $\rightarrow$ SAT	0.250	4.562	0.000	Supported
H3	REL $\rightarrow$ SAT	0.220	3.736	0.000	Supported
H4	RES $\rightarrow$ SAT	0.133	2.175	0.030	Supported
H5	TAN $\rightarrow$ SAT	0.079	0.852	0.394	Not Supported

The results indicate that Empathy exerted the strongest influence on Patient Satisfaction ($\beta = 0.250$), followed closely by Assurance and Reliability. Tangibility did not significantly influence satisfaction.

The findings suggest that interpersonal care, trust, emotional support, and service dependability are more influential than physical infrastructure in oncology healthcare settings.



4.6 Coefficient of Determination (R^2)

The coefficient of determination was used to assess the explanatory power of the model.

Endogenous Construct	R^2	Adjusted R^2
Patient Satisfaction	0.188	0.167

The model explains approximately 18.8% of the variance in Patient Satisfaction, indicating moderate explanatory power.

4.7 Effect Size (f^2)

Path	f-square
ASSU -> SAT	0.058
EMP -> SAT	0.074
REL -> SAT	0.058
RES -> SAT	0.022
TAN -> SAT	0.008

Empathy demonstrated the highest effect size among all predictors, confirming its importance in oncology patient satisfaction.

4.8 Importance–Performance Map Analysis (IPMA)

IPMA results revealed that Empathy and Assurance demonstrated both high importance and high performance in influencing patient satisfaction. Tangibility exhibited relatively lower importance and performance.

The outer weights analysis showed that the indicators related to emotional understanding, professional competence, and personalized care contributed substantially to the predictive power of the model.

4.8.1 Construct-Level IPMA

Construct Path	Path coefficients
ASSU -> SAT	0.221
EMP -> SAT	0.250
REL -> SAT	0.220
RES -> SAT	0.133
TAN -> SAT	0.079

The construct-level IPMA results revealed that Empathy demonstrated the highest importance value (0.250) in predicting Patient Satisfaction, followed closely by Assurance (0.221) and Reliability (0.220). These findings indicate that emotional support, trust-building communication, and dependable healthcare delivery are the strongest experiential drivers of satisfaction within oncology settings.

Responsiveness exhibited moderate importance (0.133), suggesting that prompt assistance and staff availability contribute positively but less strongly to satisfaction formation. Tangibility demonstrated the lowest importance value (0.079), implying that physical infrastructure and environmental aspects exert comparatively weaker influence on patient satisfaction when compared with interpersonal and psychological service dimensions.

The IPMA findings align with the structural model results, reinforcing the central role of empathy, assurance, and reliability in shaping patient experiences across heterogeneous oncology hospitals.

4.8.2 Indicator-Level Outer Weights

Outer Weights-Matrix	ASSU	EMP	REL	RES	SAT	TAN
A1	0.092					
A2	0.416					
A3	0.466					
A4	0.267					
EMP1		0.392				
EMP2		0.295				
EMP3		0.305				
EMP4		0.275				
REL1			0.374			
REL2			0.320			

REL3			0.182			
REL4			0.383			
RES2				0.458		
RES3				0.577		
RES4				0.183		
SAT1					0.321	
SAT2					0.279	
SAT3					0.343	
SAT4					0.334	
TAN1						0.582
TAN3						0.360
TAN4						0.269

The IPMA outer weight analysis identified the most influential indicators contributing to each latent construct. Within the Tangibility construct, TAN1 demonstrated the highest importance weight (0.582), indicating that facility cleanliness and physical environment strongly shaped tangible service perceptions. Similarly, RES3 (0.577) emerged as the most influential responsiveness indicator, suggesting that staff willingness to assist patients plays a critical role in responsiveness evaluations.

Among the Assurance indicators, A3 (0.466) and A2 (0.416) contributed substantially, highlighting the importance of clear communication and professional competence in oncology care settings. For Reliability, REL4 (0.383) and REL1 (0.374) showed comparatively higher contributions, emphasizing the significance of dependable and accurate service delivery. Within the Satisfaction construct, SAT3 (0.343) recorded the highest indicator importance, suggesting that recommendation intention strongly reflected overall satisfaction.

Overall, the IPMA findings reinforce the structural model results by demonstrating that emotionally supportive, reliable, and professionally competent interactions contribute most significantly to patient satisfaction across oncology hospitals.

The data analysis was conducted using SmartPLS 4 software for Partial Least Squares Structural Equation Modeling (PLS-SEM) (Ringle, Wende, & Becker, 2024).

4.9 Hypotheses Testing Summary

The hypotheses proposed in the conceptual framework were tested using bootstrapping procedures in SmartPLS 4. The structural relationships between the SERVQUAL dimensions and Patient Satisfaction were evaluated using standardized path coefficients (β), t-statistics, and p-values.

Table 4. Hypotheses Testing Results

Hypothesis	Structural Path	β	t-value	p-value	Decision
H ₁	Tangibility → Patient Satisfaction	0.079	0.852	0.394	Not Supported
H ₂	Reliability → Patient Satisfaction	0.220	3.736	0.000	Supported
H ₃	Responsiveness → Patient Satisfaction	0.133	2.175	0.030	Supported

H ₄	Assurance → Patient Satisfaction	0.221	3.312	0.001	Supported
H ₅	Empathy → Patient Satisfaction	0.250	4.562	0.000	Supported

Interpretation of Hypotheses Results

The structural model results revealed that four of the five proposed hypotheses were supported. Empathy emerged as the strongest predictor of Patient Satisfaction ($\beta = 0.250$, $p < 0.001$), indicating that emotional understanding, personalized attention, and compassionate care play a decisive role in shaping oncology patient experiences. This finding reinforces the argument that cancer care is not evaluated solely through clinical competence, but through emotionally resonant interactions that reduce vulnerability and psychological distress.

Assurance also demonstrated a significant positive relationship with Patient Satisfaction ($\beta = 0.221$, $p = 0.001$). The result suggests that professional competence, trust-building communication, and confidence in healthcare staff substantially influence satisfaction formation across oncology settings. Reliability similarly exerted a statistically significant positive influence ($\beta = 0.220$, $p < 0.001$), emphasizing the importance of consistent, accurate, and dependable healthcare delivery processes.

Responsiveness showed a weaker but statistically significant positive effect on satisfaction ($\beta = 0.133$, $p = 0.030$). Although promptness and staff availability remain important, their influence appears comparatively lower than emotional and trust-related dimensions in oncology care environments.

In contrast, Tangibility did not demonstrate a statistically significant relationship with Patient Satisfaction ($\beta = 0.079$, $p = 0.394$). This indicates that physical infrastructure, environmental aesthetics, and visible facilities alone are insufficient to meaningfully enhance patient satisfaction when compared to interpersonal and psychological dimensions of care. The finding suggests that patients undergoing prolonged cancer treatment prioritize human-centered interactions over environmental impressions.

Overall, the hypothesis testing results support the broader theoretical position that experiential and relational dimensions of healthcare service quality carry greater explanatory power than purely physical or environmental attributes in specialized oncology contexts.

4.10 Summary of Data Analysis Findings

The data analysis results collectively indicate that patient satisfaction in oncology hospitals is predominantly shaped by interpersonal and psychological service quality dimensions rather than tangible infrastructure alone. Among all SERVQUAL constructs, Empathy demonstrated the strongest influence on satisfaction, followed closely by Assurance and Reliability. These findings highlight the critical importance of compassionate communication, emotional support, trust-building interactions, and dependable service delivery in oncology care environments.

The contextual comparative analysis further revealed meaningful variation across hospitals, treatment units, treatment stages, and patient visit frequency. NABH-accredited institutions and radiation units demonstrated comparatively higher satisfaction scores, whereas outpatient settings reported relatively lower perceptions of service quality dimensions. Such differences reinforce the importance of contextualizing patient satisfaction within institutional and operational environments.

The PLS-SEM model explained 18.8% of the variance in Patient Satisfaction ($R^2 = 0.188$), indicating moderate predictive capability. The IPMA analysis additionally identified Empathy and Assurance as both highly important and high-performing constructs, suggesting that investments in communication quality, emotional intelligence training, and patient-centered care delivery may yield the greatest improvements in satisfaction outcomes.

Overall, the findings provide empirical support for the SERVQUAL framework and Expectation-Confirmation Theory within heterogeneous oncology care settings, while also demonstrating that emotionally supportive and

trust-oriented healthcare interactions form the central foundation of patient satisfaction across Bangalore's oncology ecosystem.

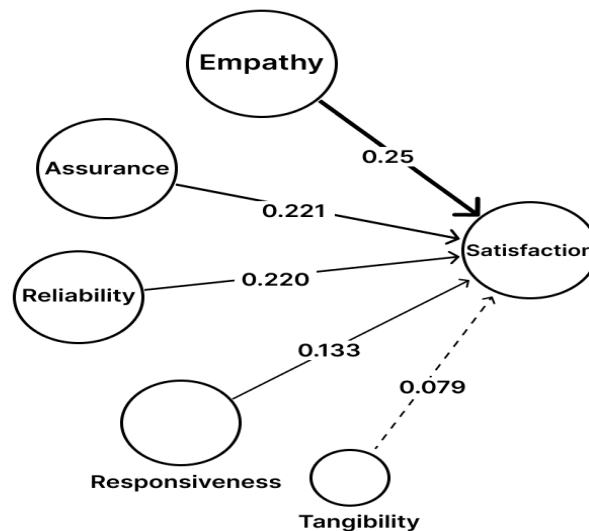


Figure 1 Integrated Framework of Significant Determinants of Patient Satisfaction

5. Discussion

This section interprets the findings of the PLS-SEM analysis in relation to SERVQUAL theory, Expectation-Confirmation Theory (ECT), and existing oncology healthcare literature. The results indicate that patient satisfaction within oncology settings is influenced more strongly by interpersonal and psychological dimensions of care than by physical infrastructure alone. Among the SERVQUAL dimensions, Empathy emerged as the strongest predictor of Patient Satisfaction, followed by Assurance and Reliability, highlighting the central importance of compassionate, trustworthy, and dependable care experiences across heterogeneous oncology hospitals in Bangalore.

5.1 Discussion of Structural Relationships

Empathy and Patient Satisfaction

Empathy demonstrated the strongest positive relationship with Patient Satisfaction ($\beta = 0.250$), indicating that emotional understanding, individualized attention, and compassionate interaction significantly shape oncology patient experiences. Cancer treatment is emotionally demanding and often prolonged; therefore, patients tend to evaluate healthcare quality not only through clinical outcomes but also through how supported and understood they feel during treatment. This finding aligns with prior oncology studies which emphasize empathy as a psychological stabilizer that reduces fear, uncertainty, and emotional isolation.

The finding also supports Expectation-Confirmation Theory, as patients entering oncology care often expect emotional reassurance and humane treatment alongside medical intervention. When these expectations are fulfilled, satisfaction levels increase substantially.

Assurance and Patient Satisfaction

Assurance showed a significant positive influence on Patient Satisfaction ($\beta = 0.221$). The result suggests that professional competence, clear communication, and trust-building interactions are critical in oncology environments where uncertainty regarding diagnosis and treatment outcomes remains high. Patients appear to interpret staff confidence and clarity as indicators of institutional reliability and safety.

This finding is consistent with SERVQUAL literature, where assurance frequently emerges as one of the strongest predictors of satisfaction in healthcare settings. In oncology care specifically, the ability of doctors and healthcare staff to communicate confidently and respectfully plays a major role in reducing patient anxiety.

Reliability and Patient Satisfaction

Reliability also demonstrated a significant positive effect on satisfaction ($\beta = 0.220$). Consistency in scheduling, record accuracy, treatment coordination, and service delivery contributes to patient trust and continuity of care. In cancer treatment settings, operational disruptions such as delayed appointments or administrative errors may intensify psychological stress; therefore, dependable service systems become essential to positive patient experiences.

The result indicates that patients evaluate healthcare quality not only through interpersonal care but also through the smooth functioning of institutional processes.

Responsiveness and Patient Satisfaction

Responsiveness exhibited a weaker but statistically significant relationship with satisfaction ($\beta = 0.133$). Prompt assistance, accessibility of staff, and timely responses positively influence patient perceptions; however, the comparatively lower coefficient suggests that responsiveness alone is insufficient to create strong satisfaction unless accompanied by empathy and assurance.

This indicates that oncology patients may value the quality of interaction more than the speed of interaction. A quick response that lacks emotional sensitivity may not contribute as strongly to overall satisfaction.

Tangibility and Patient Satisfaction

Tangibility did not demonstrate a statistically significant relationship with Patient Satisfaction ($\beta = 0.079$). This finding suggests that physical infrastructure, environmental aesthetics, and visible facilities are less influential than interpersonal care dimensions in oncology settings. While clean and organized facilities remain important baseline expectations, they do not independently drive satisfaction when compared with emotional support, communication quality, and trust.

The result is particularly important because it challenges the assumption that infrastructure upgrades alone can substantially improve patient experiences. In oncology care, patients appear to prioritize human-centered care over purely environmental impressions.

5.2 Contextual Comparative Discussion

The comparative analysis across hospitals, treatment units, and patient groups revealed meaningful contextual variation in service quality perceptions. NABH-accredited hospitals reported comparatively higher satisfaction scores, particularly in Assurance and Empathy dimensions, indicating stronger institutional standardization and patient-centered communication practices.

Radiation units demonstrated the highest satisfaction levels, while outpatient departments (OPD) reported comparatively lower scores in responsiveness and tangibility. This may reflect workload pressure, crowding, and reduced interaction time in OPD settings.

Patients undergoing ongoing treatment reported relatively higher empathy perceptions compared with newly diagnosed patients, suggesting that prolonged interactions with healthcare providers may strengthen emotional connection and institutional trust over time.

5.3 Theoretical and Managerial Implications

The findings reinforce the applicability of SERVQUAL and Expectation-Confirmation Theory within oncology healthcare settings. The study demonstrates that satisfaction is shaped primarily through emotionally meaningful and trustworthy interactions rather than through infrastructure alone.

From a managerial perspective, the findings suggest that healthcare administrators should prioritize:

- empathy and communication training,
- trust-building clinical interactions,
- reliable scheduling and administrative systems,
- and emotionally supportive patient engagement practices.

The results indicate that investments in human-centered care may yield stronger improvements in patient satisfaction than isolated investments in physical infrastructure.

5.4 Summary

The discussion highlights that patient satisfaction in oncology care is multidimensional but strongly driven by empathy, assurance, and reliability. Emotional support, professional competence, and dependable service delivery emerged as the most influential determinants across heterogeneous oncology settings in Bangalore. The findings therefore position patient satisfaction not merely as a reaction to treatment outcomes, but as a reflection of how patients experience care psychologically, emotionally, and institutionally throughout the cancer treatment journey.

6. Conclusion and Recommendations

6.1 Conclusion

The study examined the determinants of patient satisfaction across heterogeneous oncology hospitals in Bangalore using the SERVQUAL framework and PLS-SEM analysis. The findings revealed that Empathy emerged as the strongest predictor of Patient Satisfaction, followed by Assurance and Reliability. Responsiveness demonstrated a weaker but significant influence, while Tangibility did not exhibit a statistically significant relationship with satisfaction.

The results indicate that oncology patients evaluate healthcare experiences primarily through emotionally supportive, trustworthy, and dependable interactions rather than through physical infrastructure alone. Satisfaction within cancer care settings therefore appears to be deeply connected to communication quality, emotional reassurance, institutional trust, and continuity of care.

The comparative analysis across hospitals and treatment units further demonstrated that service quality perceptions vary across institutional contexts, emphasizing the importance of patient-centered care strategies tailored to operational realities.

6.2 Recommendations

Based on the findings, the following recommendations are proposed:

- Strengthen empathy-focused communication training for clinical and frontline staff.
- Improve assurance-building practices through clear treatment communication and patient counseling.
- Enhance reliability through better scheduling systems, record accuracy, and service coordination.
- Reduce responsiveness gaps in high-volume outpatient settings through streamlined patient support systems.
- Focus on human-centered care improvements alongside infrastructure development rather than relying on physical upgrades alone.

6.3 Limitations and Future Research

The study is limited by its cross-sectional design, moderate sample size, and reliance on self-reported perceptual data collected from selected oncology hospitals in Bangalore. The findings therefore reflect associations rather than causal relationships.

Future research may extend the study through longitudinal analysis, multi-city comparisons, qualitative patient narratives, and moderation analysis across demographic and institutional variables.

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