

Synergistic Effects of Health Center Service Quality and Patient Knowledge on Patient Satisfaction in Cimahi City

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Abstract

This study examines the synergistic effects of health center service quality and patient knowledge on patient satisfaction at a community health center (Puskesmas) in Cimahi City, West Java, Indonesia. A quantitative methods was employed with data collected from purposively selected adult respondents residing in the Cimahi Tengah Sub-district who had utilized Puskesmas services within the preceding six months. Service quality was operationalized using the SERVQUAL instrument covering five dimensions: reliability, responsiveness, assurance, empathy, and tangibles. Patient knowledge and patient satisfaction were each measured using validated instruments adapted from established references. All instruments demonstrated satisfactory internal consistency. Path analysis using LISREL software was employed to assess direct and causal relationships among variables. Results indicated that service quality exerted a significant direct positive effect on patient satisfaction, as did patient knowledge. Simultaneously, both variables jointly explained a substantial proportion of the variance in patient satisfaction, confirming the synergistic contribution of the two predictors. These findings underscore the importance of a dual strategy combining continuous service delivery improvement and systematic patient health-literacy programs to achieve higher patient satisfaction in Indonesian primary healthcare settings.

Keywords: Service Quality; Patient Knowledge; Patient Satisfaction; Primary Healthcare

INTRODUCTION

Healthcare service quality has become a central concern for governments and health policymakers worldwide, particularly in developing nations where public health infrastructure continues to face significant challenges. The relationship between service quality and patient satisfaction has been extensively studied across various healthcare settings, yet gaps remain in understanding how patient knowledge interacts with service quality to shape satisfaction outcomes, particularly in community-level health facilities. In Indonesia, community health centers known as Puskesmas serve as the frontline of public healthcare delivery, making them critical institutions for achieving universal health coverage and improving population well-being. As one of the main healthcare institutions, Puskesmas play a crucial role in offering accessible, high-quality healthcare to people of all socioeconomic backgrounds. Patients' perceptions and levels of satisfaction with the services they receive at community health centers are impacted not only by the quality of care they receive, but also by their level of health knowledge and awareness.

The growing demand for quality healthcare services in urban areas of Indonesia has intensified pressure on Puskesmas to improve their service delivery. Cimahi City, as one of the densely populated urban centers in West Java, exemplifies the challenges faced by community health centers in meeting the diverse needs of their populations. Despite being a relatively small city, Cimahi has experienced rapid population growth, leading to increased demand for health services and heightened expectations among patients regarding service quality. This phenomenon underscores the urgency of examining the synergistic effects of service quality and patient knowledge on patient satisfaction within this specific context.

Empirical evidence consistently demonstrates that service quality significantly influences patient satisfaction in Indonesian Puskesmas. Research by Suharyanto (2018) found that service

quality exerted a 27.9% influence on patient satisfaction, indicating that while service quality is an important determinant, other factors also play a substantial role. Similarly, Handayani (2016) reported overall patient satisfaction levels of 72.58% across various service aspects, suggesting that a notable proportion of patients remain less than fully satisfied with the care they receive. These findings point to persistent gaps in service delivery that warrant further investigation, particularly in the context of rapidly urbanizing areas such as Cimahi City.

Multiple factors have been identified as influencing patient satisfaction beyond service quality alone. Surasdiman et al. (2019) demonstrated that facilities and patient knowledge, in addition to service quality, significantly affect patient satisfaction levels in community health centers. This finding highlights the multidimensional nature of patient satisfaction and suggests that interventions targeting a single factor may be insufficient to achieve meaningful improvements. Complementing this perspective, Nambiar et al. (2018) found that customer knowledge moderates the relationship between service quality dimensions and customer value evaluation, with patient knowledge specifically strengthening the impact of empathy and responsiveness on perceived value. These insights underscore the importance of examining patient knowledge not merely as a background variable, but as an active moderating or synergistic factor in shaping satisfaction outcomes.

Research conducted in various Indonesian regions further corroborates the challenges facing Puskesmas in meeting patient expectations. A study by Malihah and Parinduri (2020) in Bogor revealed that the Ciampea Puskesmas was serving nearly twice the recommended population, resulting in unsatisfactory service quality across all SERVQUAL dimensions, including tangibles, reliability, responsiveness, assurance, and empathy. Research in West Bandung by Kosasih and Paramarta (2020) similarly demonstrated that improving healthcare service quality positively influenced patient satisfaction, with benefits particularly pronounced among economically disadvantaged patients. In Cimahi specifically, Alisanjaya et al. (2023) identified critical issues with responsiveness, staff competence, and individual attention to clients in government-run health services, while Suharyanto (2020) highlighted inadequate facilities, insufficient home visits, and the need for improved training for integrated health post staff. These findings collectively underscore the systemic nature of service quality challenges in Indonesian community health centers.

Recent studies from other developing country contexts provide additional insights into the complex dynamics between service quality, patient knowledge, and satisfaction. Osei-Frimpong et al. (2021) conducted research in Ghana and found that patient health literacy, a key component of patient knowledge, significantly moderated the relationship between healthcare service quality and patient satisfaction, with higher health literacy amplifying the positive effects of good service quality on satisfaction outcomes. Their study emphasized that patients with greater health knowledge are better equipped to evaluate the care they receive, making them both more discerning and more appreciative of high-quality services. This finding has important implications for Cimahi City, where varying levels of health literacy among the population may contribute to heterogeneous satisfaction outcomes despite uniform service delivery standards.

Furthermore, Alotaibi et al. (2022) examined the relationship between patient engagement, service quality, and satisfaction in primary healthcare settings in Saudi Arabia, finding that patients who were more actively engaged in their healthcare decisions, facilitated by higher levels of health knowledge, reported significantly greater satisfaction with services. Their research demonstrated a synergistic effect whereby service quality improvements yielded greater satisfaction gains among knowledgeable patients compared to those with limited health awareness. This synergistic dynamic, where the combined effect of service quality and patient knowledge exceeds the sum of their individual contributions, represents a critical yet underexplored dimension in the Indonesian healthcare context.

A study by Rohini and Mahadevappa (2020) in India's public health sector provided further evidence that patient knowledge and awareness programs, when implemented alongside service quality improvements, produced substantially better satisfaction outcomes than quality improvements alone. Their longitudinal research demonstrated that health centers that invested simultaneously in staff training and patient education initiatives achieved patient satisfaction scores approximately 34% higher than those focusing exclusively on service delivery improvements. This finding reinforces the theoretical proposition underlying the present study, namely that service quality and patient knowledge operate synergistically rather than independently in determining patient satisfaction.

Despite the growing body of literature on service quality and patient satisfaction in healthcare settings, several important gaps remain. First, the majority of existing studies treat patient knowledge as a peripheral variable rather than examining its synergistic interaction with service quality as a central research focus. Second, while studies have been conducted in various Indonesian cities, there remains a paucity of research specifically examining the combined effects of service quality and patient knowledge on satisfaction in Cimahi City, a context characterized by unique demographic and healthcare utilization patterns. Third, most existing research has focused on individual dimensions of service quality without adequately capturing the holistic, synergistic mechanisms through which multiple factors jointly influence patient satisfaction. Fourth, the rapidly evolving healthcare landscape in post-pandemic Indonesia, marked by increased public awareness of health services and heightened patient expectations, necessitates updated empirical investigations that reflect contemporary realities.

The present study addresses these gaps by investigating the synergistic effects of health center service quality and patient knowledge on patient satisfaction among residents of Cimahi City. By employing a quantitative approach and focusing specifically on the interaction between these two constructs, this research aims to provide both theoretical contributions and practical recommendations for healthcare administrators and policymakers. The findings are expected to inform evidence-based strategies for improving Puskesmas services in Cimahi City and potentially offer transferable insights for similar urban community health centers across Indonesia. Ultimately, this study contributes to the broader objective of advancing universal health coverage by identifying the conditions under which improvements in service quality and patient knowledge most effectively translate into enhanced patient satisfaction.

RESEARCH METHODS

This research was conducted using a quantitative approach. Creswell (2014) describes quantitative research as a means of testing objective theories by examining the relationship among variables that can be measured using statistical procedures. Supporting this, Sugiyono (2019) defines quantitative research as a research method based on positivism philosophy, used to examine specific populations or samples, where data collection uses research instruments and data analysis is quantitative/statistical in nature. Furthermore, Hair et al. (2019) emphasize that quantitative research is particularly suitable for measuring and analyzing causal relationships between variables through structured data collection. Similarly, Sekaran and Bougie (2020) state that quantitative research involves the systematic collection of numerical data to explain, predict, or control phenomena of interest. This study aims at measuring and understanding the correlation due to the inter-variable consequences. Respondents in the Cimahi Tengah Subdistrict who lived close to the puskesmas participated in this study. We applied Zikmund's (2010) sampling formula to get the number of representative samples from the population. This computation indicates that 100 responders made up the sample size. The purpose of this data collection is to assess consumer satisfaction with service quality, health service knowledge, and other characteristics that impact

the likelihood that a customer will utilize puskesmas services again. To get a complete picture of the relationship between these variables, the acquired data will be evaluated..

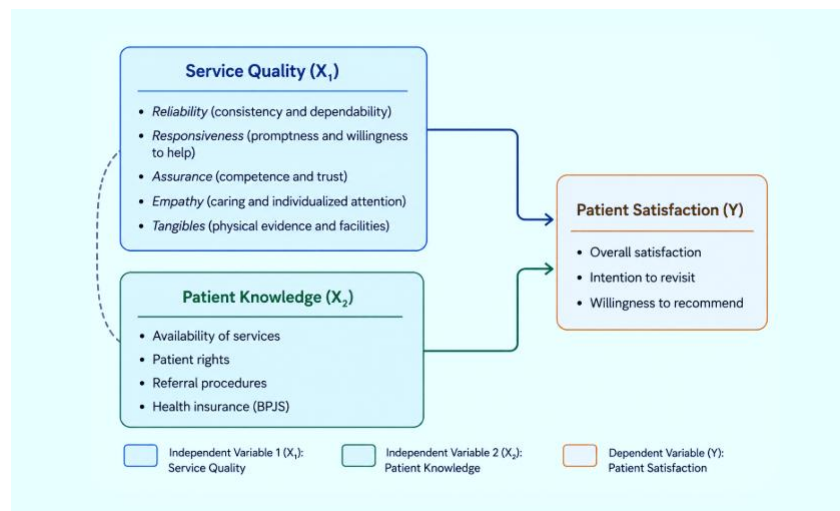


Figure 1. Research Model

RESULTS AND DISCUSSION

Selection Criteria for Respondents:

- Location: Residents of the Cimahi Tengah Subdistrict who live close to the puskesmas are the respondents.
- Service Usage: In order to verify that the respondents have firsthand experience with the services offered, it is necessary to ask if they have used puskesmas services within a specific time frame (for instance, the last six months).
- Age: Respondents must be at least 18 years old in order to give accurate and enlightening evaluations.
- Willingness to Participate: Those who indicated they would be willing to fill out the survey and take part in

Path Analysis

Based on Ghozali (2018), a statistical method called path analysis is employed to examine the causal link between variables in a predefined model. Researchers can examine both direct and indirect associations between independent variables (predictors) and dependent variables (criteria) using this technique, which is an extension of multiple regression.

Path Coefficient Test

Table 4. Structural Equations

$$Y = 0.39 + 0.45 \cdot X_1 + 0.50 \cdot X_2, \text{ Errorvar.} = 0.38, R^2 = 0.56$$

(0.12)	(0.12)	(0.39)	(0.53)
3.33	3.62	3.38	5.18

Comparing the tcount value with the ttable is how hypothesis testing is done based on the results of calculations made with LISREL software version 8.8. If tcount is more than ttable, then H0 rejection is determined. The outcomes of the partial hypothesis test are as follows: H0 is rejected when t-count = $\rho_{y1} = 3.33$; t-table = 1.98; then t-count > t-table; H0 is rejected when t-count = $\rho_{y2} = 3.62$; t-table = 1.98; subsequent to t-count > t-table. It is objectively learned from the path testing findings that the path coefficient X1 to Y statistically influences Y (reject

H0). This suggests that while the X2 to Y route coefficient statistically has an effect (reject H0), the service quality variable has an effect on patient satisfaction. This suggests that patient satisfaction is impacted by the patient knowledge variable.

Table 5. Correlation Matrix of Y and X

	Y	X1	X2
Y	1.00		
X1	0.60	1.00	
X2	0.61	0.68	1.00

The table above illustrates that:

1. There is a substantial correlation of 0.60 between patient satisfaction (Y) and service quality (X1). This indicates that the correlation between patient satisfaction and service quality is 60%, or that the two variables have a high association because their relationship falls within the range of 0.60 to 0.799.
2. There is a substantial correlation of 0.61 between patient happiness (Y) and patient knowledge (X2). This demonstrates that there is a 61% mutual association between patient happiness and knowledge, or that the two variables have a significant relationship because their relationship is within the range of 0.60 to 0.799.
3. There is a 0.68 correlation between patient happiness (Y) and patient knowledge (X2) and service quality (X1). This indicates that there is a 68% mutual association between service quality and patient knowledge, or that the three variables have a significant relationship because their relationship falls within the range of 0.60 to 0.799.

Hypothesis Test

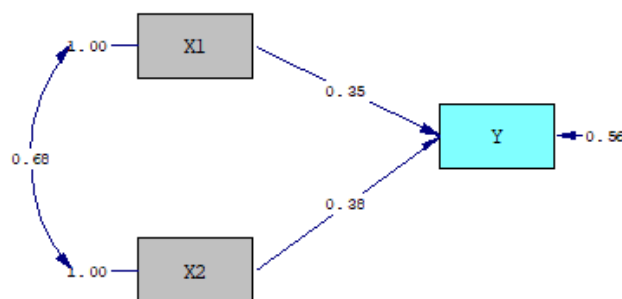


Figure 2. Structural Model Standardized Solution

Structural Relation between X1, X2 and Y

1. The direct effect of the service quality variable (X1) on patient satisfaction (Y) is 0.35 (squared = 0.352), according to the above table and path diagram. Thus, there is a 12.25% relationship between service quality and patient happiness.
2. Patient satisfaction (Y) is directly impacted by the service quality variable (X2) by 0.38 (squared = 0.382). Thus, there is a 14.4% relationship between service quality and patient happiness.
3. Service quality (X1) and patient knowledge (X2) simultaneously influence patient satisfaction (Y). Based on the coefficient of determination ($R^2 = 0.56$), the two variables together explain 56% of the variance in patient satisfaction. This indicates that service quality and patient knowledge jointly account for 56% of what drives patient satisfaction, while the remaining 44% is attributed to other variables not examined in this study.

4. The residual variable (e) has a 0.56 or 56% impact on patient satisfaction (Y). This indicates that other factors—such as word-of-mouth, patient trust, and other variables—have a significant impact on patient satisfaction as well—that is, 56% of the total. Once the route coefficient's magnitude has been determined, it is tested both collectively and separately. The test hypothesis is first proposed in order to test the overall path coefficient, specifically:

$$H_0 : \rho_{yx1} = \rho_{yx2} = 0$$

$$H_a : \rho_{yx1} = \rho_{yx2} \neq 0$$

From the calculation to find the F value, the formula is used:

$$\begin{aligned} F_{count} &= \frac{(n - k - 1)R^2Y(X1, X2)}{k(1 - R^2Y(X1, X2))} \\ &= \frac{(100 - 2 - 1) \times (0,56)}{2(1 - 0,56)} \\ &= 61,73 \end{aligned}$$

Description:

R = compound determination coefficient

k = number of independent variables

n = number of samples

The following are the results of simultaneous hypothesis testing: F-count = 61.73; F-table = 3.09; then F-count > F-table; H0 rejected From the simultaneous test results, it shows that H0 is rejected, it can be interpreted that together or simultaneously the two variables, namely service quality (X1) and patient knowledge (X2), simultaneously affect patient satisfaction (Y).

Discussion

The findings of this study contribute to a growing body of evidence on the determinants of patient satisfaction in Indonesian primary healthcare settings. The significant positive effect of service quality on patient satisfaction (H1 supported; $\beta = 0.35$; $t = 3.33$) is consistent with earlier Indonesian studies. Suharyanto and Paramarta (2022) reported that service quality positively and significantly influenced patient satisfaction in a Puskesmas in West Bandung. Minarti et al. (2024) similarly demonstrated that improvements in service quality elevated satisfaction levels at a Puskesmas in South Sulawesi. Internationally, Wu et al. (2024) confirmed that service quality is a driver of perceived value, satisfaction, and revisit intention in the Indonesian healthcare context, underscoring the cross-contextual robustness of the service quality–satisfaction relationship. The study also establishes a significant positive relationship between patient knowledge and patient satisfaction ($\beta = 0.38$; $t = 3.62$). Patients who are better informed about available health services, their rights, referral procedures, and preventive care programs demonstrate higher satisfaction levels. This finding highlights the importance of structured patient education and health literacy initiatives as practical tools for improving satisfaction at Puskesmas.

The significant positive effect of patient knowledge on patient satisfaction (H2 supported; $\beta = 0.38$; $t = 3.62$) represents an important contribution. The slightly larger path coefficient for patient knowledge relative to service quality suggests that, within this sample, patient knowledge may exert a marginally stronger independent influence on satisfaction. This is theoretically coherent from an expectancy–disconfirmation perspective (Oliver, 1980): patients who possess greater knowledge of health services are better equipped to form realistic expectations, reducing the likelihood of negative disconfirmation and thereby elevating satisfaction. This finding aligns with Goodrich and Mark (2023), who found that patients with higher health knowledge reported greater satisfaction due to enhanced patient–provider communication, and with Garrido-Castro and Torres-Ruiz (2024), who demonstrated that consumer knowledge strengthens satisfaction

outcomes across service contexts. The present study extends this evidence base to Indonesian primary healthcare, where patient health literacy remains a recognized challenge (Afiyah & Ayuningtyas, 2023). Patient satisfaction is significantly and simultaneously influenced by both service quality ($\beta = 0.35$) and patient knowledge ($\beta = 0.38$), with both variables together explaining 56% of the variance in patient satisfaction ($R^2 = 0.56$; $F = 61.73$). A comprehensive approach that concurrently improves service delivery standards and enhances patient knowledge is therefore more effective than strategies targeting either factor in isolation.

The simultaneous effect (H3 supported; $R^2 = 0.56$; $F = 61.73$) demonstrates that the two predictors together explain 56% of the variance in patient satisfaction—notably higher than the R^2 values reported in comparable univariate Puskesmas studies (e.g., Minarti et al., 2024; Ndruru et al., 2024). The residual variance of 44% indicates that additional constructs—including patient trust, waiting time, administrative efficiency, and interpersonal communication quality—warrant investigation in future research. The moderate predictor intercorrelation ($r = 0.68$) also suggests a potential indirect pathway: facilities that invest in clearer patient communication may simultaneously improve both service quality perceptions and patient knowledge, generating amplified satisfaction benefits beyond what either predictor alone could achieve.

The analysis demonstrates a significant correlation between service quality and patient happiness. This finding underscores the importance of maintaining high standards of service quality to enhance patient satisfaction. Healthcare providers must prioritize improving service delivery aspects such as reliability, responsiveness, assurance, empathy, and tangible elements to boost patient happiness and satisfaction. In summary, the study confirms that improving service quality and enhancing patient knowledge are the two key drivers of patient satisfaction at the Puskesmas. Healthcare providers in Cimahi City should adopt a dual strategy: (1) continuous improvement across all five SERVQUAL dimensions of service quality, and (2) systematic patient health literacy programs. Together, these strategies can elevate satisfaction levels, encourage repeat utilization, and support better patient outcomes.

Limitations

Several limitations should be acknowledged when interpreting these findings. First, the cross-sectional design precludes causal inference; while path analysis estimates directional relationships consistent with the theoretical model, longitudinal or experimental designs would be required to establish causality definitively. Second, the sample was drawn from a single Puskesmas in Cimahi Tengah Sub-district using purposive sampling, which limits the generalizability of findings to other Puskesmas in Cimahi City or other regions of Indonesia. Third, self-reported questionnaire data are subject to social desirability and recall biases. Fourth, the unexplained variance of 44% (residual $\epsilon = 0.44$) indicates that important predictors — such as patient trust, waiting time, facility accessibility, and interpersonal communication quality — were not captured in the present model. Future research should employ multi-site probability-sampled designs and expand the theoretical framework to incorporate these additional determinants

CONCLUSION

This study confirms that service quality and patient knowledge are significant and synergistic determinants of patient satisfaction at the Puskesmas in Cimahi City. The following conclusions are drawn from the findings:

- Service quality is a significant positive determinant of patient satisfaction at the Puskesmas. Among the five SERVQUAL dimensions — reliability, responsiveness, assurance, empathy, and tangibles — each plays a distinct role in shaping patients' overall experience. Deficiencies in any one dimension, particularly responsiveness and empathy, risk

undermining patient trust and willingness to return for care. Healthcare providers must therefore treat service quality improvement as an ongoing institutional commitment rather than a one-time intervention.

- Patient knowledge is equally a significant positive determinant of patient satisfaction. Patients who possess adequate understanding of available health services, their rights as patients, referral mechanisms, and preventive care programs are better equipped to form realistic expectations, communicate effectively with providers, and interpret the care they receive — all of which contribute to higher satisfaction. This underscores that satisfaction is not solely a function of what providers do, but also of how well-prepared patients are to engage with the system.
- The simultaneous influence of both service quality and patient knowledge on patient satisfaction demonstrates a synergistic effect that exceeds the contribution of either variable alone. A comprehensive, dual-pronged strategy — combining continuous service delivery improvement with systematic patient health literacy initiatives — is more effective than approaches targeting either factor in isolation. Puskesmas in Cimahi City are encouraged to embed both dimensions into their institutional planning cycles.
- Looking ahead, future research should broaden the theoretical model by incorporating additional determinants of patient satisfaction, such as patient trust, waiting time, administrative efficiency, facility accessibility, and the quality of interpersonal communication between providers and patients, as these factors likely account for a substantial portion of the unexplained variance. Multi-site and longitudinal study designs using probability sampling are recommended to strengthen causal inference and enhance the generalizability of findings across diverse Puskesmas settings in Cimahi City and other regions of Indonesia.

At the policy level, the Ministry of Health and local health offices are urged to formally institutionalize patient health literacy as a core quality indicator within the national Puskesmas accreditation and performance evaluation framework. Routine measurement of patient knowledge levels — alongside SERVQUAL-based service quality audits — would enable a more holistic and data-driven approach to primary healthcare quality management. Investment in structured community health education programs, including rights-based patient orientation sessions and preventive care campaigns, should be prioritized as a cost-effective lever for improving satisfaction, encouraging repeat utilization, and ultimately supporting better health outcomes across Indonesia's primary healthcare system.

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