



DIGITAL HEALTH AND PATIENT SATISFACTION IN INDONESIAN HOSPITALS: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Indonesian hospitals have rapidly adopted hospital information systems, electronic medical records, telemedicine, online registration, Mobile JKN, and artificial intelligence. Yet adoption alone does not guarantee a better patient experience. This review synthesized Indonesian evidence on how hospital digital transformation affects patient satisfaction and identified the mechanisms, implementation conditions, and evidence gaps. A systematic literature review following PRISMA 2020 searched Scopus, Google Scholar, SINTA, DOAJ, ScienceDirect, SpringerLink, and Wiley Online Library for publications from 2021 to 2026. Forty records were identified; after deduplication, screening, and full-text assessment, 15 from 40 studies were included in a qualitative thematic synthesis. Eight studies were quantitative, six were literature reviews, and one was qualitative. Mobile JKN and online registration were the most frequently examined interventions. Across the corpus, perceived gains in access, shorter administrative pathways, information quality, and operational efficiency were associated with greater satisfaction. However, benefits depended on usability, system integration, staff capability, organizational readiness, and the continued availability of humane offline support. The evidence base was geographically fragmented, dominated by cross-sectional designs, and potentially vulnerable to double-counting because primary studies and reviews were synthesized together. Digital transformation improves patient satisfaction when it removes friction from care rather than merely digitising it.

Keywords: digital health; hospital; Indonesia; patient experience; patient satisfaction; systematic literature review

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INTRODUCTION

Digital transformation has become a health-system strategy rather than a narrow information-technology project. Global guidance stresses that digital initiatives must align technological, organizational, human, and financial resources around equitable and person-centered care (World Health Organization, 2021). In hospitals, this distinction matters because patients do not experience a database or an application in isolation. They experience waiting, uncertainty, communication, continuity, and whether a clinician remains attentive while using a screen.

Indonesia's post-pandemic acceleration has expanded hospital information systems, electronic medical records, telemedicine, online registration, Mobile JKN, and emerging artificial-intelligence interfaces (Alawi & Ariyani, 2024; Laksono, 2022). These tools can reduce administrative burden and widen access, but technological presence is a weak proxy for value. International evidence likewise suggests that broad hospital digitization does not automatically improve satisfaction; patient-facing, value-adding functions show more consistent benefits than adoption measured at the institutional level (Canfell et al., 2024; von Wedel et al., 2022).

Patient satisfaction is therefore treated here as a relational outcome produced through the interaction of system quality, information quality, service quality, perceived usefulness, and the circumstances in which care is delivered. This interpretation extends the DeLone and McLean information-systems success model (DeLone & McLean, 2003) by recognizing that a technically reliable system

may still exclude patients with limited digital literacy, shift work onto families, or weaken clinician-patient interaction.

Indonesian studies have grown quickly, but their findings remain scattered across single technologies and local hospital settings. Several reviews coexist with primary surveys in the same literature, and organizational readiness, equity, trust, and adaptation over time receive less attention than immediate satisfaction scores. Accordingly, the overarching objective of this review is to systematically analyze the relationship between digital transformation and patient satisfaction in Indonesian hospitals. Specifically, this study aims to: (1) categorize the forms and modalities of digital health technologies evaluated in Indonesian hospital settings; (2) elucidate the mechanistic pathways through which digital systems influence multidimensional patient satisfaction; (3) identify the human, organizational, and infrastructural conditions that facilitate or constrain these effects; and (4) synthesize the methodological and conceptual gaps in the current evidence base to inform future health-system policy and research directions.

METHOD

Design and review questions

A systematic literature review with qualitative thematic synthesis was conducted and reported with reference to PRISMA 2020 (Page et al., 2021). The review focused on patients using Indonesian hospital or hospital-related services, digital interventions affecting access or care delivery, and outcomes concerning satisfaction, experience, service quality, loyalty, efficiency, or accessibility.

Search strategy and eligibility

Scopus, Google Scholar, SINTA, DOAJ, ScienceDirect, SpringerLink, and Wiley Online Library were searched for publications dated 2021-2026. Indonesian and English terms covered digital transformation, hospital digitization, hospital information systems, electronic medical records, telemedicine, Mobile JKN, online registration, digital health services, patient satisfaction, patient experience, and hospital services. Boolean combinations joined technology and outcome concepts.

Eligible records were peer-reviewed full-text articles in Indonesian or English that examined a digital hospital intervention and reported a patient-centered or service outcome relevant to Indonesian hospital care. Empirical quantitative, qualitative, mixed-methods, and review studies were eligible. Opinion pieces, news, theses, dissertations, abstracts without full text, duplicates, non-health sectors, and articles outside the date range were excluded.

Study selection and synthesis

The search identified 40 records. Two duplicates were removed, leaving 38 records. Twelve records were excluded during initial screening, 26 titles and abstracts were examined, and eight were excluded as out of scope. Eighteen full texts were assessed; three were excluded for an unsuitable focus or insufficient data, leaving 15 included studies. Data extraction captured authorship, year, technology, design, setting, conceptual model, outcome, and principal finding. Studies were grouped by technology and by the pathway through which digitalisation affected patient experience. Because interventions, designs, and outcomes were heterogeneous, no meta-analysis was attempted.

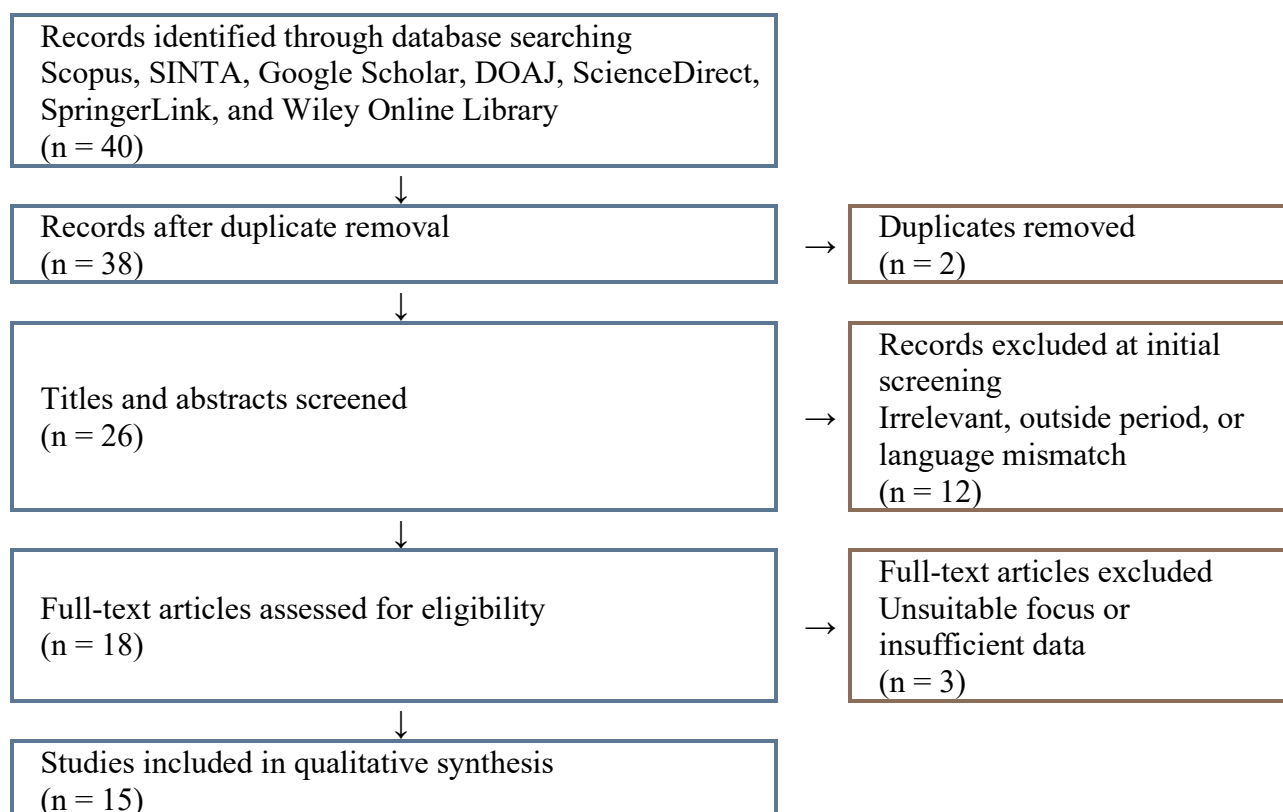


Figure 1. PRISMA flow diagram of study selection

The source review used a uniform extraction form and prespecified eligibility rules. However, it did not report duplicate independent screening, a registered protocol, or a formal risk-of-bias instrument. The present synthesis consequently treats the findings as directional rather than as a pooled causal estimate. Including both primary studies and literature reviews also creates a possible overlap of underlying evidence, which is addressed explicitly as a limitation.

RESULT

Profile of included evidence

The 15 included publications were concentrated in 2024-2026: six appeared in 2024, seven in 2025, and two in 2026. Eight used quantitative designs (53.3%), six were literature reviews (40.0%), and one was qualitative (6.7%); none used mixed methods. Four studies focused on Mobile JKN or online registration, three on hospital information systems, three on broad hospital digital transformation, two on telemedicine, one on electronic medical records, and two on information technology or digital marketing. The studies covered public and private settings in Jakarta, Bogor, Bandung, Medan, Bondowoso, Riau, and other Indonesian locations.

Table 1.

Characteristics and principal findings of the 15 included studies

Study	Technology / design	Patient-relevant finding
Ira et al. (2024)	HIS / review	System, information, and service quality were positively related to patient satisfaction.
Ikawati (2024)	EMR / review	Electronic records improved data accuracy, service efficiency, and reported service quality.
Alawi and Ariyani (2024)	Digital systems / review	Accessibility and operational efficiency were the main proposed pathways to satisfaction.
Yunengsih and Elvin (2025)	Mobile JKN / quantitative	Effective online registration was significantly associated with outpatient satisfaction.
Harahap et al. (2026)	Mobile JKN / quantitative	Easier access through Mobile JKN was associated with higher outpatient satisfaction.
Febrina et al. (2025)	Digital marketing / quantitative	E-marketing and service quality jointly contributed to patient satisfaction.

Study	Technology / design	Patient-relevant finding
Widiyawati et al. (2025)	AI chatbot / experiment	Interactive information support improved patient experience and loyalty.
Jahraa et al. (2025)	Hospital transformation / qualitative	Digitalisation supported service quality and efficiency, conditional on implementation capacity.
Teresa and Ridwan (2025)	Hospital IT / review	Information technology supported work effectiveness, service quality, and user satisfaction.
Budiono et al. (2024)	Online registration / quantitative	Online registration shortened service processes and improved satisfaction.
Johansen and Keni (2025)	HIS / quantitative	System quality and perceived usefulness significantly predicted satisfaction.
Rosidah and Aslamiyah (2025)	Mobile JKN / quantitative	The application improved registration effectiveness and patient satisfaction.
Damayanti and Gani (2024)	Telemedicine / quantitative	Use was associated with satisfaction, adherence, and loyalty.
Mariyam et al. (2025)	Telemedicine / review	Perceived service quality shaped telemedicine experience and satisfaction.
Melly (2026)	Hospital digitization / quantitative	Operational efficiency mediated the relationship between digitization and satisfaction.

Mechanisms linking digital transformation to satisfaction

The most consistent mechanism was friction reduction. Mobile JKN and online registration simplified appointment access, reduced repeated administrative steps, and made waiting more predictable (Budiono et al., 2024; Harahap et al., 2026; Rosidah & Aslamiyah, 2025; Yunengsih & Elvin, 2025). These functions are close to the patient's immediate journey, which helps explain why their benefits were reported more consistently than benefits from back-office digitization. A second mechanism was informational reliability. Hospital information systems and electronic records were linked to more accurate, available, and coordinated information (Ikawati, 2024; Ira et al., 2024; Johansen & Keni, 2025). In the DeLone and McLean logic, system quality and information quality influence use and satisfaction. In clinical settings, however, information quality becomes meaningful only when it improves continuity, reduces the need to retell a history, and supports clear communication.

A third mechanism was reach. Telemedicine reduced geographical and scheduling barriers and was associated with satisfaction, treatment adherence, and loyalty (Damayanti & Gani, 2024; Mariyam et al., 2025). Its value was strongest for consultation, follow-up, and chronic-care monitoring, while services requiring physical examination still depended on in-person care. Telemedicine is therefore better understood as a complementary pathway than a universal substitute. A fourth mechanism was operational efficiency. One Jakarta study positioned efficiency as a mediator between hospital digitization and satisfaction (Melly, 2026). This is conceptually important: patients may not reward digitalisation itself, but they do respond to the shorter queues, fewer errors, clearer instructions, and faster transitions that good digital workflows can produce.

Implementation conditions and unresolved tensions

Positive effects were conditional rather than automatic. Organizational readiness, staff competence, integration across systems, and management support shaped whether technology reduced or merely relocated work (Alawi & Ariyani, 2024; Jahraa et al., 2025). Fragmented systems can force patients and staff to repeat data entry, while poorly designed interfaces can transfer administrative labor to patients. Digital access may also disadvantage older adults, people with disabilities, rural populations, and users with limited devices, connectivity, or digital literacy.

The Indonesian pattern is consistent with broader reviews. Patient portals and patient-centered records can improve engagement, communication, and selected outcomes, yet effects on utilization and satisfaction remain heterogeneous (Brands et al., 2022; Carini et al., 2021). Digital patient

experience depends on usability, trust, personalisation, technical support, and the fit between a tool and the clinical pathway (Wang et al., 2022). Reviews of digital hospitals also warn that inefficient workflows and screen-focused work can strain clinician-patient interaction (Canfell et al., 2024).

DISCUSSION

This review supports a qualified conclusion: digital transformation can improve patient satisfaction in Indonesian hospitals when it reduces the practical and emotional burden of obtaining care. Registration tools act on access and waiting, information systems on accuracy and coordination, and telemedicine on reach and continuity. International evidence supports distinguishing technological adoption from the value of its implementation. An analysis of 383 German hospitals found no significant association between technology adoption alone and patient satisfaction, whereas user-perceived quality of digitization was associated with better satisfaction (von Wedel et al., 2022). Although this hospital-level association cannot establish causality or be transferred directly to Indonesia, it supports interpreting the present findings through specific service improvements rather than the number of platforms installed. This distinction also determines how confidently the favorable findings can be interpreted.

The predominance of favorable findings requires methodological qualification. Eight quantitative studies were largely cross-sectional, which limits causal inference and makes common-method and selection biases plausible. Six included publications were themselves reviews, so synthesis alongside primary studies may repeat underlying evidence; publication bias also cannot be excluded. These concerns are consistent with a broader review of 61 digital-hospital studies, in which only 10 examined patient experience and the evidence linking digital hospitals to patient satisfaction was weak (Canfell et al., 2024). The present review therefore offers a context-specific account of recurrent associations and plausible mechanisms, rather than a universal effect size. Establishing these mechanisms requires closer attention to both technical performance and patients' capacity to use the service.

The findings suggest two refinements to the application of information-systems success theory. Operational efficiency may connect technical quality with patient experience, while digital inclusion and relational quality may condition that connection. Supporting this distinction, a 2025 instrument-validation study identified separate dimensions of convenience, perceived value, efficiency, and satisfaction in patients' use of digital health solutions at home (Oudbier et al., 2025). Its measurement structure supports evaluating these dimensions separately, although it does not demonstrate mediation and requires validation before use in Indonesian hospitals. The contribution of the present synthesis is thus to propose relationships for empirical testing, including whether efficiency gains remain meaningful when patients encounter barriers to access.

Digital inclusion is particularly relevant when online registration and telemedicine become routine entry points to care. A critical interpretive synthesis of Australian telehealth research identified benefits alongside unintended consequences affecting access, care quality, and equity (Osman et al., 2024). For Indonesian hospitals, this provides a comparative rationale for assessing connectivity, digital literacy, and the availability of assistance alongside satisfaction among successful users. High satisfaction among application users may coexist with exclusion among patients who cannot complete registration or access a consultation. Assisted registration, clear instructions, and a viable in-person pathway should therefore be evaluated as components of service quality, with attention to how assistance preserves patients' autonomy and communication with clinicians.

Relational quality also helps explain why administrative efficiency may not translate uniformly into satisfaction. The digital-hospital review identified difficulties involving documentation, hybrid workflows, and disruption of clinician-patient relationships despite favorable assessments of data accessibility (Canfell et al., 2024). This suggests that technically reliable systems may create

competing demands on clinicians' attention. In the Indonesian context, staff training should therefore address explanation, privacy, and patient involvement as well as software operation. Whether such training improves satisfaction remains a question for intervention studies; the immediate managerial task is to identify where digital workflows facilitate communication and where they interrupt it.

For hospital managers, investment decisions should prioritize interoperable workflows that reduce duplicate entry, provide reliable appointment information, and maintain accessible support. Evaluation should combine transaction time and system availability with patient-reported convenience, perceived value, and satisfaction. The instrument developed by Oudbier and colleagues provides a recent example of separating these patient-reported dimensions (Oudbier et al., 2025). However, local language adaptation and psychometric testing would be necessary before adopting it in Indonesian hospital services. Complaints, unsuccessful transactions, and experiences across demographic groups would provide complementary evidence that aggregate satisfaction scores may miss, helping managers identify priorities for redesign with patients and frontline staff.

Patient participation can make these redesign priorities more concrete. A participatory study at University Hospital Zurich developed a supportive cancer-care application with patients and health professionals, identifying ease of use, workflow integration, professional introduction, and technical support as potential facilitators of adoption (Difrancesco et al., 2025). This evidence illustrates a design process rather than proof that co-design improves satisfaction. Nevertheless, it supports involving Indonesian patients and frontline workers when specifying registration, information, and communication functions, so that development addresses actual service tasks. Policymakers and developers should pair integration goals with usability, accessibility, privacy, and interoperability requirements, then evaluate how these requirements operate in practice.

CONCLUSION

Digital transformation in Indonesian hospitals is generally associated with higher patient satisfaction through easier access, better information, shorter administrative pathways, wider service reach, and improved operational efficiency. Mobile JKN and online registration have the clearest patient-facing evidence, while hospital information systems, electronic records, telemedicine, and AI-supported communication offer benefits that depend strongly on implementation quality. The current literature is too heterogeneous and methodologically limited to justify a simple claim that digitization always improves satisfaction.

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