

Physician-Centered EHR Satisfaction: A Literature-Driven Conceptual Usability Model

Siti Noorsiah Jamaludin

Faculty of Information Science, Universiti Teknologi MARA Cawangan Johor, Kampus Segamat, Johor

DOI: <https://doi.org/10.47772/IJRISS.2026.100700438>

Received: 22 July 2026; Accepted: 27 July 2026; Published: 03 August 2026

ABSTRACT

Despite the widespread adoption of Electronic Health Records (EHR) systems aimed at efficiently systemizing healthcare information, the demand continues to pose challenges, with ongoing reports of usability issues. This paper reviews recent literature on EHR usability factors, with a specific focus on research aimed at addressing several vital challenges associated with its usability and on understanding its impacts on physicians' job satisfaction. The scoping review identifies relevant studies published in English between 2018 and 2026. The model was proposed after reviewing recent literature on factors and usability issues affecting physicians' efficiency and satisfaction with EHR. The proposed conceptual model requires validation, and it may be used to assess physicians' satisfaction with the use of EHR to realize benefits. Ongoing studies consistently indicate that usability issues frequently contribute to physicians' dissatisfaction with EHR systems, impacting their workload and job satisfaction over time.

Keywords: Electronic health records, physicians, usability, job satisfaction, healthcare

INTRODUCTION

Technology integration in the healthcare industry has driven a significant revolution, enhancing the quality of care, improving patient outcomes, and increasing operational efficiency. In today's digital age, the healthcare sector is undergoing a significant transformation enabled by cutting-edge technology. This shift is making healthcare services more streamlined and effective than ever before. Hence, the health sector is now adopting the Electronic Health Record (EHR) as a secure digital repository of patient data for the contemporary healthcare system. This EHR system serves as a digital framework for capturing, storing, and using patient information (Woldemariam & Jimma, 2023). Therefore, authorized healthcare providers utilize EHR systems to deliver healthcare services effectively.

In contemporary healthcare settings, EHR are pivotal in facilitating patient care delivery, and information technology (IT) usability tools are used to manage patients' data efficiently. The introduction of EHR signifies a notable progression in the digitalization of healthcare. EHR provide a systematic, comprehensive repository for storing patient and population health information in digital format, thereby enhancing the efficiency and accessibility of healthcare data. EHR empowers healthcare professionals to plan, document, and deliver patient care, and to facilitate information exchange with other healthcare providers, ensuring continuity of care (Buivydaite et al., 2022).

The widespread integration of EHR systems in recent years has heralded the prospect of enhanced information dissemination among clinical personnel. The transition from traditional paper-based records to electronic health records was anticipated to reduce documentation time for staff and increase time allocated for direct patient care. This innovative technology possesses the potential to significantly reshape the healthcare sector by enhancing the quality of care and improving medical professional outcomes (Abernethy et al., 2022). Thus, technology has the potential to elevate the quality of care and the effectiveness of healthcare providers. Primarily, the technology facilitates expedited access to patient information through EHR systems and medical knowledge databases, enabling medical personnel to deliver improved care and efficiently access valuable resources.

Despite these advancements, EHR systems are not without their challenges. (Rizvi et al., 2017) suggested that usability issues remain pervasive, impacting the adoption of EHR systems among physicians. Evidence suggests usability is a crucial factor influencing physician satisfaction, operational efficiency, and workload management, as inadequate usability is associated with increased burnout and stress levels among healthcare professionals (Viitanen et al., 2026). Research indicates that the predominant hindrance to the effective use of EHR systems is their usability, which significantly affects the well-being of both healthcare practitioners and patients (Buivydaite et al., 2022). Thus, this paper proposes a conceptual model of the factors influencing EHR usability. This study was conducted to ensure sufficient in-depth knowledge of the challenges confronting EHR usability and a clear approach to understanding how usability influences physicians' experience and usage patterns. In this paper, the specific objectives are as follows: i) to identify the usability issues that contribute to the dissatisfaction of physicians with EHR systems, ii) to do a detailed literature review on the challenges resulting from poor EHR usability, and iii) to propose a model that is able to understand how these factors influence the system use experience that affects physicians' efficiency and job satisfaction.

LITERATURE REVIEW

The fundamental IT infrastructure has been established, and healthcare organizations are actively investing resources in developing and implementing health IT solutions. Globally, the healthcare industry is progressively transitioning toward digital health. This paradigm shift has led to the development and implementation of technological advancements to enable the longitudinal tracking of an individual's health through EHR (Alzghaibi, 2023). Baumann et al. (2018) emphasized that EHR systems can enhance information flow, facilitate access to knowledge, enable real-time validation checks, and support continuous monitoring. These endeavours aim to strengthen physicians' capabilities while fostering critical thinking and informed decision-making in healthcare (Carayon & Hoonakker, 2019). Although EHR has demonstrated essential benefits in health information, it may also introduce adverse effects on clinical tasks; physicians continue to express significant concerns regarding EHR's poor usability and high workload (Dunn Lopez et al., 2021). Thus, it is important to identify the issues that may underlie physicians' perceptions of EHR usability and workload.

Electronic Health Records (EHR)

EHR systems have become common in recent years, offering better information sharing among clinical staff. The provision of electronic medical records, commonly called EHR, represents a significant advancement in safeguarding patient data. The remarkable progress and widespread adoption of digital technology in healthcare have instigated transformative changes across virtually all facets of human endeavour (Abernethy et al., 2022). It was hoped that transitioning to EHR would ultimately reduce staff documentation time and increase time for direct patient care.

In accordance with current developments, EHRs are a secure digital repository for patient data and a fundamental element of contemporary healthcare systems (Buivydaite et al., 2022). EHR can aid healthcare professionals in planning, documenting, and delivering patient care, as well as facilitating data exchange. As such, instilling confidence in healthcare professionals in the use of EHR during EHR implementation is a crucial factor in enhancing EHR utilization (Ala'a & Ramayah, 2023). Healthcare worldwide is increasingly recognizing the significant potential of information and communication technology (ICT) to drive industry-wide transformation (Hareem et al., 2024). Consequently, effective adoption and use of EHR systems, along with proper training and organizational readiness, are crucial for maximizing the benefits of ICT in enhancing healthcare quality, efficiency, and patient safety.

In fact, EHR has been cited in numerous studies as a tool for enhancing the global quality of healthcare (Alzghaibi, 2023). The implementation of EHR has significantly contributed to the global digitization of patients' health information, transforming the landscape of medication management (Hareem et al., 2024). Thus, the adoption of EHR has been pivotal in digitizing patients' health information globally and has emerged as an essential component of modern healthcare. It has revolutionized conventional paper-based prescription methods by enabling electronic transmission, thereby significantly enhancing the management, accuracy, and safety of medical records (Hareem et al., 2024).

Despite the advantages, the use of these systems has also led to unintended consequences, including EHR-related factors that have been suggested to contribute to physician burnout (Carayon & Hoonakker, 2019). As mentioned, Alami et al. (2022) identify usability challenges in EHR design that directly impact the efficacy and efficiency of tasks within the EHR environment. The widespread use of EHR in the healthcare sector underscores the need to recognize that minor inefficiencies in EHR use can substantially burden physicians' workloads (Dunn Lopez et al., 2021). The implementation of EHRs has raised issues related to usability, workflow adaptation, data security, ethical concerns, and professional competency (Alonazi, 2025). These challenges affect clinical efficiency, communication, and patient satisfaction, highlighting the need for a deeper understanding of barriers to effective use. Thus, as suggested by Ala'a & Ramayah (2023), studying the implications of EHR utilization would facilitate the refinement of its implementation and the development of novel practices within the healthcare sector. Dunn Lopez et al. (2021) mentioned that physicians' overall workload was associated with EHR usability. Thus, as Yunus et al. (2023) highlighted, assessing usability and user experience is imperative for successful EHR implementation. Therefore, identifying the usability issues health professionals face with EHR is crucial to improving EHR use.

IT Usability in EHR

In healthcare environments, IT usability refers to the systems used to aid physicians in achieving their objectives, providing satisfaction, and an efficient approach to enhancing productivity and efficacy in managing patient information. The concept of usability concerns the development of systems that are both easy to use and efficient, thereby minimizing user effort while enhancing satisfaction. According to Alami et al. (2022), usability is critical to successful EHR adoption, as it significantly influences clinical workflows and patient outcomes. EHR systems enhance the quality of care, support clinical decision-making, and promote an efficient approach to improving healthcare service delivery (Alonazi, 2025). However, concerns regarding low digital literacy hinder optimal EHR use and confidence among healthcare professionals.

Despite the benefits offered by the usability of EHR systems, challenges and unintended consequences are impeding the successful adoption and use of EHR systems in healthcare settings (Woldemariam & Jimma, 2023). The potential of leveraging interoperable digital technology to enhance efficiency, equity, and continuity of care is considerable, yet it presents inherent complexities (Abernethy et al., 2022). As Dunn Lopez et al. (2021) emphasized, frequent and persistent minor usability issues can lead to significant usability challenges. These problems include complex navigation, unintuitive interfaces, and excessive data entry requirements, which frustrate healthcare professionals and lead to increased errors, reduced productivity, and lower job satisfaction. Hence, healthcare facilities often encounter challenges with EHR system usability, with a key contributing factor being insufficient user adoption; thus, it is essential to thoroughly evaluate their usability and user experience (Yunus et al., 2023).

Meanwhile, a substantial body of literature remains to be addressed regarding the deleterious impact of health IT usability on physicians. As emphasized by Carayon and Hoonakker (2019), recent media coverage has highlighted the challenge of health IT usability and its consequential negative impact on physicians and other healthcare providers. A recent survey of over 5,000 physicians across various medical specialties reported poor overall EHR usability (Abernethy et al., 2022). Poor EHR usability can lead to low job satisfaction among medical professionals, ultimately compromising the quality and safety of healthcare delivery. According to Abernethy et al. (2022), the system's poor usability has negatively impacted clinicians' work-life balance and patient interactions. Thus, the findings directly correlate EHR usability and physician burnout, implying a detrimental impact on patient safety. Therefore, if clinicians find EHRs disorganized or difficult to use, they may not complete them consistently. This can diminish the benefits associated with EHRs and contribute to patient harm. Thus, Ratwani et al. (2018) suggest that identifying a systemic usability issue necessitates implementing a more comprehensive, wide-ranging solution. Therefore, gaining deeper insight into how health IT design and usability can incorporate diverse perspectives is of utmost importance to ensure good usability and to assess its impact on medical professionals' outcomes.

System Workflow Navigation

EHR has revolutionized healthcare delivery, offering unprecedented access to patient information, streamlining administrative processes, and enhancing clinical decision-making. However, transitioning from paper-based systems to EHRs has introduced new challenges in navigating system workflows. Healthcare professionals firmly believe that EHR create obstacles to efficient workflow and communication, leading to delays in healthcare services (Woldemariam & Jimma, 2023). The implementation process often leads to unintended consequences and disruptions to existing workflows, resulting in temporary inefficiencies and physician resistance to EHR adoption (Hareem et al., 2024). When navigation flows are non-standardized, and interface designs lack consistency, it can create a jumble of confusion and mental strain for users (Gaspary et al., 2026). Clear and cohesive design not only enhances user experience but also reduces cognitive load, making interactions more intuitive and enjoyable. Thus, the accessibility of EHR systems plays a crucial role in facilitating efficient workflow navigation and promoting a user-centric approach to the development and optimization of EHR systems.

A significant body of research highlights the difficulties of integrating EHR systems into established system workflows. Implementing and maintaining EHR systems is costly and challenging due to their far-reaching impact on virtually all clinical workflows and care processes (Janett & Yeracaris, 2020). The continued impact of EHR usage on system navigation has been associated with a decline in EHR usability among physicians (Dunn Lopez et al., 2021). Therefore, it is imperative to carefully consider the challenges associated with EHR, specifically their user-friendliness and seamless integration into existing workflows (Hareem et al., 2024). Furthermore, Hareem et al. (2024) highlighted that EHR systems often require clinicians to adapt to new workflows, which can be particularly challenging in high-pressure environments and healthcare practices.

The discrepancy discussed above suggests a potential avenue for investigating the influence of EHR systems on physician workflow and satisfaction. Thus, Carayon & Hoonakker (2019) recommend broadening the assessment of health IT design beyond individual considerations to gauge physician satisfaction with navigating the technology. Thus, it is essential to uncover EHR navigation issues that may underlie physicians' perceptions of EHR usability and workload.

System Interface

The implementation of EHRs has significantly modernized the healthcare industry by digitalizing patient data, facilitating seamless information sharing, and improving care coordination. However, the efficacy of EHR systems is significantly impacted by their user interface design. The usability attributes, including contentment, usefulness, learning performance, ease of use, and learnability, constitute the most critical elements in achieving a well-structured and effective EHR system (Alzghaibi, 2023). According to a study by Hareem et al. (2024), the interface design of EHR systems affects how easily clinicians can navigate the system, enter and retrieve information, and perform clinical tasks. If the interface is well-structured, users are more likely to have a satisfactory experience, thereby fostering repeat engagement (Peter Dey et al., 2019). Hence, enhanced efficiency and effectiveness in task execution are positively correlated with increased user satisfaction associated with designing effective EHR interfaces. This, in turn, may lead to improved healthcare delivery and better health outcomes by enabling the rapid location and use of information.

However, a study by Janett and Yeracaris (2020) emphasizes that poor user interface design can hinder clinicians' ability to navigate the system efficiently, leading to increased time spent on data entry and decreased time for patient care. One major issue is the complexity of the information that must be presented in EHR systems, which must balance comprehensive data and a user-friendly interface (Janett & Yeracaris, 2020). Complex user interfaces in EHR systems significantly hinder efficient navigation and increase the risk of errors in medication orders, testing, and other interventions. Thus, the level of cognitive workload is influenced by usability, specifically by the design of human-computer interfaces (Dunn Lopez et al., 2021). Makhni et al. (2026) highlight that EHR interfaces are often cluttered and unintuitive, increasing cognitive load and making it difficult to synthesize patient data. As emphasized by Olakotan et al. (2025), poorly organized, complex interfaces and navigation make it difficult to distinguish critical from non-critical results, leading to information overload. In addition, complex interface designs, cognitive overload, and workflow misalignment can reduce efficiency and

increase documentation time, potentially limiting patient interaction (Alonazi, 2025). Therefore, allocating resources to proper interface design is paramount for healthcare environments' efforts to elevate medical professional satisfaction and enhance system usability. There is a pressing need to advance EHR design to effectively reduce workflow disruptions caused by documentation burdens and eliminate extraneous task complexity. To address these challenges, it is essential to adopt a human factors approach that optimizes information retrieval, enhances interface usability, and simplifies unnecessary tasks, thereby improving overall operational efficiency in healthcare settings (Olakotan et al., 2025).

An intuitive and user-friendly interface significantly enhances workflow efficiency and reduces cognitive load. The design of user interfaces is crucial for creating positive user experiences (Zhang & Song, 2023). As highlighted by Bloom et al. (2021), it is imperative to incorporate essential elements into EHR systems that are seamlessly integrated to enhance functionality. In contrast, a poorly designed interface can result in frustration, errors, and a marked decrease in productivity. Hence, there is a significant gap between the current usability of EHR and the achievable optimal usability of the system interface (Rizvi et al., 2017). The heuristic evaluation has revealed that violations in EHR interface design contribute to increased cognitive workload and reduced time efficiency among physicians (Dunn Lopez et al., 2021). Thus, tailoring EHR interfaces and workflows to specialty needs and investing in user training can enhance usability (Viitanen et al., 2026). In this case, the goal is to identify interface issues that cause clinicians to perceive the EHR system as challenging to use and adding to their workload.

System Integration (interoperability)

The integration of EHR systems into healthcare workflows presents both opportunities and challenges. While EHRs can enhance clinical efficiency and improve patient care, system integration was among the factors identified as a usability challenge associated with using the EHR system. Alami et al. (2022) identify several barriers to effective EHR integration, including system complexity, lack of customization, and inadequate training. These issues can lead to disruptions in routine clinical practices, increased cognitive load on clinicians, and potential declines in productivity (Janett & Yeracaris, 2020).

Ultimately, EHRs are designed to enhance the quality of care and operational efficiency by integrating various aspects of patient management into a unified platform. However, there is a flaw in integrating the technology into the EHR: it lacks comprehensive details on inputs and outputs, requiring users to navigate to other pages to obtain the required data (Alami et al., 2022). On the other hand, excessive demands for clinical documentation and inadequate health IT usability and workflow integration represent significant EHR-related factors believed to contribute to physician burnout (Carayon & Hoonakker, 2019). For example, psychiatric specialties struggled with unstructured documentation, while surgical specialties faced challenges due to multiple ancillary systems (Viitanen et al., 2026). Thus, the current situation presents a challenge, as the system is not operating at its anticipated full capacity, which impacts healthcare users' experience and affects EHR adoption (Woldemariam & Jimma, 2023). The absence of standardized data exchange leads to fragmented records and workflow inefficiencies. Although existing standards can help mitigate these issues, their adoption and integration remain insufficient (Makhni et al., 2026).

Even EHRs hold the promise of enhancing clinical efficiency and elevating patient care. The successful implementation of EHRs hinges upon addressing usability issues, ensuring seamless workflow integration, and providing robust support to healthcare providers. As emphasized by Hareem et al. (2024), achieving successful integration depends on implementing user-centered design, adhering to standardized practices, and establishing a robust infrastructure. Enhancements could stem from improved system integration, greater user confidence, and comprehensive training efforts (Viitanen et al., 2026). Thus, exploring satisfaction with EHR systems across different healthcare settings, including rural and underserved areas, will provide a more comprehensive understanding of EHR adoption.

User Experience in EHR

The user experience of EHR systems has garnered significant attention in recent years, especially as healthcare organizations increasingly adopt these systems to improve patient care. Despite widespread EHR adoption,

persistent usability issues affect both healthcare providers and healthcare professionals. Usability encompasses the efficient and effective use of technology, including system design and customization to align with specific clinical workflows. However, understanding the link between usability and user experience is crucial for designing and assessing interfaces and digital health technologies suited to healthcare professionals' needs (Zainal et al., 2023).

EHR usability is significant in allowing healthcare professionals to perform patient health information tasks quickly, efficiently, and with minimal mental effort in healthcare settings. However, research has demonstrated that poor user experience, satisfaction, and usability in EHR systems can lead to frustration among healthcare professionals. A systematic review of usability measures for digital health technology found that user satisfaction is a primary factor in EHR adoption (Zainal et al., 2023). This factor plays a crucial role in enhancing user engagement while adopting technologies. Thus, it is essential to recognize that when the interface is well-structured and integrates a range of features, users are more likely to have a satisfying experience, which encourages them to return regularly (Peter Dey et al., 2019). On the other hand, several studies have demonstrated that physicians allocate a larger portion of their time to EHR documentation than to direct patient interactions (Nijor et al., 2022). In addition, most physicians remained dissatisfied with EHR usability (Viitanen et al., 2026). This tendency engenders frustration among healthcare professionals and leads to dissatisfaction with the way their duties are carried out. EHR usability challenges considerably impact clinician burden, compounded by factors such as interoperability (Ratwani et al., 2018). Therefore, enhancing EHR usability may be a significant strategy for mitigating healthcare professionals' burnout (Melnick et al., 2020).

The existing literature highlights the paramount need to enhance the user experience of EHR systems to improve the efficiency of healthcare delivery (Alami et al., 2022; Tan & Mukhriz, 2023; Jimma & Enyew, 2022). Consequently, healthcare organizations should prioritize implementing user-centered design in EHR development. Enhancing patient safety has been suggested by reducing cognitive load through improved EHR usability, such as customizable interfaces and streamlined documentation (Nijor et al., 2022). Systems characterized by suboptimal usability are significantly associated with increased physician burnout. Conversely, systems with high usability, especially those that incorporate user feedback to improve functionality, have been found to positively affect physicians' perceptions of being valued in their professional environment (Bloom et al., 2021). Hence, further investigation is necessary to delve into user engagement in EHR with the specific objective of comprehending the usability of EHR across various healthcare environments.

METHODOLOGY

A structured literature search was conducted to identify studies related to Electronic Health Record usability published between 2018 and 2026. The databases searched included PubMed/MEDLINE, ScienceDirect, and Google Scholar because they index high-quality literature in medical informatics, healthcare management, and health information systems. The search combined keywords using Boolean operators. Thus, to facilitate the study, a targeted search was conducted using the following keywords: 'usability', 'electronic health record', 'technical factors', 'IT usability', and 'healthcare'. Hence, these words serve as a controlled-vocabulary thesaurus for searching the indexed articles. All retrieved articles were carefully reviewed to assess their relevance to the research objectives using their titles and abstracts. Subsequently, 20 full-text articles that met the inclusion criteria and exclusion criteria were selected for further analysis. All the processes of systematic search are explained as follows in **Table 1**:

Table 1: The search string and criteria

Search string	Databases	PubMed/Medline, Google Scholar, and ScienceDirect.
	Search keywords	'usability', 'electronic health record', 'technical factors', 'IT usability', and 'healthcare'.
	Boolean operators	("Electronic Health Record" OR "Electronic Medical Record"), ("Usability" OR "User Experience"), ("Physician" OR "Healthcare

		Professional"), ("Job Satisfaction" OR "Burnout")
Inclusion criteria	Timeline	2018 and 2026
		Article journal, peer-reviewed journals, article review, research paper, reports, full-text available
	Area	Studies discussing EHR usability, studies involving physicians or healthcare professionals
	Language	English
Exclusion criteria	Document types	Conference abstracts, editorials, letters, duplicate studies
	Area	Studies focusing only on technical software development without healthcare users
	Language	Non-English articles

This study primarily sought to synthesize conceptual evidence rather than conduct a formal systematic review; therefore, a streamlined quality assessment was implemented. Articles were appraised based on criteria including publication in peer-reviewed journals, methodological clarity, relevance to the usability of electronic health records (EHR), and alignment with the overarching research objectives. Studies that demonstrated insufficient methodological transparency or lacked direct relevance to physician usability were systematically excluded from consideration.

The data collection process commenced with identifying the principal concepts within the three research questions, which are presented as results or findings in each analyzed article. This approach served as the basis for extracting data and systematically organizing relevant information on the specified topics. Accordingly, the data obtained is utilized as the basis for constructing the proposed conceptual framework in this study.

Study Selection

The study selection process was delineated into four critical stages: identification, screening, eligibility assessment, and final inclusion. Initially, a thorough and systematic search was conducted across multiple databases, including PubMed/MEDLINE, ScienceDirect, and Google Scholar, using predefined search terms relevant to EHR, usability, information technology, and the healthcare sector. All records obtained were subsequently exported for preliminary review, during which duplicate publications identified across the various databases were meticulously removed. All the selection processes are explained as follows in **Table 2**:

Table 2: Study selection process

Steps	Process
1. Identification	- A comprehensive search was conducted across PubMed/MEDLINE, ScienceDirect, and Google Scholar using predefined search keywords related to Electronic Health Records (EHR), usability, information technology, and healthcare. - All retrieved records were exported for preliminary review, and duplicate publications identified across databases were removed.
2. Screening	- The titles and abstracts of the retrieved articles were examined to determine their relevance to the objectives of this study. - Articles that did not focus on EHR usability, were unrelated to healthcare settings, or did not address physician or healthcare professional experiences were excluded. - Studies published in languages other than English, conference abstracts, editorials, opinion papers, and publications without accessible full texts were also excluded.
3. Eligibility	Each article was evaluated to determine whether it examined factors influencing EHR usability, user experience, workflow, interface design, system integration, or physician satisfaction.

	Studies that provided insufficient information or did not contribute directly to the development of the proposed conceptual model were excluded from further analysis.
4. Included	20 articles that met all selection criteria were included in the final review. - These studies formed the basis for identifying the major EHR usability issues and developing the proposed conceptual model presented in this paper.

The overall study selection process is summarized in Table 2. This selection process ensured that only relevant and high-quality evidence was synthesized to address the research objectives.

Research Questions

This literature review, using a descriptive approach, focuses on formulating a research question to identify the usability challenges physicians encounter during EHR implementation. Thus, the research questions are formulated based on the study objectives to ensure the achievement of the study goals as follows:

- What are the usability issues that contribute to the dissatisfaction of physicians with EHR systems?
- What challenges do physicians encounter that lead to EHR's poor usability?
- What factors can be used to integrate a model to understand the system use experience that affects physicians' efficiency and satisfaction?

In line with the established research questions, this review aims to develop a conceptual model that integrates existing studies. This framework ensures that the mentioned factors can be integrated as a foundation for further examination of physician satisfaction with EHR.

FINDINGS OF STUDIES

The following review comprehensively analyses the factors and usability literature in a healthcare delivery setting. This examination focuses solely on articles that address the specific research question. After identifying articles relevant to the study's context, the research questions are examined to ensure comprehensive answers.

RQ 1: The usability issues that contribute to the dissatisfaction of physicians with EHR systems.

Subsequently, the selected articles are used to identify the factors contributing to the usability problem. To thoroughly examine RQ 1, the selected articles are utilized to identify the factors contributing to usability problems. **Table 3** presents evidence derived from selected studies, as documented in various publications.

Table 3: Key usability challenges (evidence of studies)

Study	Design	Settings	EHR usability issues			
			Navigation	Interface	Integration	Resources
(Carayon & Hoonakker, 2019)	Literature	-	•		•	
(Alami et al., 2022)	Observation	US	•	•	•	
(Dunn Lopez et al., 2021)	Mixed-method	US	•	•		
(Woldemariam & Jimma, 2023)	Literature	-	•		•	
(Alzghaibi, 2023)	Literature	-		•		
(Ratwani et al., 2018)	Reports survey	US	•	•	•	
(Melnick et al., 2020)	Cross-sectional survey	US	•		•	•

(Salleh et al., 2021)	Convenience sampling	Malaysia	•		•	
(Zhang & Song, 2023)	Purposive sampling	China		•		
(Zainal et al., 2023)	Literature	-		•		
(Nijor et al., 2022)	Literature	-		•	•	
(Hareem et al., 2024)	Quantitative survey	Australia	•		•	
(Bloom et al., 2021)	Quantitative survey	UK		•		
(Mazur et al., 2019)	Longitudinal study	US	•	•		
(Wronikowska et al., 2021)	Literature	-		•		
(Viitanen et al., 2026)	Cross-sectional surveys	Finland	•	•	•	
(Olakotan et al., 2025)	Literature	-		•		
(Alonazi, 2025)	Literature	-		•		
(Makhni et al., 2026)	Literature	-		•	•	
(Gaspary et al., 2026)	Qualitative	Brazil	•	•		

This study identified the usability issues contributing to physicians' dissatisfaction with EHR systems through a systematic literature review. Upon examining the literature, it becomes clear that multiple factors have been identified as contributing to dissatisfaction among medical professionals, specifically physicians, with the use of EHR. These factors include system workflow navigation, system interfaces, system integration (interoperability), and system resources. However, system resources (including physical and virtual components accessible for efficient management) do not exhibit frequent usability issues. The overall selected articles are exhibited in **Figure 1**. Consequently, upon careful analysis, system resources have been identified as not being significant contributors to usability issues within the healthcare sector.

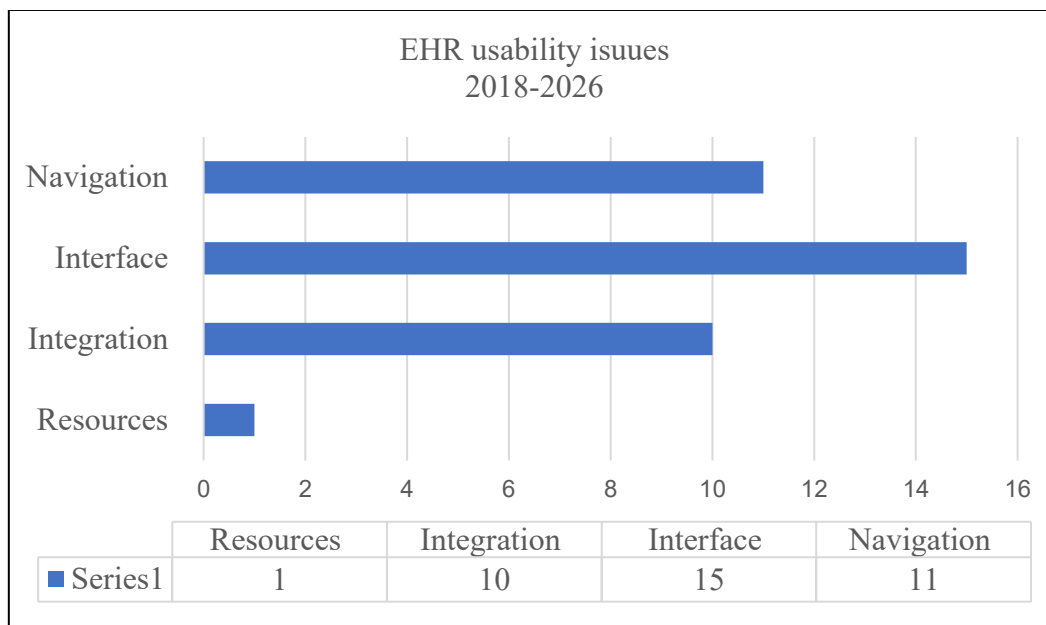


Figure 1: Categories of usability issues

Figure 1 illustrates the distribution of EHR usability issues reported in studies published between 2018 and 2026, across 20 articles. Four major categories of usability issues were identified: interface, navigation, integration, and resources. The findings indicate that interface-related issues were the most frequently reported usability problem, with 15 studies, followed by navigation, which was the second most common issue, reported in 11 studies. Integration issues ranked third, appearing in 10 studies. In contrast, resource-related issues were the least frequently reported, appearing in only one study. The overall results are summarized in **Table 4**. The findings suggest that most usability concerns are associated with system design rather than organizational resources.

Table 4: Results summary

Usability Issue	Frequency	Interpretation
Interface	15	The most frequently reported issue concerns problems with system design, layout, and ease of use.
Navigation	11	The second most common issue is that users experience difficulty locating information and navigating the system.
Integration	10	Frequently reported issues related to interoperability and data exchange between healthcare systems.
Resources	1	Least-reported issue; suggests that organizational resources are less commonly identified than technical usability concerns.

Overall, the literature published between 2018 and 2026 demonstrates that interface usability is the dominant challenge affecting EHR systems, followed by navigation and integration issues. These findings imply that future EHR improvements should prioritize user-centered interface design, simplified navigation, and enhanced interoperability to improve healthcare professionals' efficiency, reduce documentation burden, and support higher-quality patient care.

RQ 2: The challenges physicians encounter that lead to EHR's poor usability.

Based on analysis of data from previous studies, physicians encounter several challenges with EHR that can affect EHR usability and overall job effectiveness. The study has identified and extracted key attributes of EHR usability issues, based on an extensive review of relevant literature, as delineated in **Table 5**.

Table 5: Usability assessment

No.	Usability issues	Findings of the identified issues
1.	System workflow navigation	Experiencing usability issues, such as time and effort constraints, frustrates healthcare professionals, hindering their performance and potentially leading to burnout (Carayon & Hoonakker, 2019).
		Workflow is disrupted by navigating between pages for information (Alami et al., 2022).
		Changes are appropriately prioritized and thoroughly evaluated for potential unintended consequences (Dunn Lopez et al., 2021).
		Physicians firmly believe EHR impedes workflow and communication while prolonging healthcare services (Woldemariam & Jimma, 2023).
		Workflow support's usability does not align with the clinician's expectations, leading to a mismatch in the EHR display (Ratwani et al., 2018).
		The increasing complexity of workflows may compound unintended effects on patient safety and physician burnout (Melnick et al., 2020).
		EHR's ease of use and efficiency positively impact job satisfaction (Salleh et al., 2021).
		Technical challenges in implementing EHR significantly affect clinical workflow (Hareem et al., 2024).
		Non-standardized navigation flows and inconsistent interface design increase cognitive load and user confusion (Gaspary et al., 2026).
		Optimizing system workflows within EHRs offers an opportunity to reduce cognitive workload and enhance performance (Mazur et al., 2019).
2.	System interface	The dashboard design was not optimized to reduce pre-rounding time (Alami et al., 2022).
		Cognitive workload is affected by usability, specifically the system interface used to accomplish healthcare tasks (Dunn Lopez et al., 2021).
		Usability attributes such as satisfaction, usefulness, learning efficiency, ease of use, and ease of learning were the most critical elements in EHR design (Alzghaibi, 2023).

		The complexity of design interfaces may exacerbate the challenges associated with system feedback (Ratwani et al., 2018).
		The ease of access to information has positively affected physicians' work (Salleh et al., 2021).
		Visual elements improve readability and make it easier to distinguish interface components, thereby enhancing the user experience (Zhang & Song, 2023).
		The user interface design represents a significant challenge in the widespread adoption of EHR (Zainal et al., 2023).
		The presence of a composable interface does not inherently guarantee increased efficiency (Nijor et al., 2022).
		It is important to have uncomplicated components in EHR systems with well-integrated functions (Bloom et al., 2021).
		The interface must be designed to recognize key features that enhance users' learning efficacy (Wronikowska et al., 2021).
		Enhancements to EHR interfaces can significantly mitigate cognitive workload and improve performance (Mazur et al., 2019).
		Disconnected workflows significantly burden clinicians, elevating their cognitive load and impacting patient care (Olakotan et al., 2025).
		EHR interfaces are often confusing and cluttered, increasing cognitive load and complicating the synthesis of patient data (Makhni et al., 2026).
		Complex interfaces, cognitive overload, and misaligned workflows reduce efficiency and increase documentation time, limiting patient interactions (Alonazi, 2025).
3.	System Integration	A lack of systematic integration of human factors throughout the health IT development life cycle has contributed to physician burnout (Carayon & Hoonakker, 2019).
		The page lacks detailed information on intakes and outputs, requiring physicians and nurses to visit other pages for the data (Alami et al., 2022).
		The current situation poses a challenge as the system is not operating at its anticipated full capacity (Woldemariam & Jimma, 2023).
		Limiting the sharing of patient information can contribute to patient harm (Ratwani et al., 2018).
		The data's cross-sectional nature makes it challenging to establish integration (Melnick et al., 2020).
		The prevalence of clinically irrelevant information, inadequate data display, and excessive alerting has consistently been identified as factors contributing to information overload and difficulty in system integration (Nijor et al., 2022).
		Successful integration requires designing for the user, adhering to standard practices, and establishing a robust infrastructure (Hareem et al., 2024).
		Lack of standardized data exchange leads to fragmented records and workflow inefficiencies (Makhni et al., 2026).

Thus, addressing these challenges often requires better EHR system design and ongoing user feedback to develop more effective, user-friendly systems. EHR usability challenges involve multiple interconnected factors, resulting in increased documentation burden, workflow disruptions, and potential risks to patient safety. By incorporating targeted usability components into EHR system design, it is possible to develop an exemplary system that better aligns with users' requirements and expectations.

RQ 3: Factors that can be integrated into the model to understand the experience of using the system that affect the efficiency and satisfaction of physicians.

This study proposes a conceptual model that focuses on EHR usability in relation to physicians' adoption of the EHR system. This model considers cognitive workload as a factor in physicians' job satisfaction when using EHR. Based on the literature review, this study has identified IT-related usability issues (system navigation, system interface, and system integration) as factors often associated with physicians' workload. The proposed

conceptual model has been formulated by integrating variables derived from the literature, as evidenced in **Table 3**.

In this study, the intended model was not subjected to empirical field testing; the proposed conceptual model was developed through an extensive review of recent literature, yet it has not been empirically validated. Consequently, the relationships among system workflow navigation, system interface, system integration, EHR usability, and physicians' job satisfaction remain theoretical. Future research should aim to validate the proposed model using quantitative methods, such as Structural Equation Modeling (SEM) or Partial Least Squares Structural Equation Modeling (PLS-SEM). This empirical validation would allow researchers to explore the strength and significance of the proposed relationships and evaluate the model's explanatory and predictive capabilities. Furthermore, mixed-methods studies incorporating interviews or focus groups could yield deeper insights into physicians' experiences and enhance the understanding of the quantitative findings.

Future validation should include physicians from multiple healthcare settings, such as tertiary, district, private, and teaching hospitals, as well as primary healthcare clinics. Comparing different healthcare environments would improve the model's generalizability because EHR implementation, workflow complexity, organizational support, and technological infrastructure vary considerably across healthcare institutions.

Thus, the proposed model offers a robust foundation for potential research endeavours. The model has the potential to serve as a guiding framework for forthcoming research to comprehensively examine the impact of EHR usability on physicians' workloads. This may subsequently improve EHR usability.

This study introduces a novel conceptual framework that encompasses three distinct independent variables. Each variable is intricately associated with physician satisfaction with EHR use, as shown in **Table 3**. Thus, the diagram in **Figure 2** illustrates the interrelationships among the independent, mediating, and dependent variables in the proposed study model.

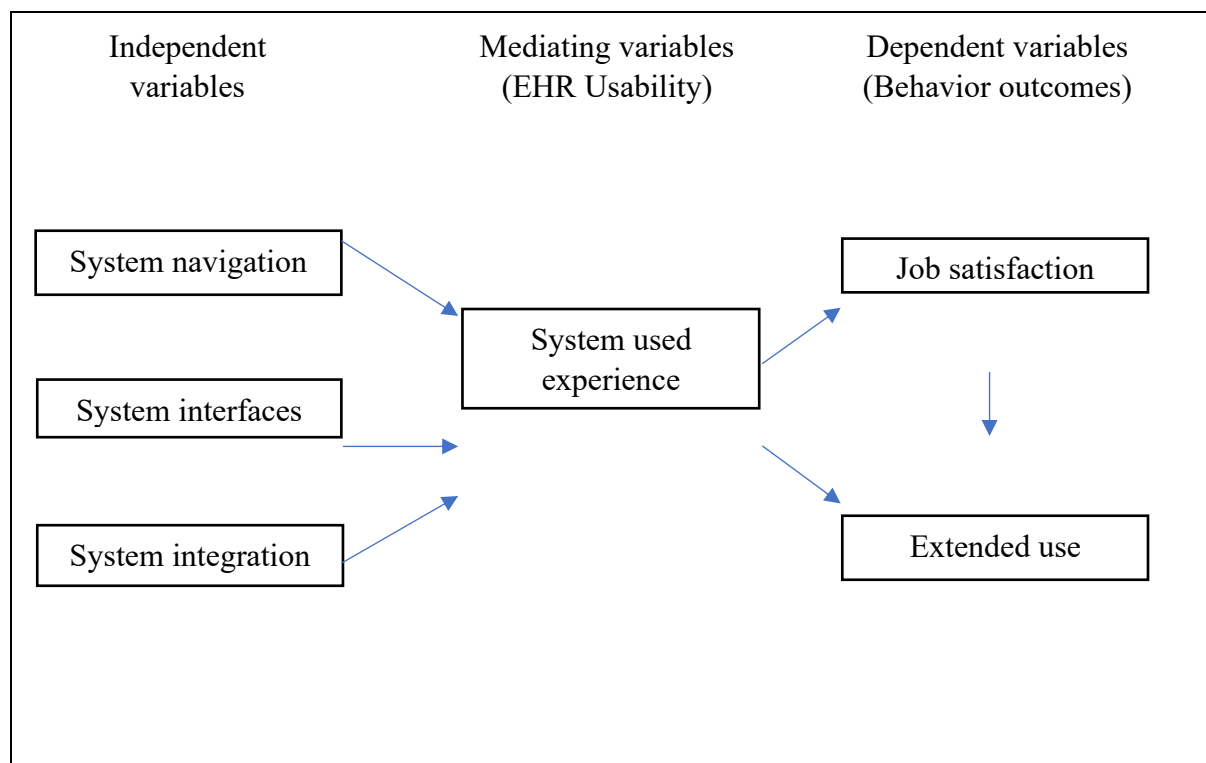


Figure 2: The proposed conceptual model

The Technology Acceptance Model posits that a system's usability is critical to its adoption rate. This theoretical framework has found widespread application in facilitating EHR implementation in healthcare settings. Based on variables identified through an extensive literature review, **Figure 2** presents the proposed conceptual model for future scholarly investigation. Additional research is required to elucidate the observed discrepancies in users' feedback concerning the impact of various features on usability.

This review primarily examines the experiences of physicians, as they constitute one of the most significant cohorts engaged in intensive EHR use and are frequently highlighted in the existing literature on usability. However, it is essential to acknowledge that EHR systems are used collaboratively by multidisciplinary healthcare teams, including nurses, pharmacists, allied health professionals, and administrative staff. Therefore, it is imperative that future research endeavors extend the proposed conceptual model to encompass these diverse professional groups. Such an expansion would facilitate a comparative analysis of usability perceptions across various clinical roles, ultimately enhancing the framework's comprehensiveness and applicability.

CONCLUSION

Healthcare electronic record documentation is a pivotal endeavour for preserving patient data, bolstering patient safety, and streamlining physician efficiency. As EHR adoption has become increasingly prevalent, healthcare facilities commonly encounter challenges stemming from inadequate user uptake, particularly among physicians, which significantly contributes to EHR systems' limited adoption. Yunus et al. (2023) emphasize that adopting EHR poses considerable challenges for healthcare facilities, particularly for medical professionals such as physicians. Despite the numerous benefits associated with EHR systems, various challenges and unintended consequences pose obstacles to the widespread adoption and optimal utilization of EHR systems within healthcare settings. Thus, to ensure a successful EHR implementation, it is crucial to thoroughly assess and evaluate the system's usability and user experience (Yunus et al., 2023).

Recent literature on the adoption of EHR systems continues to highlight usability problems, such as system workflow navigation, interface, and integration, which affect physicians' outcomes (positive or negative) depending on users' experience. Thus, user experience is critical in creating the ultimate user experience by seamlessly integrating various features (Peter Dey et al., 2019). It is encouraging to see emerging literature on EHR usability issues, which is one of the critical reasons for this gap in the literature, helping address factors related to system usability in healthcare delivery. This study identified the straightforward IT usability of EHR and the crucial factors that facilitate EHR adoption.

This study has proven that current research consistently demonstrates that IT-related usability issues significantly contribute to the discontent experienced by healthcare professionals, specifically physicians, with EHR systems. It is important to realize that implementing an EHR system is a complex endeavour, where the user experience significantly influences its success (Yunus et al., 2023). As Dunn Lopez et al. (2021) emphasized, minor usability issues that occur frequently and persistently can escalate into significant problems. Continuous, specialized monitoring and targeted development initiatives are essential to enhancing EHR systems and optimizing physicians' experiences (Viitanen et al., 2026). Such efforts will ensure that the systems effectively meet the evolving needs of healthcare professionals, thereby fostering improved patient outcomes and operational efficiency. These issues have a discernible impact on the system's overall workload and long-term EHR usability, requiring further investigation. This literature review synthesizes findings from academic papers published between 2018 and 2026, focusing on the relationship between EHR usability and user experience and their implications for healthcare delivery. Hence, the suggested model can be further evaluated to assess its effect on physicians' adoption of the EHR system.

REFERENCES

1. Abernethy, A., Adams, L., Barrett, M., Bechtel, C., Brennan, P., Butte, A., Faulkner, J., Fontaine, E., Friedhoff, S., Halamka, J., Howell, M., Johnson, K., Long, P., McGraw, D., Miller, R., Lee, P., Perlin, J., Rucker, D., Sandy, L., ... Valdes, K. (2022). The Promise of Digital Health: Then, Now, and the Future. In *NAM Perspectives*.
2. Ala'a, A.-M., & Ramayah, T. (2023). Impact of Electronic Healthcare Records Usage on Healthcare Professionals' Performance Among Jordanian Public Sector: A Conceptual Paper. *International Journal of Business and Technology Management*, 4(4), 129–143. <https://doi.org/10.55057/ijbtm.2022.4.4.11>

3. Alami, J., Hammonds, C., Hensien, E., Khraibani, J., Borowitz, S., Hellems, M., & Riggs, S. L. (2022). Usability challenges with electronic health records (EHRs) during prrounding on pediatric inpatients. *JAMIA Open*, 5(1), 1–6. <https://doi.org/10.1093/jamiaopen/ooac018>
4. Alonazi, E. (2025). Challenges to Healthcare Professionals Regarding the Use of Electronic Health Records in PHCs. *Journal of Clinical Practice and Medical Research*, 1(3), 23–36. [https://doi.org/10.59324/jcpmr.2025.1\(3\).05](https://doi.org/10.59324/jcpmr.2025.1(3).05)
5. Alzghaibi, H. (2023). Usability of health IT for health and medical students: A systematic review. *Informatics in Medicine Unlocked*, 38(February), 101200. <https://doi.org/10.1016/j.imu.2023.101200>
6. Baumann, L. A., Baker, J., & Elshaug, A. G. (2018). The impact of electronic health record systems on clinical documentation times: A systematic review. *Health Policy*, 122(8), 827–836. <https://doi.org/10.1016/j.healthpol.2018.05.014>
7. Bloom, B. M., Pott, J., Thomas, S., Gaunt, D. R., & Hughes, T. C. (2021). Usability of electronic health record systems in UK EDs. *Emergency Medicine Journal*, 38(6), 410–415. <https://doi.org/10.1136/emmermed-2020-210401>
8. Buivydaite, R., Reen, G., Kovalevica, T., Dodd, H., Hicks, I., Vincent, C., & Maughan, D. (2022). Correction to: Improving usability of Electronic Health Records in a UK Mental Health Setting: A Feasibility Study. *Journal of Medical Systems*, 46(9). <https://doi.org/10.1007/s10916-022-01848-6>
9. Carayon, P., & Hoonakker, P. (2019). Human Factors and Usability for Health Information Technology: Old and New Challenges. *Yearbook of Medical Informatics*, 28(1), 71–77. <https://doi.org/10.1055/s-0039-1677907>
10. Dunn Lopez, K., Chin, C. L., Leitão Azevedo, R. F., Kaushik, V., Roy, B., Schuh, W., Banks, K., Sousa, V., & Morrow, D. (2021). Electronic health record usability and workload changes over time for provider and nursing staff following transition to new EHR. *Applied Ergonomics*, 93(December 2020). <https://doi.org/10.1016/j.apergo.2021.103359>
11. Gaspary, F. P., Amaral, D. B., Fagundes, C. V., Lopes, L. F. D., & Gaspary, J. F. P. (2026). A structured framework to improve usability in EHR implementation: a user-centered case study in Brazilian mental healthcare. *Frontiers in Digital Health*, 7. <https://doi.org/10.3389/fdgth.2025.1676631>
12. Hareem, A., Stupans, I., Park, J. S., Stevens, J. E., & Wang, K. (2024). Electronic health records and e-prescribing in Australia: An exploration of technological utilisation in Australian community pharmacies. *International Journal of Medical Informatics*, 187(May), 105472. <https://doi.org/10.1016/j.ijmedinf.2024.105472>
13. Janett, R. S., & Yeracaris, P. P. (2020). Electronic medical records in the american health system: Challenges and lessons learned. *Ciencia e Saude Coletiva*, 25(4), 1293–1304. <https://doi.org/10.1590/1413-81232020254.28922019>
14. Jimma, B. L., & Enyew, D. B. (2022). Barriers to the acceptance of electronic medical records from the perspective of physicians and nurses:A scoping review. *Informatics in Medicine Unlocked*, 31(June), 100991. <https://doi.org/10.1016/j.imu.2022.100991>
15. Makhni, S., Cerrato, P., Rico, J., Niazi, S., O'Horo, J., Peters, S., Shah, V., & Halamka, J. (2026). Meeting the challenges of electronic health record (EHR) optimization. In *npj Digital Medicine* (Vol. 9, Number 1). Nature Research. <https://doi.org/10.1038/s41746-025-02178-w>
16. Mazur, L. M., Mosaly, P. R., Moore, C., & Marks, L. (2019). Association of the Usability of Electronic Health Records With Cognitive Workload and Performance Levels Among Physicians. *JAMA Network Open*, 2(4), e191709. <https://doi.org/10.1001/jamanetworkopen.2019.1709>
17. Melnick, E. R., Dyrbye, L. N., Sinsky, C. A., Trockel, M., West, C. P., Nedelec, L., Tutty, M. A., & Shanafelt, T. (2020). The Association Between Perceived Electronic Health Record Usability and Professional Burnout Among US Physicians. *Mayo Clinic Proceedings*, 95(3), 476–487. <https://doi.org/10.1016/j.mayocp.2019.09.024>
18. Nijor, S., Rallis, G., Lad, N., & Gokcen, E. (2022). Patient Safety Issues From Information Overload in Electronic Medical Records Background and Objective: Electronic health records (EHRs) have. *J Patient Saf*, 18(6), 999–1003.

19. Olakotan, O., Samuriwo, R., Ismaila, H., & Atiku, S. (2025). Usability Challenges in Electronic Health Records: Impact on Documentation Burden and Clinical Workflow: A Scoping Review. In *Journal of Evaluation in Clinical Practice* (Vol. 31, Number 4). John Wiley and Sons Inc. <https://doi.org/10.1111/jep.70189>
20. Peter Dey, P., Raj Sinha, B., Amin, M., & Badkoobei, H. (2019). Best Practices for Improving User Interface Design. *International Journal of Software Engineering & Applications*, 10(5), 71–83. <https://doi.org/10.5121/ijsea.2019.10505>
21. Ratwani, R. M., Savage, E., Will, A., Fong, A., Karavite, D., Muthu, N., Rivera, A. J., Gibson, C., Asmonga, D., Moscovitch, B., Grundmeier, R., & Rising, J. (2018). Identifying electronic health record usability and safety challenges in pediatric settings. *Health Affairs*, 37(11), 1752–1759. <https://doi.org/10.1377/hlthaff.2018.0699>
22. Rizvi, R. F., Marquard, J. L., Hultman, G. M., Adam, T. J., Harder, K. A., & Melton, G. B. (2017). Usability evaluation of electronic health record system around clinical notes usage-an ethnographic study. *Applied Clinical Informatics*, 8(4), 1095–1105. <https://doi.org/10.4338/ACI-2017-04-RA-0067>
23. Salleh, M. I. M., Abdullah, R., & Zakaria, N. (2021). Evaluating the effects of electronic health records system adoption on the performance of Malaysian health care providers. *BMC Medical Informatics and Decision Making*, 21(1), 1–13. <https://doi.org/10.1186/s12911-021-01447-4>
24. Tan, J., & Mukhriz, I. (2023). Challenges Arising From Digitalising Health Records. *Khazanah Research Institute*, (15/23 May), 1–9.
25. Viitanen, J., Nisula, S., Tuovinen, T., & Lääveri, T. (2026). Improvements in EHR usability during eleven years: Cross-sectional surveys on specialist physicians' experiences in Finland. *International Journal of Medical Informatics*, 212. <https://doi.org/10.1016/j.ijmedinf.2026.106355>
26. Woldemariam, M. T., & Jimma, W. (2023). Adoption of electronic health record systems to enhance the quality of healthcare in low-income countries: A systematic review. *BMJ Health and Care Informatics*, 30(1). <https://doi.org/10.1136/bmjhci-2022-100704>
27. Wronikowska, M. W., Malycha, J., Morgan, L. J., Westgate, V., Petrinic, T., Young, J. D., & Watkinson, P. J. (2021). Systematic review of applied usability metrics within usability evaluation methods for hospital electronic healthcare record systems. *Journal of Evaluation in Clinical Practice*, 27(6), 1403–1416. <https://doi.org/10.1111/jep.13582>
28. Yunus, M., Sakkinah, I. S., Rahmawati, U. E., Deharja, A., & Santi, M. W. (2023). Electronic Health Records (EHR) Usability and User Experience Evaluation: A Case Study. *INTENSIF: Jurnal Ilmiah Penelitian Dan Penerapan Teknologi Sistem Informasi*, 7(2), 192–201. <https://doi.org/10.29407/intensif.v7i2.19090>
29. Zainal, A., Aziz, N. F. A., Ahmad, N. A., Razak, F. H. A., Razali, F., Azmi, N. H., & Koyou, H. L. (2023). Usability measures used to enhance user experience in using digital health technology among elderly: a systematic review. *Bulletin of Electrical Engineering and Informatics*, 12(3), 1825–1832. <https://doi.org/10.11591/eei.v12i3.4773>
30. Zhang, S., & Song, J. (2023). An empirical investigation into the preferences of the elderly for user interface design in personal electronic health record systems. *Frontiers in Digital Health*, 5(January), 1–11. <https://doi.org/10.3389/fdgth.2023.1289904>