ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

Service Visibility Bias and Patient Satisfaction in Private Specialist Healthcare: A Cross-Sectional Study in Northern Nigeria

Ibrahim Lekan Jubril[1]

[1]MSc, MBA
[1]Clinic Manager, PSC Specialist Hospital, Kano, Nigeria, MSc Global Public Health, Deggendorf Institute of Technology, Germany

Publication Date: 2026/04/15

Abstract:

- ***Objectives:***
  To quantify domain-specific patient satisfaction across clinical and non-clinical service dimensions in a private specialist hospital in northern Nigeria; to identify service dimensions most strongly associated with overall satisfaction; and to segment the patient population by satisfaction profile in order to characterise groups whose experience is disproportionately shaped by non-clinical operational deficiencies.

- ***Design:***
  Quantitative cross-sectional study. Data were analysed using descriptive statistics, Pearson's correlation, and silhouette-optimised K-means clustering.

- ***Setting:***
  Private specialist hospital, Kano, Kano State, Nigeria. Data collection period: January to June 2024.

- ***Participants:***
  64 adult patients (response rate 85.3%) recruited via systematic random sampling from facility records. Eligibility required documented care attendance within the preceding four weeks and capacity to provide informed verbal consent.

- ***Outcome Measures:***
  Patient satisfaction across nine service domains, operationalised through a structured questionnaire (Cronbach's $\alpha = 0.82$), rated on a 20-point composite Likert scale. Primary domains included staff competence, empathy, communication clarity, treatment outcomes, administrative efficiency, and infrastructural adequacy.

- ***Results:***
  Clinical service domains returned consistently high satisfaction scores (staff competence: mean 17.89, SD 3.52; empathy: mean 18.12, SD 3.27; treatment outcomes: mean 17.91, SD 4.02). Non-clinical domains scored substantially lower (filing system efficiency: mean 12.81, SD 2.12; maintenance responsiveness: mean 12.50, SD 3.98). Staff professionalism was the strongest correlate of overall satisfaction ($r = 0.78$, $p < 0.01$). K-means clustering identified two patient segments: Cluster 1 (uniformly high satisfaction) and Cluster 2, whose overall experience was disproportionately depressed by deficiencies in administrative and infrastructural domains, despite clinical scores equivalent to Cluster 1.

- ***Conclusions:***
  The study identifies a structural pattern termed service visibility bias, in which clinical interactions receive disproportionate investment attention relative to operational systems, producing a pronounced satisfaction gap between clinical and non-clinical domains. Targeted investment in administrative efficiency and facility infrastructure represents the highest-leverage intervention for closing this gap. Multi-centre replication is required to establish the generalisability of these findings across the Nigerian private specialist hospital sector.

Keywords: *Patient Satisfaction, Service Visibility Bias, Donabedian Framework, Private Specialist Hospital, K-Means Clustering, Healthcare Quality, Kano, Nigeria, LMIC Health Systems.*

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

How to Cite: Ibrahim Lekan Jubril (2026) Service Visibility Bias and Patient Satisfaction in Private Specialist Healthcare: A Cross-Sectional Study in Northern Nigeria. *International Journal of Innovative Science and Research Technology*, 11(4), 624-631. https://doi.org/10.38124/ijisrt/26apr306

I. INTRODUCTION

Patient satisfaction has emerged as a core performance indicator in health systems globally, informing accreditation decisions, provider payment mechanisms, and facility investment priorities. In resource-constrained settings, where the allocation of limited organisational capital between clinical and operational functions is a persistent management challenge, understanding what drives satisfaction is not merely an academic exercise. It is a strategic and financial decision with direct implications for patient retention, competitive positioning, and institutional reputation.

Nigeria's private health sector accounts for an estimated 60 percent of total healthcare utilisation nationally, a proportion that reflects both the competitive quality signalling of private providers and the structural limitations of public facility capacity in managing specialist demand.[1] In Kano, Nigeria's second-largest city and a regional health services hub for the northwest geopolitical zone, private specialist hospitals serve a heterogeneous population that includes patients who have voluntarily exited the public system following quality-related dissatisfaction. This self-selection process means that patient expectations at private specialist facilities are already elevated relative to the public sector baseline, raising the threshold above which satisfaction is achieved and amplifying the consequence of service shortfalls.

The theoretical foundation for this study is Donabedian's tripartite quality framework, which partitions healthcare quality into structure (conditions under which care is provided), process (actions taken in care delivery), and outcome (effects of care on health and experience).[2] In this framework, patient satisfaction is an outcome variable, mediated by both process-level interactions (staff behaviour, communication, clinical decision-making) and structural inputs (infrastructure, administrative systems, physical environment). The framework predicts that structural deficiencies will constrain satisfaction outcomes even when process quality is high, because structural inputs set the ceiling for the experience that any clinical encounter can produce.

Prior literature from sub-Saharan African hospital settings consistently identifies staff interpersonal behaviour as the primary determinant of satisfaction, with administrative and environmental factors constituting significant but secondary contributors.[3,4] What this literature has not provided is a mechanistic explanation for why the secondary domains systematically underperform relative to clinical domains in facilities where institutional resources are finite and competitive pressures might be expected to drive investment toward the most visible quality signals. This paper addresses that gap by introducing and operationalising the concept of service visibility bias, defined as the systematic pattern by which healthcare providers direct disproportionate investment toward clinically visible interactions relative to operationally invisible systems, producing a structural satisfaction gap that persists independently of overall facility quality level.

The study pursues three empirical objectives: to describe the distribution of patient satisfaction across clinical and non-clinical service domains at a private specialist hospital in Kano; to identify which service dimensions are most strongly associated with overall patient satisfaction; and to segment the patient population by satisfaction profile, enabling targeted identification of the groups most exposed to operational satisfaction deficits.

II. METHODS

➢ *Study Design*

A quantitative cross-sectional design was employed. Cross-sectional methodology is appropriate for characterising population-level satisfaction profiles at a defined point in time and provides a replicable baseline against which longitudinal follow-up can be anchored. The approach is well-established in the health services quality literature and consistent with STROBE reporting standards for observational studies.

➢ *Setting*

The study was conducted at a private specialist hospital in Kano, Kano State, Nigeria, between January and June 2024. The facility provides general and specialist outpatient and inpatient services across medical, surgical, and maternal health domains. It was selected following unsuccessful recruitment approaches to multiple other facilities in the city, as described below. Kano State had an estimated population of 16.9 million as of the 2022 National Population Commission projection, making it one of Nigeria's most populous states and a representative context for studying specialist healthcare access in the northwestern region.

➢ *Participants and Sampling*

The target population comprised adult patients (aged 18 years and above) who had received care at the facility within the four weeks preceding data collection. Systematic random sampling was applied to the facility's patient records: a sampling interval was calculated by dividing the total eligible patient census by the target sample size, and every nth patient record was selected following a randomly determined starting point. An initial sample of 75 patients was approached; 64 completed questionnaires met eligibility and completeness criteria and were retained for analysis, yielding an effective response rate of 85.3 percent. Patients who lacked capacity to provide informed consent or whose most recent care episode preceded the four-week eligibility window were excluded.

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

It is noted that only one facility in Kano agreed to participate in this research, despite outreach to multiple institutions. This pattern of institutional non-cooperation with patient experience research in the Nigerian private hospital sector is itself a finding of contextual significance. Private hospitals face competitive disclosure concerns and liability considerations that make them reluctant to permit independent satisfaction measurement. This dynamic limit the external validity of single-facility studies and simultaneously underscores the value of the data that can be obtained from cooperating institutions.

➢ *Data Collection Instrument*

A structured questionnaire was developed to operationalise patient satisfaction across nine service dimensions, grouped into two construct categories consistent with Donabedian's process and structural domains. Clinical domains comprised: (1) staff competence and professionalism; (2) courtesy and empathy; (3) clarity of communication and patient involvement in decision-making; and (4) treatment outcomes. Non-clinical domains comprised: (5) reception services and ward convenience; (6) appointment handling and waiting time management; (7) filing system efficiency; (8) car parking adequacy; and (9) maintenance responsiveness.

All items used a five-point Likert response format aggregated into a 20-point composite satisfaction scale. This measurement approach enabled within-facility comparison across domains on a shared metric while retaining sufficient distributional variance for correlation and clustering analyses. The instrument was pre-tested with a convenience sample prior to full deployment. Internal consistency across the pre-tested version was assessed using Cronbach's alpha, which returned 0.82, meeting the acceptable reliability threshold ($\alpha \geq 0.70$) for health services research instruments. No item modifications were made following pre-testing.

➢ *Statistical Analysis*

All analyses were conducted using IBM SPSS Statistics (version 21) and Python (Pandas version 1.3.5 and Matplotlib version 3.4.3). The analytical strategy comprised three sequential and complementary components.

Descriptive statistics (means, standard deviations, and distributional summaries) were computed for each of the nine service domains and for the overall composite satisfaction score. Pearson's correlation coefficients assessed the bivariate associations between individual service dimensions and overall satisfaction, with significance tested at $p < 0.05$ (two-tailed).

K-means clustering was applied to segment the patient sample by satisfaction profile. The optimal number of clusters was determined empirically via silhouette analysis, which evaluates the cohesion and separation of candidate cluster solutions and selects the k value maximising the mean silhouette coefficient. This approach avoids the arbitrary cluster number selection that limits the interpretability of K-means applications in the health services literature. Cluster profiles were characterised by computing domain-level mean satisfaction scores within each segment and examining the pattern of between-cluster differences. Missing data were handled via pairwise deletion.

➢ *Ethical Considerations*

This study was originally conducted as part of an MBA thesis, and prospective institutional ethics committee review was not obtained prior to data collection. This constitutes a transparent limitation that must be acknowledged. Verbal informed consent was secured from all participants before questionnaire administration, clearly describing the voluntary nature of participation, the absence of any clinical consequence for declining, and the confidentiality of responses. No personally identifying information was collected or retained at any stage of data collection, storage, or analysis. All procedures were consistent with the principles of minimal risk and participant autonomy articulated in the Declaration of Helsinki. Future iterations of this research will obtain prospective ethics committee review from the National Health Research Ethics Committee of Nigeria before any data collection commences.

➢ *Reporting Guidelines*

This manuscript was prepared in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) statement for cross-sectional studies. A completed 22-item STROBE checklist is provided as Supplementary File S1.

III. RESULTS

➢ *Sample Characteristics*

Sixty-four adult patients comprised the final analytical sample. The gender distribution, age range, reason for facility attendance, and visit frequency are documented in the study instrument (see Supplementary File S2). The sample was geographically concentrated in Kano State, consistent with the facility's catchment area. All participants had received care at the facility within the four weeks preceding data collection.

➢ *Descriptive Statistics: Domain-Level Satisfaction*

Table 1 presents mean satisfaction scores, standard deviations, and ranges for all nine service domains. A pronounced systematic difference emerged between clinical and non-clinical domains. Clinical service dimensions returned means ranging from 17.45 to 18.12 on the 20-point scale, approaching the instrument ceiling. Non-clinical domains ranged from 12.50 to 16.56, with maintenance responsiveness ($M = 12.50$, $SD = 3.98$) and filing system efficiency ($M = 12.81$, $SD = 2.12$) producing the lowest scores across the entire instrument. The within-facility gap between the highest-scoring domain (empathy: $M = 18.12$) and the lowest (maintenance responsiveness: $M = 12.50$) was 5.62 points, representing 28.1 percent of the total scale range. This magnitude of intra-facility variation is itself a substantively important finding, indicating that the facility is not a uniformly performing institution but one with structural asymmetry between its clinical and operational quality levels.

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

Table 1 Patient Satisfaction Scores by Service Domain (n = 64)

Service Domain	n	Mean	SD	Min	Max
Clinical Service Domains		**Domain mean range: 17.45–18.12**			
Staff Competence and Professionalism	64	**17.89**	3.52	9	20
Courtesy and Empathy	64	**18.12**	3.27	10	20
Clarity of Communication and Patient Involvement	64	**17.45**	3.88	8	20
Treatment Outcomes	64	**17.91**	4.02	7	20
Non-Clinical Service Domains		**Domain mean range: 12.50–16.56**			
Reception Services and Ward Convenience	64	16.56	4.00	7	20
Appointment Handling and Waiting Time	64	15.22	3.74	6	20
Filing System Efficiency	64	**12.81**	2.12	8	18
Car Parking Adequacy	64	**13.75**	4.19	5	20
Maintenance Response Time	64	**12.50**	3.98	4	20

Note: *All domains rated on a 20-point composite Likert scale. Bold means indicate the lowest-scoring domains (Maintenance Response Time: 12.50; Filing System Efficiency: 12.81). SD = standard deviation. Within-facility gap between highest and lowest domain means: 5.62 points (28.1% of scale range).*

➢ *Correlation Analysis: Service Dimensions and Overall Satisfaction*

Table 2 presents Pearson's correlation coefficients for the bivariate associations between each service dimension and overall patient satisfaction. Staff competence and professionalism demonstrated the strongest association ($r = 0.78$, $p < 0.01$), consistent with the interpersonal primacy pattern documented across sub-Saharan African hospital satisfaction studies. Empathy ($r = 0.72$), communication clarity ($r = 0.69$), and treatment outcomes ($r = 0.65$) followed in descending order. Non-clinical domains showed weaker but statistically significant associations, with maintenance responsiveness ($r = 0.38$) and filing system efficiency ($r = 0.41$) producing the smallest coefficients. The correlation structure confirms that while clinical dimensions are stronger predictors of overall satisfaction, non-clinical domains retain independent explanatory value, indicating that operational improvements would produce measurable satisfaction gains independently of any changes to clinical care quality.

Table 2 Pearson's Correlation Coefficients: Service Dimensions and Overall Patient Satisfaction (n = 64)

Service Dimension	Pearson's r	p-value
Staff Competence and Professionalism	**0.78**	< 0.01
Courtesy and Empathy	**0.72**	< 0.01
Clarity of Communication and Patient Involvement	**0.69**	< 0.01
Treatment Outcomes	**0.65**	< 0.01
Reception Services and Ward Convenience	0.54	< 0.01
Appointment Handling and Waiting Time	0.49	< 0.01
Filing System Efficiency	0.41	< 0.05
Car Parking Adequacy	0.39	< 0.05
Maintenance Response Time	0.38	< 0.05

Note: *Two-tailed significance testing. Bold r values indicate correlation coefficients ≥ 0.65, representing the four clinical service dimensions. All reported associations significant at $p < 0.05$.*

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

➢ *Cluster Analysis: Patient Satisfaction Segments*

Silhouette analysis returned an optimal solution of k = 2, with a mean silhouette coefficient of 0.61, indicating good cluster separation. Table 3 presents the domain-level satisfaction profiles of both segments.

Cluster 1 comprised patients with uniformly high satisfaction across all nine service domains, including both clinical and non-clinical dimensions. Cluster 2 comprised patients whose clinical satisfaction scores were equivalent to Cluster 1 but whose non-clinical domain scores were substantially lower, producing an overall satisfaction differential driven entirely by operational experience rather than clinical care. This finding has direct intervention implications: the patients most dissatisfied with this facility are not dissatisfied with its clinical care. They are dissatisfied with its operational environment.

Table 3 K-Means Cluster Profiles: Patient Satisfaction by Service Domain and Segment (n = 64)

Service Domain	Cluster 1 (Uniformly High)	Cluster 2 (Operational Gap)	Clinical Significance of Difference
Clinical Domains			**Minimal inter-cluster variation**
Staff Competence and Professionalism	High	High	Negligible — not a differentiating factor
Courtesy and Empathy	High	High	Negligible — not a differentiating factor
Communication Clarity	High	Moderate-High	Small — not clinically meaningful
Treatment Outcomes	High	High	Negligible — not a differentiating factor
Non-Clinical Domains			**Large inter-cluster variation — primary differentiating factor**
Reception Services and Ward Convenience	High	Moderate	Moderate — contributes to overall gap
Appointment Handling and Waiting Time	High	Moderate	Moderate — contributes to overall gap
Filing System Efficiency	Moderate-High	Low	Large — primary dissatisfaction driver in Cluster 2
Car Parking Adequacy	Moderate	Low	Moderate-Large — significant contributor
Maintenance Response Time	Moderate	Low	Large — primary dissatisfaction driver in Cluster 2

Note: *Cluster descriptors correspond to K-means centroid positions. Ordinal labels derived from score ranges on the 20-point scale: High ≥ 17; Moderate-High 15–16.9; Moderate 13–14.9; Low < 13. Silhouette coefficient = 0.61 (good separation). Clinical significance terminology is used in the descriptive, not inferential, sense.*

IV. DISCUSSION

➢ *Service Visibility Bias: Defining the Construct*

The central empirical finding of this study is the 5.62-point gap between the highest-scoring clinical domain and the lowest-scoring non-clinical domain on a shared 20-point satisfaction scale. This gap is not noise. It is systematic, reproducible across multiple non-clinical dimensions simultaneously, and structurally explained by the cluster analysis: it drives the entire satisfaction differential between the two identified patient segments while clinical performance remains constant between groups.

This pattern calls for a theoretical name and a mechanistic explanation. We propose the concept of service visibility bias, defined as the systematic tendency of healthcare organisations to direct disproportionate investment attention toward clinically visible interactions relative to operationally invisible systems, producing a structural satisfaction divergence that persists independently of overall facility quality level.

Three mechanisms sustain service visibility bias in private specialist healthcare settings. First, competitive signalling: clinical quality is directly observable by patients and their referrers through staff-patient interaction, and reputational capital accrues primarily through the clinical

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

encounter. Administrative systems are invisible to patients until they fail, meaning investment in those systems generates no reputational return under normal operating conditions. Second, investment incentive asymmetry: facility management investment decisions respond to the dimensions of quality that are most visible in complaints, referrals, and reputation. Since clinical encounters dominate both satisfaction measurement instruments and informal patient recommendations, investment naturally tracks clinical quality. Third, operational invisibility at the measurement stage: most patient satisfaction frameworks, including SERVQUAL and many HCAHPS variants, weight tangibles and reliability heavily for clinical dimensions while treating administrative and physical environment dimensions as secondary subscales. This measurement weighting transmits into facility improvement priorities.

Each of these mechanisms has an independent evidence base. The competitive signalling mechanism aligns with the market positioning literature on healthcare quality signalling in private provider markets.[5] The investment incentive asymmetry is consistent with principal-agent frameworks in health facility management.[6] The operational invisibility at the measurement stage is demonstrable from the subscale weighting in published SERVQUAL adaptations for hospital settings. The conceptual contribution of service visibility bias is to name the composite effect of all three mechanisms operating simultaneously, and to connect that effect directly to an empirical pattern observable in patient satisfaction data.

- *Donabedian and the Structural Mediation of Clinical Quality*

The cluster analysis provides direct empirical illustration of Donabedian's structural mediation prediction. Cluster 2 patients receive equivalent clinical care to Cluster 1 patients — their clinical domain scores are not meaningfully different between groups. Yet their overall satisfaction is substantially lower. The mechanism is structural: the operational environment surrounding their clinical encounter is inferior, and that operational environment is a structural input in Donabedian's taxonomy.[2] The implication is that clinical quality alone cannot deliver patient satisfaction above a ceiling set by the structural quality of the operational environment in which it is delivered.

This finding is consistent with and extends Andaleeb's (2001) demonstration that structural and process quality factors jointly determine patient satisfaction in developing country hospital settings,[3] and with Cleary and McNeil's (1988) observation that satisfaction measurement must capture both interpersonal and environmental dimensions to be valid.[4] The present study adds cluster-level specificity: it identifies not merely that both dimensions matter, but that a distinct and identifiable patient segment exists whose satisfaction is exclusively determined by the structural dimension.

- *Intervention Priorities Derived from the Cluster Structure*

The cluster analysis is analytically actionable in a way that aggregate satisfaction means are not. The mean maintenance responsiveness score of 12.50 tells a facility manager that this domain underperforms. The cluster structure tells them that this underperformance is the primary driver of a specific patient segment's overall dissatisfaction, and that clinical investment will not improve that segment's experience.

Three domain-specific interventions are prioritised in order of satisfaction gap magnitude. Filing system efficiency and maintenance responsiveness both produced cluster-level differences classified as Large, meaning they are the primary sources of Cluster 2 dissatisfaction. For filing systems, adoption of an open-source electronic health record platform (such as OpenMRS, which has demonstrated feasibility in comparable Nigerian facility contexts[7]) would address both the filing efficiency deficit and the appointment handling gap simultaneously. For maintenance responsiveness, a formalised response protocol with defined resolution time standards and accountability tracking would address the structural source of this domain's underperformance without requiring significant capital expenditure. Car parking adequacy produced a Moderate-Large cluster difference and is addressed through physical infrastructure investment that, while more capital-intensive, carries no clinical implementation complexity.

These recommendations are segment-specific, not facility-generic. A quality improvement programme that invests further in staff training or clinical protocols, without addressing these operational deficits, will improve the experience of Cluster 1 patients marginally while leaving Cluster 2 patients' dissatisfaction structurally unaddressed. This is the practical application of the service visibility bias concept: it reorients the facility's investment attention from where it has historically been directed (clinically visible interactions) to where the largest satisfaction gains are now available (operationally invisible systems).

- *Limitations and Future Research Directions*

The single-facility design is the most consequential limitation of this study. The institutional non-cooperation pattern observed during recruitment, in which multiple private hospitals in Kano declined to participate, is itself a finding of relevance to the Nigerian private health research environment, but it means that the service visibility bias pattern documented here requires multi-centre replication before it can be generalised to the private specialist sector at the city, regional, or national level.

The sample of 64, while adequate for the K-means and correlation analyses performed, limits statistical power for subgroup analyses, particularly when controlling for patient demographic variables such as age, visit frequency, and clinical reason for attendance. Future studies should be powered for subgroup analysis, which would enable examination of whether service visibility bias differentially affects specific patient groups such as first-time versus returning patients or those attending for acute versus chronic care episodes.

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

The 20-point composite Likert scale, while producing adequate internal consistency ($\alpha = 0.82$) and distributional variance for all analyses, is a non-standard instrument. Score comparability with facilities using SERVQUAL, HCAHPS, or the validated Nigerian patient satisfaction instruments developed for public hospital settings would require formal instrument equivalence testing. Future iterations should adopt or adapt a validated, internationally comparable instrument to enable meta-analytic aggregation.

Finally, the absence of prospective ethics committee approval, while transparently acknowledged and contextually explained, will constrain submission to journals with absolute pre-registration requirements. Future replication of this research will obtain ethics committee approval from the National Health Research Ethics Committee of Nigeria before any data collection commences, enabling submission to the full range of indexed journals without this constraint.

V. CONCLUSION

This study documents a structural satisfaction asymmetry at a private specialist hospital in northern Nigeria in which clinical service quality approaches ceiling performance while non-clinical operational domains produce substantially lower satisfaction scores and drive the entirety of cross-patient satisfaction variation. The concept of service visibility bias provides a mechanism-based explanation for this pattern, one that is not specific to this facility but likely replicable across private specialist hospitals in comparable resource-constrained urban markets where clinical quality is the primary competitive differentiator and operational systems receive secondary investment attention.

The cluster analysis produces an actionable finding that aggregate satisfaction measurement cannot: it identifies a patient segment whose dissatisfaction is structurally located in operational domains, and for whom clinical improvement is irrelevant as a satisfaction intervention. Addressing the administrative efficiency and infrastructure deficits identified by this segment through electronic health record adoption, parking investment, and formalised maintenance protocols represents the highest-leverage satisfaction improvement available to this facility without clinical restructuring.

The next research priority is multi-centre replication. If the service visibility bias pattern holds across multiple private specialist hospitals in Kano and other northern Nigerian cities, it becomes a health system-level finding with implications for regulatory quality standards, facility accreditation criteria, and investment advisory frameworks for the private health sector. Building that evidence base is both empirically tractable and policy consequential.

CONTRIBUTORS, FUNDING, AND COMPETING INTERESTS

➢ *Contributor:*

Ibrahim Lekan Jubril conceived the study, designed the instrument, recruited participants, conducted all analyses, and wrote the manuscript in full.

➢ *Funding:*

No external funding was received. This research was originally conducted as part of an MBA programme.

➢ *Competing Interests:*

None declared.

➢ *Patient and Public Involvement:*

No patients were involved in the design or analysis of this study. Participants provided verbal informed consent for questionnaire administration.

➢ *Data Availability:*

The anonymised dataset supporting the findings is available from the corresponding author on reasonable request. Prospective repository deposit (OSF or Zenodo) is planned for the follow-up multi-centre study.

➢ *Ethics:*

Prospective institutional ethics committee approval was not obtained, reflecting the MBA thesis context of the original study. Verbal informed consent was obtained from all participants; no identifying information was retained. Future replication will obtain National Health Research Ethics Committee of Nigeria approval prior to any data collection.

STRENGTHS AND LIMITATIONS OF THIS STUDY

➢ *Strengths*

- Provides rare quantitative patient experience data from a private specialist facility in northern Nigeria, a region chronically underrepresented in the health services quality literature.
- Employs an analytically layered strategy — descriptive statistics, correlation analysis, and silhouette-optimised K-means clustering — enabling both population-level and segment-level characterisation of patient experience.
- Introduces and operationalises the concept of service visibility bias as an original theoretical contribution, offering a mechanism-based explanation for the clinical-operational satisfaction divide that has been documented but not named in prior literature.
- Adhered to STROBE reporting guidelines; a completed checklist is provided as supplementary material.

➢ *Limitations*

- Single-facility design necessitated by widespread institutional non-participation in Kano; findings cannot be generalised to the private specialist hospital sector without replication across multiple centres.

ISSN No: -2456-2165 https://doi.org/10.38124/ijisrt/26apr306

- Sample size of 64 limits statistical power for subgroup analyses; the two-cluster solution, while silhouette-validated, should be treated as exploratory pending replication.
- Prospective institutional ethics committee approval was not obtained prior to data collection, reflecting the MBA thesis context of the original study; verbal informed consent was secured and no identifying data were retained.
- The 20-point composite Likert scale is a non-standard measurement instrument; direct comparisons with SERVQUAL- or HCAHPS-based studies require instrument equivalence testing.

KEY MESSAGES

➢ *What is Already Known:*

Interpersonal aspects of clinical care consistently dominate patient satisfaction measurement in sub-Saharan African hospital studies. Non-clinical operational domains are documented as secondary dissatisfiers, but the structural mechanism explaining why they systematically underperform has not been theorised. Evidence from private specialist hospitals in northern Nigeria is absent from the peer-reviewed literature.

➢ *What this Study Adds:*

Among 64 patients at a private specialist hospital in Kano, clinical and non-clinical satisfaction domains diverged by up to 5.62 points on a shared 20-point scale. K-means cluster analysis revealed a patient segment (Cluster 2) whose dissatisfaction was entirely attributable to operational deficiencies, not clinical care. This paper introduces service visibility bias as a theoretically grounded concept naming the mechanism responsible for this divergence: a systematic pattern of underinvestment in operationally invisible systems relative to clinically visible interactions.

➢ *Clinical and Policy Implications:*

Marginal investment in already high-performing clinical domains will yield diminishing satisfaction returns for the Cluster 2 patient segment. Administrative digitalisation (electronic health records), parking infrastructure, and formalised maintenance response protocols represent high-leverage, tractable interventions targeted at the specific sources of dissatisfaction in the lower-performing patient segment.

REFERENCES

[1]. Federal Ministry of Health Nigeria. National Health Policy 2016. Abuja: FMOH; 2016.
[2]. Donabedian A. The quality of care: How can it be assessed? JAMA. 1988;260(12):1743–1748. doi:10.1001/jama.1988.03410120089033
[3]. Andaleeb SS. Service quality perceptions and patient satisfaction: A study of hospitals in a developing country. Soc Sci Med. 2001;52(9):1359–1370. doi:10.1016/S0277-9536(00)00235-5
[4]. Cleary PD, McNeil BJ. Patient satisfaction as an indicator of quality care. Inquiry. 1988;25(1):25–36.
[5]. Manary MP, Boulding W, Staelin R, Glickman SW. The patient experience and health outcomes. N Engl J Med. 2013;368(3):201–203. doi:10.1056/NEJMp1211775
[6]. Menachemi N, Collum TH. Benefits and drawbacks of electronic health record systems. Risk Manag Healthc Policy. 2011;4:47–55. doi:10.2147/RMHP.S12985
[7]. Jha AK, DesRoches CM, Campbell EG, et al. Use of electronic health records in hospitals. N Engl J Med. 2009;360(16):1628–1638. doi:10.1056/NEJMsa0900592
[8]. Ghosh S, Scott JE. Predictive analytics in healthcare: opportunities and challenges. J Big Data. 2018;5(1):69. doi:10.1186/s40537-018-0127-3
[9]. Okafor IP, Sekoni AO, Ezeokoli FC, et al. Determinants of patient satisfaction at a secondary health facility in south-west Nigeria. Niger J Clin Pract. 2012;15(1):8–13.