



The Impact of E-Prescribing Use in Hospitals: A Systematic Review

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ABSTRACT

Background: Electronic prescribing (e-prescribing) systems have been increasingly adopted in hospital settings to enhance the safety, accuracy, and efficiency of medication management. These systems aim to reduce human error in prescribing and dispensing medication, which is crucial for improving patient outcomes and the overall quality of healthcare.

Objectives: This study aims to evaluate the direct effects of the e-prescribing system on prescribing errors, medication errors, efficiency and effectiveness, and user acceptance among healthcare workers.

Methods: The study is based on a comprehensive review of 13 articles published between 2019 and 2023, covering a range of quantitative and mixed methods studies sourced from databases such as PubMed, ScienceDirect, and Google Scholar.

Results: The findings reveal that e-prescribing has a significant positive impact on reducing errors. Six of the reviewed studies reported a reduction in prescription writing errors while four studies highlighted a decrease in medication errors after the implementation of the system. Additionally, six studies demonstrated improvements in efficiency and productivity, and four studies reported positive user acceptance of the system.

Conclusion: The implementation of electronic prescribing systems in hospitals has shown clear advantages in reducing errors, increasing efficiency, and receiving positive feedback from healthcare workers. This highlights the potential role of e-prescribing in improving the quality of healthcare services.

Keywords: Efficiency and productivity; Electronic Prescribing; Medication Error; Prescription Error; User acceptance.

INTRODUCTION

Electronic Prescription (e-prescribing) is the use of computer systems to create, modify, review, and transmit medication prescriptions electronically, replacing traditional handwritten methods. Its earliest implementation dates back to the 1970s, when hospitals began adopting this technology as part of a broader move toward healthcare digitalization¹. In the UK, the Winchester & Eastleigh NHS Trust became a pioneer in e-prescribing, becoming the first hospital to implement it. By the mid-1980s, the Winchester Trust received regional funding to expand the use of e-prescriptions across other hospitals. This innovation aimed to enhance the accuracy and efficiency of prescription processes, reduce medication errors, and improve patient safety. Over time, e-prescribing has become a critical tool in modern healthcare, benefiting both healthcare providers and patients².

Computerized Physician Order Entry (CPOE), also known as electronic prescribing, is designed to ensure the readability and completeness of prescriptions. It provides essential information about the medication to be administered, including dosage, route of administration, and recommended frequency. The primary goal of CPOE is to minimize medication errors by improving the clarity of prescriptions and reducing instances of incomplete information¹. This system offers various functional and technical capabilities that can deliver significant benefits

to all stakeholders involved, including healthcare providers, medication distributors, patients, and insurance organizations. When used correctly, electronic prescriptions enhance the accuracy of medication orders, streamline the prescription process, and contribute to overall improvement in patient safety and healthcare efficiency³.

The use of electronic prescriptions in developed and developing countries shows significant differences in implementation and outcomes. This system has been meticulously developed and successfully implemented in countries such as the United States, the United Kingdom, and Germany, reaching significant levels of maturity and providing substantial benefits to their healthcare systems. In developing countries, electronic prescriptions still face major challenges in achieving widespread acceptance and attaining their objectives. These challenges include limited technological infrastructure, lack of supportive regulations, and resistance from healthcare professionals due to insufficient training⁴.

In Indonesia, the implementation of e-prescribing has become an integral part of the Hospital Information System (HIS), transforming prescribing prescription processes. Electronic prescribing (e-prescribing) involves using specialized software to facilitate and manage prescription services more efficiently. Initially, the primary goal was to reduce paper usage in hospitals, but over time, many other benefits have emerged. The adoption of e-prescribing systems has significantly reduced the risk of prescription errors by eliminating issues related to handwritten prescriptions. Additionally, it speeds up the prescription process, leading to faster service delivery. This improvement enhances the efficiency, safety, and overall quality of healthcare services. Consequently, e-prescribing is now seen as a critical step toward modernizing healthcare in Indonesia, ultimately contributing to better patient outcomes⁵.

The utilization of information technology is crucial for improving service quality, minimizing error risks, increasing service capacity, and enhancing service efficiency⁶. However, with the advancement of this technology, it is necessary to conduct a thorough systematic study to evaluate the impact of electronic prescriptions holistically. Evaluating e-prescribing is essential to ensure that the system functions optimally and provides maximum benefits in healthcare service. This evaluation helps identify and address various technical issues, such as non-user-friendly formats and content, as well as the lack of supportive alert systems for pharmacy services. Additionally, the evaluation also considers aspects of user acceptance, training, and supervision needed to enhance system effectiveness. A comprehensive evaluation can help reduce prescription errors and improve patient safety⁷.

This study aimed to investigate the direct impact of electronic prescribing systems on medication errors, as well as their effectiveness, efficiency, and acceptance among healthcare workers in the hospital setting. By examining these factors, the research seeks to offer a comprehensive understanding of the effectiveness and implications of implementing e-prescribing systems in clinical practice. This insight is not only valuable for health workers who directly interact with the systems but also for policymakers in the healthcare sector, as it highlights areas for improvement and optimization. Additionally, the findings of this study can serve as a foundation for developing more effective policies that promote the adoption and integration of information technology in healthcare. By doing so, it is expected to improve the quality of patient care, enhance safety, and contribute to the overall modernization of healthcare services in hospitals. This research ultimately aims to support ongoing efforts toward advancing healthcare technology.

METHODS

Study design

The study design for this systematic review included 13 articles that employed both quantitative and mixed-methods approaches. These studies provided a thorough examination of the impact of e-prescribing within hospital settings, offering valuable insights into how electronic prescribing affects various aspects of hospital operations and patient care.

Search strategy

Searches were conducted in the PubMed, ScienceDirect, and Google Scholar databases from 2019 to 2023, using appropriate keywords. The selected keywords were “Electronic prescribing”, “medication errors”, “patient safety”, and “hospital”, used both separately and in combination to ensure comprehensive coverage of relevant literature. This review study was designed and executed following the PRISMA guidelines, which are established standards for conducting systematic reviews. The timeframe of 2019 to 2023 was chosen to capture the most recent advancements and research trends in the field, reflecting current practices and developments in electronic prescribing and its impact on medication errors and patient safety within hospital settings.

Eligibility criteria

The quality of the research methodology was rigorously using two distinct tools. The Mixed Methods Appraisal Tool (MMAT) was employed to assess studies that integrate both qualitative and quantitative approaches, ensuring a comprehensive evaluation of mixed-methods research. This tool examines various dimensions, such as methodological rigor and the integration of different data types. Additionally, to evaluate the quality of quantitative research methodologies specifically, an assessment tool derived from the Joanna Briggs Institute (JBI) was utilized. This tool focuses on evaluating the design, execution, and reporting of quantitative studies to ensure their reliability and validity. Together, these tools provide a thorough assessment of research quality across diverse methodologies.

Data Analysis

Comprehensive searches for data sources were conducted, followed by an initial screening of studies based on titles and abstracts to identify those most relevant to the research objectives. This screening was crucial to narrow down the pool of studies to only those that met predefined inclusion criteria, ensuring relevance and quality. Studies that did not meet the criteria, such as those lacking sufficient detail on electronic prescribing (e-prescribing) or focusing on unrelated topics, were excluded. This methodical approach streamlined the analysis process by focusing only on high-quality studies.

After the screening, the remaining articles underwent a detailed review of the full text to assess their methodologies, results, and relevance. Key information related to e-prescribing was extracted systematically using a standardized process to minimize bias and ensure consistency across all studies, which is essential for reliable results.

A structured table was developed to organize and analyze the extracted data. This table focused on capturing the impacts of e-prescribing in healthcare settings across four critical areas: (1) prescription errors, (2) medication errors, (3) efficiency and productivity, and (4) user acceptance of the system. This categorization allowed for a systematic evaluation of how e-prescribing affects healthcare professionals and patients.

The analysis included examining prescription errors, comparing the accuracy of e-prescribing to traditional methods, and assessing medication errors during dispensing and administration to understand their impact on patient safety. Efficiency and productivity were evaluated by looking at operational improvements, such as time savings and reduced administrative burdens, while user acceptance focused on the adaptation and satisfaction of healthcare providers and patients.

This systematic approach ensured thorough analysis of all relevant aspects of e-prescribing, leading to meaningful conclusions about its impact on prescription accuracy, medication safety, operational efficiency, and user experience, thus providing a strong foundation for understanding its effectiveness in improving healthcare outcomes.

Search strategy result

In the literature search process utilizing the database, a total of 812 articles published between 2019 and 2023 were initially identified. Following an initial screening phase employing predetermined inclusion and exclusion criteria, 113 articles were retained as meeting these criteria. Subsequently, a secondary screening based on title and abstract narrowed down the selection to 32 articles. Further assessment of eligibility criteria for systematic review led to selection of 13 articles from this pool. This meticulous selection process aimed to ensure that only the most pertinent and high quality articles were included in the systematic analysis.

Data Extraction

The assessment outlined in Table 1 reveals that all selected studies were published between 2019 and 2023, reflecting recent advancements in the field. These studies were conducted across a diverse range of countries, including Spain, the United Kingdom, Brazil, Australia, and Indonesia. This broad geographic distribution facilitates a more global understanding of electronic prescription practices within hospital settings. The studies employed a variety of research methodologies, with a focus on both quantitative and mixed-methods approaches. Data collection techniques included prescription analysis, questionnaire surveys, and interviews with healthcare professionals, providing a well-rounded perspective on how electronic prescribing systems are implemented and utilized in real-world settings.

The inclusion of both quantitative and qualitative data contributes to a deeper understanding of the effectiveness of electronic prescribing systems in enhancing pharmaceutical services. These studies examine various aspects such as user satisfaction, error reduction, workflow efficiency, and overall system performance. The use of interviews and surveys with healthcare professionals enriches the findings by incorporating firsthand experiences and insights into the challenges and benefits of electronic prescribing. This comprehensive approach

ensures that the assessment captures a wide spectrum of impacts, making it relevant to various healthcare contexts and providing valuable insights for the ongoing improvement of e-prescribing systems globally.

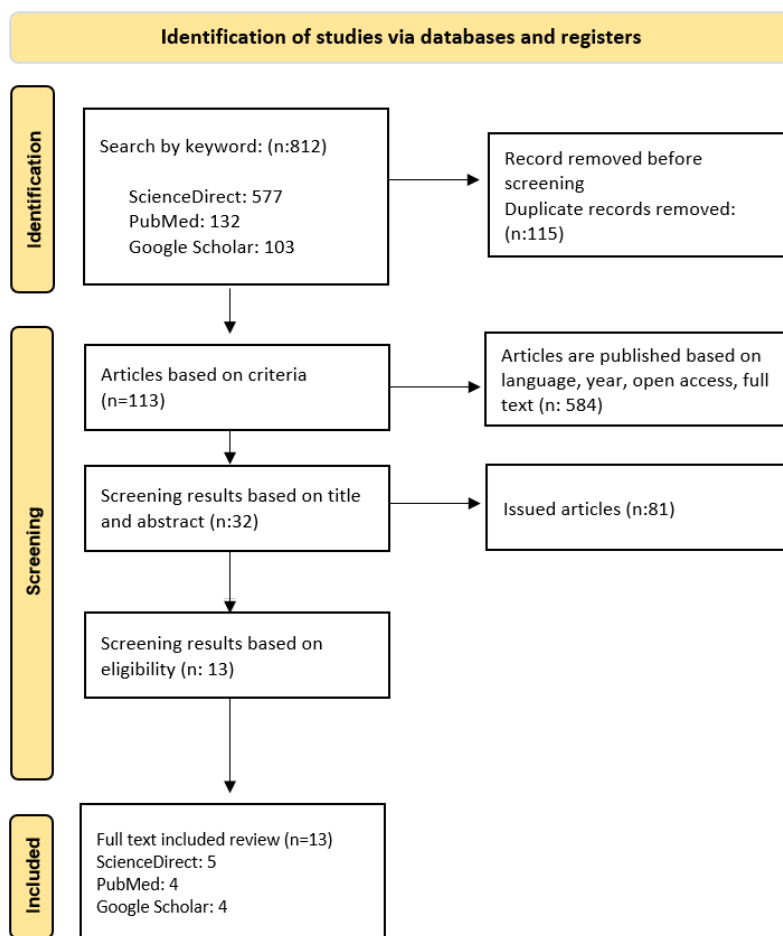


Figure. 1. PRISMA flow diagram for study selection

Table I. Characteristics of included studies

Author and Year	Location	Method	Population	Intervention
(Fernandez Oliveira et al., 2020) ⁸	A tertiary hospital in Spain	Quantitative	166 patients	AEP (Assisted electronic prescription)
(Slight et al., 2019) ⁶	A tertiary-care teaching hospital in the UK	Quantitative	All newly admitted patients (3824 patients)	Electronic Prescription
(McLeod et al., 2019) ⁹	NHS Teaching Hospital in the UK	Mix Methods	8 Pharmacists	CPOE
(Rosa et al., 2019) ¹⁰	Two hospitals of Belo Horizonte, Brasil	Quantitative	1028 prescriptions	CPOE
(Urtasun et al., 2022) ¹¹	Two hospitals in the Autonomous City of Buenos Aires	Mix Methods	3420 prescriptions	Electronic Prescribing

(Tran et al., 2019) ¹²	A teaching hospital in Melbourne, Australia	Quantitative	198 and 210 patients	Electronic Prescribing
(Hindmarsh and Holden, 2022) ¹³	UK Teaching hospital	Quantitative	108 patients	Electronic Prescribing
(Mehta et al., 2023) ¹⁴	Academic hospitals in the UK	Quantitative	303 patients	Electronic vs. conventional Prescription
(Woodman et al., 2023) ¹⁵	Guy's Hospital and St Thomas' Hospital in the UK	Mix Methods	33 patients	Electronic Prescribing
(Adriral et al., 2019) ¹⁶	M.Natsir Hospital Solok, Indonesia	Quantitative	431 prescriptions	Electronic vs. conventional Prescription
(Feberina et al., 2023) ¹⁷	"A" Hospital in Cibinong, Bogor	Mix Methods	764 prescriptions	Electronic vs. conventional Prescription
(Indrasari et al., 2021) ¹⁸	Sultan Agung Islamic Hospital, Semarang	Quantitative	384 conventional prescription and 2396 electronic prescription	Electronic Prescribing
(Dyah Anggraini et al., 2021) ¹⁹	Dr. Cipto Mangunkusumo Hospital	Quantitative	100 doctors participating in the Specialist Doctor Education Program (PPDS)	Electronic Prescribing

RESULTS AND DISCUSSION

From the 13 reviewed articles, it is clear that electronic prescribing has a significant impact on various critical aspects of hospital operations. These studies collectively highlight the influence of electronic prescribing on prescription errors, medication errors, overall efficiency, and the acceptance of these systems by healthcare workers.

A thorough analysis of these studies reveals that electronic prescribing systems play a crucial role in enhancing the accuracy of prescriptions and reducing medication errors. By automating the prescribing process and minimizing manual input, these systems help mitigate common sources of errors, such as illegible handwriting and incorrect dosage information. This, in turn, contributes to improved patient safety and reduced risk of adverse drug events.

Additionally, electronic prescribing systems enhance operational efficiency by streamlining workflows and facilitating quicker access to patient information. This efficiency is achieved through features such as real-time drug interaction checks, automated order routing, and seamless integration with other healthcare technologies.

Furthermore, the acceptance of electronic prescribing systems by healthcare workers is a key factor in their successful implementation. Positive reception among staff indicates that these systems can effectively support clinical practice and improve overall productivity. The studies provide valuable insights into the benefits and challenges of electronic prescribing, highlighting its potential to transform medical practices and enhance the quality of care in hospital settings.

Table II. Summary of study

No	Author, Year	Country	Location	Prescription Error	Medication Error	Efficiency & Productivity	User Acceptance
1	(Fernandez Oliveira et al., 2020) ⁸	Spain	Departement of pediatrics	decrease	n/a	n/a	n/a
2	(Slight et al., 2019) ⁶	United Kingdom	Renal clinic, cardiology, general medical, and orthopedic surgery	n/a	decrease	n/a	n/a

3	(McLeod et al., 2019) ⁹	United Kingdom	Acute Disease Inpatient ward and Elderly ward	n/a	n/a	increase	n/a
4	(Rosa et al., 2019) ¹⁰	Brazil	Hospital	decrease	n/a	n/a	n/a
5	(Urtasun et al., 2022) ¹¹	Argentina	Children's Hospital	decrease	n/a	n/a	positive
6	(Tran et al., 2019) ¹²	Australia	An inpatient orthopedic unit	n/a	decrease	increase	n/a
7	(Hindmarsh and Holden, 2022) ¹³	United Kingdom	Adult medical ward	n/a	decrease	increase	n/a
8	(Mehta et al., 2023) ¹⁴	United Kingdom	ICU	n/a	n/a	n/a	positive
9	(Woodman et al., 2023) ¹⁵	United Kingdom	Hospital	n/a	n/a	Increase	positive
10	(Adrizal et al., 2019) ¹⁶	Indonesia	Hospital	decrease	decrease	increase	n/a
11	(Feberina et al., 2023) ¹⁷	Indonesia	Outpatient Unit	n/a	n/a	increase	n/a
12	(Indrasari et al., 2021) ¹⁸	Indonesia	Outpatient Unit	decrease	n/a	n/a	n/a
13	(Dyah Anggraini et al., 2021) ¹⁹	Indonesia	Pediatric Ward	decrease	n/a	n/a	n/a

Prescribing Errors

The implementation of e-prescription systems in hospitals across various countries has proven to have a significant impact in reducing prescription errors and improving medication safety. In healthcare, patient safety is a top priority, and using technology to minimize manual errors is considered a highly effective step. In Spain, the implementation of the Assisted Electronic Prescription (AEP) system successfully reduced prescription errors by 96.2%. The reduction in errors included incorrect patient indications, treatment duration, dosage, route of administration, contraindications, and duplicate prescriptions. This highlights the importance of e-prescribing systems in ensuring that patients receive the right medication with the correct dosage, ultimately contributing to an overall improvement in the quality of healthcare service⁸.

In Brazil, the implementation of e-prescriptions also yielded positive results, particularly in reducing errors related to drug formulations and concentrations. A study conducted at a hospital in Brazil showed that the most common errors during prescription were related to drug formulations and pharmaceutical preparation concentrations. The implementation of e-prescriptions in the hospital successfully reduced these errors, including in administering doses and concentrations of Unfractionated Heparin (UFH). Errors in administering UFH can have serious consequences for patients, making the reduction of such errors a significant achievement in effort to improve patient safety¹⁰.

The implementation of an e-prescription system has also been shown to improve the quality of prescriptions, particularly in terms of dosage accuracy, especially for pediatric patients. In context of dosing based on a child's weight, e-prescriptions help ensure that the dosage is precisely tailored to the patient's needs, reducing the risk of errors that can occur with manual prescription. This is one of the main reasons why e-prescriptions are increasingly being adopted in various countries as part of effort to enhance the quality of healthcare¹¹.

An additional benefit of e-prescription systems is the integration of verification functions by pharmacists. With this system, pharmacists can electronically verify prescriptions, allowing early identification and correction of errors before the medication is administered to the patient. This function is crucial in ensuring that patients receive the correct medication, reducing the risk of undesirable side effects. Moreover, the completeness of prescription parameters in computerized systems also contributes to reducing the frequency of prescription errors¹⁰.

Although the benefits of e-prescriptions are evident, there are still challenges to be faced in their implementation. A study in the United Kingdom found that the causes of electronic prescription errors are

multifactorial and interconnected. These causes were categorized into six main groups: computer systems, prescribers, patients, tasks, teams, and work environments. The study also revealed that the causes and contributing factors of electronic prescription errors reported by various professionals, both medical and non-medical, were similar to many errors that occur in conventional handwritten prescriptions, with the addition of errors related to the electronic system itself. Therefore, while e-prescriptions have successfully reduced many types of errors, the challenges arising from the use of this technology must still be taken seriously²⁰.

The use of e-prescribing in hospitals in Indonesia has also demonstrated a significant reduction in prescription errors. E-Prescription improves adherence to the national formulary, achieving 98.2% compliance compared to 86.2% with conventional prescriptions¹⁶. This helps doctors select medications according to established prescription errors, such as incomplete prescriptions and undesirable drug interactions, contributing 33.8% to the improvement in medication safety¹⁸. At Dr. Cipto Mangunkusumo Hospital, e-prescribing has reduced prescription errors by 37% although issues such as compounding errors and policy non-compliance still need to be addressed¹⁹.

Medication errors

The analysis of the four articles indicated a significant decrease in medication errors following the implementation of e-prescribing systems in hospitals. The adoption of e-prescribing has been shown to substantially reduce both the number of medication errors and the adverse events experienced by patients. Prior to the implementation of e-prescribing, medication reconciliation errors and dosage errors were among the most common types of errors encountered in hospitals.

A study conducted in the United Kingdom identified over 5,000 major errors, with medication reconciliation, dosage, and avoidable medication delays being the most frequent issues. Although no significant changes were observed in the overall rate of medication errors per admission, there was a notable reduction in dosage errors and inappropriate medication errors over time. Additionally, there was a significant decrease in the potential for adverse drug events during the four study periods⁶.

Research in Australian hospitals emphasized that delays in correcting medication orders or prescriptions can contribute to medication errors. This highlights the critical role of pharmacists in ensuring that medications are prescribed correctly from the outset. Such proactive measures are anticipated to enhance the effectiveness of e-prescribing, particularly during the prescription receipt stage, thus significantly reducing the risk of medication errors and adverse events¹².

Similarly, a study conducted at a specialized hospital in Egypt examined the impact of electronic prescribing on medication errors in an outpatient clinic. The results demonstrated that the implementation of an e-prescribing system led to a substantial reduction in dispensing errors, decreasing from 4% to 2.8%. Moreover, errors such as administering medication to the wrong patient and labeling errors were completely eliminated with the use of the electronic system²¹.

In a hospital in Indonesia, an evaluation comparing conventional prescribing with e-prescribing assessed service quality and found that e-prescribing significantly reduces the incidence of medication errors. The error rate in electronic prescribing was 0%, compared to a 2.4% error rate with conventional prescribing. Although statistical tests indicated that this difference was not statistically significant, the reduction in errors to 0% suggests that e-prescribing is effective in enhancing patient safety. This effectiveness is attributed to the e-prescribing system's ability to eliminate risks associated with the prescription-writing phase, such as misreading prescriptions, incorrect dosages, and usage instructions¹⁶.

Efficiency and productivity

The implementation of an e-prescribing system has proven to reduce prescription errors, highlighting the positive impact of technology in improving the efficiency and effectiveness of patient medication management. E-prescribing not only reduces medication errors and adverse patient events but also enhances service efficiency by saving both patients and administrative processes. A study conducted in UK hospitals showed a significant reduction in prescription processing time, from 60 minutes to 26 minutes, and the average time from prescription to medication administration decreased from 120 minutes to 65 minutes¹³.

This system also improves hospital efficiency by speeding up prescription processing, particularly at the discharge stage. The integration of electronic prescriptions with ordering and dispensing systems automates tasks such as drug labeling and patient documentation, which previously required separate steps. Although e-prescribing may increase the time pharmacists spend verifying prescriptions, time savings are achieved in other

areas, leading to an overall reduction in processing time. Therefore, the impact of e-prescribing on efficiency should be assessed by considering the entire workflow rather than individual processes¹³.

The e-prescribing systems enhance the quality of medication screening by allowing pharmacists to evaluate medications more effectively through easy access to patients records and laboratory results. Features like the medication management page help prioritize patients, and clear prescription documentation facilitates better error investigation and feedback. The system also reduces the risk of medication errors by preventing prescriptions for drugs that patients are allergic to. Despite challenges such as increased time for certain tasks and reduces direct patient interaction, the benefits of improved efficiency and documentation suggest that e-prescribing can significantly enhance the quality of pharmacy services in hospital⁹.

The involvement of pharmacists in the e-prescribing process has proven to enhance the efficiency and effectiveness of healthcare systems by reducing medication errors and accelerating patient care. E-prescribing creates a transparent audit trail, making it easier to track and verify every step of the prescribing process, thereby minimizing the potential for administrative errors¹².

During the COVID-19 pandemic, e-prescribing has further demonstrated its value by streamlining the prescribing process through use of a COVID-19-specific order set. This adaptation allowed healthcare professionals to prescribe medications more quickly and accurately, while improving adherence to complex treatment guidelines, particularly under conditions of high workload and frequent guideline changes. However, there are potential limitations, include the risk of the protocol becoming a “tick-box exercise” and the challenge of updating the software as guidelines evolve¹⁵.

System Acceptance by Healthcare Professionals

The acceptance of electronic prescribing systems among healthcare professionals is critical factor for successful implementation and long-term sustainability. Several studies highlight the importance of engaging multidisciplinary teams and actively seeking input and feedback from prescribers when developing and implementing e-prescribing protocols¹⁵. This participatory approach helps identify potential barriers to adoption, such as concerns related to usability, workflow integration, and patient safety. By involving frontline healthcare professionals in the process, support and ownership are strengthened, contributes to the overall success of e-prescribing initiatives.

For instance, a study conducted in Poland found that many doctors do not believe e-prescribing will enhance their performance. The majority of doctors expressed dissatisfaction with the available support during implementation and were unconvinced that the technology would lead to improved results or greater efficiency in their tasks. Notably, more experienced doctors felt they benefited less from e-prescribing compared to their younger counterparts, suggesting that long-established habits pose a significant barrier to the acceptance of new technology²².

In contrast, research on e-prescribing system in Greece shows a more favorable view. Healthcare professionals in Greece recognize that e-prescribing positively impacts the overall prescribing process. They appreciate that the system reduces errors and simplifies procedures is seen as a tool to decrease medication errors and streamline the handling of prescriptions for both doctors and pharmacists. However, feedback from Greek healthcare professionals indicates that there is still room for improvement. Enhancing the system to better support decision-making and promote high-quality healthcare services remains a priority²³.

Overall, while acceptance of e-prescribing systems varies by region and experience level, involving healthcare professionals in the development and refinement of these systems is crucial for addressing concerns and improving adoption rates. For example, in one UK study, pharmacists showed positive acceptance of the EP system after 18 months of implementation. The system improved prescribing quality, facilitated easier access to data, and reduced errors, leading to increased satisfaction and fewer transitional challenges compared to paper-based prescribing systems¹⁴.

CONCLUSION

The implementation of electronic prescribing (e-prescribing) systems has proven to significantly reduce prescription and medication errors, enhance efficiency, and improve service quality in healthcare settings. Evidence from various countries, including Spain, Brazil, and Indonesia, demonstrates that e-prescribing systems effectively decrease errors related to medication dosage, drug formulations, and patient indications, thereby improving patient safety. Additionally, e-prescribing has been shown to streamline prescription processing,

reduce administrative burdens, and increase adherence to formularies, contributing to overall improvements in healthcare delivery.

However, successful implementation of e-prescribing systems necessitates robust policy support, complete infrastructure, and targeted intervention to address challenges related to system errors, workflow integration, and professional resistance. Despite the positive impact and general acceptance of e-prescription among healthcare workers, ongoing efforts to improve accuracy, address technical issues, and engage healthcare professionals are essential for maximizing the benefits of this technology. In summary, while e-prescribing offers substantial advantages in reducing errors and enhancing efficiency, its effectiveness is contingent upon addressing these implementation challenges and ensuring comprehensive support and infrastructure.

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CONFLICT OF INTEREST

The authors of this systematic review declare that there are no conflicts of interest associated with this research.

STATEMENT OF ETHICS

Not Applicable for statement of ethics

REFERENCES

1. Kannry J. Effect of e-prescribing systems on patient safety. *Mt Sinai J Med.* 2011;78(6):827-833. doi:10.1002/MSJ.20298
2. Goundrey-Smith S. History and Context of Electronic Prescribing in the US and UK. Published online 2012:25-46. doi:10.1007/978-1-4471-4045-0_2
3. Vejdani M, Varmaghani M, Meraji M, Jamali J, Hooshmand E, Vafae-Najar A. Electronic prescription system requirements: a scoping review. *BMC Med Inform Decis Mak.* 2022;22(1):1-13. doi:10.1186/S12911-022-01948-W/FIGURES/2
4. Bouraghi H, Imani B, Saeedi A, et al. Challenges and advantages of electronic prescribing system: a survey study and thematic analysis. *BMC Health Serv Res.* 2024;24(1):1-9. doi:10.1186/S12913-024-11144-3/FIGURES/2
5. Cahya Sabila F, Zakiah Oktarlina R, Utami N. Pereseapan Elektronik (E-Prescribing) Dalam Menurunkan Kesalahan Penulisan Resep. *Nurul Utami |Pereseapan Elektronik (E-Prescribing) Dalam Menurunkan Kesalahan Penulisan Resep Majority J.* 2018;7.
6. Slight SP, Tolley CL, Bates DW, et al. Medication errors and adverse drug events in a UK hospital during the optimisation of electronic prescriptions: a prospective observational study. *Lancet Digit Health.* 2019;1(8):e403-e412. doi:10.1016/S2589-7500(19)30158-X
7. Ekakarttika S. *Evaluasi Penerapan Sistem E-Prescribing Di Instalasi Farmasi Poliklinik Spesialis RSU Bunda Jakarta.* UniversitasGadjahMada; 2017.
8. Fernández-Oliveira C, Martínez-Roca C, Ávila-Álvarez A, et al. *Impact of Introducing Assisted Electronic Prescription on Paediatric Patient Safety.* Vol 93.; 2020. www.analesdepediatría.org
9. McLeod M, Karampatakis GD, Heyligen L, McGinley A, Franklin BD. The impact of implementing a hospital electronic prescribing and administration system on clinical pharmacists' activities - A mixed methods study. *BMC Health Serv Res.* 2019;19(1). doi:10.1186/s12913-019-3986-4
10. Rosa MB, Nascimento MMG do, Cirilio PB, et al. Electronic prescription: frequency and severity of medication errors. *Rev Assoc Med Bras (1992).* 2019;65(11):1349-1355. doi:10.1590/1806-9282.65.11.1349
11. Urtasun M, Takata M, Davenport MC, et al. Effect of electronic prescriptions on the safety of hospitalized pediatric patients. *Arch Argent Pediatr.* 2022;120(2). doi:10.5546/AAP.2022.ENG.111
12. Tran T, Taylor SE, Hardidge A, et al. Pharmacist-assisted electronic prescribing at the time of admission to an inpatient orthopaedic unit and its impact on medication errors: a pre- and postintervention study. *Ther Adv Drug Saf.* 2019;10:204209861986398. doi:10.1177/2042098619863985

13. Hindmarsh J, Holden K. The electronic prescribing of subcutaneous infusions: A before-and-after study assessing the impact upon patient safety and service efficiency. *Int J Med Inform.* 2022;163. doi:10.1016/j.ijmedinf.2022.104777
14. Mehta R, Onatade R, Vlachos S, Sloss R, Maharaj R. The association of a critical care electronic prescribing system with the quality of patient care provided by clinical pharmacists - a prospective, observational cohort study. *Int J Med Inform.* 2023;177. doi:10.1016/j.ijmedinf.2023.105119
15. Woodman M, Salkeld J, Sharrock C, et al. Prescribing in a pandemic: Electronic prescribing aids to improve non-specialist adherence to COVID-19 guidelines. *Clin Infect Pract.* 2023;19. doi:10.1016/j.clinpr.2023.100223
16. Adrizal A, Sriwahyuni F, Aldi Y. Analisis Pelayanan Resep Konvensional dan Elektronik serta Pengaruhnya terhadap Kualitas Pelayanan Kefarmasian di RSUD M. Natsir Solok Indonesia. *Jurnal Sains Farmasi & Klinis.* 2019;6(3):195. doi:10.25077/jfsk.6.3.195-199.2019
17. Feberina ND, Hasan D, Widyastuti S. Analisis Kualitas Layanan dan Kepuasan Pasien pada Resep Konvensional Dibandingkan Resep Elektronik di Rumah Sakit A Cibinong Bogor. *MAHESA : Malahayati Health Student Journal.* 2023;3(8):2241-2262. doi:10.33024/mahesa.v3i8.10764
18. Indrasari F, Wulandari R, Nurul D, Farmasi AP, Tinggi S, Nusaputera IF. Peran Resep Elektronik dalam Meningkatkan Medication Safety pada Proses Peresepan di RSI Sultan Agung Semarang. *Jurnal Farmasi Dan Ilmu Kefarmasian Indonesia 1 Special Issue: Seminar Inovasi Teknologi dan Digitalisasi Pada Pelayanan Kefarmasian.* Published online 2020.
19. Anggraini D, Meliala A, Dwiprahasto I, et al. Evaluasi Peresepan Elektronik Di Departemen Ilmu Kesehatan Anak. *Jurnal Manajemen Pelayanan Kesehatan (The Indonesian Journal of Health Service Management).* 2021;24(02):55-59. doi:10.22146/JMPK.V24I02.4115
20. Alshahrani F, Marriott JF, Cox AR. A qualitative study of prescribing errors among multi-professional prescribers within an e-prescribing system. *Int J Clin Pharm.* 2021;43(4):884-892. doi:10.1007/S11096-020-01192-0
21. Kenawy AS, Kett V. The impact of electronic prescription on reducing medication errors in an Egyptian outpatient clinic. *Int J Med Inform.* 2019;127:80-87. doi:10.1016/J.IJMEDINF.2019.04.005
22. Wrzosek N, Zimmermann A, Balwicki Ł. Doctors' Perceptions of E-Prescribing upon Its Mandatory Adoption in Poland, Using the Unified Theory of Acceptance and Use of Technology Method. *Healthcare.* 2020;8(4). doi:10.3390/HEALTHCARE8040563
23. Grammatikopoulou M, Lazarou I, Giannios G, et al. Electronic prescription systems in Greece: a large-scale survey of healthcare professionals' perceptions. *Archives of Public Health.* 2024;82(1):1-11. doi:10.1186/S13690-024-01304-6/TABLES/4