



**Systematic Literature Review on The Use of Electronic Prescribing  
(E-Prescribing) At Hospital Installation**

**Authors:**

***Rinna Dwi Lestari*<sup>1,2\*</sup>, *Sri Sundari*<sup>1</sup>, *Setyo Trisnadi*<sup>3</sup>**

<sup>1</sup>Master Program of Hospital Administration, Universitas Muhammadiyah Yogyakarta,  
Yogyakarta, Indonesia

<sup>2</sup>Faculty of Medicine, Universitas Wahid Hasyim, Semarang, Indonesia

<sup>3</sup>Faculty of Medicine, Sultan Agung Islamic University, Semarang, Indonesia

*Corresponding Email:* \* [drlestari@unwahas.ac.id](mailto:drlestari@unwahas.ac.id)

**About the Author**

1st Author : Dr. dr. Rinna Dwi Lestari, SH., MH., Sp.KFR.  
Affiliation : <sup>1</sup>Master Program of Hospital Administration, Universitas Muhammadiyah Yogyakarta  
<sup>2</sup>Faculty of Medicine, Universitas Wahid Hasyim  
Mailing address : <sup>1</sup>JL. Brawijaya, Kasihan, Bantul, Yogyakarta 55183  
<sup>2</sup>Jl. Raya Gunungpati KM 15 Nongkosawit, Gunungpati, Semarang, Jawa Tengah 50224  
Email of author : drlestari@unwahas.ac.id  
Orcid ID : 0009-0003-9045-6916  
Google Scholar URL : <https://scholar.google.com/citations?user=o70lPQkAAAAJ&hl=id>  
Phone number : +62 81326010100

2nd Author : Dr. dr. Sri Sundari, M.Kes  
Affiliation : Master Program of Hospital Administration, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia  
Mailing address : JL. Brawijaya, Kasihan, Bantul, Yogyakarta 55183  
Orcid ID : -  
Google Scholar URL : <https://scholar.google.com/citations?user=GI0RaWMAAAAJ&hl=id&oi=ao>  
Phone number : +62 8122789196

3th Author : Dr. dr. Setyo Trisnadi, SH., Sp.KF.  
Affiliation : Faculty of Medicine, Sultan Agung Islamic University  
Mailing address : Jl. Raya Kaligawe Km.4. Terboyo Kulon, Genuk, Semarang, Jawa Tengah 50112  
Orcid ID : 0000-0002-5004-682X  
Google Scholar URL : <https://scholar.google.co.id/citations?user=kAEFHVYAAAAJ&hl=id>  
Phone number : +62 85290050721

## ABSTRACT

Hospitals are a very complex organization in providing health services through a health maintenance approach (promotive, preventive, curative and rehabilitative) which is carried out comprehensively in accordance with applicable laws and regulations. In the era of the industrial revolution 4.0, the Internet of Things (IoT) is important in improving health services. One of the implementations of IoT in healthcare is e-Prescribing. The purpose of this study is to analyze the benefits and challenges of using e-prescribing in improving health services in hospitals. The method used in this study is qualitative research with a literature study approach. The source of data for this research is a scientific article related to the use of e-prescribing in hospitals, The data analysis technique used in the study is the content analysis method. Content analysis is a scientific method of studying and drawing conclusions from a study by utilizing documents or texts The results of the study show that E- Prescribing brings several benefits, such as improving patient compliance and health system integration. With prescription information more accessible and understood by patients, reduced errors in medication and speeding up the process of prescription delivery in pharmacies and the ease of sharing medical prescription information directly and in real-time between various health systems. However, e- Prescribing also has challenges that need to be considered. Such as the expensive cost of implementation and maintenance of the e- Prescribing system, the security and privacy of patient data, and the technical difficulties and use by healthcare workers who may not be familiar with the technology.

**Keywords:** E-prescribing; Service Quality; Hospital;

## ABSTRAK

Rumah sakit merupakan suatu organisasi yang sangat kompleks dalam menyelenggarakan pelayanan kesehatan melalui pendekatan pemeliharaan kesehatan (promotif, preventif, kuratif dan rehabilitatif) yang dilaksanakan secara menyeluruh sesuai peraturan perundang-undangan yang berlaku. Dalam era revolusi industri 4.0, Internet of Things (IoT) menjadi penting dalam meningkatkan layanan kesehatan. Salah satu implementasi IoT dalam layanan kesehatan adalah e- Prescribing. tujuan penelitian ini adalah menganalisis bagaimana manfaat dan tantangan penggunaan e-prescribing dalam meningkatkan pelayanan Kesehatan di rumah sakit. Metode yang digunakan dalam penelitian ini adalah penelitian kualitatif dengan pendekatan studi literatur. Sumber data penelitian ini adalah Artikel ilmiah yang berkaitan dengan penggunaan e-prescribing di rumah sakit, Teknik analisis data yang digunakan dalam penelitian adalah dengan metode analisis isi. Analisis isi adalah metode ilmiah dalam mempelajari dan menarik kesimpulan atas suatu kajian dengan memanfaatkan dokumen atau teks Hasil penelitian menunjukkan bahwa E- Prescribing membawa beberapa manfaat, seperti meningkatkan kepatuhan pasien dan integrasi sistem kesehatan. Dengan informasi resep lebih mudah diakses dan dipahami oleh pasien, berkurangnya kesalahan dalam pengobatan dan mempercepat proses pengiriman resep di apotek dan kemudahan berbagi informasi resep medis secara langsung dan real-time antara berbagai sistem Kesehatan. Namun, e- Prescribing juga memiliki tantangan yang perlu diperhatikan. Seperti Biaya implementasi dan pemeliharaan sistem e- Prescribing yang mahal, keamanan dan privasi data pasien, dan kesulitan teknis dan penggunaan oleh tenaga kesehatan yang mungkin belum terbiasa dengan teknologi.

**Kata kunci:** Peseseapan elektronik; Kualitas pelayanan; Rumah sakit;

## INTRODUCTION

Development in the health sector is basically an effort that involves all elements of society to increase awareness, motivation, and ability to live a healthy lifestyle. Therefore, the goal of health development is to achieve the most optimal degree of public health possible. In this case, health is part of investing in the development of a country's human resources that can have a positive impact on the country's social and economic sectors. This can be realized if people live a healthy lifestyle, clean environment, have equal and fair access to quality health services, and are supported by a strong and highly competitive health system. A hospital is

defined by Health Law Number 17 of 2023 as a medical facility that offers full range of personalized health services, such as preventive, curative, rehabilitative, and/or palliative care. It offers emergency, outpatient, and inpatient versions of these treatments. (Undang Undang Republik Indonesia No. 17 tahun 2023 Tentang Kesehatan, 2023).

According to the World Health Organization (WHO), hospitals must be able to serve as a reference for health services against acute and complex diseases, as well as become centers of education, training, and research for doctors, nurses, and other health workers (World Health Organization, n.d.). The Hospital carries out individual health service functions in the form of specialties and/or subspecialties. In addition to individual health services in the form of specialties and/or subspecialties, hospitals also provide basic health services. In addition, the hospital also has educational and research functions in the health sector. Furthermore, every hospital must implement good hospital management and clinical management (Undang Undang Republik Indonesia No. 17 tahun 2023 Tentang Kesehatan, 2023). The hospital offers a variety of services, including as medical care, medical support services, services for rehabilitation, prevention and health enhancement, training and educational facilities, and research and development centers for health-related science and technology (Angeline, 2020). The advancement of information technology has the potential to boost productivity and efficacy across various industries, including the health sector's prescription practices. The Republic of Indonesia's Regulation Number 72 of 2016 concerning Pharmaceutical Service Standards in Hospitals states that a prescription is a written request, made in paper or electronic form, from a physician or dentist to a pharmacist for the provision and delivery of medication to patients in compliance with applicable regulations (Peraturan Menteri Kesehatan Republik Indonesia Nomor 72 Tahun 2016 Tentang Standar Pelayanan Kefarmasian di Rumah Sakit, 2016).

Prescribing has evolved through the use of information and communication technology known as e-prescribing. Electronic Prescribing (E-Prescribing) has become an important innovation in the world of health services, including in hospital installations. This system replaces conventional paper-based prescribing methods with a more efficient, secure, and electronically structured prescribing process. In this context, outpatient installation refers to hospital services that primarily rely on electronic prescriptions (Fischer, Vogeli, Stedman, Ferris, & Weissman, 2008). One of the medical errors that can occur in hospitals is errors in prescribing (Dornan et al., 2009). Patients often do not receive clear, evidence-based treatment and receive treatment that is not needed (Aronson, 2005; Kanji, Corman, & Douen, 2002). This raises questions about the patient's trust in the doctor and the medication he prescribes.

In a hospital context, E-Prescribing allows physicians to access a patient's medical information electronically, including disease history, drug allergies, and previous medication history (Salmon & Jiang, 2012). This allows doctors to make more informed decisions in determining the type of medication that is appropriate for the patient. One important feature of E-Prescribing is its ability to alert doctors about potential dangerous drug interactions or drug doses that exceed safe limits (Zadeh & Tremblay, 2016). This helps in preventing the occurrence of errors in administering drugs to patients. With the advancement of information technology and the need for excellent service, the use of e-prescribing is inevitable. With an integrated system, information regarding drug prescriptions can be easily accessed and shared between various parties involved, thus minimizing communication errors and improving patient adherence to drug use.

Research on the Use of E-Prescribing in Hospitals globally has actually been quite widely researched, such as research conducted by (Artawan & Martini, 2020). The hospital's implementation of e-prescribing to reduce medication errors. Through interviews with management, IT, pharmacists, physicians, and nurses, this study demonstrates how successfully e-prescribing is implemented in hospitals. However, there is a problem with the internet network's intermittent weakness and the dearth of computing equipment. This may cause issues for the drug service procedure. According to evidence, doctors' average percentage of incomplete prescriptions written before 2016 was 16.8%. Beginning in 2018, data patterns demonstrated a global decline in writing incompleteness, with an average of 1.8%. Patient safety would be enhanced and the standard of healthcare services will rise with the proper deployment of electronic prescriptions. It is necessary to enhance the management's responsibility in periodically observing and assessing the execution of e-prescribing.

Then research conducted by (Elliott, Lee, & Hussainy, 2016), named Medication administration and electronic prescription in a residential aged care setting. According to the study, e-prescribing increases medicine safety and labor efficiency in the opinion of doctors, nurses, and pharmacists. However, a number of obstacles have been shown to restrict the benefits of e-prescribing and lead to poor GP uptake. As well as research conducted by (Porterfield, Engelbert, & Coustasse, 2014), named "Electronic prescribing: Enhancing the Precision and Effectiveness of Prescription in the Outpatient Setting." According to this study, electronic prescribing lowers errors in prescription filling, boosts productivity, and lowers medical expenses. Treatment mistakes have declined to one-seventh of their pre-implementation levels, and practices using electronic prescription are expected to save between \$140 billion and \$240 billion over a ten-year period in costs because of better patient outcomes and fewer patient visits. But there are several obstacles to deployment, such as expense, inadequate support from providers, patient privacy, malfunctions in the system, and legal concerns.

From the background description above, the author still finds a little research related to how e-prescribing can improve health services in hospitals as a whole. Thus this study provides a thorough analysis related to the use of e-prescribing in hospital installations. Therefore, the purpose of this study is to analyze how the benefits and challenges of using e-prescribing in improving health services in hospitals.

## **METHOD**

Penelitian ini menggunakan metode penelitian kualitatif dengan pendekatan Studi Literature. Sumber data penelitian ini adalah Artikel ilmiah yang berkaitan dengan penggunaan e-prescribing di rumah sakit. Penelitian ini dalam pengumpulan data meliputi tiga tahap: (1) identifikasi literatur yang relevan dan pengumpulan data dengan mempertimbangkan kriteria yang dibutuhkan dari artikel seperti tema dan kontribusinya dalam teoritis; (2) menentukan data yang akan di analisis berdasarkan kriteria (3) kategorisasi tambahan dari literatur yang diperoleh. Teknik analisis data yang digunakan dalam Studi Literature adalah dengan metode analisis isi. Analisis isi adalah metode ilmiah dalam memperajari dan menarik kesimpulan atas suatu kajian dengan memanfaatkan dokumen atau teks (Rismawati & Muhibbin, 2015).

## RESULTS AND DISCUSSION

In order to increase the competitiveness and to be superior in the competition, organizations or companies must improve the quality of goods or services they produce (Soetjipto, 1994), in this case hospitals in their health services. To improve hospital services, hospitals must always carry out evaluations and research to obtain information related to the characteristics, needs and desires of patients (Berkowitz, 2021). In addition, the service quality must be maintained simultaneously and consistently through the hospital management (Pascoe, 1983). Good service quality can lead to patient satisfaction and this is the success of hospital management (Jacobalis, 1989). Patient satisfaction can also be defined as the difference (gap) between the service received by the patient and the patient's expectations for the service (Supriyanto & Ernawati, 2010). Although patient satisfaction does not only depend on hospital services, it is also influenced by the characteristics of each patient (Sarwono, 1995).

The service quality provided by hospitals to their patients is a primary factor. Medical errors in service affect the quality of patient care (Ammenwerth, Schnell-Inderst, Machan, & Siebert, 2008). This includes mistakes in prescribing and filling medications as ones of the most common medical errors. Prescribing errors harm patients when the drug is consumed by the patient or consumer (Smith, Giuliano, & Starkowski, 2011). Prescribing errors can occur during the drug use process, including errors from prescribing to dispensing the drug and monitoring how the drug is used (Kaushal, Kern, Barrón, Quaresimo, & Abramson, 2010). Hospitals are health care facilities and outpatient settings are the most common places where prescribing errors occur (Abramson et al., 2011). In this case, several previous studies concerning e-prescribing are presented in Table 1.

**Table 1.**  
**Previous Research concerning E-prescribing**

No	Author (Year)	Title	Findings
1	Fidya Cahya Sabila, Rasmi Zakiah Oktarlina, Nurul Utami (2018)	Electronic Prescribing (E-Prescribing) in Reducing Errors in Prescribing Writing (Sabila, Oktarlina, & Utami, 2018)	The advantages of e-prescribing encompass enhanced patient safety and medication management, cost savings for patients, an automated data distribution process, reduced personnel involvement, verification of drug codes against prescription codes, and the utilization of barcodes in the labeling process. Additionally, e-prescribing helps mitigate the risk of misinterpreting prescriptions, ensures accurate medication dosage, provides information on the patient's treatment history, drug allergies, and the effects of previously consumed drugs. Moreover, the data input process is simplified, rapid, eco-friendly by reducing paper usage, and offers practicality.
2	Ferika Indrasari, Ratna Wulandari, Dwi Nurul Anjayanti (2021)	Role of Electronic Prescribing in Improving Medication Safety on the Prescribing Process at RSI Sultan Agung	E-prescribing can increase medication safety in the prescribing process. Such existence of an electronic system can increase the prescribing accuracy, awareness of potential adverse interactions, history of drug allergies, efficiency of service time and can patients' safety

No	Author (Year)	Title	Findings
3	Kholifatul Ulum, Indah Laily Hilmi, Salman (2023)	Semarang (Indrasan, Wulandari, & Anjayanti, 2021) Implementation and Evaluation of Electronic Prescribing to Reduce Medication Error (Ulum, Hilmi, & Salman, 2023)	E-prescribing has the potential to enhance patient care and medication safety by eliminating handwritten errors, granting access to the patient's prescription history and information about drug allergies, and expediting patient waiting times. Nevertheless, the full adoption of e-prescribing faces obstacles such as insufficient human resources, the availability of e-prescribing applications, and inadequate support from facilities.
4	Rima Putri Permata Sari, Budhi Setianto, Inge Dhamanti (2022)	Identification of Incomplete Prescription using the Approach of Failure Mode and Effect Analysis (FMEA) at Islamic Hospital of Ahmad Yani Surabaya (Sari, Setianto, & Dhamanti, 2022)	Failure is still found on the use of e-prescribing. However, its use and FMEA makes it easier to identify and prioritize problems that occur in the prescribing flow
5	Endah Zuraidah, Ernani Hadiyati, Umi Muawanah (2022)	Effect of Price, E-Prescribing Implementation and Waiting Time of Service of Patients' Satisfaction through Service Quality as Intervening Variable (Zuraidah, Hadiyati, & Muawanah, 2022)	E-prescriptions significantly affect the patient satisfaction, waiting time has no significant effect on patient satisfaction, service quality significantly affects patient satisfaction, price significantly affects patient satisfaction through service quality, e-prescriptions significantly affect the patient satisfaction through service quality, and waiting time significantly affects the patient satisfaction through service quality
6	Sofyan Widi Kastanto, Elsy Maria Rosa (2018)	Evaluation of E-Prescribing Implementation in Inpatient Installation at PKU Muhammadiyah Gamping Hospital Yogyakarta (Kastanto & Rosa, 2018)	Most respondents had a good perception of the implementation of e-prescribing by 54.5%. This result indicates that the perception of the implementation of e-prescribing in the outpatient installation at PKU Muhammadiyah Gamping Hospital, Yogyakarta is categorized as good

According to (Rusnawati & Hariyati, 2022) The existence of the internet of things (IoT) in the era of the industrial revolution 4.0 needs to be developed to facilitate health services, so that they become more efficient in monitoring patient health conditions remotely. The Internet of Things (IoT) refers to a network of networked computing devices, including both mechanical and digital machinery, items, and even animals or people. These devices are assigned unique identities and have the capability to send data across a network without the need for human-to-human or human-to-computer interaction. One form of using the Internet of things in health services is the use of E-Prescribing. Based on content analysis of several previous studies related to the use of E-prescribing in hospitals, it was found that several

aspects of health services will increase with the use of e-prescribing as a whole in hospitals in Indonesia.

First, related to patient compliance. Patient safety and security are improved through e-prescribing due to ease of prescription reading, reduced prescribing time to drug acceptance, and ultimately reduced errors in medication (Kannry, 2011). The process of the prescription journey in pharmacies has also become faster and easier (Grossman, Cross, Boukus, & Cohen, 2012). Patient adherence related to e-Prescribing has major implications in disease management and patient recovery. By making good use of the features provided by e-Prescribing, it is expected to improve patient adherence and improve overall health outcomes. Second, health system integration. E-Prescribing, or electronic prescribing, has become one of the important innovations in the field of modern healthcare. In addition to bringing direct benefits in the process of prescription delivery and drug management, e-Prescribing also plays a crucial role in improving overall health system integration. Health system integration is an effort to connect and unify various aspects of the health system, including health care providers, health information systems, and other related parties, to improve service coordination, efficiency, and quality of patient care. E-Prescribing contributes to improving health system integration through several ways. First, e-Prescribing allows healthcare providers to access and share medical prescription information directly and in real-time with various other health systems. Thus, prescribing information can be easily accessed by physicians, pharmacists, and other healthcare providers involved in patient care, enabling better coordination between different entities in the health system.

In addition, e-Prescribing also facilitates integration with electronic medical record (EMR) or electronic health record (EHR) systems. With this integration, medical prescription information can be integrated with other patient medical information in one system, allowing healthcare providers to have more comprehensive and unified access to patient medical history. This is critical in supporting better clinical decision-making and providing more coordinated and holistic care. And the use of e-prescribing can also save costs, where large savings occur by reducing Adverse Drug Event (ADE). Because, the success of treatment can reduce the cost of hospitalization and visits to the doctor (“E-prescribing shown to improve outcomes, save billions. Study quantifies relationship between e-prescribing and medication adherence, with potential savings of \$140 billion over the next 10 years.” 2012; Weingart et al., 2009). It can be seen that the use of electronic prescriptions will have practical implications for health care providers, e-prescribing software vendors, and policymakers (Zadeh & Tremblay, 2016).

But on the other hand, although E-prescribing brings various benefits, it also faces a number of challenges and shortcomings that need to be considered in its implementation. One of the main challenges is the cost of implementing and maintaining an e-Prescribing system which can be a financial burden for hospitals and health practitioners (Rusnawati & Hariyati, 2022). In addition, the need for adequate technological infrastructure and training of medical staff to use the e-Prescribing system is also a factor affecting the cost and difficulty of implementation. In addition to cost, data security and privacy are serious issues to consider in e-Prescribing (Zadeh & Tremblay, 2016). With medical information stored in digital format, the risk of data leakage and misuse of health information is higher. Strict measures are required to ensure the security of patient data, such as data encryption and the use of a strong authentication system.

Then, technical difficulties are also a challenge in the implementation of e-Prescribing (Odukoya, Stone, & Chui, 2014). The e-Prescribing system must be compatible with various existing health information systems, including patient management systems and electronic medical records. Seamless integration between these systems can hinder the efficiency and effectiveness of using e-Prescribing. In addition to implementation challenges, e-Prescribing also has shortcomings in terms of use by health workers (Ayaz, Naqvi, & Branch, 2015). For example, some doctors and pharmacists may have difficulty operating an e-Prescribing system, especially if they are unfamiliar with the technology. This can result in decreased productivity and increased errors in prescription delivery.

Some studies have also shown that e-Prescribing can lead to an increase in the number of medications prescribed, which can potentially increase overall health care costs (Abramson, 2015). This can happen because of the ease of sending electronic prescriptions which can lead to overprescribing or sending prescriptions that do not meet the needs of patients. And there are also concerns about the social impact and relationship between patients and doctors (Wrzosek, Zimmermann, & Balwicki, 2020). Some patients may feel less emotionally connected to their doctors if their interactions become more technology-focused. In addition, some doctors may feel that the use of e-Prescribing reduces their flexibility and freedom in prescribing medications.

While there are a number of challenges and drawbacks to be aware of in the implementation of e-Prescribing, it is important to remember that the huge benefits in improving the safety, efficiency, and quality of healthcare often outweigh the disadvantages. By taking note of these challenges and shortcomings and taking appropriate steps to address them, e-Prescribing can be an invaluable tool in improving the overall healthcare system.

## **CONCLUSIONS AND SUGGESTIONS**

In the era of the industrial revolution 4.0, the Internet of Things (IoT) has become important in improving health services. One of the implementations of IoT in healthcare is e-Prescribing, which makes it easy to monitor the patient's health condition remotely. E-Prescribing brings several benefits, such as improving patient compliance and health system integration. Patient adherence to treatment can be improved with e-Prescribing as it allows prescription information to be more easily accessed and understood by patients. This can reduce errors in medication and speed up the process of delivering prescriptions in pharmacies. In addition, e-Prescribing also supports health system integration by enabling direct and real-time access and sharing of medical prescription information between various health systems. With this integration, medical prescription information can be integrated with other patient medical information in one system, allowing healthcare providers to have more comprehensive and unified access to a patient's medical history.

Although it brings benefits, e-Prescribing also has challenges that need attention. The cost of implementing and maintaining an e-Prescribing system can be a financial burden for hospitals and health practitioners. In addition, data security and privacy are also serious issues that need to be dealt with strictly. Another challenge is technical difficulties and use by health workers who may not be familiar with the technology. By taking into account these benefits and drawbacks, and taking appropriate steps to address them, e-Prescribing can be an invaluable tool in improving the overall healthcare system.

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