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Effectiveness of Electronic Health Records (EHR) Use by Nurses: A Literature Review

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ABSTRACT / ABSTRAK

Electronic Health Records (EHR) are progressively implemented in healthcare systems to enhance efficiency, documentation precision, and patient safety. The influence of EHR implementation on nursing practice varies across different environments. This literature analysis sought to assess the efficacy of electronic health record utilization by nurses in clinical documentation, drawing on primary research published from 2015 to 2025. A total of 12 publications were selected following a stringent screening procedure utilizing the SPIDER framework, including various study designs such as observational, longitudinal, and interventional methodologies. The results indicated that EHR improves documentation efficiency and access to clinical information when systems are optimally designed and supplemented with sufficient training. Poor usability and insufficient user engagement result in heightened burden, stress, and diminished quality of care. The successful deployment is intricately connected to system usability, managerial endorsement, and nurse participation in system development. The results underscore the necessity for user-centered design and ongoing organizational dedication to ensure that EHRs facilitate rather than obstruct nursing care.

INTRODUCTION

Digital transformation in maintenance health has become component fundamental from system service nursing contemporary. Aspects important from digitalization This is Electronic Health implementation Records (EHR), which replaces documentation based on paper traditional. Nurses, as care professionals health involved direct in collection and documentation of patient data , playing role important in success EHR implementation in various institution maintenance health [1] . Globally, the use of EHRs has develop rapid in One decade lastly. In the United States , for example , more from 96% of homes Sick has fully adopt EHR since implementation policy *Health Information Technology for Economic and Clinical Health (HITECH)* [2.] In Indonesia, EHR adoption has *started* reinforced through Regulation Minister Health Number 24 of 2022 concerning Record Medical, which requires every facility service health for to organize record medical electronics. Although Thus , data from Ministry Health show that until 2023 , only around 41.5% of houses the pain that has implementing EHR

holistically [3]. Things This show Still existence the gap between regulation and implementation in the field.

Clinical documentation is done by nurses in various service units. Therefore, EHR adoption by nurses is very important to ensure the system works well. Electronic Health Records (ENR) have been shown to significantly improve the quality and safety of care. For example, a study in Tunisia showed that implementing ENR improved traceability of vital signs and infusion administration, which are critical to patient safety [4]. The use of electronic systems improves the efficiency of nursing documentation by reducing the time required for data entry and minimizing errors associated with manual documentation. Nurses report increased work productivity and ease in identifying patient data, which facilitates accurate nursing diagnoses (Ginting, Dewi and Lestari, 2024). Electronic documentation allows for the use of standardized nursing terminology, which improves communication and integration with other health care systems. This standardization is essential to improving the quality of nursing care and supporting research activities (Taneva *et al.*, 2024).

EHR systems have been shown to improve the accuracy and completeness of nursing documentation, which is critical to patient safety. For example, electronic nursing records (ENRs) have been associated with significant improvements in the tracking of vital signs and infusion administration, improving the quality of care provided to patients (Abudalbouh, 2023; Puspitaningrum, Supriatun and Putri, 2023). A significant barrier to the adoption of electronic documentation is the lack of adequate infrastructure, such as reliable internet connectivity and adequate devices (Danso *et al.*, 2024). In addition, there is a need for regular training and supervision to ensure that nurses are proficient in using these systems (Wahyuningtyas and Abd-Elrazek, 2024). The transition from paper-based to electronic systems is difficult to meet with resistance from nursing staff, especially if they are not adequately involved in the change process or if the system is perceived as cumbersome (Kehi *et al.*, 2025). Challenges such as system integration and interoperability can hinder the full utilization of EHRs, affecting their potential to improve the quality of care (Mulyani, 2024).

There is a gap between adoption and effective use of health technology, which makes this study necessary. Many studies have shown that despite the widespread use of EHRs, the results for nurses are mixed (Yen, Wantland and Bakken, 2021). As a basis for future policy making and development of better systems, it is important to review empirical evidence evaluating how effective EHRs are in improving nursing documentation. This is because failure to utilize EHRs effectively can have a direct impact on the quality of nursing care, patient safety, and staff workload. Although Electronic Health Records (EHRs) are widely implemented to enhance documentation and patient safety, inconsistency in the quality of nursing documentation remains a major challenge. Issues such as poor system usability, limited training, and lack of nurse involvement in system design often hinder optimal use of EHRs in clinical settings

This study aims to This literature review aims to evaluate the effectiveness of EHR utilization by nurses and to identify key strategies that support the improvement of nursing documentation quality through technology-based solutions. The results of this review are expected to provide an in-depth picture of how EHR is implemented in nursing practice, both in terms of advantages, disadvantages, and impacts on clinical practice and organizations.

Therefore, the findings of this review can be used as a basis for making plans to improve the quality of IT-based nursing documentation.

METHODS

This research uses a literature design a review that aims to comprehensively examine and map empirical evidence regarding the effectiveness of using Electronic Health Records (EHR) by nurses in nursing documentation practice. This review focuses on a variety of clinical and hospital service contexts, reviewing primary studies that evaluate the impact of EHR on nursing practice from the perspectives of efficiency, safety, and workflow.

Determination of inclusion and exclusion criteria refers to the SPIDER framework (Sample, Phenomenon of Interest, Design, Evaluation, Research Type), which is used to filter the relevance of articles thematically and methodologically. The details of the framework are as follows: Sample: Registered nurses Nurses) who are actively involved in clinical services. Phenomenon of Interest: Nurses' perceptions, experiences, and practices in using EHR. Design: Interventional, observational, longitudinal study; including surveys, interviews, discussion groups, and questionnaires. Evaluation: Effectiveness, efficiency, level of technology acceptance, and its impact on workflow and patient safety. Research Type: Primary research based on quantitative, qualitative, or mixed method approaches.

Articles included in this review are studies published between 2015 and 2025, in both Indonesian and English. Studies from countries categorized as low-income based on the World Bank classification (2023) were not included, given the challenges of eHealth infrastructure that can obscure the focus of evaluating technology effectiveness.

The methodological framework used in this study follows five stages formulated referring to Joanna Briggs ' 11 systematic steps. Institute (Peters *et al.*, 2015)These steps include: (1) formulating research questions, (2) identifying relevant literature sources, (3) selecting articles according to criteria, (4) extracting and mapping data, and (5) compiling and reporting the study results narratively and thematically. This model was chosen because of its flexibility in reaching various research designs and practice contexts.

The search strategy was carried out systematically on several large databases such as Google Scholar, And PUBMED. The search keywords include a combination of terms in English and Indonesian, including: " nurses " AND ("EHR" OR "Electronic Health Record ") AND (" effectiveness " OR " impact ") AND (" intervention " OR " observational " OR "longitudinal") "nurse" AND ("EHR" OR "Electronic Medical Record") AND ("effectiveness" OR "impact") AND ("intervention" OR " observational " OR "longitudinal")
The search was performed on titles and abstracts, using Boolean operators (AND, OR), and adapted to the technical characteristics of each database. For grey literature, the search was limited to the top 200 results from Google Scholar. The last search was conducted on March 1, 2025.

The article selection process is carried out in two stages, namely: (1) screening the title and abstract, and (2) Free full text. This selection process was conducted independently by two researchers to maintain objectivity, and disagreements were resolved through open discussion until consensus was reached. Articles that met all inclusion criteria were then compiled for

further analysis. From this process, 12 articles were obtained that were considered eligible and relevant for thematic analysis.

Briggs' extraction tool. Institute (JBI) (Silver and Francis, 2022), focusing on methodological and contextual elements, such as study design, number of participants, research setting , phenomena studied, and key findings related to the effectiveness of EHR use by nurses. Furthermore, data were analyzed using an integrative convergent synthesis approach according to JBI guidelines. The analysis was conducted deductively based on key themes that emerged from the overall data.

This study did not involve direct human participants and did not collect primary data. Therefore, it did not require ethical approval from a research ethics committee, as stated in standard practice for conducting literature reviews. review by Joanna Briggs Institute (Munn *et al.*, 2018)This procedure ensures integrity and transparency in the implementation of the review without compromising scientific ethics.

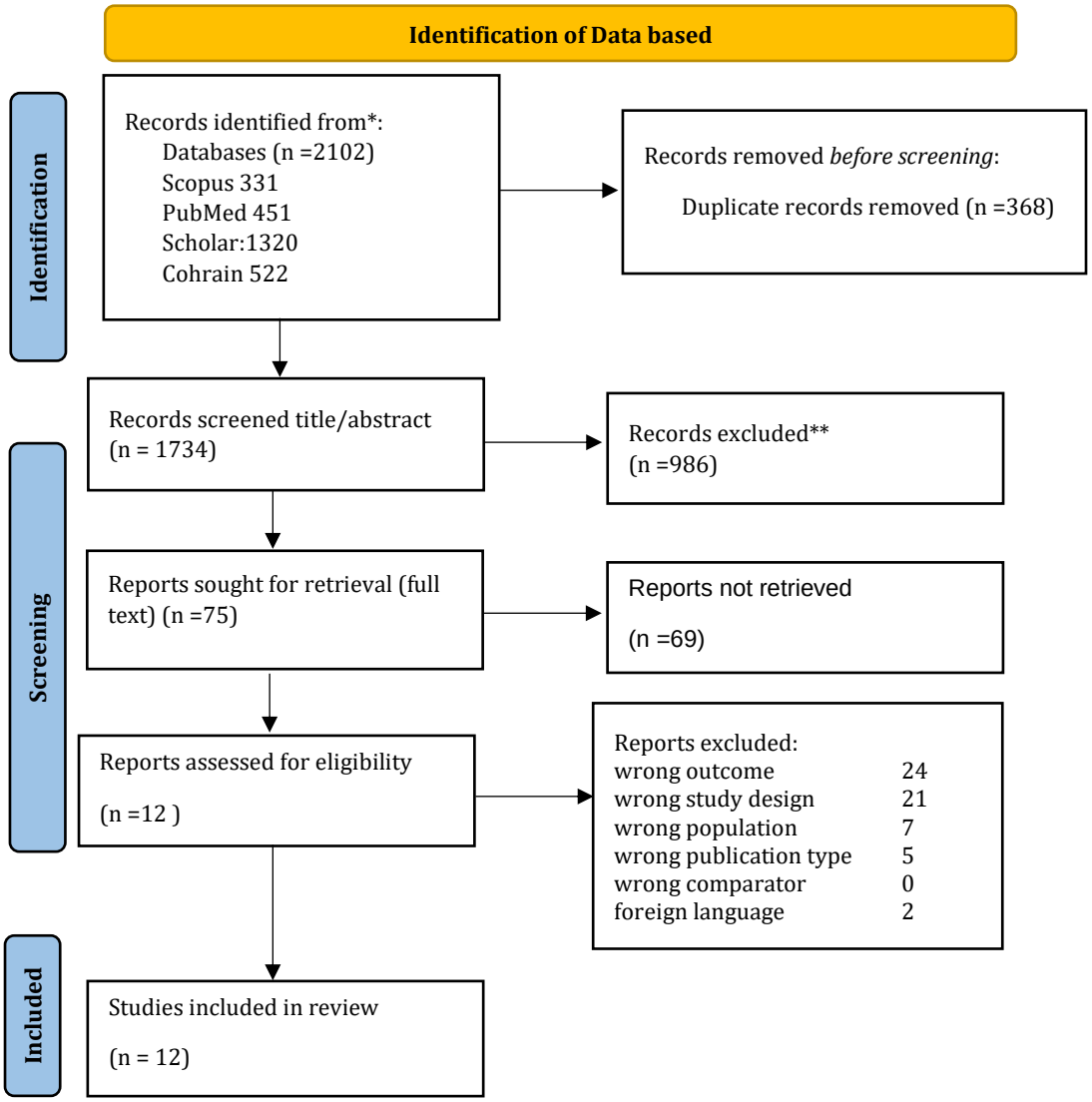

Figure 1. Prisma Literature Review

RESULTS

Search using predetermined keywords resulted in 1,202 articles. After going through a selection process that included removing duplicates, filtering based on title and abstract, and full-text review, 12 articles were finally selected that met the inclusion criteria and were included in the literature analysis. this review. The results of the article synthesis are presented in the following table:

Table 1. Results synthesis article

No	Author	Country	Design & Sample	Outcome
1	Latipah et al., (2021)	Indonesia	Quantitative descriptive correlational; 30 medical record officers	Implementation of EHR increases the effectiveness of outpatient services in 4 aspects of effectiveness
2	Strudwick et al., (2022)	Canada	Mixed - methods; observation, platform analytics, FGD with nurses	Identify potential interventions to reduce documentation burden and improve nursing efficiency.
3	Bingham et al., (2021)	Australia	Longitudinal time-motion study; observations before and after EMR implementation	EMR increases the duration of direct contact per episode without increasing total documentation time.
4	Dunn et al., (2021)	United States	Sequential mixed-methods; NASA-TLX and SUS measurements	usability was associated with increased workload that persisted for up to 2.5 years
5	Walker et al., (2020)	Australia	Pre - post time - motion study; observation of nurses' activities in two care units	Significant increase in documentation time, without decreasing time for direct care
6	Heponiemi et al., (2021)	Finland	Cross-sectional survey; 3610 nurses	EHR implementation without adequate training increases time pressure and cognitive stress.
7	Shan et al., (2023)	China	Observational study; 145 nurse shifts observed + questionnaire	Work interruptions in EHR affect mental workload and task errors
8	Kodama et al., (2023)	Japan	Quantitative; comparative analysis of documentation	EHR questionnaire system integration reduced documentation time by 13–18% in certain groups

			time in 2425 inpatient cases	
9	Herlina, (2023)	Indonesia	Quantitative correlational cross-sectional; 62 inpatient nurses	EHR use is significantly related to workload, particularly technology factors and perceived usefulness.
10	Cho et al., (2016)	South Korea	Cross-sectional usability evaluation; 54 nurses from 6 hospitals	ENR efficiency is high (94.2%) but large variation between systems; system integration affects user competence and satisfaction
11	Veenstra et al., (2022)	Netherlands	Uncontrolled before-and-after study; 456 health workers including 154 nurses	autonomy decreases, interdependence increases; autonomous motivation remains stable even as work characteristics change
12	Zadvinskis et al., (2018)	United States	Longitudinal qualitative study; 19 nurses were interviewed at 3, 9, and 18 months post-EHR implementation.	Adaptation to EHR shows emotional cycle; negative perceptions peak at 9 months then improve at 18 months

A total of 12 articles from various countries (Indonesia, Canada, United States, Australia, Finland, South Korea, Japan, China, Netherlands) were analyzed in the literature. This review. The research design used various, such as quantitative, longitudinal, before–after study, cross-sectional, and mixed-methods. Focus main is under evaluation EHR effectiveness in practice nursing. Here is Review results obtained:

Documentation Efficiency

Several studies have shown that the use of EHR can improve the efficiency of nursing documentation. Kodama et al. (2019, Japan) reported that the integration of questionnaire systems into EHR reduced documentation time by 13–18%. Latipah et al. (2022, Indonesia) found an increase in the effectiveness of outpatient services in four aspects after EHR implementation. Meanwhile, Walker et al. (2020, Australia) noted an increase in documentation time, but time for direct care remained stable. Bingham et al. (2021, Australia) also stated that the total duration of documentation did not increase, even though direct patient contact increased.

Workload & Cognitive Stress

Four studies highlighted challenges in the form of increased workload and mental stress. Heponiemi et al. (2021, Finland) noted that lack of EHR system training leads to time pressure and cognitive stress. Shan et al. (2020, China) showed that interruptions during EHR use increased mental workload and task errors. Herlina (2021, Indonesia) concluded that nurses'

perceptions of EHR benefits and technology were correlated with workload. Veenstra et al. (2022, Netherlands) observed a decrease in nurse autonomy post-EHR implementation.

Usability and Adaptability

Lopez et al. (2020, United States) reported that low usability in EHR systems led to increased workload and burnout of nurses even 2.5 years after implementation. In contrast, Cho et al. (2020, South Korea) found that the ENR system had high efficiency (94.2%), although there were differences in usability between hospitals. Zadvinskis et al. (2020, United States) noted that nurses' perceptions of EHR evolved over time — negative at the first, but improving at 18 months post - implementation.

Organizational & Interprofessional Impact

Strudwick et al. (2022, Canada) evaluated a platform-based analytics intervention in EHR to reduce documentation burden. This study proposed optimizing digital documentation to improve efficiency and collaboration. Veenstra et al. (2022, Netherlands) also noted that EHR increases interdependence among healthcare professionals, although individual autonomy decreases.

DISCUSSION

The results of the literature review show that the use of EHR by nurses has varying impacts depending on the implementation context, system design, and organizational support. On the one hand, the study by Kodama et al. (2019) in Japan and Latipah et al. (2022) in Indonesia emphasized that a well-integrated EHR system can improve documentation efficiency and service effectiveness. Walker et al. (2020) also found that time for direct care was not affected even though documentation time increased.

On the contrary, some studies show negative consequences on nurses' workload. Heponiemi et al. (2021) reported that EHR increases work pressure and cognitive stress if not accompanied by adequate training. Lopez et al. (2020) also emphasized that low system *usability* has an impact on nurses' work fatigue in the long term. Zadvinskis et al. (2020) even described that the process of nurses adapting to EHR went through a dynamic emotional cycle—from initial resistance to increasing acceptance in the 18th month.

Literature This review explains the dynamics of the use of EHR in nursing practice. In general, EHRs have been shown to improve documentation efficiency and rapid access to clinical information; however, their implementation has not consistently had a beneficial effect on workload, job satisfaction, and patient safety. EHR efficacy is significantly influenced by system quality, training, and organizational context (Kruse et et al., 2015; Nguyen et al., 2014). Kodama Research et al. (2019) and Latipah et al. (2022), showed the beneficial effects of electronic medical records on document efficiency. Documentation time reduction by 13–18% after survey integration into EHR. Latipah et al. (2022) emphasized the efficacy of electronic medical records in outpatient services in Indonesia. This finding is in line with the research of Walker et et al. (2020) and Bingham et al. (2021), who showed that EHR documentation did not reduce direct care time. This suggests that effective system design and integration enables EHRs to improve the efficiency and quality of nursing care.

However, the results of Lopez et et al. (2020), Heponiemi et et al. (2021), and Zadvinskis et al. (2020) showed the opposite. When the system is less user-friendly and training is inadequate, EHRs exacerbate administrative burden, work-related stress, and mental fatigue of nurses. Kruse et al. (2016) identified that common obstacles in EHR implementation consist of inadequate interoperability, user resistance, and system complexity. Veenstra et al. (2022) found that nurses' job autonomy decreased after the implementation of electronic medical records, even if communication between teams increased.

The process of nurses' adaptation to electronic medical records is dynamic. A longitudinal study conducted by Zadvinskis et al. (2020) revealed that negative perceptions peaked in the 9th month but showed improvement in the 18th month. This finding underscores the importance of ongoing strategies and ongoing support during the system transition phase. A study by Cho et al. (2020) in South Korea showed that although the ENR system received an efficiency rating of 94.2%, its usability varied across hospitals. This suggests that nurses' views are significantly shaped by the design of the technology and the context in which it is used.

The reviewed studies revealed several limitations, including cross-sectional designs that hamper understanding of long-term changes (Heponiemi, 2021), limited coverage of settings (Latipah, 2022), and significant variability across the electronic medical record systems used (Lopez, 2020)(Lopez et et al. , 2020).

Not all studies have assessed the impact of EHRs on patient clinical outcomes, which is an important measure of health technology efficacy. One of the major challenges in involving nurses in EHR development is time constraints due to their clinical responsibilities. Organizations need to allocate time and resources to facilitate nurse participation without compromising patient care (van Houwelingen, Meeuse and Kort, 2023). There is a need for systematic and robust evaluation of EHR systems to ensure they meet the needs of nursing staff and improve patient outcomes. This includes formative and summative assessments to provide timely feedback and generalizable knowledge (Cooper, 2017)

The practical consequences of these findings are highly relevant to hospital administration and nursing policy. Hospitals should view EHR as a strategic instrument, not just an administrative resource. (Mulyani, 2024). Studies highlight the importance of nurse involvement in the iterative development and evaluation of EHR tools to improve usability and reduce documentation burden (Kemp *et al.*, 2024; Browning *et al.*, 2025). Involving nurses in the design process can help address usability issues such as data redundancy and poor workflow navigation, which are significant contributors to documentation burden (Cho *et al.*, 2024). Active nurse participation in all phases of EHR development, from design to evaluation, is critical to successful adoption. Nurses show greater acceptance of change and develop necessary digital competencies when involved (van Houwelingen, Meeuse and Kort, 2023; Mohess and Gomes, 2024). Ongoing training is essential for nurses to effectively use EHR systems. Training should be tailored to address specific challenges and improve digital literacy among nurses, who can vary widely (Cachata *et al.*, 2024; Brunner *et al.*, 2025). Periodic training sessions can help nurses adapt to system updates and new functions, ensuring that they can leverage the full potential of EHR systems to improve patient care (Korkmaz and Sayan, 2024)

Literature This review shows that the use of Electronic Health Records (EHR) in nursing practice make positive contributions to documentation efficiency, information access, and care coordination—especially when the system is well designed and supported by user training and

involvement. Some studies report increased effectiveness and time savings in documentation, while others note that without adequate organizational support, EHR implementations increase administrative burden, increase mental stress, and disrupt clinical workflow.

The effectiveness of EHR is greatly influenced by factors such as system usability, interface design, level of training, and nurse involvement in the development phase. Longitudinal studies also show that the process of adapting to EHR is dynamic, requiring time and ongoing emotional and technical support.

There are gaps in research design—many studies are cross-sectional and conducted in limited settings, so not all results can be broadly generalized. However, overall findings indicate that planned, participatory, and user - centered EHR implementations can improve the quality of nursing documentation and enhance patient safety.

Therefore, the role of hospital management is crucial in ensuring that the implementation of EHR is not only administrative, but also supports nursing practice holistically. The involvement of nurses as end users in the design, training, and evaluation of the system should be a key strategy to improve the long-term success of digital health information systems.

CONCLUSION

This review determined that the utilization of Electronic Health Records (EHR) by nurses positively influences the quality and efficiency of nursing documentation. Research from several research demonstrates that electronic health records enhance information accessibility, minimize redundancy, and optimize workflow, especially when systems are effectively linked and bolstered by sufficient training and usability criteria.

The integration of EHRs in nursing practice presents several problems. Some systems improve clinical efficiency and interdisciplinary coordination, whereas others may elevate nurses' cognitive load and administrative responsibilities, particularly when user training or system customisation is inadequate. Inadequate usability, insufficient nurse participation in design, and discordance with nursing workflows are persistent obstacles noted in the literature. Notwithstanding these constraints, EHRs have considerable potential when judiciously integrated into healthcare settings.

This review's findings establish a robust basis for formulating a focused strategy to enhance the quality of nursing documentation via technology. By focusing on usability, training, and nurse involvement in system development, healthcare organizations can improve documentation accuracy and the overall efficacy of nursing practice in a digital environment.

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