



SERVICE QUALITY AND PATIENT SATISFACTION ASSESSMENT USING SERVQUAL AND ZOT MODELS

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ABSTRACT

Healthcare service quality is a critical determinant of patient satisfaction, particularly in primary healthcare settings such as Puuwatu Primary Healthcare Center, which continues to receive complaints regarding service timeliness, staff courtesy, and physical facilities. Objective: This study aimed to assess service quality at Puuwatu Primary Healthcare Center and to identify service dimensions requiring improvement using the SERVQUAL and Zone of Tolerance (ZoT) models. Method: This descriptive quantitative study involved 100 outpatients selected using the Slovin formula. Data were collected through a structured questionnaire comprising 29 SERVQUAL indicators and were analyzed using gap (GAP) scores, Mean Service Adequacy (MSA), Mean Service Superiority (MSS), and ZoT analysis. Result: The findings revealed negative GAP scores across all service dimensions, indicating that the services provided did not meet patient expectations. ZoT analysis demonstrated that only the assurance dimension achieved a positive score, while responsiveness, empathy, and reliability remained within the tolerance zone but below expected standards. The tangible dimension exhibited the highest level of dissatisfaction. Conclusion: Service quality improvement efforts should prioritize upgrading physical facilities and strengthening service consistency and responsiveness to enhance overall patient satisfaction.

Keywords: primary healthcare center; SERVQUAL; ZoT

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INTRODUCTION

Puuwatu Primary Healthcare Center serves as a public health institution with a strategic role in delivering community-based healthcare services (Kemenkes RI, 2024b). As the frontline provider of promotive, preventive, curative, rehabilitative, and palliative services, the center is responsible for ensuring continuous improvement in community health status within its designated service area (Kemenkes RI, 2024a). Its primary objective is to achieve optimal public health outcomes. In addition, primary healthcare centers play a crucial role in addressing various community health problems while delivering essential healthcare services in accordance with the Minimum Service Standards (MSS) in the health sector (Kemenkes, 2019). These services are provided by qualified healthcare professionals with specific competencies, covering a wide range of population groups, including newborns, pregnant women, school-aged children, toddlers, adults of productive age, and the elderly (Kemenkes, 2009). Puuwatu Primary Healthcare Center also provides individual healthcare services encompassing various forms of medical interventions regulated by established standards and guidelines. These standards include requirements related to site location, infrastructure, facilities, laboratory services, medical equipment, and healthcare supplies. Compliance with these provisions is supported by adequate and qualified healthcare personnel to ensure the delivery of high-quality services (Daswita et al., 2024; Muhammad Anzar et al., 2023).

Healthcare services provided by Puuwatu Primary Healthcare Center are fundamentally expected to address patients' needs and meet their expectations (Mohammad Rofiudin et al., 2024). Patients seek care at healthcare facilities to obtain solutions to their health concerns; therefore, service

quality becomes a key determinant influencing their decision to revisit the facility (Marliyani et al., 2023; Wida & Ida, 2023). Patient satisfaction is widely regarded as a fundamental indicator reflecting the quality of healthcare services delivered (Heni Anggit et.al, 2023). Information on patient satisfaction levels can be utilized by the healthcare center to evaluate ongoing programs and to identify areas requiring improvement.

Patient dissatisfaction indicates that healthcare services may not be delivered effectively and efficiently. Satisfaction is achieved when patients' expectations, needs, and preferences are adequately fulfilled. Therefore, service quality that successfully accommodates patient expectations has a direct impact on higher levels of satisfaction. In this regard, patients' perceptions of service quality play a crucial role in determining their overall satisfaction (Heni Anggit et.al, 2023). Several complaints have been reported by patients, including delays in service hours that disrupt daily activities and reduce time efficiency, as well as unfriendly attitudes displayed by staff toward patients. Additionally, limited parking capacity has been perceived as inadequate, contributing to inconvenience and discomfort among visitors.

Service quality can be evaluated using the SERVQUAL approach, which is designed to assess patient satisfaction by measuring perceived service performance and outcome quality based on actual service experiences (Palinggi et al., 2020). The SERVQUAL model, first introduced by Parasuraman et al., has been widely applied to evaluate service quality across various service sectors (Parasuraman et al., 1985, 2008). This model measures the gap between patients' expectations and their perceptions of the services received across five key dimensions: reliability, tangibles, assurance, empathy, and responsiveness (Parasuraman et al., 1985; Rahmawati et al., 2023). These dimensions form the basis of assessment indicators that reflect patient satisfaction levels. In the present study, SERVQUAL was integrated with the Zone of Tolerance (ZoT) analysis to determine whether the gap between expectations and perceived performance remains within an acceptable tolerance range (Irfyza et al., 2022; Vernanda & Zuraidah, 2022).

Previous studies assessing service quality using the SERVQUAL method have been conducted in several primary healthcare centers, including Tanjungsari Primary Healthcare Center in Bogor Regency, the Bekasi City Health Office, Pantoloan Primary Healthcare Center in Palu City, and Karangrayung Primary Healthcare Center (Rahayu & Nasrawati, 2024; Yusransyah et al., 2022). However, studies integrating SERVQUAL with Zone of Tolerance (ZoT) analysis in inpatient primary healthcare settings remain limited and, to date, have only been reported at Lepo-Lepo Primary Healthcare Center.

Therefore, conducting a similar study at Puuwatu Primary Healthcare Center, which also provides inpatient services, is essential to obtain a comprehensive evaluation of healthcare service quality. This study aims to provide an in-depth assessment of healthcare service quality at Puuwatu Primary Healthcare Center. The findings are expected to serve as a strategic reference for identifying service strengths and weaknesses and for formulating effective improvement strategies to enhance healthcare service quality in the future.

METHOD

This study employed a descriptive quantitative approach aimed at describing, analyzing, and explaining the phenomena under investigation. This approach enables objective conclusions to be drawn through the processing and interpretation of numerical data as the basis for analysis (Aziza, 2023; Wiwik Sulistyawati, Wahyudi, 2022). The study population comprised all outpatients who visited Puuwatu Primary Healthcare Center. The sample size was determined based on the 2023 service profile data of the healthcare center, which recorded a total of 37.850 patient visits. To obtain a representative sample, the Slovin formula was applied with a 10% margin of error, resulting in a final sample of 100 respondents (Rosita et al., 2021). The research instruments

consisted of a structured questionnaire and interviews. The questionnaire items were systematically developed based on relevant scientific references, including research articles, textbooks, and other supporting sources. Respondents' answers were measured using a five-point Likert scale, ranging from 1 to 5, where 1 represented a very high level of disagreement or dissatisfaction and 5 indicated a very high level of agreement or satisfaction (Sendi Gustiandi et al., 2024). Validity testing indicated that all item-total correlation coefficients (r -calculated) exceeded the critical r -table value of 0.163, confirming that all questionnaire items were statistically valid. Reliability analysis demonstrated that the Cronbach's Alpha coefficients for all five servqual dimensions were greater than 0.6, indicating acceptable internal consistency. Therefore, the questionnaire was considered reliable for measuring service quality constructs in this study.

Service Quality (Servqual)

The research utilized interviews and questionnaires as a data collection medium. Respondents were asked to respond to 29 questions. The questions were developed based on various literature references and utilized a *Likert* scale of 1-5, where one indicates "strongly disagree/dissatisfied" and five indicates "strongly agree/satisfied." The questions applied can be observed in Table 1 below. The servqual value is calculated by finding the difference (GAP score) between expectations and service performance received. The servqual value can be calculated as follows (Bachtiar et al., 2022).

$$\text{Servqual Value (GAP Score)} = \text{Performance Value} - \text{Expected Value}$$

Where:

1. If the GAP Score is negative, the performance is below expectations, and the service does not satisfy the patient.
2. If the GAP score is zero, performance = expectations, the services provided can be said to be of high quality and can satisfy the patient.
3. If the GAP Score is positive and performance is above expectations, the service is very satisfying for the patient.

Where the servqual value shows the quality of service, the performance value shows the service the patient receives, and the expectation value is the patient's expectation of the service to be received.

Zone of Tolerance (ZoT) Mapping

Zone of Tolerance (ZoT) is a range that describes the level of satisfaction in service quality assessment. This concept aims to ensure that the quality of service provided is still acceptable to customers. To find out this, it is necessary to calculate the value of *the measure of Service Adequacy* (MSA), "*Measure of Service Superiority* (MSS)," and "*Zone of Tolerance* (ZoT)." These values help evaluate the extent to which services can meet or exceed customer expectations. The MSA, MSS, and ZoT values can be calculated as follows

1. MSA Value= Current Service-Minimum Service
2. MSS Value = Current Service - Expected Service
3. ZoT value $\frac{\text{MSA}}{(\text{Expected Service} - \text{Minimum Service})}$

If the MSS value is positive, then this indicates that the currently available service is above the ZoT value, which indicates that the patient is satisfied with the service provided. Conversely, if the MSS value is negative, the current service is below the ZoT value, reflecting patient dissatisfaction with the service received. Meanwhile, if the ZoT value is positive, it shows that even though patients feel dissatisfied with the service they get, they can still accept it. Determining the ZoT position for each

dimension requires data in the form of the average value of the current service performance level, the average value of the expected service level, and the average value of the minimum service level. These three values analyze whether service quality meets or exceeds patients' expectations and basic needs.

RESULT

Respondent Characteristics

The respondents in this study were patients who had visited and received healthcare services at Puuwatu Primary Healthcare Center. The demographic characteristics of the respondents are presented in Table 1 below.

Table 1.
Respondent Characteristics by Age, Gender, and Occupation

Respondent characteristics	f	%
Age:		
17-27 Years	30	30
28- 38 Years	49	49
39-49 Years	16	16
50-60 Years	4	4
>61 Years	1	1
Gender:		
Male	34	34
Female	66	66
Occupation:		
Civil Servant	13	12
Private Sector Employee	42	42
Unemployed	45	45

SERVQUAL

SERVQUAL scores were calculated by measuring the gap (GAP) between patients' expectations and the perceived performance of the services received. When patients' expectations exceed the quality of services provided, the service is perceived as suboptimal and fails to meet quality standards, resulting in dissatisfaction. Conversely, when the services delivered meet or surpass patient expectations, the service is considered high quality and capable of generating patient satisfaction.

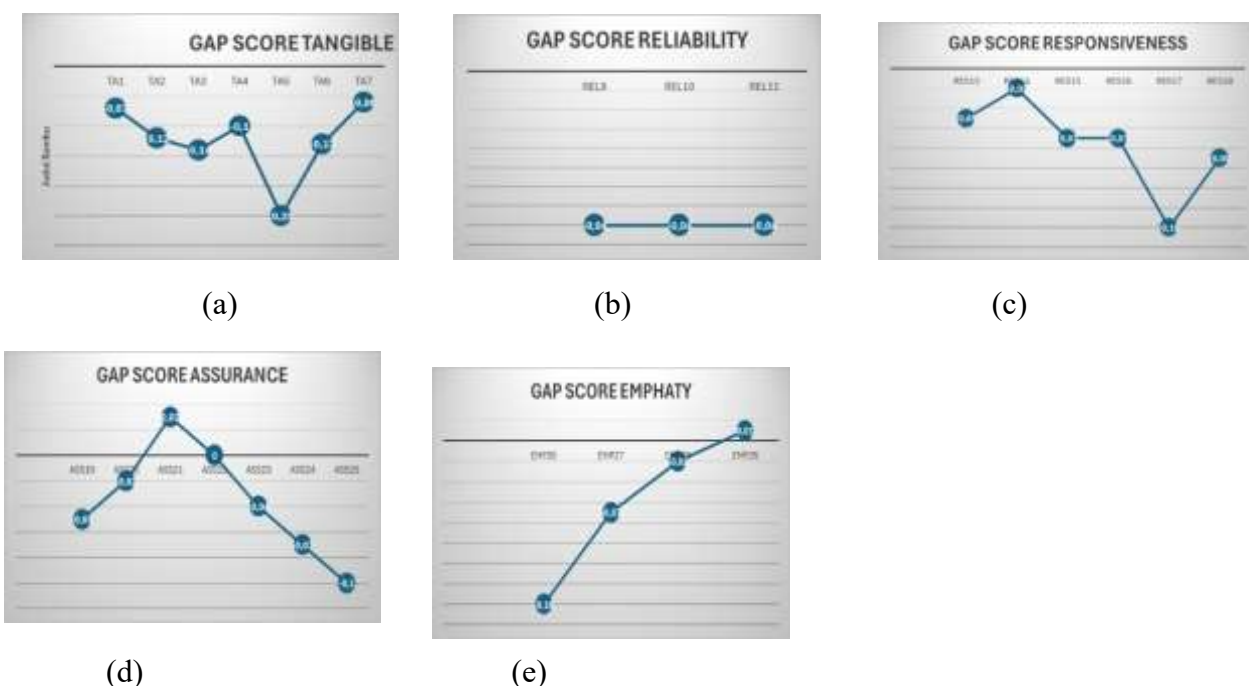


Figure 1. Gap Values Across the Five SERVQUAL Dimensions

Note: Gap Values by Dimension: (a) Tangibles; (b) Reliability; (c) Responsiveness; (d) Assurance; (e) Empathy.

ZOT

The Zone of Tolerance (ZoT) represents a range of values that reflect customers' acceptable level of service quality and satisfaction (Rahmi & Zulvia, 2024). The ZoT concept is used to determine whether the service quality delivered remains within an acceptable tolerance range from the patient's perspective.

Table 2.
Zone of Tolerance Positions Across the Five SERVQUAL Dimensions

No.	Dimensions	Mean Expected Service Level	Mean Perceived Service Performance	Mean Minimum Service Level	MSA	MSS	ZOT
1.	Tangible	4,39	4,26	4,32	-0,06	-0,12	-1,03
2	Reliability	4,41	4,36	4,35	0,01	-0,05	-0,25
3	Responsiveness	4,46	4,38	4,37	0,01	-0,08	-0,04
4	Assurance	4,44	4,41	4,42	-0,01	-0,04	0,38
5	Emphaty	4,52	4,46	4,46	0,00	-0,06	-0,01

DISCUSSION

Based on interviews conducted with 100 respondents, the demographic characteristics were described according to gender, age, educational level, and occupation. The majority of respondents were female (66%), suggesting that women tend to demonstrate greater concern for health issues and often assume decision-making roles in family healthcare matters. The largest age group was 28–38 years (49%), indicating that the utilization of services at Puuwatu Primary Healthcare Center is predominantly driven by adults within the productive age group who actively access healthcare facilities. In terms of occupation, most respondents were unemployed or homemakers (45%). This finding may be attributed to the greater availability of homemakers during service operating hours compared to civil servants or private-sector employees, who may face time constraints in accessing healthcare services.

The tangible dimension showed that all physical aspects of service delivery remained below user expectations, as indicated by negative GAP values across all indicators (TA1–TA7), ranging from –0.06 to –0.25. The largest gap was observed in TA5 (–0.25), suggesting that service facilities and equipment were perceived as the most inadequate compared to expectations. Although some attributes, such as staff appearance and general facilities, showed smaller gaps, improvements in consistency and comfort are still required. Overall, enhancing physical facilities and equipment should be prioritized, followed by improvements in the waiting area, informational clarity, and environmental comfort. Addressing these key gaps may substantially improve user satisfaction and align service quality more closely with expectations.

The reliability dimension reflects the ability of the healthcare center to deliver services consistently, accurately, and as promised. All indicators (REL9, REL10, and REL11) showed identical GAP values of –0.04, indicating that service performance was slightly below user expectations. The small magnitude of the gap suggests that service delivery in this dimension is relatively stable and generally satisfactory, although not yet fully aligned with community expectations. Despite the relatively minimal discrepancy, improvements are still necessary to optimize service reliability. Efforts should focus on maintaining punctuality, ensuring procedural consistency, and providing accurate and accountable information to patients. As all indicators exhibited similar GAP values, improvement strategies should be implemented comprehensively rather than targeting a single aspect. Strengthening service consistency while maintaining current performance may enable the reliability dimension to achieve higher levels of user satisfaction.

The responsiveness dimension reflects staff promptness in delivering services, including their readiness to assist, speed in addressing patient needs, and clarity in providing information. All indicators (RES13–RES18) showed negative GAP values ranging from -0.02 to -0.16 , indicating that service performance has not fully met user expectations. The smallest gap was observed in RES14 (-0.02), suggesting relatively good responsiveness in handling patient requests, while the largest gap occurred in RES17 (-0.16), highlighting service speed and response to patient complaints as the primary areas of concern. Overall, patients expect more responsive service, particularly in terms of timeliness and attentiveness. Improvement efforts should prioritize aspects with the largest gap, such as optimizing staffing during peak hours, implementing more efficient queue systems, and enhancing rapid-response communication skills. Meanwhile, indicators with smaller gaps should be maintained to preserve service consistency. Strengthening overall responsiveness may significantly improve patient satisfaction, as patients are more likely to feel acknowledged and promptly attended to.

The assurance dimension reflects patients' sense of trust and security regarding staff competence, service safety, courtesy, and the ability to provide clear explanations. All indicators showed negative GAP values ranging from -0.02 to -0.10 , indicating that service performance has not fully met patient expectations. The smallest gap was observed in ASS21 (-0.02), suggesting that staff competence was perceived as relatively satisfactory. In contrast, the largest gap was identified in ASS25 (-0.10), indicating that aspects related to patient safety and protection were perceived as less optimal. Overall, the findings suggest that patients expect stronger assurance not only in terms of professional competence but also through enhanced safety guarantees and clearer communication. Improvement efforts should prioritize indicators with the largest gaps, such as strengthening safety standards, increasing procedural transparency, and providing more comprehensive explanations of services. Meanwhile, aspects with smaller gaps should be maintained to ensure consistency. Enhancing the assurance dimension may foster greater patient trust, comfort, and confidence in the reliability of healthcare services provided.

The empathy dimension reflects the extent to which staff provide individualized attention, demonstrate friendliness and concern, and are willing to listen to patients' complaints. All indicators showed negative GAP values ranging from -0.01 to -0.18 , indicating that patient expectations regarding staff empathy were not fully met. The largest gap was observed in EMP26 (-0.18), suggesting that individualized attention and understanding of patient needs were perceived as the most inadequate aspects. In contrast, the smallest gap occurred in EMP29 (-0.01), indicating that certain aspects of staff friendliness were already close to patient expectations. Overall, patients expect healthcare services that combine efficiency with genuine human interaction. Improvement efforts should prioritize enhancing personalized attention, active listening, and compassionate communication. Meanwhile, aspects that are already close to expectations should be maintained to ensure consistency. Strengthening the empathy dimension may enhance patient comfort and reinforce the perception that patients are valued as individuals rather than merely service recipients.

Based on the Zone of Tolerance (ZoT) values presented in the table, the assurance dimension demonstrated the strongest performance, with a positive ZoT score ($+0.38$). This indicates that aspects related to staff knowledge, courtesy, and the ability to instill trust and security not only met but exceeded the minimum acceptable level of service. Thus, assurance represents a key strength of the healthcare services provided. In contrast, the responsiveness and empathy dimensions showed ZoT values close to zero, suggesting that although service performance remains within patients' tolerance limits, it still falls slightly below expectations. Meanwhile, the reliability dimension exhibited a more pronounced negative ZoT value (-0.25), indicating that service consistency and accuracy require further improvement. The lowest ZoT value was observed in the tangible dimension (-1.03), reflecting the most significant level of dissatisfaction. Physical aspects such as facilities, equipment, and the service environment were perceived as falling below not only patient

expectations but also their minimum tolerance threshold. These findings highlight the urgent need to prioritize improvements in physical infrastructure to enhance overall service quality and meet acceptable standards.

CONCLUSION

The ZoT analysis indicated that the service quality at Puuwatu Primary Healthcare Center has not yet fully met patient expectations. The assurance dimension emerged as the only aspect with a positive ZoT value, suggesting that staff competence, courtesy, and the sense of security provided to patients were within an acceptable service range and approached the desired level of performance. In contrast, the responsiveness, empathy, and reliability dimensions demonstrated negative ZoT values that were close to zero, indicating that although these aspects remain within patients' tolerance limits, they still require improvement. The tangible dimension exhibited the lowest ZoT value, high lighting that physical facilities, infrastructure, and other tangible elements of service constitute the primary source of patient dissatisfaction. These findings align with the objective of the study, which was to provide a comprehensive assessment of healthcare service quality at Puuwatu Primary Healthcare Center and to identify dimensions requiring improvement. Based on the ZoT results, physical aspects of service delivery should be prioritized for enhancement, followed by moderate improvements in reliability, responsiveness, and empathy. Overall, this study successfully achieved its objective by identifying both strengths and weaknesses in service delivery and by providing an evidence-based foundation for developing more targeted quality improvement strategies at Puuwatu Primary Healthcare Center.

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