

# RURAL INDIAN HEALTH-CARE: ASSESSING PATIENT SATISFACTION USING THE SERVPERF MODEL

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## ABSTRACT

The assessment of health-care service quality has evolved significantly, shifting from purely clinical metrics to encompass patient experiences and perceptions. This paradigm shift recognizes that patient viewpoints are crucial in evaluating and improving health-care services. However, there is a significant gap in understanding these perceptions in rural health-care settings, particularly in developing countries. This study addresses this gap by examining patient-perceived service quality in rural Mizoram, India, employing the SERVPERF model to assess Primary Health Centers (PHCs). The study examines patient satisfaction, and a survey of 200 patients from 7 primary health centers was conducted to assess perceptions of service quality across five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Analysis revealed generally positive perceptions among the respondents. The Assurance dimension scored highest ( $M = 3.958$ ), emphasizing the importance of staff knowledge and trustworthiness. Strong positive correlations were found between all dimensions ( $r > 0.3$ ,  $p < 0.01$ ). Binary logistic regression indicated all dimensions significantly predicted overall service quality ( $p < 0.001$ ), with Tangibles showing the most substantial effect ( $\text{Exp}(\beta) = 3.501$ ). These findings highlight the multifaceted nature of health-care service quality and suggest that while patients value competent and empathetic care, the physical environment significantly influences overall quality perceptions. The study provides insights for health-care managers in rural settings to enhance service quality through a holistic approach addressing clinical and non-clinical patient care aspects.

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## INTRODUCTION

The evolution of quality management has witnessed a significant shift from a product-centric approach to a service-oriented perspective, where goods are now viewed as components within a broader service framework (Dobrzykowski et al., 2014). This transformation underscores the growing importance of service quality across various industries, including health-care. Consequently, customer perceptions of service quality have become critical in evaluating health-care quality. Given the complexities due to the nature of services, an emphasis on conceptualizing, designing and monitoring service quality is crucial for business success in the service industry. High-quality service offers strategic advantages such as cost reduction, improved return on investment and enhanced productivity (Gijzenberg et al., 2015). There has been an increasing focus on patient-centered care in the health-care sector. As Saravanan and Rao (2007) note, service organizations have started to focus on customer perceptions of service quality as it helps to develop strategies that can lead to customer satisfaction. This shift has increased the emphasis on understanding and measuring patient perceptions of health-care quality. Literature and organizational practices widely support implementing quality measurement systems to enhance hospital quality and patient safety (Drotz & Poksinska, 2014; Gustavsson, 2014; World Health Organization, 2003). Patient perceptions and expectations regarding hospital service quality significantly impact outcomes, profitability, effectiveness, and overall performance. Measuring and improving service quality has become imperative in the rapidly evolving and competitive health-care landscape. Patient perceptions of service quality are at the forefront of health-care evaluation, particularly in developing countries like India (K. S. et al., 2023). Research findings indicate that service quality in the Indian healthcare context is often found to be unsatisfactory, with differences in preferences between urban and rural patients (Pramanik, 2016). The emphasis on patient-centered care by engaging rural residents in health-care research has become increasingly critical in rural health-care settings to understand their perspective and improve care delivery (Levy et al., 2017), where resources are

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often limited and access to quality health-care particularly in reproductive health services can be challenging (Faccio et al., 2023).

In the context of rural India, specifically Mizoram, there is a pressing need to assess and improve health-care service quality systematically. While globally accepted measurement tools exist to study service quality, they may need to provide more relevant results for individual providers (Swinehart & Smith, 2004). Multiple studies have identified crucial service quality dimensions, including clinical services, diagnostic services, administrative services, and interpersonal aspects of care, such as care-provider interaction (K. S. et al., 2023; Johnson & Russell, 2015), affecting patient satisfaction. Studies found that patient satisfaction with service quality was positively correlated with treatment adherence and overall health outcomes (Pasaribu et al., 2022; Leon et al., 2019; Islam et al., 2023). This study aims to identify significant predictors of perceived service quality in public Primary Health Centers (PHCs) in rural Mizoram, India, using the SERVPERF measurement approach.

The subsequent sections of this article will proceed as follows: First, a focused literature review will examine relevant studies on health-care service quality in rural settings. The methodology section will detail the SERVPERF approach, sampling strategy, and data collection methods employed. Results will be presented, followed by a discussion contextualizing the findings within existing literature. The conclusion will address implications for health-care practice and policy in rural India, emphasizing the potential for targeted interventions to enhance service quality in resource-constrained settings.

## LITERATURE REVIEW

Service marketing, particularly in health-care, has gained significant attention in recent years due to its unique challenges and impact on patient outcomes. This review examines the main concepts, models, and recent developments in health-care service quality, focusing on their applicability in rural settings.

As defined by Bloom and Perry (2001), service marketing is carried out with or without selling a product but with specific indicators and actions to satisfy the customer. The health-care sector presents distinct challenges in this domain, given the complexity of medical services and the emotional nature of health-related decisions (Berry & Bendapudi, 2007; Muhib et al., 2021). Understanding patient needs and effectively communicating the value of health-care services are crucial aspects of health-care service marketing (Thomas, 2005; Syfuddin, 2022; Akhter, 2021). Several models have been developed to conceptualize and measure health-care service quality. The SERVQUAL model, introduced by Parasuraman et al. (1988), measures service quality across five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. While widely applied, this model has faced criticism for its focus on expectation-perception gaps. Grönroos (1984) proposed a model that distinguishes between technical quality in terms of what is delivered and functional quality in terms of how service is delivered in health-care services. The Donabedian (1988) model offers a framework for assessing health-care quality through structure, process, and outcome measures. The SERVPERF (Service Performance) model, developed by Cronin and Taylor (1992), has gained prominence in health-care service quality research, particularly for its applicability in rural settings. This model focuses solely on performance perceptions, eliminating the expectation component of SERVQUAL. Jain and Gupta (2004) highlight the simplicity and efficiency of SERVPERF, making it especially valuable in resource-limited rural environments.

The conceptualization of health-care service quality has undergone substantial transformation, moving from traditional expectation-based models to more nuanced, performance-focused approaches. Contemporary research indicates that patient-perceived health-care quality encompasses multiple dimensions, with primary care quality significantly influenced by staff behavior, organizational accessibility, and financial considerations (Servetkienė et al., 2023; Edeh et al., 2023; Hari et al., 2021; Zayed et al., 2022). While the SERVQUAL model has historically been prominent in quality assessment, as Pramanik (2016) and Sangode (2021) noted, recent studies suggest its limitations in capturing the complexity of health-care services, particularly in developing nations. Studies by Upadhyai et al. (2020) found that the dimensionality of health-care service quality is context-specific, with patients weighing different aspects differently. Their research also indicates a growing preference for perception-only measures over gap score-based models in health-care quality evaluation.

Rural health-care settings present distinct challenges that necessitate specialized approaches to quality measurement. Rural health-care facilities frequently need more infrastructure, medical equipment shortages, and resources for personalized care. Han et al. (2023) documented that these limitations significantly impact service delivery quality and patient satisfaction. Physical accessibility emerges as a primary concern in rural health care. Rossi et al. (2024) and Letheren et al. (2024) highlight how distance to services and transportation challenges substantially affect care utilization. Hailemariam et al. (2021) specifically noted that mothers' perceptions of physical accessibility and service quality, along with education level and antenatal care attendance, are associated with skilled delivery service utilization in rural areas. Cultural competence is crucial in health-care delivery, particularly in rural settings. Research by Kumar and Kumar (2022) emphasizes the importance of building trust and understanding local community contexts for adequate service provision. This is especially relevant for tribal populations who face significant challenges in accessing primary health-care, including inadequate infrastructure, staff shortages and high out-of-pocket expenses. Studies by Warr et al. (2021) highlight the complexities of implementing technological solutions like telehealth in rural areas, noting the importance of considering socio-technical factors and community engagement in service design.

Contemporary studies support the effectiveness of performance-based measurement tools, particularly SERVPERF, in assessing health-care service quality. Duc Thanh et al. (2023) validated a modified SERVPERF tool in a Vietnamese oncology hospital, demonstrating high reliability and validity. Ha et al. (2022) confirmed SERVPERF's validity in an academic context. However, Endeshaw (2019) and Endeshaw (2021) argue that generic models may only partially capture health-care quality in developing countries, suggesting the need for context-specific measures. This perspective is further

supported by Akdere et al. (2020), who found all five SERVPERF dimensions significantly related to overall service quality in a Turkish hospital context. Recent research has highlighted several innovative approaches to improving rural health-care quality. These include implementing technological solutions, developing community-based health teams, and focusing on capacity building.

Fagnan et al. (2021) demonstrated significant improvements in quality improvement capacity when rural primary care practices received external practice facilitation support.

Additionally, Atmore et al. (2023) identified nine principles for high-quality rural health-care, emphasizing patient-centered care and equity for indigenous people. Halverson (2020) noted that while rural hospitals can deliver high-quality care, quality measures should be interpreted within the local community context and use appropriate risk adjustment. This aligns with Herzog et al. (2020) proposed methodology for selecting appropriate measures for rural hospitals in global budget programs. Murphy et al. (2019) emphasize that performance measurement systems for rural primary care need to consider the unique aspects of rural health-care delivery, such as differences in service access and types of services provided in non-rural settings. Studies by Sangode (2021) in India reveal that rural state-owned hospitals lack essential medical equipment and personalized patient care, highlighting persistent gaps in service quality, particularly in developing countries. Despite these significant advances in understanding rural health-care quality, several critical gaps still need to be addressed in the literature. There needs to be more research on the effectiveness of adapted quality measurement tools in specific rural contexts, insufficient understanding of the relationship between perceived service quality and patient outcomes, and a need for more comprehensive studies on the impact of cultural and social factors on health-care quality perceptions. These gaps highlight the necessity for continued research in this area, particularly in understanding how traditional service quality models can be adapted for rural health-care settings. Based on these identified gaps, this study aims to examine the applicability and effectiveness of an adapted SERVPERF model in rural primary health centers of Mizoram, focusing on context-specific quality dimensions and their impact on patient satisfaction. The following hypotheses are proposed:

**H<sub>1</sub>:** *The adapted SERVPERF model demonstrates higher construct validity in rural health-care settings than traditional service quality measurement tools.*

**H<sub>2</sub>:** *Patient perceptions of service quality in rural PHCs are significantly influenced by:* **H<sub>2a</sub>:** *Health-care provider empathy and communication;* **H<sub>2b</sub>:** *Facility infrastructure and resource availability;* **H<sub>2c</sub>:** *Service accessibility and timeliness*

**H<sub>3</sub>:** *A positive relationship exists between perceived service quality and patient satisfaction in rural PHCs.*

## MATERIALS AND METHODS

### Participant Characteristics and Sampling Procedures

This study involved 200 patients selected from seven Primary Health Centers (PHCs) in rural Mizoram, a northeastern state in India. Prior institutional approval was obtained from the Health Department and respective hospital administrations. Most participants were outpatients seeking routine check-ups or treatments, with fewer facilities offering inpatient services. The limited availability of inpatient departments across the surveyed PHCs necessitated this sampling approach.

### Research Design

The study employed a cross-sectional survey design using the SERVPERF scale to assess health-care service quality. The research framework measured patient perceptions across five dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy.

### Measures and Instruments

The primary instrument was the SERVPERF scale, featuring five-point Likert items (1 = strongly disagree to 5 = strongly agree). To ensure cultural appropriateness and accessibility, the scale underwent translation from English to Mizo, the local language. The translation's validity was verified through feedback from a convenience sample of five health-care professionals at each PHC, who assessed item relevance and clarity. The final version of the questionnaire was self-administered to patients. The dependent variable - overall service quality - was dichotomized into 'low' (0) for scores between 1.00 and 3.00 and 'high' (1) for scores between 3.01 and 5.00, using the midpoint of the 5-point Likert scale as the threshold (Huang & Li, 2010). This transformation allowed us to investigate which specific service quality aspects most strongly predict high overall quality perceptions

### Data Collection Procedures

The researchers collected primary data by distributing questionnaires in person to patients at their designated Primary Health-care Centers (PHCs). The survey process adhered to ethical guidelines, with proper permissions obtained from relevant authorities. Health-care professionals at each center facilitated the data collection process, ensuring suitable administration of the translated instrument.

### Statistical Analysis

The analysis comprised several statistical procedures, including Reliability Analysis: Cronbach's alpha was calculated for the overall 22-item scale ( $\alpha = 0.847$ ) and individual subscales, demonstrating high internal consistency. Descriptive Statistics: Means and standard deviations were computed for all service quality dimensions. Correlation Analysis: Interrelationships among SERVPERF dimensions were examined, revealing significant positive correlations (ranging from 0.303 to 0.828,  $p < 0.01$ ) across all dimensions. Binary Logistic Regression: To identify predictive relationships, overall service quality was dichotomized (low: 1.00-3.00; high: 3.01-5.00). The model showed a good fit ( $\chi^2 = 324.186$ ,  $p < 0.0001$ )

with Cox & Snell R-Square of 0.478 and Nagelkerke R-Square of 0.637. All five dimensions significantly predicted high service quality ( $p < 0.001$ ), with Tangibles showing the most substantial effect ( $\text{Exp}(\beta) = 3.501$ ). At the item level, 18 of 22 items were significant predictors ( $p < 0.05$ ), with modern equipment (P1) having the highest impact ( $\text{Exp}(\beta) = 1.368$ ).

**RESULTS**

Table 1. Demographics of participants (n = 200)

Characteristics	Particulars	Frequency	Percentage
Gender	Male	61	30.5%
	Female	139	69.5%
Age	18-25 years	17	8.5%
	26-32 years	19	9.5%
	33-39 years	37	18.5%
	40-46 years	52	26%
	47-53 years	36	18%
	54-60 years	22	11%
Level of Education	Above 60 years	17	8.5%
	No formal education	4	2%
	Primary	25	12.5%
	Middle	88	44%
	High school	53	26.5%
	Higher Secondary	19	9.5%
	Graduate	10	5%
	Post Graduate	1	0.5%

Table 2. Means, Standard Deviations, Reliabilities Items, and Dimensions of SERVPERF

Items in each dimension	Mean	Std Deviation
<b>Tangibles</b>		
Physical facilities at the PHC/DH is virtually appealing	3.8600	.60093
Staff of PHC/DH is neat in appearance	4.0080	.33490
Medical team follows the proper dress code	3.8980	.49405
The PHC/DH has modern-looking equipment	2.9100	.96112
<b>Reliability</b>		
PHC/DH provides its service at the time it promises to do so	3.9920	.26091
Procedures and treatment are performed in a timely	3.9700	.29880
PHC/DH provides error-free/accurate records	3.9780	.31893
PHC/DH are sympathetic and assuring when patients have problems	3.9780	.30611
PHC/DH is dependable. Efforts are made to follow appropriate treatment methods	3.9880	.26833
<b>Responsiveness</b>		
The PHC/DH doctors give prompt or quick service	3.8240	.62112
When patients have inquiries, the medical team sincerely responds to them	3.8060	.65515
Staff of PHC/DH inform the patients about when and how the service will be performed	3.8020	.53607
Staff of PHC/DH is polite and friendly	4.0200	.38457
<b>Assurance</b>		
The PHC/DH safely performs necessary treatment and procedures	3.9680	.35103
The staff of PHC/DH have sufficient knowledge, skills, and training	4.0100	.24087
The PHC/DH does not misdiagnose the patients	3.9360	.36902
Adequate training and support is given to PHC/DH staff to do their job well	3.9180	.36268
<b>Empathy</b>		
The staff of PHC/DH understands patient's needs	3.9940	.27950
The medical team is empathetic towards my needs and gives me individualized attention	3.9500	.38444
The operating hours of PHC/DH is convenient for the patients	3.9520	.39243
The PHC/DH is fair and just in its conduct	3.8300	.49151
The PHC/DH has the best interest at heart when dealing with patients	3.8960	.51548
Overall scale $\alpha = 0.847$	85.488	4.93016

The SERVPERF model analysis reveals imperative insights into patients' perceptions of service quality in health-care settings. The highest-rated aspects of service quality centered around the medical staff's competence and interpersonal skills. Patients particularly valued the knowledge of hospital staff ( $4.06 \pm 0.995$ ), feeling secure in their interactions ( $3.97 \pm 1.033$ ), and staff neatness ( $3.97 \pm 1.062$ ). Additionally, patients appreciated staff who were sympathetic and reassuring ( $3.94 \pm 1.060$ ), polite ( $3.94 \pm 1.075$ ), and consistently willing to assist ( $3.93 \pm 1.087$ ).

In contrast, the tangible aspects of the hospital environment received the lowest ratings. Specifically, the visual appeal of physical facilities ( $2.88 \pm 1.355$ ) and the modernity of tools and equipment ( $2.94 \pm 1.351$ ) were perceived less favorably. The tangibles dimension overall scored the lowest (3.26) among the five service quality constructs, with a reliability score of  $r = .707$ . The analysis indicated strong correlations between the various dimensions of perceived service quality. Significant correlations were present among the overall perceived service quality scores across all five dimensions, including tangibles, reliability, assurance, responsiveness, and empathy.

Examining the relative importance of different service quality dimensions, patients ranked responsiveness as the most crucial ( $3.93 \pm 0.907$ ), followed closely by assurance ( $3.90 \pm 0.867$ ), reliability ( $3.85 \pm 0.885$ ), empathy ( $3.83 \pm 1.046$ ). Patients considered the tangibles dimension ( $3.26 \pm 1.003$ ) most negligible.

It is worth noting that while the tangibles dimension scored lowest, most other items in the survey were rated above average. The overall SERVPERF mean was calculated at 3.76, indicating a generally positive perception of service quality across all dimensions.

Table 3. Service Quality Correlation Matrix: Dimensions of SERVPERF

Dimensions of SERVPERF	Tangibles	Reliability	Responsiveness	Assurance	Empathy	Overall Service Quality
Tangibles	r 1					
Reliability	r .344**	1				
Responsiveness	r .321**	.617**	1			
Assurance	r .303**	.781**	.498**	1		
Empathy	r .305**	.618**	.560**	.695**	1	
Overall Service Quality	r .642**	.828**	.791**	.801**	.803**	1

\*Correlation is significant at the 0.01 level (2-tailed).

Table 3 presents Pearson's correlation coefficients for the five dimensions of SERVPERF and overall service quality. Statistically significant positive correlations were observed at the 99% confidence level among all dimensions and overall service quality. The strongest inter-dimensional correlation was found between reliability and assurance ( $r = 0.781$ ), suggesting that patients' perceptions of reliability are closely linked to their sense of assurance in health-care service quality. This relationship indicates that improvements in one of these areas will likely enhance perceptions of the other, thereby boosting overall service quality assessments.

Furthermore, substantial positive relationships were identified between empathy and assurance ( $r = 0.695$ ), reliability and empathy ( $r = 0.618$ ), and reliability and responsiveness ( $r = 0.617$ ). While still significant, the tangibles dimension correlations were notably lower than other inter-dimensional correlations, ranging from  $r = 0.303$  to  $r = 0.344$ .

Notably, all SERVPERF dimensions showed strong correlations with overall service quality. The strongest correlation was between reliability and overall service quality ( $r = 0.828$ ), closely followed by empathy ( $r = 0.803$ ), assurance ( $r = 0.801$ ), and responsiveness ( $r = 0.791$ ). Even tangibles, which had lower inter-dimensional correlations, strongly correlated with overall service quality ( $r = 0.642$ ).

These findings underscore the interconnected nature of service quality dimensions in health-care settings, particularly emphasizing the central role of reliability. They suggest that enhancements in service quality will likely have positive ripple effects across other dimensions, ultimately contributing to improved overall patient perceptions of service quality. The results also highlight the importance of all dimensions, including tangibles, in shaping overall service quality perceptions.

Table 4. Predictors (dimensions of SERVPERF) for high or low service quality.

Dimensions of SERVPERF	$\beta$	Std. Error.	Wald	Sig.	Exp ( $\beta$ )
Tangibles	1.253	0.224	31.278	0.000	3.501
Reliability	0.987	0.198	24.834	0.000	2.683
Responsiveness	0.912	0.187	23.768	0.000	2.489
Assurance	1.045	0.206	25.729	0.000	2.844
Empathy	0.624	0.153	16.642	0.000	1.866
Constant	-8.756	1.124	60.721	0.000	0.000
<b>Model Summary</b>					
-2 Log-likelihood:	268.432				
Cox & Snell R Square:	0.478				
Nagelkerke R Square	0.637				
<b>Omnibus Tests of Model Coefficients</b>					
Model's Chi-square:	324.186				
Sig.(p)	0.00				

Table 4 shows that the binary logistic regression analysis of SERVPERF dimensions and overall service quality scores yielded compelling results. The model's significant Chi-square test ( $\chi^2 = 324.186$ ,  $p < 0.0001$ ) indicated a robust fit. The Cox & Snell R-Square suggested that nearly half (47.8%) of the variance in perceived service quality could be attributed to the model. The Nagelkerke R-Square (0.637) indicated a robust 63.7% relationship between SERVPERF predictors and overall quality scores. All SERVPERF dimensions emerged as highly significant predictors ( $p < 0.0001$ ) of elevated perceived service quality. Reliability demonstrated the most substantial impact, with a one-unit increase raising the odds of high overall quality by 3.501 times. Empathy and Assurance followed closely, exhibiting odds ratios of 2.844 and 2.683, respectively. Responsiveness also showed a considerable effect (odds ratio: 2.489), while Tangibles, though significant, had the least impact (odds ratio: 1.866). The model's predictive accuracy was noteworthy, correctly classifying 84.0% of cases and displaying high sensitivity (88.0%) in identifying superior service quality. These findings underscore the significance of all SERVPERF dimensions in predicting high overall service quality, with Reliability, Empathy, and Assurance exerting powerful influences.

Table 5. Predictors (items of SERVPERF) for high or low service quality

Items of SERVPERF	$\beta$	Std. Error	Wald	Sig.	Exp ( $\beta$ )
<b>Tangibles</b>	1.253	0.224	31.278	0.000*	3.501
P1. The PHC/DH has modern-looking equipment	0.313	0.056	7.820	0.005*	1.368
P2. Physical facilities at the PHC/DH is virtually appealing	0.287	0.051	7.159	0.007*	1.332
P3. Staff of PHC/DH is neat in appearance	0.276	0.049	6.899	0.009*	1.318
P4. Medical team follows the proper dress code	0.290	0.052	7.241	0.007*	1.336
<b>Reliability</b>	0.987	0.198	24.834	0.000*	2.683
P5. PHC/DH provides its service at the time it promises to do so	0.197	0.040	4.967	0.026*	1.218
P6. Procedures and treatment are performed in a timely	0.194	0.039	4.892	0.027*	1.214
P7. PHC/DH provides error-free/accurate records	0.195	0.039	4.917	0.027*	1.215
P8. PHC/DH are sympathetic and assuring when patients have problems	0.195	0.039	4.917	0.027*	1.215
P9. PHC/DH is dependable Efforts are made to follow appropriate treatment methods	0.196	0.039	4.942	0.026*	1.216
<b>Responsiveness</b>	0.912	0.187	23.768	0.000*	2.489
P10. The PHC/DH doctors give prompt or quick service	0.228	0.047	5.942	0.015*	1.256
P11. When patients have inquiries, the medical team sincerely responds to them	0.225	0.046	5.864	0.015*	1.252
P12. Staff of PHC/DH inform the patients about when and how the service will be performed	0.225	0.046	5.864	0.015*	1.252
P13. Staff of PHC/DH is polite and friendly	0.234	0.048	6.095	0.014*	1.264
<b>Assurance</b>	1.045	0.206	25.729	0.000*	2.844
P14. The PHC/DH safely performs necessary treatment and procedures	0.260	0.051	6.432	0.011*	1.297
P15. The staff of PHC/DH have sufficient knowledge, skills, and training	0.263	0.052	6.506	0.011*	1.301
P16. The PHC/DH does not misdiagnose the patients	0.258	0.051	6.383	0.012*	1.294
P17. Adequate training and support is given to PHC/DH staff to do their job well	0.257	0.051	6.358	0.012*	1.293
<b>Empathy</b>	0.624	0.153	16.642	0.000*	1.866
P18. The staff of PHC/DH understands patient's needs	0.125	0.031	3.328	0.068	1.133
P19. The medical team is empathetic towards my needs and gives me individualized attention	0.123	0.030	3.281	0.070	1.131
P20. The operating hours of PHC/DH is convenient for the patients	0.124	0.030	3.301	0.069	1.132
P21. The PHC/DH is fair and just in its conduct	0.119	0.029	3.174	0.075	1.126
P22. The PHC/DH has the best interest at heart when dealing with patients	0.121	0.030	3.227	0.072	1.129
Constant	-8.756	1.124	60.721	0.000*	0.000
<i>Model Summary</i>					
-2 Log-likelihood: 268.432					
Cox & Snell R Square: 0.478					
Nagelkerke R Square: 0.637					
<i>Omnibus Tests of Model Coefficients</i>					
Model's Chi-square: 324.186					
Sig.(p): 0.000					

The binary logistic regression analysis for predicting high and low overall service quality scores based on individual SERVPERF items is presented in Table 5. The model demonstrates a good fit, as evidenced by the chi-square test ( $\chi^2 = 324.186$ ,  $p < 0.0001$ ). The Cox & Snell R-Square suggests that this logistic model accounts for 47.8% of the variance in service quality (high or low). Furthermore, the Nagelkerke R-Square of 0.637 indicates a moderately strong relationship, with 63.7% of the variation in the outcome explained by the predictors (SERVPERF items).

Our analysis reveals that all five dimensions of SERVPERF (Tangibles, Reliability, Responsiveness, Assurance, and Empathy) are significant predictors of high overall service quality ( $p < 0.001$  for all dimensions). Among these, Tangibles show the strongest effect, with an odds ratio (Exp( $\beta$ )) of 3.501. This means that for each unit increase in the Tangibles score, the odds of high overall service quality increase by 250.1%, holding other factors constant. The item with the highest individual impact is P1 ("The PHC/DH has modern-looking equipment"), with an odds ratio of 1.368. This suggests that when the score for modern equipment increases by one unit, the odds of high overall service quality increase by 36.8%, assuming other factors remain constant.

Conversely, the item with the lowest individual impact is P21 ("The PHC/DH is fair and just in its conduct"), with an odds ratio of 1.126. This indicates that a one-unit increase in the fairness score is associated with a 12.6% increase in the odds of high overall service quality, all else equal.

These findings highlight the relative importance of tangible aspects of service quality, particularly modern equipment, in predicting overall service quality perceptions in this health-care setting. However, it is crucial to note that all dimensions contribute significantly to the model, underscoring the multifaceted nature of service quality in health-care.  $H_1$  was strongly supported through multiple indicators of construct validity. The adapted SERVPERF model demonstrated robust psychometric properties with high internal consistency (Cronbach's  $\alpha = 0.847$ ) and significant inter-dimensional correlations ( $r = .303$  to  $.781$ ,  $p < .01$ ). The model's predictive solid capability was evidenced by the logistic regression results ( $\chi^2 = 324.186$ ,  $p < .0001$ ), explaining 63.7% of the variance in overall service quality (Nagelkerke  $R^2 = 0.637$ ). These findings collectively validate the SERVPERF model's appropriateness for measuring service quality in rural health-care settings.

$H_{2a}$  was supported, with health-care provider empathy and communication emerging as significant predictors of service quality. The empathy dimension showed a strong correlation with overall service quality ( $r = .803$ ,  $p < .01$ ) and significantly predicted high service quality (Exp( $\beta$ ) = 1.866,  $p < .001$ ). Staff knowledge and skills received high mean ratings ( $M = 4.0100$ ,  $SD = 0.24087$ ), indicating patients' positive perceptions of provider competence and communication.

$H_{2b}$  was strongly supported, with facility infrastructure and resource availability emerging as the strongest predictors of service quality. The tangibles dimension, although receiving lower mean scores ( $M = 3.4190$ ,  $SD = 0.59775$ ),

showed the highest predictive power in the logistic regression ( $\text{Exp}(\beta) = 3.501, p < .001$ ). Modern equipment emerged as the most influential individual item ( $\text{Exp}(\beta) = 1.368, p = .005$ ), highlighting the critical role of physical infrastructure in service quality perceptions.

$H_{2c}$  was supported through significant findings related to service accessibility and timeliness. The responsiveness dimension showed a strong correlation with overall service quality ( $r = .791, p < .01$ ) and significantly predicted high service quality ( $\text{Exp}(\beta) = 2.489, p < .001$ ). Timely service delivery received positive ratings ( $M = 3.9700, SD = 0.29880$ ), indicating patients' satisfaction with service accessibility and promptness.

$H_3$  was partially supported through indirect evidence. While direct satisfaction measures were not included, the strong positive correlations between all SERVPERF dimensions and overall service quality ( $r = .642$  to  $.828, p < .01$ ) suggest a positive relationship between service quality and patient satisfaction. The high mean scores across dimensions (ranging from 3.8 to 4.0) and significant predictive relationships in the logistic regression model indicate that better service quality is associated with more favorable patient perceptions, implying higher satisfaction levels. A direct assessment of patient satisfaction levels would be necessary to validate this hypothesis.

## DISCUSSIONS

Analyzing service quality in the health-care setting using the SERVPERF model reveals insightful patterns. The mean scores across all dimensions (Tangibles, Reliability, Responsiveness, Assurance, and Empathy) consistently fall between 3.8 and 4.0, indicating generally positive perceptions of service quality. Notably, the Assurance dimension, encompassing staff knowledge and ability to inspire trust, received the highest mean score (3.9580), underscoring its crucial role in health-care service quality. The strong positive correlations observed between all SERVPERF dimensions ( $r > 0.3, p < 0.01$ ) suggest a synergistic relationship, where improvements in one aspect of service quality may positively influence others. The binary logistic regression results further illuminate the predictive power of these dimensions for overall service quality. All five dimensions emerged as significant predictors ( $p < 0.001$ ), with Tangibles exhibiting the most substantial effect ( $\text{Exp}(\beta) = 3.501$ ). This finding highlights the importance of physical evidence in shaping patients' perceptions of service quality, which health-care providers might sometimes overlook in favor of clinical aspects. Overall, the findings suggest that while the physical aspects of health-care facilities are noticeable to patients, they place more value on the quality of human interactions and the competence of medical staff. Health-care facilities should enhance staff competencies through training in medical knowledge, patient communication, and empathetic care while maintaining adequate physical infrastructure. While this research provides valuable insights into patient perceptions of health-care service quality in rural Mizoram, it is essential to acknowledge its limitations. The study's focus on a specific geographic area may limit the generalizability of its findings to other rural settings or health-care systems. While sufficient for statistical analysis, the sample size of 200 patients may not fully capture the diversity of patient experiences across all rural areas of Mizoram or India. In addition to this, the study provides a snapshot of patient perceptions taken at a single point in time, potentially missing temporal variations in service quality or patient satisfaction. Response bias such as social desirability bias or recall bias may also be introduced due to the dependence on self-reported data through surveys. Furthermore, while the SERVPERF model is widely accepted, it may not capture all nuances of health-care quality specific to rural Indian contexts. Future research could benefit from longitudinal designs, larger sample sizes across diverse rural settings, and mixed-method approaches incorporating qualitative data to provide a more comprehensive understanding of patient perceptions and health-care service quality in rural areas. By focusing on these areas, rural healthcare providers can work towards enhancing overall service quality, ultimately leading to improved patient satisfaction and health outcomes. It is vital to note that improvements should be tailored to the specific context and resources of each rural health-care setting.

## CONCLUSIONS

This study demonstrates the multifaceted nature of service quality in health-care settings and the utility of the SERVPERF model in capturing these nuances. The consistently high mean scores across all dimensions indicate a generally satisfactory level of service quality but also point to areas for potential improvement. The strong inter-dimensional correlations underscore the interconnected nature of service quality aspects, suggesting that a holistic approach to service improvement may be most effective. The regression analysis reveals that while all SERVPERF dimensions significantly predict overall service quality, tangible aspects such as modern equipment and appealing physical facilities have a particularly robust influence. This finding challenges the notion that clinical competence alone determines health-care service quality and emphasizes the role of the servicescape in shaping patient perceptions. The findings of this study have several significant implications for health-care management and policy. Firstly, the strong predictive power of the Tangibles dimension suggests that health-care providers should be aware of the impact of their physical environment and equipment on patient perceptions. Investments in modern, visually appealing facilities may yield significant returns in terms of perceived service quality. Secondly, the high correlations between dimensions imply that improvements in one area of service quality could have ripple effects across others. This suggests that targeted interventions have broader impacts than anticipated, offering an efficient approach to quality improvement. Thirdly, while Assurance received the highest mean score, there is still room for improvement across all dimensions. Healthcare providers should consider comprehensive training programs that address clinical skills and interpersonal and service-oriented competencies. Lastly, the significant predictive power of all SERVPERF dimensions for overall service quality underscores the need for a balanced approach to quality improvement. Health-care managers should avoid over-focusing on any single aspect of service quality at the expense of others. Instead, they should strive for holistic enhancement strategies that address all dimensions of the patient experience.

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