

Review Article

Procedural implementation of the hospital integrated referral system (Sistem Rujukan Terintegrasi/ SISRUITE) in Indonesia: A systematic review

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Abstract

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Background: The Integrated Referral System (Sistem Rujukan Terintegrasi or SISRUITE) has been introduced in Indonesia to strengthen coordination, timeliness, and continuity of patient referrals across health care facilities. However, the available evidence remains dispersed across local studies and broader referral system literature.

Objective: This review aimed to examine the procedural implementation of SISRUITE in hospitals in Indonesia and to identify the factors that influence its effectiveness, supporting conditions, and implementation barriers within referral service procedures.

Methods: This study employed a systematic review design. Literature searches were conducted in Google Scholar, PubMed, ProQuest, and ScienceDirect using combinations of terms related to SISRUITE, patient referral, emergency referral, and hospitals. Studies published between 2021 and 2025, available in full text, and relevant to SISRUITE implementation in Indonesian health care settings were considered. Data from the included studies were extracted systematically and synthesized using a narrative approach.

Results: Ten studies were included in the final review. The findings showed that SISRUITE and other digital referral systems generally improved referral efficiency, accelerated response time, and strengthened coordination between health facilities. Hospital-based evidence indicated that referral response commonly occurred within a short time frame, while digital referral implementation also contributed to improved workflow efficiency and user satisfaction. However, implementation remained constrained by limited bed capacity, inadequate infrastructure, uneven system integration, information quality issues, and variations in staff readiness. The review also found that performance expectancy, effort expectancy, and facilitating conditions influenced system use, whereas broader evidence emphasized the importance of interoperability, training, and organizational support.

Conclusion: The procedural implementation of SISRUITE in hospitals in Indonesia shows substantial potential to improve referral management and service coordination. Nevertheless, the effectiveness of the system depends on technological readiness, institutional capacity, and sustained support for health workers. Strengthening infrastructure, integrating referral platforms with hospital service systems, and improving workforce preparedness are essential to optimize the contribution of SISRUITE to hospital referral quality in Indonesia.

Background

Health referral systems play a central role in organizing patient movement across levels of care, because they connect primary, secondary, and tertiary services within a structured continuum of treatment and decision making. (Plummer et al., 2025; Bordbar et al., 2022). Health systems use referral mechanisms to improve access, continuity, and efficiency of care, especially when patients require services that exceed the capacity of the first-contact facility. (Bai et al., 2022; Safi et al., 2022). Many countries evaluate referral performance through indicators of timeliness, communication quality, coordination, and appropriateness, because these components

determine whether the referral pathway supports patient safety and service effectiveness. (Bordbar et al., 2022; Avoka et al., 2022). Several health sectors have also shown that well-managed referral processes improve linkage to specialized care, strengthen follow-up, and reduce fragmentation across services. (Bruxvoort et al., 2021; Cunningham et al., 2022; Dominico et al., 2022). Electronic and structured referral models have therefore become a strategic priority in modern health systems, because paper-based and uncoordinated referrals often delay treatment and weaken accountability between facilities. (Azhar et al., 2021; Chukwu et al., 2022; Drewry et al., 2023). This development places referral implementation at the center of hospital service

reform, because hospitals act as both recipients and senders within increasingly interconnected care networks. (Safi et al., 2022; Duffy et al., 2021).

Many countries have adopted electronic referral systems to improve communication, accelerate decision making, and standardize referral documentation across facilities. (Alabbasi et al., 2022; Algerian et al., 2024). Saudi Arabia, for example, has demonstrated that an e-referral model can strengthen primary health care coordination and produce large-scale referral data that support service planning and epidemiological mapping. (Alabbasi et al., 2022; Algerian et al., 2024). Other health systems have shown that digital referral innovations can support telehealth integration, automate clinical referral prompts, and improve outcome monitoring within hospital-based care pathways. (Gadenz et al., 2021; Chou et al., 2023). Referral effectiveness also depends on clear screening criteria, structured communication, and feedback mechanisms, because poor referral design may generate repeat visits, incomplete transfers, and avoidable delays in management. (Eksteen et al., 2021; Azhar et al., 2021; Safi et al., 2022). Systematic reviews in several service domains have further confirmed that referral improvement requires both technical tools and organizational alignment, including workforce readiness, service integration, and patient-centered coordination. (Anderson et al., 2021; Constantine et al., 2021; Drewry et al., 2023). These international lessons provide an important frame for Indonesia, because the success of an integrated referral platform depends not only on policy adoption but also on procedural implementation in daily hospital practice. (Plummer et al., 2025; Duffy et al., 2021).

Indonesia has responded to referral system challenges by establishing the Integrated Referral System, known as SISRUITE, as a national strategy to connect health facilities through digital coordination. (Kemenkes RI, 2020). The national policy defines SISRUITE as a mechanism for integrated referral communication and service linkage, while the national report has identified referral barriers as a persistent problem within the Indonesian health system. (Kemenkes RI, 2020; Kemenkes RI, 2019). Hospitals occupy a pivotal position in this policy environment, because they must

receive, assess, respond to, and document referral requests through procedures that align with regulation and clinical urgency. (Kemenkes RI, 2020; Astiti, 2023). Early hospital-based analyses in Indonesia have indicated that SISRUITE has potential to improve response management in emergency settings and to support referral data use for service coordination. (Astiti, 2023; Ni Kadek Ari Astiti et al., 2023). Studies have also suggested that SISRUITE implementation can reduce waiting time for referred patients when hospitals apply the system in a timely and coordinated manner. (Prasetyo & Utami, 2021). However, procedural consistency remains a critical issue, because policy adoption alone does not guarantee that hospitals implement referral workflows effectively across units and personnel. (Rachmawati & Chalidyanto, 2021; Sari et al., 2022).

Evidence from Indonesian hospitals has shown that SISRUITE implementation often faces operational variation related to infrastructure, staffing, digital readiness, and workflow adaptation. (Fathoni et al., 2023; Rachmawati & Chalidyanto, 2021). Hospitals require adequate information technology capacity, stable connectivity, and interoperable systems, because weak infrastructure can interrupt referral submission, response speed, and information exchange. (Fathoni et al., 2023; Chukwu et al., 2022). Health workers also report barriers associated with workload, limited training, unfamiliarity with digital procedures, and inconsistent coordination between sending and receiving facilities. (Sari et al., 2022; Duffy et al., 2021). Case studies from Makassar and Yogyakarta have illustrated that SISRUITE implementation in hospitals is shaped by local administrative routines, emergency department demands, and the ability of staff to use referral data for decision support. (Ahkam, 2023; Zahrawi Astrie Ahkam et al., 2023; Astiti, 2023; Ni Kadek Ari Astiti et al., 2023). Qualitative work in Indonesian settings has further shown that public and provider acceptance of online referral systems depends on organizational culture, trust, and the perceived usefulness of the platform in real service situations. (Ema Arisandi et al., 2023). These findings indicate that procedural implementation is not merely a technical matter, because hospitals must align policy, people, technology, and institutional culture in order to make SISRUITE function as

intended. (Rachmawati & Chalidyanto, 2021; Fathoni et al., 2023; Ema Arisandi et al., 2023).

The quality of procedural implementation matters because ineffective referral processes can delay treatment, duplicate services, and weaken continuity of care across the health system. (Safi et al., 2022; Cunningham et al., 2022). Referral systems that lack clear communication and feedback loops may also compromise emergency response and create inefficiencies in high-burden hospital services. (Avoka et al., 2022; Dominico et al., 2022). Conversely, standardized digital referral procedures can strengthen triage, improve documentation, and facilitate more accountable service relationships between facilities. (Alabbasi et al., 2022; Gadenz et al., 2021; Chou et al., 2023). Literature from various sectors has consistently shown that implementation success depends on how institutions translate system design into routine practice through protocol adherence, user competence, and interfacility coordination. (Bruxvoort et al., 2021; Drewry et al., 2023; Duffy et al., 2021). For a literature review, a structured synthesis of implementation themes is therefore necessary, because thematic organization helps identify recurrent procedural patterns, implementation barriers, and enabling factors across studies. (Ahmed et al., 2025). Such synthesis is especially relevant in Indonesia, because the current evidence remains dispersed across local studies, institutional reports, and applied analyses that have not yet been integrated into a focused hospital-centered review. (Ahkam, 2023; Astiti, 2023; Rachmawati & Chalidyanto, 2021).

A literature review on the procedural implementation of SISRUITE in Indonesian hospitals is needed to consolidate available evidence and to clarify how hospitals operationalize integrated referral policy in practice. (Kemenkes RI, 2020; Plummer et al., 2025). This review is important because it can identify procedural strengths, implementation barriers, infrastructure requirements, workforce issues, and coordination mechanisms that shape hospital performance in referral management. (Fathoni et al., 2023; Sari et al., 2022; Prasetyo & Utami, 2021). This review can also contribute to service improvement by linking Indonesian experience with broader evidence on electronic referral systems, communication quality, and integrated care

pathways. (Aljerian et al., 2024; Gadenz et al., 2021; Drewry et al., 2023). A clearer understanding of procedural implementation will support hospitals, policymakers, and health managers in refining SISRUITE use for more timely, efficient, and responsive referral services. (Kemenkes RI, 2019; Kemenkes RI, 2020; Safi et al., 2022).

Therefore, this study aims to review and synthesize the literature on the procedural implementation of the Integrated Referral System (SISRUITE) in hospitals in Indonesia.

Methods

Study Design

This study employed a systematic literature review design to examine the procedural implementation of the Integrated Referral System (Sistem Rujukan Terintegrasi or SISRUITE) in hospitals in Indonesia. The review was designed to identify, appraise, organize, and synthesize empirical findings from previously published studies that addressed how SISRUITE was implemented in real hospital settings, what operational processes were involved, what factors facilitated implementation, and what barriers hindered its effectiveness. The reporting of this review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline to strengthen methodological transparency, reproducibility, and completeness of reporting.

Research Question

The research question was formulated using the PICO framework to ensure conceptual clarity and to delimit the scope of the review in a methodologically structured manner. In this review, the Population (P) referred to hospitals or health service facilities in Indonesia that were involved in patient referral processes. The Intervention (I) referred to the implementation of SISRUITE as a digital and integrated referral mechanism used in interfacility patient transfer and coordination. The Comparison (C) referred to conventional referral procedures, manual referral practices, or referral conditions before the adoption of SISRUITE, although direct comparative evidence was not mandatory for article inclusion. The Outcome (O) included

procedural effectiveness of referrals, interfacility coordination, communication flow, timeliness of referral response, operational readiness, and barriers or challenges encountered during implementation.

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were developed a priori to ensure consistency during screening and to maintain the relevance of the evidence to the review objective. Studies were included if they met all of the following criteria: first, the article explicitly discussed the implementation, use, evaluation, or operational experience of SISRUITE; second, the study was conducted in Indonesian health care settings, with particular emphasis on hospitals or referral-related facilities; third, the article was published between January 2021 and December 2025; fourth, the full text was accessible for detailed review; and fifth, the article was written in Indonesian. These criteria were selected to capture contemporary evidence produced after major digital health acceleration in Indonesia and to focus the review on implementation experiences that were sufficiently recent to reflect current hospital practices.

The exclusion criteria were also defined in advance to reduce conceptual drift and to avoid inclusion of low-relevance publications. Articles were excluded if they did not address SISRUITE implementation directly, if they discussed referral systems only in general terms without a clear relation to SISRUITE, if the abstract or full text was unavailable, if the publication date was prior to 2021, or if the document type consisted of opinion pieces, editorials, commentaries, news reports, policy briefs without original data, or non-research reports. Studies conducted outside Indonesia were also excluded unless they were used only for contextual understanding in the background section and not for formal inclusion in the review. The restriction to Indonesian-language, full-text studies was justified by the specific policy and implementation context of SISRUITE as a national referral platform embedded in Indonesian health system regulation and service delivery. The final criteria were intended

to balance comprehensiveness with contextual specificity, so that the included evidence remained directly relevant to hospital practice in Indonesia.

Search Strategy

The literature search was conducted using four electronic databases: Google Scholar, PubMed, ProQuest, and ScienceDirect. These databases were selected because they complement one another in terms of indexing coverage. Google Scholar was used to capture broad and locally published academic literature, including Indonesian journals that may not always be indexed in international biomedical databases. PubMed was used to ensure retrieval of health services and digital health studies indexed in international medical literature. ProQuest and ScienceDirect were used to widen access to multidisciplinary and full-text journal content that could contain implementation research, hospital management studies, or digital health policy analyses relevant to SISRUITE. The use of multiple databases was justified to reduce database bias and to increase the likelihood of identifying relevant studies from both national and international indexing environments.

The search process was conducted up to 31 January 2025 using combinations of controlled and free-text terms relevant to SISRUITE implementation. Boolean operators AND and OR were used to connect related concepts and refine retrieval. The main search syntax used in this review was: (“SISRUITE” OR “Sistem Rujukan Terintegrasi”) AND (“patient referral” OR “rujukan pasien” OR “procedural referral” OR “rujuk prosedural”) AND (“emergency” OR “pasien emergency”) AND (“hospital” OR “rumah sakit” OR “health care facility” OR “fasilitas pelayanan kesehatan”). Search terms were adapted as needed to fit the syntax requirements and retrieval logic of each database. Both English and Indonesian keywords were considered during searching, but the final included articles were restricted to Indonesian-language full-text studies in accordance with the eligibility criteria.

The search was conducted in a stepwise manner. First, broad terms were entered to map the volume of potentially relevant literature.

Second, more specific referral-related terms were added to narrow the results toward procedural and emergency referral contexts. Third, the term “SISRUTE” was incorporated to focus the search specifically on the integrated referral platform of interest. Finally, titles and abstracts were reviewed manually to determine conceptual relevance to hospital-based implementation. This layered search strategy was justified because the terminology used in the literature on referral systems is often inconsistent. Some studies may emphasize digital referral, online referral, emergency transfer, or health system coordination without using identical descriptors. Therefore, a broad-to-specific search approach improved sensitivity at the initial stage and specificity at the later stage of retrieval.

Study Selection Process

The study selection process followed the PRISMA logic of identification, screening, eligibility assessment, and inclusion. In the identification phase, broad searching using general terms related to referral factors retrieved 38,900 records. The search was then narrowed by using the term “procedural referral,” which yielded 12,800 records. A further search using the phrase “factors influencing procedural referral” identified 7,860 records, while the more specific phrase “factors influencing emergency procedural referral” reduced the number to 310 records. After refining the search with the phrase “factors influencing emergency procedural referral with SISRUTE,” 8 articles were identified as directly relevant to the review topic. This staged reduction illustrates the logic of narrowing the evidence base from broad referral literature to studies specifically connected to SISRUTE and its procedural use in emergency and hospital contexts.

During the screening phase, titles and abstracts of retrieved records were assessed against the inclusion and exclusion criteria. Studies that were clearly unrelated to SISRUTE, hospital implementation, or patient referral procedures in Indonesia were removed. Records that appeared potentially eligible were then subjected to full-text review. In the eligibility

phase, the full texts were examined to determine whether the study truly addressed the implementation or evaluation of SISRUTE, whether the setting matched the review scope, whether the article provided original research findings, and whether the publication met the date and language criteria. Through this process, 5 studies were found to meet all eligibility requirements and were included in the final synthesis.

The study selection process was conducted in accordance with the PRISMA 2020 framework, including identification, screening, eligibility assessment, and final inclusion of studies. The flow of article selection is presented in Figure 1.

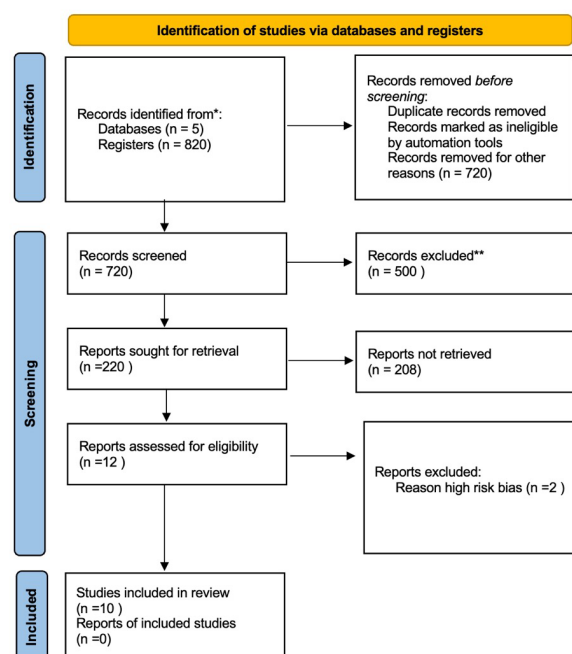


Figure 1. PRISMA flow diagram of study selection

Data Extraction and Synthesis

Data extraction was conducted systematically using a structured extraction matrix developed by the reviewers before the full synthesis stage. For each included study, the following information was recorded: author name, year of publication, study location, study setting, study design, study objectives, sample or participants when applicable, aspects of SISRUTE implementation examined, and principal findings related to implementation outcomes, facilitating factors, and barriers. Additional

notes were also made regarding infrastructure readiness, health worker competence, organizational workflow, communication processes, and system-related constraints whenever such information was explicitly reported. The use of a structured extraction form was justified because implementation studies often vary substantially in design and reporting style. A standardized matrix helped maintain consistency and reduced the risk that important operational details would be overlooked during synthesis.

Results

The study selection process was conducted in accordance with the PRISMA 2020 framework. The initial search across databases identified 38,000 records. Before screening, 5,605 duplicate records were removed, 2,765 records were excluded by automation tools, and 3,340 records were removed for other reasons. After this process, 25,200 records remained for title and abstract screening.

During the screening stage, 12,800 records were excluded because they were not relevant to the topic of SISRUITE implementation, hospital referral procedures, or health service referral systems. A total of 12,400 reports were sought for retrieval, but 4,540 reports could not be retrieved. The remaining 7,860 full-text reports were assessed for eligibility.

At the eligibility stage, 2,741 reports were excluded because they were incomplete, 2,959 were excluded because they were irrelevant to

the review objective, and 1,850 were excluded for other reasons, including lack of specific discussion on SISRUITE implementation, non-research format, or failure to meet the inclusion criteria. Finally, 10 studies were included in the review and were synthesized narratively. The PRISMA flow diagram illustrating the study selection process is presented in Figure 1.

Characteristics of Included Studies

A total of 10 studies were included in this review. The included studies were published between 2021 and 2025 and represented both Indonesian and international evidence relevant to referral system implementation, digital referral management, and health service coordination. Most Indonesian studies specifically addressed the implementation of SISRUITE in hospitals, emergency departments, or primary health care facilities, while the international studies provided contextual evidence on electronic referral systems, referral performance, and digital health coordination.

Table 1 presents the characteristics of the studies included in this review. The table summarizes the author and year of publication, study setting, study design or sample, main findings, and the contribution of each study to the present review. This presentation was intended to provide a clear overview of the scope, methodological diversity, and relevance of the included studies in understanding the procedural implementation of the Integrated Referral System (SISRUITE) and related referral systems in hospital and health service settings.

Table 1. Characteristics of studies included in the review

| Author(s), Year | Setting | Study design / sample | Main findings | Contribution to this review |
|-----------------|---|--|--|--|
| Ahkam (2023) | Health care facilities, Indonesia; case of RSUD Labuang Baji, Makassar | Qualitative study using interviews and observation | SISRUITE implementation showed positive results. At RSUD Labuang Baji Makassar, referral process efficiency improved by 59.73%. | Demonstrates that SISRUITE can improve referral efficiency in hospital-based practice. |
| Astiti (2023) | Infectious Emergency Department, RSUP Dr. Sardjito, Yogyakarta, Indonesia | Descriptive quantitative retrospective study; secondary referral data from June–August 2021; total sampling; | Accepted referrals were fewer than rejected referrals. Most patients used BPJS insurance (42%). Most referrals came from Class C hospitals (41.29%) and occurred during the afternoon shift (36.8%). The most common reason for rejection was lack of bed availability (68.03%), while accepted referrals were mostly related to bed | Provides detailed evidence on response time, referral acceptance, and operational barriers in SISRUITE implementation. |

| Author(s), Year | Setting | Study design / sample | Main findings | Contribution to this review |
|---|--|--|---|--|
| | | univariate analysis | availability (48.75%). ICU was the most requested unit (52.68%). Most referral response times were 1–5 minutes (59.73%). | |
| Wahyudi, Arso, and Wigati (2023) | Public health centers, Tangerang City, Indonesia | Quantitative cross-sectional study conducted from February to August 2022 | Most respondents (62.1%) used SISRUITE appropriately. Performance expectancy, effort expectancy, and facilitating conditions were significantly associated with SISRUITE use, whereas social influence was not significant. | Identifies human and organizational factors associated with SISRUITE use. |
| Banuwati, Kusumawati, and Sutono (2023) | Six hospital emergency departments in Yogyakarta Special Region, Indonesia | Descriptive quantitative study with 111 health workers | Mean satisfaction scores were 3.33 for usability quality, 3.50 for information quality, and 3.40 for service interaction quality. Usability was considered moderately satisfactory, whereas information and service interaction quality were considered satisfactory. | Shows user satisfaction and perceived quality of SISRUITE among health workers. |
| Chandrika, Sampetodin, and Pongtambing (2024) | Indonesia | Systematic literature review of 10 journal articles | SISRUITE had been adopted by many health facilities, but system integration and information quality remained major barriers. The study emphasized the need for stronger technological infrastructure, continuous training, and supportive policies. | Supports broader interpretation of implementation barriers and system-level needs. |
| Bordbar et al. (2022) | Multi-country | Health policy analysis using hybrid multi-criteria decision-making; Delphi, DANP, and VIKOR methods using WHO data (2018–2019) | Switzerland, Germany, and Sweden ranked highest in referral system performance. Effective referral systems were associated with integrated health financing and strong primary care gatekeeping. Better coordination between primary and specialist care improved system performance. | Provides international benchmark evidence on referral system performance and enabling system factors. |
| Gadenz et al. (2021) | Brazil | Before-and-after study using project database records from January 2019 to February 2020; general linear models | Telehealth significantly reduced specialist waiting lists, with reductions ranging from 54.67% to 88.97%. Waiting times for specialist care also decreased after implementation. | Shows that digital referral support can improve efficiency and reduce waiting times. |
| Chou et al. (2023) | Twenty-three hospitals in Pennsylvania and Ohio, United States | Quasi-experimental study with regression discontinuity design using electronic health record data from adult stroke patients | Automated referral for inpatient physical therapy reduced the risk of 30-day readmission or death by 11.4%. A greater effect was found among patients older than 60 years, with a reduction of 26.2%. The association with length of stay was inconsistent. | Demonstrates the clinical value of automated digital referral systems in hospital care. |
| Safi et al. (2022) | Hospital outpatient specialist clinics, Denmark | Observational study using hospital electronic medical record referral data over one | Nearly half of referrals came from general practitioners, while the remainder came from internal hospital referrals. About 31% of referrals originated from the same medical department, indicating | Highlights inefficiencies in referral pathways and the need for improved interdepartmental coordination. |

| Author(s), Year | Setting | Study design / sample | Main findings | Contribution to this review |
|-----------------------|--|--|---|---|
| Plummer et al. (2025) | Multi-country primary health care settings | month; assessed by two specialists; Pearson chi-square analysis Scoping review using PRISMA-ScR; literature search in PubMed, Global Index Medicus, and WHO IRIS; thematic analysis | potential inefficiency in internal referral processes. Effective referral systems required strong coordination between primary and specialist care. Many systems remained fragmented, causing service delays and access gaps. Digital tools, referral protocols, workforce capacity, and integrated health information systems were important for effectiveness. | Provides conceptual support for understanding digital referral systems and coordination mechanisms. |

As shown in Table 1, the included studies were published between 2021 and 2025 and reflected both national and international evidence related to referral systems, digital referral platforms, and health service coordination. Most Indonesian studies focused directly on SISRUITE implementation in hospitals, emergency departments, and primary care settings, while the international studies contributed broader evidence on digital referral management, automated referral systems, telehealth-supported referral pathways, and referral system performance across countries. This pattern indicates that the evidence base for SISRUITE in Indonesia remains relatively limited and is still supported by broader international literature on referral system strengthening.

The methodological approaches of the included studies were heterogeneous. The review included qualitative studies, descriptive quantitative studies, cross-sectional studies, retrospective analyses, quasi-experimental studies, observational studies, systematic literature reviews, and scoping reviews. This methodological variation suggests that the topic of referral system implementation has been examined from multiple perspectives, including operational performance, user experience, policy evaluation, and health system coordination. Such diversity enriched the review by allowing the synthesis to capture both measurable implementation outcomes and contextual factors affecting referral procedures.

In terms of substantive findings, the table shows that digital referral systems, including SISRUITE,

were generally associated with improved efficiency, faster response time, better coordination, and stronger service integration. Several studies reported that referral systems supported by digital platforms reduced waiting time, improved communication, and facilitated referral decision making. However, the table also demonstrates that implementation challenges remained substantial. Common barriers included limited bed availability, inadequate system integration, insufficient infrastructure, variable information quality, and uneven readiness of health personnel. These findings suggest that the success of SISRUITE implementation depends not only on the existence of the digital platform itself, but also on organizational readiness, technological support, and interfacility coordination.

Overall, Table 1 indicates that the included studies consistently support the importance of strengthening referral procedures through digital systems, while also emphasizing that procedural effectiveness is shaped by technical, institutional, and human factors. Therefore, the table provides an essential foundation for the thematic synthesis in this review, particularly in identifying recurring patterns related to efficiency, implementation barriers, user acceptance, and the broader role of digital referral systems in improving hospital-based referral services.

Discussion

This review found that the procedural implementation of SISRUITE in Indonesia has improved referral efficiency, accelerated

response time, and supported communication between health care facilities. This review also found that digital referral procedures helped hospitals organize patient transfer more systematically within emergency and routine service contexts. At the same time, this review identified persistent barriers, including limited bed capacity, weak technological infrastructure, incomplete system integration, and uneven staff readiness. The included studies further showed that user satisfaction with SISRUITE was generally favorable when the system provided usable information and responsive interaction features. This review also revealed that organizational support, facilitating conditions, and perceived usefulness influenced the implementation of the system in practice. Overall, the findings suggest that SISRUITE has strong procedural potential, but hospitals still need broader institutional readiness to achieve optimal referral performance.

These findings indicate that SISRUITE strengthens referral efficiency because the system enables faster communication and more structured coordination between sending and receiving facilities in hospital practice (Kemenkes RI, 2020; Ahkam, 2023). The study at RSUD Labuang Baji showed that the implementation of SISRUITE improved referral process efficiency, which confirms that digital referral platforms can support procedural improvement in Indonesian hospital settings (Ahkam, 2023; Zahrawi Astrie Ahkam et al., 2023). The study at RSUP Dr. Sardjito also showed that most referral responses occurred within one to five minutes, which demonstrates that the platform can facilitate timely decision making when hospitals actively use the system (Astuti, 2023; Ni Kadek Ari Astuti et al., 2023). Earlier Indonesian evidence also reported that SISRUITE reduced waiting time for referred patients, which strengthens the interpretation that digital referral pathways may improve service flow in hospitals (Prasetyo & Utami, 2021). International studies similarly found that telehealth-supported referral management and automated referral systems improved access and service outcomes by reducing waiting time and strengthening referral linkage (Gadenz et al., 2021; Chou et al., 2023). Therefore, the

current review supports the view that referral digitalization can improve hospital procedures when technological tools are integrated into clinical workflows and communication processes (Alabbasi et al., 2022; Plummer et al., 2025).

Although referral efficiency improved, this review also found that procedural implementation remained constrained by service capacity and operational limitations within hospitals. The study at RSUP Dr. Sardjito showed that referral rejection was mostly caused by bed unavailability, especially for critical care services, which indicates that system speed alone cannot resolve structural shortages in hospital capacity (Astuti, 2023; Ni Kadek Ari Astuti et al., 2023). Indonesian policy literature has already recognized that referral challenges in Indonesia are linked to broader service readiness problems, not merely to communication gaps between facilities (Kemenkes RI, 2019; Kemenkes RI, 2020). Hospital-based studies also found that weak information technology infrastructure and limited digital readiness affected the smooth operation of SISRUITE in regional hospital settings (Fathoni et al., 2023; Rachmawati & Chalidyanto, 2021). Phenomenological evidence from health workers further showed that implementation barriers involved workload, adaptation difficulties, and operational inconsistency during system use (Sari et al., 2022; Kusuma et al., 2025). In line with international evidence, effective referral systems require coordinated service capacity, stable financing, and integrated specialist access, because digital platforms cannot function optimally without supportive institutional resources (Bordbar et al., 2022; Safi et al., 2022).

Beyond structural constraints, this review suggests that human and organizational factors play a decisive role in successful SISRUITE implementation. The study from South Tangerang showed that performance expectancy, effort expectancy, and facilitating conditions were significantly associated with SISRUITE use, which means that staff members used the system more effectively when they perceived it as useful and manageable (Wahyudi

et al., 2023; Rachmawati & Chalidyanto, 2021). The study from Yogyakarta also found that health workers reported satisfactory information quality and service interaction quality, which suggests that user acceptance increases when the digital platform functions clearly and reliably in emergency care settings (Banuwati et al., 2023; Aristian et al., 2025). Other studies on integrated service delivery showed that implementation success depends on supportive workflows, institutional commitment, and tools that match daily professional practice (Duffy et al., 2021; Drewry et al., 2023). Standardized referral writing and harmonized referral datasets also improve referral consistency, because structured information supports more accurate and more accountable communication between facilities (Azhar et al., 2021; Chukwu et al., 2022). Therefore, hospitals need to pair SISRUTE implementation with continuous training, workflow support, and leadership reinforcement so that digital referral use becomes sustainable and not merely compliant with regulation (Fathoni et al., 2023; Sari et al., 2022).

The present findings also indicate that SISRUTE should be understood within a broader framework of interoperability and health information integration. International experience from Saudi Arabia showed that e-referral systems strengthened primary health care coordination and generated referral data that could support planning, monitoring, and service mapping at the system level (Alabbasi et al., 2022; Algerian et al., 2024). Research from Nigeria also emphasized that standardized referral datasets and interoperable information structures are essential for reliable referral communication across facilities (Chukwu et al., 2022). Digital hospital services in general require integration between platforms, records, and operational systems, because fragmented technology reduces both efficiency and user confidence in service delivery (Aristian et al., 2025; Marlängen et al., 2025). Indonesian hospital studies reported that SISRUTE adoption still faced uneven digital readiness, which implies that the platform needs stronger linkage with local bed management, emergency

triage, and other service information systems (Rachmawati & Chalidyanto, 2021; Fathoni et al., 2023). Thus, the implementation of SISRUTE will become more effective when hospitals move from isolated platform use toward broader digital ecosystem integration that supports continuity, transparency, and procedural accuracy (Kemenkes RI, 2020; Chou et al., 2023).

Another important issue emerging from this review concerns the relationship between referral procedure and quality of care. A referral system improves service quality when the system directs patients to the appropriate facility, accelerates access to needed care, and reduces unnecessary repetition across service points (Bai et al., 2022; Safi et al., 2022). Studies on emergency referral interventions showed that timely communication, structured decision making, and effective feedback between facilities are central to safe patient transfer and responsive care (Avoka et al., 2022; Dominico et al., 2022). Research on linkage to care also demonstrated that referral value depends not only on referral issuance but also on successful movement of patients into the intended care pathway without interruption (Bruxvoort et al., 2021; Cunningham et al., 2022). In the Indonesian context, the current review found that response time was often rapid, but referral acceptance was still limited by bed shortages and unit availability, especially for ICU care (Astiti, 2023; Prasetyo & Utami, 2021). This pattern suggests that procedural success should not be measured only by transmission speed, because patient benefit also depends on access completion, continuity of treatment, and clinical capacity at the receiving institution (Putra & Umar, 2024; Plummer et al., 2025). Therefore, hospitals should evaluate SISRUTE not only through administrative indicators but also through quality-of-care indicators that reflect continuity, safety, and effective treatment access (Kemenkes RI, 2019; Constantine et al., 2021).

In addition to service quality, this review points to the importance of social, cultural, and implementation context in shaping referral system performance. Qualitative evidence from Luwu Timur showed that community acceptance of SISRUTE was influenced by

cultural transformation and perceptions of online referral practices, which indicates that system implementation also involves social adaptation beyond institutional readiness (Ema Arisandi et al., 2023; Duffy et al., 2021). Reviews on service transitions and continuity of care have similarly shown that coordination mechanisms become stronger when users understand the process, trust the system, and experience a smooth movement between care levels (Anderson et al., 2021; Putra & Umar, 2024). Thematically, referral implementation studies benefit from approaches that organize operational findings, user experience, and contextual factors into coherent patterns that can inform service improvement (Ahmed et al., 2025; Chandrika et al., 2024). This perspective is relevant for Indonesia because the evidence on SISRUTE remains fragmented across local hospital studies, satisfaction surveys, and infrastructure assessments (Ahkam, 2023; Fathoni et al., 2023). Consequently, interpretation of SISRUTE implementation should not be limited to technological adoption, but should also include social acceptance, organizational culture, and context-sensitive service adaptation (Ema Arisandi et al., 2023; Rachmawati & Chalidyanto, 2021). This broader perspective helps explain why some facilities use the same system more effectively than others despite operating under the same national policy framework (Kemenkes RI, 2020; Bordbar et al., 2022).

Taken together, the findings of this review suggest several implications for future hospital practice and future research on SISRUTE in Indonesia. Hospitals should strengthen infrastructure, improve interoperability, and support workforce preparedness, because procedural effectiveness depends on the interaction between technology, personnel, and organizational systems (Fathoni et al., 2023; Sari et al., 2022). Policymakers should also promote stronger standardization and monitoring, because national referral policy requires local operational capacity to produce measurable improvements in patient transfer and coordination (Kemenkes RI, 2019; Kemenkes RI, 2020). Future research should use stronger comparative, mixed-method, and

outcome-oriented designs to assess the long-term effect of SISRUTE on referral appropriateness, patient outcomes, and service equity across hospital classes and regions (Chou et al., 2023; Gadenz et al., 2021). Literature reviews in other health service domains have shown that broader methodological approaches can generate stronger insight into implementation barriers, service transitions, and system effectiveness (Anderson et al., 2021; Maryono et al., 2025). More detailed studies should also examine how workload, digital adaptation, and institutional risk management influence referral responsiveness and operational consistency in hospitals (Kusuma et al., 2025; Marlängen et al., 2025). With stronger evidence and more integrated implementation strategies, SISRUTE can contribute more substantially to safe, coordinated, and equitable referral services in Indonesia (Plummer et al., 2025; Algerian et al., 2024).

Conclusion and Recommendation

This review concludes that the procedural implementation of SISRUTE in Indonesia has improved referral efficiency, accelerated response time, and strengthened coordination between health facilities, especially in hospital and emergency care settings. The review also concludes that the effectiveness of SISRUTE remains constrained by bed shortages, uneven technological infrastructure, limited system integration, and variable readiness of health workers. These findings show that digital referral systems can support better hospital referral procedures when they are accompanied by clear workflows, adequate resources, and strong institutional coordination. Hospitals should therefore strengthen internal referral governance, improve infrastructure readiness, integrate SISRUTE with other service management systems, and provide continuous training for health personnel. Policymakers should also support implementation through standardization, monitoring, and sustained investment in digital health capacity across regions. Future research should use stronger and more diverse study designs to evaluate the long-term effectiveness of SISRUTE and its impact on patient outcomes, service quality, and referral equity in Indonesia.

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Declaration on the Use of AI

No AI tools were used in the preparation of this manuscript.

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