

Digital Service Quality, Patient Satisfaction, and Patient Loyalty: An Empirical Study of Mobile JKN Implementation at A Regional General Hospital in Indonesia

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ABSTRACT

The increasing integration of digital technologies into healthcare has transformed patient interactions with healthcare providers, making digital service quality an increasingly important determinant of patient experience and behavioral outcomes. However, empirical evidence regarding how digital service quality influences patient loyalty within government-supported digital healthcare systems remains limited, particularly in the context of Indonesia's National Health Insurance program. This study aimed to examine the effects of digital service quality on patient satisfaction and patient loyalty and to determine the mediating role of patient satisfaction among BPJS Kesehatan participants using the Mobile JKN application at Permata Bunda General Hospital, Tasikmalaya, Indonesia. A quantitative cross-sectional study was conducted among 331 BPJS Kesehatan participants selected through consecutive sampling. Data were collected using a structured questionnaire and analyzed using path analysis. The results showed that digital service quality had a strong positive effect on patient satisfaction ($\beta = 0.878$) and a positive direct effect on patient loyalty ($\beta = 0.393$). Patient satisfaction also had a positive effect on patient loyalty ($\beta = 0.518$). Furthermore, digital service quality demonstrated a positive indirect effect on patient loyalty through patient satisfaction (0.455), with a total effect of 0.848, indicating partial mediation. The model explained 77.2% of the variance in patient satisfaction and 78.2% of the variance in patient loyalty. These findings demonstrate that digital service quality contributes to patient loyalty through both direct functional value and indirect effects mediated by patient satisfaction. The study extends the understanding of digital healthcare service quality by demonstrating that digital interactions constitute an integral component of the patient experience within a national health insurance system. Strengthening the reliability, efficiency, responsiveness, security, accessibility, and usability of digital healthcare services may therefore enhance patient satisfaction and foster more sustainable patient relationships in digitally integrated healthcare delivery.

Keywords: Digital Service Quality; Patient Satisfaction; Patient Loyalty; Mobile JKN; BPJS Kesehatan

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INTRODUCTION

The rapid advancement of digital technologies has fundamentally transformed healthcare delivery worldwide, reshaping how healthcare organizations interact with patients and provide services. Digital health technologies, including mobile health

(*mHealth*) applications, telemedicine, electronic medical records, and digital appointment systems, have increasingly become integral to contemporary healthcare systems because they can improve accessibility, operational efficiency, continuity of care, and patient-centered service delivery. The World Health Organization (WHO) has emphasized that digital health should contribute to stronger health systems by improving access to healthcare services, enhancing continuity and quality of care, and supporting the achievement of universal health coverage (WHO, 2021). This development has shifted the focus of digital transformation from technology adoption alone toward the quality of services delivered through digital platforms. Healthcare organizations are therefore increasingly expected to ensure that digital technologies provide reliable, accessible, responsive, secure, and user-oriented experiences that meet patients' expectations.

The increasing integration of digital platforms into healthcare has also changed the way patients evaluate healthcare services. Patients no longer assess healthcare quality solely on the basis of clinical outcomes, physical facilities, or interactions with healthcare professionals. Their experiences with digital interfaces, online registration, information access, communication, and administrative processes increasingly form part of their overall evaluation of healthcare providers. Consequently, digital service quality has emerged as an important dimension of healthcare service delivery. Parasuraman et al. (2005), through the E-S-QUAL model, conceptualized electronic service quality in terms of dimensions such as efficiency, system availability, fulfillment, and privacy, while related electronic service quality research has also emphasized responsiveness and reliability as important determinants of users' evaluations. In healthcare, these dimensions become particularly important because the quality of a digital platform can influence patients' ability to obtain information, complete administrative procedures, and access healthcare services accurately, efficiently, and securely (Nguyen et al., 2023; Parasuraman et al., 2005). Thus, digital service quality should be understood not merely as a technological attribute but as an essential component of the patient experience.

Patient satisfaction represents an important outcome of healthcare service delivery because it reflects patients' overall evaluation of their experiences relative to their expectations. The Expectation–Confirmation Theory proposed Oliver (1980) explains that satisfaction develops when perceived service performance meets or exceeds prior expectations, whereas dissatisfaction may occur when actual performance falls below expectations. In digital healthcare environments, this evaluation encompasses both the healthcare service itself and the digital processes through which patients access or manage healthcare services. A digital platform that is reliable, easy to use, informative, responsive, and secure can reduce the effort required to obtain healthcare services and improve patients' perceptions of convenience and service performance. Conversely, technical difficulties, unclear information, system instability, or complicated procedures may create additional effort and negatively influence the overall patient experience. Previous studies have demonstrated that digital service quality is positively associated with patient satisfaction because high-quality digital services can improve convenience, accessibility,

efficiency, and the perceived effectiveness of healthcare service delivery (Nguyen et al., 2023; Wati et al., 2025).

Beyond satisfaction, patient loyalty is an important behavioral outcome for healthcare organizations. Loyalty reflects patients' commitment to continue using a healthcare provider or service, revisit the organization when healthcare needs arise, and recommend the service to others. Oliver (1999, 2015) conceptualized loyalty as a deeply held commitment to repurchase or continue using a preferred service despite situational influences and competing alternatives. In healthcare, loyalty has implications beyond organizational sustainability because continued patient engagement can support continuity of care, strengthen patient-provider relationships, and contribute to positive word-of-mouth. Previous studies have indicated that patient satisfaction is an important determinant of loyalty, while perceived service quality may influence loyalty both directly and indirectly through satisfaction (Aladwan et al., 2021; Mardaleta et al., 2022; Olesen & Bathula, 2022). These relationships suggest that patients' favorable evaluations of digital healthcare services may translate into stronger satisfaction and, ultimately, a greater willingness to continue using and recommending healthcare services.

The relationship between digital service quality, patient satisfaction, and patient loyalty can be understood through the logic of service evaluation and behavioral response. High digital service quality can provide patients with a more efficient and reliable service experience, thereby increasing satisfaction. Satisfied patients are subsequently more likely to develop favorable attitudes toward the healthcare provider and demonstrate behavioral intentions associated with loyalty. At the same time, digital service quality may influence loyalty directly when patients perceive the digital service itself as convenient, reliable, and valuable enough to encourage continued use. Patient satisfaction may therefore function as an intervening mechanism through which digital service quality is translated into patient loyalty. Examining this mediation is important because a significant direct relationship alone does not explain how digital service quality generates longer-term patient behavioral responses.

Within Indonesia, the relevance of digital healthcare services has increased alongside the development of the National Health Insurance (*Jaminan Kesehatan Nasional* [JKN]) program administered by BPJS Kesehatan. As the national health insurance system serves a large and diverse population, digitalization has become an important mechanism for facilitating interactions between participants and healthcare services. One of the major digital innovations within the JKN system is the Mobile JKN application, which enables participants to conduct various administrative and healthcare-related activities through a mobile platform. The application represents an important component of BPJS Kesehatan's digital transformation because it provides participants with greater opportunities to access and manage healthcare services without relying entirely on conventional face-to-face administrative processes (Imanuddin et al., 2021; Yunus et al., 2025). The effectiveness of this transformation, however, depends not only on the availability and adoption of the application but also on the quality of the digital service experienced by its users.

The distinction between technology adoption and service quality is particularly important in the context of Mobile JKN. The availability of a digital application does not necessarily mean that patients experience healthcare services as convenient, reliable, responsive, or satisfactory. Users may encounter technical problems, difficulties understanding application features, system instability, or challenges in completing digital procedures. Preliminary observations at Permata Bunda General Hospital, Tasikmalaya, indicated that some patients experienced login difficulties, unstable system performance, limited understanding of application features, and the need for assistance when completing digital registration procedures. These conditions illustrate a potential gap between the intended benefits of digital healthcare transformation and patients' actual experiences when using digital services. Such experiences may affect how patients evaluate the quality of the digital service and, subsequently, their satisfaction with and loyalty toward the healthcare provider (Oktabella et al., 2024; Wati et al., 2025).

The hospital context is also important because digital healthcare services do not operate independently from the broader healthcare delivery system. Patients' experiences with Mobile JKN occur within a specific organizational environment involving hospital administrative procedures, healthcare personnel, service processes, and patient characteristics. Consequently, the same digital platform may generate different perceptions and outcomes across healthcare institutions. Hospital-level evidence is therefore necessary to understand whether digital service quality is effectively supporting patient satisfaction and loyalty within actual healthcare service settings. This is particularly relevant for BPJS Kesehatan participants, whose interactions with Mobile JKN are closely connected to their access to healthcare services within the National Health Insurance system.

Although previous studies have established positive associations among electronic service quality, patient satisfaction, and loyalty, several gaps remain. First, much of the existing literature has examined digital services in contexts such as telemedicine, private healthcare platforms, online commercial services, or general electronic services, while empirical evidence concerning government-supported digital healthcare platforms embedded within a national health insurance system remains comparatively limited. Second, previous research has frequently examined the direct effects of electronic or digital service quality on satisfaction or loyalty, but fewer studies have simultaneously examined patient satisfaction as a mediating mechanism linking digital service quality to patient loyalty. Third, evidence concerning the implementation and user experience of Mobile JKN at the individual hospital level remains limited, even though patients' experiences may vary according to organizational processes, digital infrastructure, service characteristics, and local implementation conditions (Oktabella et al., 2024; Yunus et al., 2025). These gaps indicate the need for empirical research that examines the three constructs within an integrated model and within the specific context of Indonesia's National Health Insurance system.

Permata Bunda General Hospital, Tasikmalaya, provides a relevant setting for examining these relationships because BPJS Kesehatan participants interact with digital services as part of their healthcare access and administrative processes. As digital

interactions increasingly become connected to patients' overall healthcare experiences, understanding how they evaluate digital service quality is important for determining whether digital transformation is achieving its intended service benefits. Examining the relationship between digital service quality, patient satisfaction, and patient loyalty can provide a more comprehensive understanding of how digital healthcare experiences influence patients' subsequent behavioral responses. In addition, identifying the mediating role of satisfaction can clarify whether improvements in digital service quality influence loyalty primarily through improved patient experiences or also through a direct behavioral effect.

Therefore, this study aims to analyze the effect of digital service quality on patient satisfaction and patient loyalty among BPJS Kesehatan participants using the Mobile JKN application at Permata Bunda General Hospital, Tasikmalaya. Specifically, the study examines the effect of digital service quality on patient satisfaction, the effect of digital service quality on patient loyalty, the effect of patient satisfaction on patient loyalty, and the mediating role of patient satisfaction in the relationship between digital service quality and patient loyalty. By examining these relationships within the context of Indonesia's National Health Insurance system, this study seeks to contribute empirical evidence to the literature on digital healthcare service management and provide a basis for strengthening patient-centered digital service delivery. The findings are expected to support healthcare organizations in improving the quality of digital interactions, enhancing patient satisfaction, and fostering sustainable patient loyalty as healthcare services continue to undergo digital transformation.

METHOD

This study employed a quantitative research approach with a cross-sectional design and descriptive and explanatory analyses to examine the relationships among digital service quality, patient satisfaction, and patient loyalty. The study was conducted at Permata Bunda General Hospital, Tasikmalaya, Indonesia, among BPJS Kesehatan participants who had used the Mobile JKN application in connection with healthcare services. The study population comprised BPJS Kesehatan participants receiving healthcare services at the hospital who had experience using the Mobile JKN application. Participants were eligible if they were aged 18 years or older, were active BPJS Kesehatan members, had previously used the Mobile JKN application, and voluntarily agreed to participate in the study. A total of 331 respondents were recruited using consecutive sampling, whereby all patients who met the eligibility criteria and attended the hospital during the data collection period were consecutively invited to participate until the required sample size was achieved. This approach ensured that the respondents included in the analysis had direct experience with the digital healthcare service under investigation.

Data were collected using a structured self-administered questionnaire developed with reference to measurement instruments used and validated in previous studies. The questionnaire was adapted to the context of Mobile JKN and the healthcare services accessed by BPJS Kesehatan participants. The study consisted of three principal constructs:

digital service quality as the independent variable (X), patient satisfaction as the mediating variable (M), and patient loyalty as the dependent variable (Y). All questionnaire items were measured using a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores representing more favorable perceptions of the respective construct. Before the main data collection, the questionnaire was evaluated for validity and reliability to ensure that the measurement items adequately represented the intended constructs and demonstrated acceptable internal consistency. The validated instrument was subsequently administered to eligible respondents during the study period. Participants were first screened according to the predetermined eligibility criteria and were provided with information regarding the purpose and procedures of the study before completing the questionnaire. Participation was voluntary, and respondents were permitted to complete the questionnaire independently to minimize potential interviewer influence. Completed questionnaires were checked for completeness before being processed for statistical analysis.

The collected data were analyzed using IBM SPSS Statistics. Descriptive statistics were used to summarize respondents' characteristics and describe their perceptions of digital service quality, patient satisfaction, and patient loyalty. Inferential analysis was conducted using path analysis to examine the hypothesized relationships among the study variables and to estimate both direct and indirect effects. The analytical model assessed the direct effect of digital service quality on patient satisfaction, the direct effect of digital service quality on patient loyalty, and the direct effect of patient satisfaction on patient loyalty. The indirect effect of digital service quality on patient loyalty through patient satisfaction was examined to determine whether patient satisfaction functioned as a mediating variable. The total effect of digital service quality on patient loyalty was interpreted as the combination of its direct effect and its indirect effect through patient satisfaction. Statistical significance was evaluated at a 5% significance level ($p < 0.05$), and the direction and magnitude of the estimated path coefficients were considered in interpreting the relationships among the variables.

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the relevant institutional research ethics committee before data collection commenced. All participants received an explanation of the study objectives, procedures, voluntary nature of participation, and confidentiality of the information provided, and written informed consent was obtained before questionnaire completion. Participants were informed that they could decline participation without any consequences. The anonymity and confidentiality of respondents were maintained throughout the research process, and all information collected was used solely for research purposes.

RESULTS

A total of 331 BPJS Kesehatan patients who had used the Mobile JKN application at Permata Bunda General Hospital, Tasikmalaya, were included in the analysis. All

questionnaires were completed and considered eligible for analysis, resulting in a response rate of 100%.

Table 1. Descriptive Statistics of the Study Variables

Variable	Category
Digital Service Quality	Very Good
Patient Satisfaction	Very Good
Patient Loyalty	Very Good

The descriptive analysis showed that digital service quality, patient satisfaction, and patient loyalty were all categorized as very good. This finding indicates that respondents generally had favorable perceptions of the quality of digital services provided through Mobile JKN and reported positive levels of satisfaction and loyalty toward the healthcare provider.

Table 2. Direct Effects Among Study Variables

Hypothesis	Relationship	Standardized Coefficient (β)	Result
H1	Digital Service Quality $\rightarrow$ Patient Satisfaction	0.878	Supported
H2	Digital Service Quality $\rightarrow$ Patient Loyalty	0.393	Supported
H3	Patient Satisfaction $\rightarrow$ Patient Loyalty	0.518	Supported

The path analysis demonstrated positive relationships among all three study variables. Digital service quality had a strong positive effect on patient satisfaction ($\beta = 0.878$), indicating that higher perceived digital service quality was associated with higher patient satisfaction. Digital service quality also had a positive direct effect on patient loyalty ($\beta = 0.393$). In addition, patient satisfaction had a positive direct effect on patient loyalty ($\beta = 0.518$). Among the direct paths, the relationship between digital service quality and patient satisfaction had the largest standardized coefficient.

The path model further indicated that digital service quality influenced patient loyalty through both a direct pathway and an indirect pathway through patient satisfaction. The indirect effect was 0.455, calculated from the product of the path coefficients from digital service quality to patient satisfaction (0.878) and from patient satisfaction to patient loyalty (0.518). The direct effect of digital service quality on patient loyalty was 0.393, resulting in a total effect of 0.848. The presence of both a significant direct pathway and an indirect pathway through patient satisfaction indicates partial mediation. The indirect effect was greater than the direct effect, suggesting that a substantial proportion of the relationship between digital service quality and patient loyalty operated through patient satisfaction.

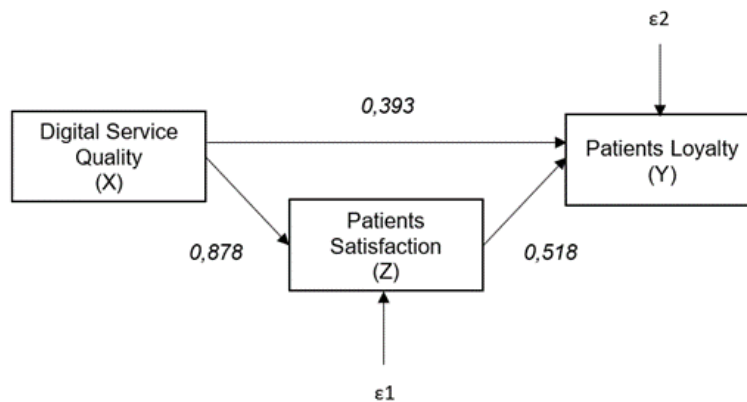


Figure 1. Path Analysis

The path analysis provides empirical support for the proposed relationships among digital service quality, patient satisfaction, and patient loyalty. The model demonstrates that digital service quality is positively associated with patient satisfaction and patient loyalty, while patient satisfaction is positively associated with patient loyalty. Patient satisfaction consequently functions as an intermediary mechanism through which digital service quality is associated with patient loyalty.

Table 3. Coefficient of Determination

Structural Model	R ²	Interpretation
Patient Satisfaction	0.772	Digital service quality explained 77.2% of the variance in patient satisfaction.
Patient Loyalty	0.782	Digital service quality and patient satisfaction jointly explained 78.2% of the variance in patient loyalty.

The coefficient of determination indicated that digital service quality explained 77.2% of the variance in patient satisfaction, while the combined effects of digital service quality and patient satisfaction explained 78.2% of the variance in patient loyalty. The remaining variance, 22.8% for patient satisfaction and 21.8% for patient loyalty, was attributable to factors not included in the present model. These results indicate that the proposed variables account for a substantial proportion of the observed variation in both patient satisfaction and patient loyalty.

Table 4. Mediation Analysis

Path	Mediation Result
Digital Service Quality → Patient Satisfaction → Patient Loyalty	Partial mediation

The mediation analysis showed that patient satisfaction partially mediated the relationship between digital service quality and patient loyalty. The mediation was characterized by the presence of both a direct effect of digital service quality on patient

loyalty and an indirect effect operating through patient satisfaction. The indirect effect (0.455) was larger than the direct effect (0.393), indicating that patient satisfaction represented an important pathway linking digital service quality to patient loyalty.

Overall, the results supported all three proposed direct-effect hypotheses and confirmed the proposed mediating role of patient satisfaction. Digital service quality demonstrated the strongest direct association with patient satisfaction, while patient satisfaction showed a stronger direct association with patient loyalty than digital service quality. The findings further indicate that patient loyalty is associated not only with the perceived quality of digital services but also with the satisfaction generated by those digital service experiences.

DISCUSSION

The present study demonstrates that digital service quality is an important determinant of patient satisfaction and patient loyalty among BPJS Kesehatan participants using the Mobile JKN application at Permata Bunda General Hospital, Tasikmalaya. The findings provide empirical evidence that these relationships remain relevant within Indonesia's National Health Insurance system, where Mobile JKN functions as an important channel for accessing and managing healthcare services. In this context, patients' interactions with healthcare providers increasingly begin before they arrive at the hospital through digital registration, queue management, referral verification, and other administrative processes. Consequently, patients' perceptions of healthcare quality are shaped not only by face-to-face clinical encounters but also by their experiences with digital services. Healthcare delivery has therefore evolved into an integrated patient journey in which digital and conventional service encounters jointly contribute to patients' overall evaluation of healthcare quality. This finding is consistent with the electronic service quality perspective proposed by Parasuraman et al. (2005), in which efficiency, system availability, reliability, privacy, responsiveness, and fulfillment contribute to users' perceptions of service quality. In healthcare, these dimensions are particularly important because problems with digital services may affect not only convenience but also patients' ability to access healthcare services in a timely and efficient manner.

The strong positive effect of digital service quality on patient satisfaction indicates that patients increasingly incorporate their digital experiences into their overall evaluation of healthcare services. Rather than evaluating administrative and clinical services as entirely separate components, patients appear to assess their healthcare experience as a continuous process. Accurate information, intuitive interfaces, efficient registration procedures, secure handling of personal information, and reliable application performance can reduce uncertainty and administrative effort, thereby creating a more favorable service experience. This finding can be interpreted through Expectation–Confirmation Theory, which proposes that satisfaction results from the comparison between expected and perceived service performance (Oliver, 1980). When Mobile JKN performs as expected by facilitating access, simplifying administrative procedures, and providing relevant information, patients are more likely to perceive that their expectations have been fulfilled.

Satisfaction in this context therefore reflects not only the quality of clinical care but also the cumulative experience generated across multiple service encounters, including those mediated by digital technology.

The magnitude of the relationship between digital service quality and patient satisfaction also highlights the increasingly important role of digital technology within healthcare delivery. Unlike digital platforms in commercial sectors, Mobile JKN operates within Indonesia's National Health Insurance system and is closely connected to the process through which BPJS Kesehatan participants access healthcare services. As a result, the quality of digital interactions may influence patients' perceptions of organizational competence even before direct contact with healthcare professionals occurs. A reliable and efficient digital platform can facilitate the service process and create an initial perception of organizational readiness, whereas system instability, inaccurate information, or complicated procedures may create barriers to healthcare access. This finding suggests that digital service quality should be viewed as an integral component of patient experience rather than merely as a technical characteristic of an information system. The result is also consistent with previous studies cited in this study, which found that improvements in electronic healthcare services can enhance patient satisfaction by reducing perceived effort and facilitating access to healthcare services (Divya et al., 2025; Purbasari, 2025; Wijayanti & Aini, 2022).

Digital service quality also demonstrated a positive direct effect on patient loyalty. This finding indicates that patients' experiences with digital healthcare services may influence their intention to maintain a relationship with the healthcare provider beyond their immediate evaluation of satisfaction. High-quality digital services can increase patients' confidence in the organization's ability to provide accessible, reliable, and efficient services. As patients become increasingly accustomed to digital interactions across other service sectors, their expectations of healthcare providers may similarly include seamless and responsive digital experiences. Consequently, healthcare organizations that provide effective digital services may be better positioned to encourage continued utilization and positive behavioral intentions. This finding extends the electronic service quality perspective by demonstrating its relevance within a government-supported healthcare platform that is embedded in a national health insurance system. Although Mobile JKN operates within a structured insurance environment, patients' perceptions of the quality of digital interactions may still contribute to their relationship with healthcare providers.

Patient satisfaction also demonstrated a positive effect on patient loyalty, reinforcing the role of satisfaction as an important determinant of patients' continued relationships with healthcare providers. Satisfaction represents patients' overall evaluation of their experiences and may influence whether they are willing to continue using a healthcare provider, return when healthcare needs arise, or recommend the provider to others. Consistent with Oliver's conceptualization of loyalty (Oliver, 1999, 2015), repeated favorable experiences can strengthen patients' commitment and behavioral intentions over time. The present finding is also consistent with previous healthcare studies showing that satisfied patients are more likely to demonstrate favorable loyalty-related behaviors.

Within the context of Mobile JKN, satisfaction may therefore represent an important link between patients' evaluations of their digital healthcare experiences and their subsequent willingness to maintain a relationship with the hospital.

An important contribution of the study is the finding that patient satisfaction partially mediates the relationship between digital service quality and patient loyalty. The presence of both a direct effect and an indirect effect indicates that digital service quality influences patient loyalty through more than one pathway. On the one hand, high-quality digital services may directly encourage continued use by providing practical benefits such as greater convenience, accessibility, and efficiency. On the other hand, positive digital experiences can increase patient satisfaction, which in turn strengthens loyalty. Patient satisfaction therefore represents an important mechanism through which digital service quality is translated into a more enduring patient relationship, while the remaining direct effect indicates that digital service quality also contributes independently to loyalty (Fida et al., 2020; Sitepu & Kosasih, 2024; Wattoo & Iqbal, 2022). This finding provides a more comprehensive explanation of the relationship between digital service quality and loyalty than a model that considers only their direct association.

The partial mediation finding also has implications for understanding how patients respond to digital healthcare services. Digital service quality may generate immediate functional value through easier access to information, registration, queue management, and other administrative processes. These practical benefits may influence patients' behavioral intentions even before they develop a broader evaluation of the healthcare provider. At the same time, repeated positive digital encounters can contribute to satisfaction and strengthen patients' overall perception of the hospital. Thus, loyalty may develop through the simultaneous influence of functional evaluations of digital service performance and broader evaluations of the healthcare experience. This interpretation is particularly relevant to Mobile JKN because the application forms part of an integrated healthcare service process rather than functioning solely as an optional digital platform.

The findings have important implications for hospital management. Because patient satisfaction only partially mediates the relationship between digital service quality and loyalty, hospitals should not focus exclusively on satisfaction as the ultimate outcome of digital transformation. Digital service quality itself represents a strategic capability that can influence patient behavior directly while also generating satisfaction. Consequently, investments in digital healthcare should extend beyond the provision of technological infrastructure to include continuous monitoring and improvement of usability, reliability, information accuracy, responsiveness, security, and service integration. Digital service performance should also be evaluated from the patient's perspective rather than solely through technical indicators (Handayani et al., 2025; Monroy-Osorio, 2024). Understanding where patients encounter difficulties during digital registration, information access, or other administrative processes can help hospitals identify service gaps that may influence both satisfaction and loyalty.

The findings further reinforce the changing concept of healthcare quality. Clinical effectiveness, patient safety, and professional competence remain fundamental

dimensions of healthcare quality, but patients increasingly encounter healthcare organizations through digital channels before receiving face-to-face services. The patient journey may begin when a patient accesses Mobile JKN to obtain information, register for services, manage administrative requirements, or verify healthcare access. Each of these interactions contributes to the patient's cumulative perception of the healthcare organization. Digital service quality should therefore be considered complementary to, rather than separate from, conventional dimensions of healthcare quality (Vignieri & Santoni, 2025). This perspective supports the development of digitally integrated, patient-centered healthcare systems in which technology facilitates rather than fragments the patient experience.

The study also contributes to the literature on electronic service quality by examining its role within a government-supported digital healthcare platform embedded in Indonesia's National Health Insurance system. Much of the previous literature has examined electronic service quality in commercial sectors or voluntary digital healthcare applications. Mobile JKN provides a different context because its use is closely associated with access to services within a national health insurance program. This setting demonstrates that the importance of digital service quality does not disappear when digital healthcare services are institutionally integrated into healthcare delivery. Instead, as digital services become increasingly important to the healthcare access process, their quality may become more consequential for patients' perceptions of service providers. The findings therefore extend existing research by showing that digital service quality remains relevant to satisfaction and loyalty within a structured public healthcare system.

Another important consideration is that Mobile JKN should be understood as part of an integrated service ecosystem rather than as an isolated technological application. Although the application is managed by BPJS Kesehatan, patients experience its functions in conjunction with the administrative and healthcare services provided by hospitals. Difficulties with registration, appointment confirmation, scheduling information, or communication may therefore influence patients' overall perception of the hospital, regardless of whether the underlying problem originates within the hospital's system or the national platform (Anastasya et al., 2024; Oktabella et al., 2024). This highlights the importance of coordination between hospitals and BPJS Kesehatan in ensuring that digital processes are aligned with hospital workflows. Effective integration, accurate information exchange, and consistent digital processes may help create a more seamless patient journey across the different stages of healthcare access.

Several limitations should be considered when interpreting these findings. First, the cross-sectional design captures patient perceptions at a single point in time and therefore limits the ability to establish how satisfaction and loyalty may change with continued use of Mobile JKN. Longitudinal research could provide greater insight into whether improvements or changes in digital service quality produce corresponding changes in patient satisfaction and loyalty over time. Second, the study was conducted at a single hospital in Tasikmalaya, which may limit the generalizability of the findings to healthcare organizations with different organizational characteristics, geographical contexts, patient

populations, or levels of digital readiness. Differences in digital infrastructure, implementation processes, and patient characteristics may produce different relationships among digital service quality, satisfaction, and loyalty. Future studies could therefore involve multiple hospitals across different regions of Indonesia and compare public and private healthcare settings.

Future research could also expand the proposed model by incorporating additional factors that may influence patients' responses to digital healthcare services, including digital health literacy, trust in digital technology, perceived value, technology readiness, perceived ease of use, and continued usage intention. Comparative research across different digital healthcare platforms or healthcare financing contexts could further determine whether the relationships identified in this study are specific to Mobile JKN or reflect broader patterns in digital healthcare. Qualitative research may also complement quantitative findings by exploring patients' experiences in greater depth and identifying specific aspects of digital service quality that most strongly influence satisfaction and loyalty.

Overall, the findings demonstrate that digital service quality is an important determinant of both patient satisfaction and patient loyalty among BPJS Kesehatan participants using Mobile JKN at Permata Bunda General Hospital. The findings further show that patient satisfaction partially mediates the relationship between digital service quality and loyalty, indicating that digital healthcare experiences influence patient loyalty both directly and through satisfaction. These results reinforce the view that digital transformation in healthcare involves more than technological adoption. Sustainable digital healthcare delivery requires reliable, efficient, secure, accessible, and patient-centered services that are integrated into the broader healthcare journey. Strengthening these dimensions of digital service quality may contribute to more favorable patient experiences and stronger relationships between healthcare organizations and the patients they serve.

CONCLUSION

This study provides empirical evidence that digital service quality plays a central role in shaping patient satisfaction and loyalty among BPJS Kesehatan participants using the Mobile JKN application at Permata Bunda General Hospital, Tasikmalaya. The findings demonstrate that higher perceived digital service quality is associated with greater patient satisfaction and stronger patient loyalty, while patient satisfaction also contributes significantly to patient loyalty. Importantly, the results show that patient satisfaction partially mediates the relationship between digital service quality and patient loyalty. This indicates that the influence of digital service quality on loyalty operates through two complementary pathways: directly through the functional value of a high-quality digital service and indirectly by creating more favorable patient experiences that increase satisfaction.

The findings extend the understanding of healthcare service quality by demonstrating that digital interactions have become an integral part of the patient experience rather than merely an administrative extension of conventional healthcare

services. Within the Mobile JKN context, the quality of digital interactions can influence how patients perceive the accessibility, efficiency, reliability, and overall performance of healthcare services. The results therefore suggest that digital transformation should not be evaluated solely in terms of technology adoption or system availability. Its effectiveness should also be assessed according to whether digital services consistently create meaningful value for patients and support positive relationships with healthcare providers.

The study also contributes to the literature by examining these relationships within Indonesia's National Health Insurance system, where a government-supported digital platform is embedded in routine healthcare access and hospital service processes. The partial mediation finding is particularly important because it indicates that improving patient satisfaction alone is insufficient to maximize the loyalty benefits of digital transformation. Digital service quality itself has a direct relationship with loyalty, while satisfaction provides an additional pathway through which digital experiences influence patients' continued engagement with healthcare providers. This highlights the need for hospitals to approach digital service quality as a strategic component of patient-centered healthcare rather than as a purely technological or administrative function.

From a managerial perspective, hospitals should continuously improve the reliability, efficiency, responsiveness, security, accessibility, and usability of digital healthcare services while ensuring that these services are effectively integrated with existing hospital workflows. Continuous evaluation of patients' digital experiences is also important for identifying service barriers that may undermine satisfaction and loyalty. More broadly, successful digital healthcare transformation requires alignment between technological capability, organizational processes, and patient needs. By strengthening this integration, healthcare organizations can move beyond digital adoption toward digital service delivery that improves patient experience and supports sustainable patient relationships.

Overall, the study demonstrates that high-quality digital healthcare services can generate value at multiple levels: they facilitate healthcare access, enhance patient satisfaction, and contribute to stronger patient loyalty. The findings reinforce the importance of placing patients' digital experiences at the center of healthcare transformation and provide a basis for further research examining how digital service quality can support sustainable, patient-centered healthcare delivery within national health insurance systems.

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