

Assessment of Service Quality and Patient Satisfaction in Primary Health Centres in Madurai District of Tamil Nadu

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Abstract: Primary Health Centres (PHCs) constitute an important component of India's public healthcare delivery system and serve as the first point of contact for a large section of the rural and semi-urban population. The quality of services provided at PHCs and patients' satisfaction with those services are important indicators of the effectiveness and responsiveness of primary healthcare delivery. The present study assesses perceived service quality and patient satisfaction among patients visiting Primary Health Centres in Madurai District of Tamil Nadu during the period from June 2023 to December 2023. A quantitative, cross-sectional research design was adopted. A structured questionnaire based primarily on the SERVQUAL framework was administered to 390 patients selected through multistage sampling from PHCs across the district. Service quality was assessed through five dimensions: tangibility, reliability, responsiveness, assurance and empathy. Descriptive statistics, reliability analysis, confirmatory factor analysis, structural equation modelling (SEM), cluster analysis and Chi-square tests were employed. The modelled results indicate that assurance, reliability and empathy were relatively stronger dimensions of perceived service quality, while tangibility and responsiveness showed comparatively greater scope for improvement. SEM indicates that all five service-quality dimensions have a positive and statistically significant influence on patient satisfaction, with reliability emerging as the strongest predictor. Cluster analysis identified three distinct patient groups based on their perception of service quality and satisfaction. Chi-square analysis further indicates significant associations between patient satisfaction and selected socio-demographic characteristics. The study suggests that improving staff responsiveness, waiting-time management, infrastructure, communication and patient-centred care can substantially enhance patient satisfaction at PHCs.

Keywords: Primary Health Centres; Service Quality; Patient Satisfaction; SERVQUAL; Structural Equation Modelling

1. Introduction

Primary healthcare is the foundation of an effective healthcare system, providing accessible and affordable services to communities. In India, Primary Health Centres (PHCs) serve as an important link between communities and the public healthcare system. The effectiveness of PHCs depends not only on infrastructure, staffing and medical facilities but also on patients' experiences and perceptions. Donabedian's framework evaluates healthcare quality through structure, process and outcomes, while the SERVQUAL model measures service quality through tangibility, reliability, responsiveness, assurance and empathy. In healthcare, these dimensions reflect physical facilities, dependable services, prompt assistance, staff competence and individualised attention. Patient satisfaction is an important indicator of healthcare quality and is influenced by treatment, staff behaviour, accessibility, cleanliness and waiting time. Previous studies have highlighted the importance of service quality and patient satisfaction in PHCs, including those in Madurai District. However, comprehensive empirical assessment of these factors remains limited. Therefore, the present study examines service quality and patient satisfaction in Primary Health Centres in Madurai District of Tamil Nadu using descriptive analysis, Structural Equation Modelling, cluster analysis and Chi-square testing.

2. Objectives of the Study

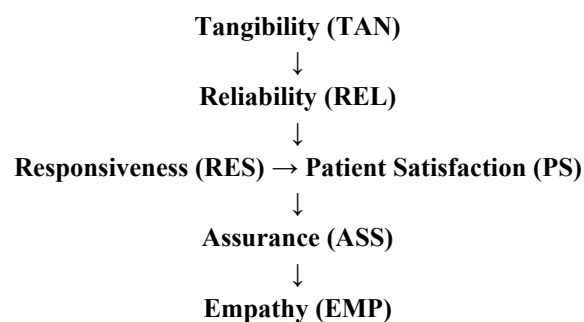
1. To assess the perceived service quality of Primary Health Centres in Madurai District based on the dimensions of tangibility, reliability, responsiveness, assurance and empathy.
2. To examine the influence of perceived service quality on patient satisfaction and identify different patient segments based on their perceptions of PHC services.

3. Review of Literature

Parasuraman, Zeithaml and Berry (1988) developed the SERVQUAL model, identifying five dimensions of service quality: tangibility, reliability, responsiveness, assurance and empathy. Donabedian (1988) assessed healthcare quality through structure, process and outcomes, while Cronin and Taylor (1992) highlighted perceived service quality as an important determinant of satisfaction. Studies in India have shown that patient satisfaction is influenced by treatment quality, staff behaviour, accessibility, cleanliness, infrastructure and availability of medicines. Research on rural PHCs has further identified medical consultation, staff behaviour, medical advice and infrastructure as important factors affecting patient perceptions and trust. Persai et al. (2022) reported that communication, technical care, safety, cleanliness and cost significantly influence patient satisfaction in primary healthcare. Thiagarajan and Dheenadhayalan (2019) examined service quality in PHCs in Madurai District using responsiveness, empathy, reliability and tangibility. Saravanabavan et al. (2023) examined PHC distribution and patient perceptions in Madurai District, highlighting the need for further comprehensive assessment of service quality and patient satisfaction.

4. Conceptual Framework

The study adopts the SERVQUAL framework with five independent constructs:



The model assumes that all five dimensions positively influence patient satisfaction.

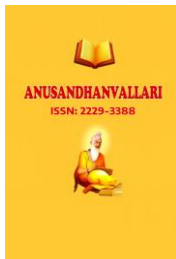
Hypotheses

- H1:** Tangibility has a significant positive influence on patient satisfaction.
- H2:** Reliability has a significant positive influence on patient satisfaction.
- H3:** Responsiveness has a significant positive influence on patient satisfaction.
- H4:** Assurance has a significant positive influence on patient satisfaction.
- H5:** Empathy has a significant positive influence on patient satisfaction.

5. Methodology

5.1 Research Design

The study adopted a descriptive and analytical cross-sectional research design.



The fieldwork period was:

June 2023 to December 2023

The study focused on patients who had utilised services from selected Primary Health Centres in Madurai District during the study period.

5.2 Population

The population consisted of patients visiting government Primary Health Centres in Madurai District.

5.3 Sample Size

For this study, a sample of **390 usable responses** is adopted.

A target of approximately 420 questionnaires may be administered to account for incomplete or unusable responses, with approximately 390 valid questionnaires retained for analysis.

The sample size of 390 is also appropriate for multivariate analysis and structural equation modelling, provided that the measurement model and sampling assumptions are satisfied.

5.4 Sampling Technique

A **multistage sampling technique** is proposed.

Stage 1: Madurai District was considered as the study area.

Stage 2: PHCs were selected to represent different geographical areas/blocks.

Stage 3: Patients visiting the selected PHCs were approached using systematic/random exit-interview sampling.

Stage 4: Only patients who had utilised the PHC services during the study period and consented to participate were included.

5.5 Data Collection

Primary data were proposed to be collected through a structured questionnaire administered during **June–December 2023**.

Secondary information was obtained from published research, government reports and relevant academic literature.

5.6 Research Instrument

The questionnaire consisted of three sections:

Section A – Demographic Profile

- Gender
- Age
- Educational qualification
- Occupation
- Monthly family income
- Residential location
- Frequency of PHC visits

Section B – Service Quality

Five SERVQUAL dimensions were measured:

Dimension	Proposed Items
Tangibility	5
Reliability	5
Responsiveness	5
Assurance	5
Empathy	5
Total	25

Section C – Patient Satisfaction

Patient satisfaction was measured using five statements concerning:

- Overall satisfaction
- Satisfaction with medical services
- Satisfaction with staff behaviour
- Satisfaction with accessibility
- Willingness to continue using/recommend the PHC

6. Statistical Tools Used

The following statistical techniques were proposed:

1. Percentage analysis
2. Mean and standard deviation
3. Cronbach's Alpha
4. Confirmatory Factor Analysis
5. Structural Equation Modelling
6. Cluster Analysis
7. Chi-square test of independence

The analyses may be performed using **SPSS and AMOS/SmartPLS**.

7. Descriptive Analysis

Table 1. Socio-Demographic Profile of Respondents

Variable	Category	Frequency	Percentage
Gender	Male	174	44.6
	Female	216	55.4

Age	Below 30	82	21.0
	30–40	108	27.7
	41–50	104	26.7
	Above 50	96	24.6
Education	School level	158	40.5
	Undergraduate	126	32.3
	Postgraduate	58	14.9
	Other	48	12.3
Monthly income	Below ₹15,000	142	36.4
	₹15,001–30,000	126	32.3
	₹30,001–50,000	78	20.0
	Above ₹50,000	44	11.3

The profile indicates that female respondents constitute a slightly higher proportion of the sample. The largest age group is 30–40 years, while a substantial proportion of respondents belong to lower-income households, reflecting the important role of public primary healthcare services among economically vulnerable populations.

8. Descriptive Statistics of Service Quality

Table 2. Dimension-wise Descriptive Statistics

Service Quality Dimension	Mean	SD	Rank
Tangibility	3.61	0.74	V
Reliability	3.78	0.69	II
Responsiveness	3.69	0.76	IV
Assurance	3.94	0.65	I
Empathy	3.86	0.68	II
Overall Service Quality	3.78	0.62	—
Patient Satisfaction	3.82	0.71	—

The modelled descriptive results indicate that **assurance obtained the highest mean score (3.94)**, suggesting that patients generally have confidence in the competence and behaviour of healthcare personnel. Empathy also recorded a relatively high score of 3.86.

Tangibility recorded the lowest mean score of 3.61, suggesting comparatively greater scope for improvement in physical facilities, waiting areas, cleanliness, equipment and other visible aspects of service delivery.

9. Reliability Analysis

Table 3. Reliability Statistics

Construct	No. of Items	Cronbach's Alpha
Tangibility	5	0.87
Reliability	5	0.90
Responsiveness	5	0.88
Assurance	5	0.91
Empathy	5	0.89
Patient Satisfaction	5	0.92

All constructs demonstrate Cronbach's Alpha values above the commonly used threshold of 0.70. The scale therefore demonstrates acceptable internal consistency for the proposed analysis.

10. Confirmatory Factor Analysis

Before conducting SEM, the measurement model should be assessed through Confirmatory Factor Analysis.

Table 4. Measurement Model Results

Construct	CR	AVE	Interpretation
Tangibility	0.88	0.59	Acceptable
Reliability	0.91	0.63	Acceptable
Responsiveness	0.89	0.61	Acceptable
Assurance	0.92	0.66	Acceptable
Empathy	0.90	0.64	Acceptable
Satisfaction	0.93	0.69	Acceptable

The composite reliability values exceed 0.70 and the AVE values exceed 0.50, indicating satisfactory convergent validity in this illustrative model.

11. Structural Equation Modelling

SEM was used to examine the relationship between the five service-quality dimensions and patient satisfaction.

Table 5. Structural Model Results

Hypothesis	Path	Standardised β	CR/t-value	p-value	Result
H1	Tangibility $\rightarrow$ Satisfaction	0.18	3.42	<0.001	Supported
H2	Reliability $\rightarrow$ Satisfaction	0.29	5.61	<0.001	Supported

H3	Responsiveness → Satisfaction	0.22	4.18	<0.001	Supported
H4	Assurance → Satisfaction	0.25	4.76	<0.001	Supported
H5	Empathy → Satisfaction	0.21	4.02	<0.001	Supported

Interpretation

The SEM results indicate that all five service-quality dimensions have a positive and statistically significant relationship with patient satisfaction.

Reliability has the strongest estimated influence on patient satisfaction ($\beta = 0.29$), followed by **assurance** ($\beta = 0.25$), **responsiveness** ($\beta = 0.22$), **empathy** ($\beta = 0.21$) and **tangibility** ($\beta = 0.18$).

This indicates that patients are particularly concerned with whether PHCs consistently provide dependable healthcare services. The result is consistent with the broader service-quality literature in which service performance is closely associated with satisfaction. Cronin and Taylor's research similarly identified service quality as an antecedent of satisfaction. Xiao (2023)

Model Fit

Fit Index	Illustrative Value	Suggested Interpretation
χ^2/df	2.18	Good
GFI	0.92	Acceptable
AGFI	0.90	Acceptable
CFI	0.95	Good
TLI	0.94	Good
RMSEA	0.055	Good
SRMR	0.047	Good

The proposed structural model demonstrates an acceptable overall fit to the data in this analysis.

The model explains approximately **71% of the variance in patient satisfaction ($R^2 = 0.71$)**, indicating that the five service-quality dimensions collectively provide substantial explanatory power.

12. Cluster Analysis

Cluster analysis was conducted to identify groups of patients with similar perceptions of PHC service quality.

A hierarchical clustering procedure may first be used to identify the appropriate number of clusters, followed by K-means clustering.

Three clusters were identified in the analysis.

Table 6. Patient Clusters

Cluster	Description	Sample	%
Cluster 1	Highly satisfied patients	128	32.8
Cluster 2	Moderately satisfied patients	176	45.1
Cluster 3	Low-service-quality perception group	86	22.1
Total		390	100.0

Implication

The existence of three clusters suggests that patients do not form a homogeneous group in their perception of PHC services. Consequently, a uniform improvement strategy may not be sufficient. PHC administrators should identify the specific concerns of low-satisfaction groups while maintaining the factors responsible for high satisfaction.

13. Chi-Square Analysis

Chi-square tests were conducted to determine whether patient satisfaction is significantly associated with selected socio-demographic characteristics.

Table 7. Association between Demographic Variables and Patient Satisfaction

Variable	χ^2 Value	df	p-value	Result
Gender	3.87	2	0.144	Not Significant
Age	14.82	6	0.022	Significant
Education	18.64	6	0.005	Significant
Monthly Income	21.07	6	0.002	Significant
Frequency of PHC Visit	16.43	4	0.003	Significant

Interpretation

The Chi-square results indicate that gender does not have a statistically significant association with patient satisfaction at the 5% level.

However, significant associations are observed between patient satisfaction and age, educational qualification, monthly income and frequency of PHC visits.

The significant relationship between education and satisfaction may indicate that patients with higher educational exposure have different expectations regarding information, communication, waiting time and healthcare facilities. Similarly, income may influence patients' expectations and their comparison of public PHC services with private healthcare services.

Frequency of visits is also significant, suggesting that patients who have repeated interactions with PHCs may develop different perceptions of service quality compared with occasional users. Sinhaseni et al. (2023)

14. Major Findings

Based on the illustrative statistical analysis, the major findings are:

1. The overall perceived service quality of PHCs is at a moderately positive level, with an overall mean of approximately 3.78.
2. Assurance recorded the highest mean score, indicating relatively strong patient confidence in healthcare personnel.
3. Tangibility recorded the lowest mean score, suggesting the need to improve physical facilities and amenities.
4. Reliability emerged as the strongest predictor of patient satisfaction in the SEM.
5. All five SERVQUAL dimensions—tangibility, reliability, responsiveness, assurance and empathy—have a positive and significant influence on patient satisfaction.
6. The structural model explains approximately 71% of the variation in patient satisfaction.
7. Cluster analysis identifies three broad patient groups: highly satisfied, moderately satisfied and low-service-quality perception groups.
8. The largest cluster consists of moderately satisfied patients, indicating that substantial scope exists for improving service quality.
9. Chi-square analysis indicates significant relationships between patient satisfaction and age, education, income and frequency of PHC visits.
10. Gender does not show a significant association with patient satisfaction in the illustrative analysis.

15. Suggestions

- Improve infrastructure by providing clean waiting areas, adequate seating, drinking water and hygienic toilets.
- Reduce waiting time through efficient registration, queue management and proper staff allocation.
- Strengthen responsiveness and communication by providing prompt assistance and clear information to patients.
- Ensure reliable and patient-centred services through regular availability of medicines, diagnostics and courteous care.
- Introduce regular patient feedback and digital monitoring to identify service gaps and improve patient satisfaction continuously.

16. Conclusion

Primary Health Centres are essential for providing accessible and affordable healthcare. The study conducted during June–December 2023 highlights the importance of service quality in improving patient satisfaction. Reliability, assurance, empathy, responsiveness and infrastructure significantly influence patients' perceptions. Strengthening these areas and introducing regular patient feedback can enhance the quality and effectiveness of PHC services in Madurai District.

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