JURNAL FARMASI SAINS DAN KOMUNITAS
Journal of Pharmaceutical Sciences & Community

p-ISSN 1693-5683; e-ISSN 2527-7146

Vol. 19, No. 1, May 2022, pp. 23-28

Research Article

Users' Views Regarding Electronic Prescribing Implementation: A Qualitative Case Study in A Private Hospital of Magelang City, Indonesia

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https://doi.org/10.24071/jpsc.003078

J. Pharm. Sci. Community, 2022, 19(1), 23-28

Article Info

Received: 02-02-2022
Revised: 22-02-2022
Accepted: 22-02-2022

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Keywords:
digital user; e-health; e-prescribing; hospital information system; prescriber

ABSTRACT

The use of the Internet and digital system in a hospital named the Hospital Information System (HIS) has grown rapidly and remarkably, including in Indonesia. One of the HIS components is electronic prescribing (e-prescribing). Although the Indonesian government has mandated HIS in hospitals since 2011, successful implementation is not without challenges. Therefore, this study aimed to explore users' views regarding e-prescribing implementation through a case study in a private hospital in Magelang City, Indonesia. This study applied a qualitative approach. Participants were e-prescribing users who were selected purposively. Data were gathered using interviews. The Capability, Opportunity, Motivation, and Behavior (COM-B) model was used to structure the interview guideline. Data were transcribed verbatim and analyzed using a thematic approach. Twenty participants were interviewed. Five themes emerged through the interviews: self-reflection, perceived advantages, policy, capacity building, and quality assurance. The themes express optimism in implementing e-prescribing. Users are central to e-prescribing system acceptance, as is explained in the self-reflection and perceived advantages themes. Furthermore, top management plays a pivotal role in improving the capacity and ensuring system implementation quality. This study's findings imply that the user, system, and organization play crucial roles in enhancing health care service quality through e-prescribing.

INTRODUCTION

The Hospital Information System (HIS) implementation, including electronic prescribing (e-prescribing), in the limited resources countries, including Indonesia, remain a challenge (Handayani *et al*., 2017; Konduri *et al*., 2017b). In the Indonesian context, the Indonesian Ministry of Health decree No. 82/2013 has mandated using HIS; in Bahasa Indonesia, it is named *Sistem Informasi Manajemen Rumah Sakit* (SIMRS) (Kemenkes RI, 2013). Since then, many hospitals, mainly the prominent and government hospitals, have implemented HIS, either complete or partial components, such as electronic medical records, electronic registration, and e-prescribing.

Many previous studies had proven that the use of e-prescribing could reduce potential medication errors (Abramson *et al*., 2011; Bhavsar *et al*., 2019; Davies *et al*., 2017). The use of e-prescribing also facilitates detecting potential drug interactions (Kannry, 2011; Page *et al.,* 2017) and improve prescription appropriateness (Baysari *et al*., 2016). The patient's waiting time for receiving the medicines prescribed through e-prescribing is shorter than the paper-based prescription, and of course, paperless (Page *et al.*, 2017). Although e-prescribing offers advantages in assuring a high health care service quality, its implementation is not without challenges, especially in developing countries. From the technology side, e-prescribing applications should fulfill standards of system, data, and service qualities. However, data quality, reliability, and accessibility are still problematic in most developing countries (Hagg

et al., 2018; Konduri *et al*., 2017b). From the users' perspective, the e-prescribing system should satisfy users in terms of acceptance and benefits. Their acceptance and perceived benefits depend on system quality and complex behavioral factors, including skills that guide behavior in using the system (Kilsdonk *et al*., 2017; Konduri *et al.*, 2017a).

Interaction between people, technology, and organizations is dynamic and complex. When the interaction is synchronized, a new system implementation benefit will be achieved (DeLone and McLean, 2003; Urbach and Müller, 2012). Given that a particular organization has its own characteristics, then exploring new information from different organizations' environments is always beneficial. Therefore, this study aimed to explore e-prescribing implementation using a case study approach in a private hospital in Magelang City, Indonesia. Users' perspectives found by this study could be used to inform hospital policy makers and management in formulating improvements of e-prescribing implementation in other similar settings.

METHODS

This study used a qualitative approach with a case study design. The Ethics committee had approved the study protocol with letter 199.3/FIKES/PL/IX/2020. Data were gathered using interviews. Participants were those who used e-prescribing in a private hospital in Magelang City, Indonesia. The participants' selection was purposive and considered e-prescribing user varieties, i.e., doctor, pharmacist, pharmacy assistance, nurse, administration/billing staff, registration staff, medical record personnel, and the Information Technology Unit personnel.

An interview guideline was structured based on the COM-B theoretical framework. This framework consists of four constructs: Capability, Opportunity, Motivation, and Behavior (Michie *et al*., 2011). Each construct guided several main questions regarding e-prescribing implementation, accompanied by some probing questions. The interview guideline was assessed by two experts independently to assure its content validity. The questions had been revised based on the experts' feedback.

The interviews took place in the participants' office for about 45 to 60 minutes. The participants had signed informed consent to guarantee their voluntary participation. Brief information regarding the study had also been informed to the participants before they signed the informed consent. The interviews were audio-taped subject to the participants' approvals. A brief note was also made in each interview session.

The recorded interviews were transcribed verbatim by the research assistant. The researchers (EP and AW) read and checked the verbatim independently, along with the audio records and the brief notes. This step was conducted to ensure verbatim accuracy. The verbatim was analyzed using thematic analysis. The two researchers (EP and AW) conducted the verbatim coding independently; then, they discussed the formal codes. The COM-B constructs guided the coding processes. This stage used a deductive approach. After that, the researchers synthesized the formal codes into themes inductively.

The data quality was assured by several steps mentioned above (Korstjens and Moser, 2018). First is the verbatim double-checking. Second is the independent coding and the agreement of the formal code. The third is a discussion between the two researchers to formulate the themes.

RESULTS AND DISCUSSION

Twenty participants were interviewed. Table 1 describes the participants' characteristics. The interviews generated five themes: self-reflection, perceived advantages, policy, capacity building, and quality assurance. These themes were elicited with the assistance of the COM-B theory. Figure 1 explains the themes' interconnection regarding e-prescribing implementation based on the users' views. This study highlights users' optimism regarding e-prescribing implementation in this case study. This study also notes that people (users), technology, and organizations play crucial roles in e-prescribing implementation success.

Self-reflection

Most participants in this study were aware that they need to improve their capability in using e-prescribing. They expressed their strong willingness to enhance their skills and technology literacy by attending the training regularly.

"...should attend training regularly, both prescriber and pharmacist. Also, myself and others [colleagues] should give supports each other..." (R-6)

Perceived advantages

Participants in this study expressed that e-prescribing benefits motivated them to use the system.

Table 1. Characteristics of participants involved in a case study about e-prescribing in a private hospital of Magelang City

Characteristics	Number (percentage) N=20
Gender:	
Male	7
Female	13
Age:	
20 – 30 Years	4
30 – 40 Years	12
40 – 50 Years	4
Profession:	
General Practitioner	5
Pharmacist	3
Pharmacist Assistant	5
Nurse	5
The Information Technology (IT) Department Personnel	2
Years of experience working in the hospital:	
1 – 5 Years	9
6 – 10 Years	4
11 – 15 Years	3
15 – 20 Years	3
20 – 25 Years	1

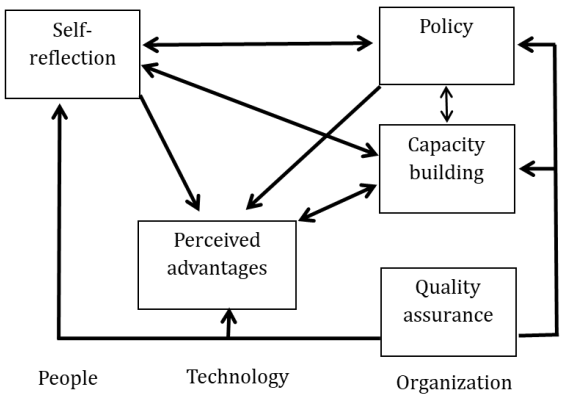


Figure 1. The thematic interconnections regarding e-prescribing implementation

"...honestly, we motivate with e-prescribing implementation, ...because if the e-prescribing is running well, then the patients' waiting time will be reduced, besides [e-prescribing] minimizes medication error..." (R-10).
"...from my opinion, indeed e-prescribing makes writing a prescription easier, ...so the patient is easier in getting their prescription..." (R-5).

Policy

Most participants stated that policy to support e-prescribing implementation is urgent. They expected that the use of e-prescribing is compulsory.
"...required official policy from hospital leader...that e-prescribing is mandated by the authority to be implemented in this hospital...and also the facilities provisions" (R-10).

Capacity building

Participants expressed that the hospital must organize training for the users. They emphasized that training is urgent in improving the capability to use e-prescribing.
"...ask the hospital [the head] to provide training ...and all the users must attend...doctors, nurse...and explaining the e-prescribing structurally and systematically...not only accompanying the data entry..." (R-1).
"...the IT department work plan is improving our skill by attending a workshop, ...the hospital asks the IT personnel to attend the training that can improve the task performance..." (R-2).

Quality assurance

Participants implied that quality assurance could guarantee e-prescribing implementation running well. It is an essential factor to assure the consumers' satisfaction regarding the service provision through e-prescribing implementation.
"...as far as my opinion if the e-prescribing is running well, the consumer satisfaction will increase,....because e-prescribing makes the patients easier in receiving their medication, the waiting time is shorter...they do not need to go to many places...again and again..." (R-14).

This study confirms the pivotal roles of three pillars: people/human, technology, and organizations, in the technology implementation success story, as mentioned in the Human, Organization, Technology, Benefits (HOT-fit) model (DeLone and McLean, 2003; Urbach and Müller, 2012). The self-reflection theme elicited by this study expresses people's willingness to enhance their capability in operating e-prescribing. The perceived advantages in this study reflect the technology quality perceived to provide benefits in improving the services. The policy, capacity building, and quality assurance themes are referred to as the organization's roles and responsibility.

Many studies had proven that human/people is a critical factor preventing new a technology implementation success, particularly in developing countries (Handayani *et al*., 2017; Konduri *et al*., 2017b); for example, many people lack the necessary skills in operating the information technology (IT) and using the HIS technology. Although facilities provision is not a problem in this study, users might not use such facilities when they do not have reliable acceptance and satisfaction. Self-reflection is an intrapersonal factor possessed by a human that gives benefits for e-prescribing implementation in this context. Self-reflection could help users to build awareness and understanding regarding technology implementation importance. In the Indonesian context, self-reflection has been underlined as one of the underlying support factors for Indonesian pharmacists to deliver pharmaceutical care for asthma patients (Widayati *et al*., 2018). This theme could be adopted in the e-prescribing implementation area.

According to the HOT-fit model, IT quality standard is reflected by three constructs, i.e., system, information, and service (DeLone and McLean, 2003; Urbach and Müller, 2012). Failure to ensure the new technology quality will lead to users' pragmatism related to technical errors (Handayani *et al*., 2017; Kuo *et al*., 2018; Peek *et al*., 2014). For example, the user stops using e-prescribing periodically because of electricity supply disturbance. The perceived advantages of the implemented technology are crucial in convincing that the technology fulfills the quality standard.

The organization plays a pivotal role in supporting technology implementation success (Devine *et al*., 2010; Fennelly *et al*., 2020; Konduri *et al*., 2018). One of the organization's responsibilities is providing a policy to ensure the resources are provided in implementing the technology. In this study context, a policy is expected by users in using the e-prescribing system and gaining support from other colleagues either in the unit or outside formally. Although the e-prescribing system tends to allow indirect communication between health professional team members; however, support from colleagues, in many forms, is one of the essential factors of successful implementation. A policy could also facilitate rewards for disciplined and professional users.

Moreover, enhancing resource capacity is also one of the organization's responsibilities (Fennelly *et al*., 2020; Konduri *et al*., 2018). In this study context, users expected the leaders could provide facilities to improve their e-prescribing system capability. Not only is users' capability urgent, but also facilities and environment are essential. Staff training has been recommended by many previous studies (Devine *et al*., 2010; Handayani *et al*., 2017), but making the capability sustainable is crucial.

Quality assurance in health care industries, including in hospitals, refers to assuring patient safety through the qualified service (De Jonge *et al*., 2011). In this study context, the quality assurance theme was elicited from participants' views regarding the urgent need for the standard operation procedure (SOP) document. They expected the leaders to provide a specific SOP of e-prescribing implementation and evaluate the process regularly. Quality assurance in this context is also urgent in preventing technical errors. Besides, stakeholders should evaluate the economic impacts of the e-prescribing implementation on the whole organization's performance; otherwise, it will be an inefficient policy (Ahmed *et al*., 2016; Dobrev *et al*., 2009).

Finally, this study is not without its limitation. Given the nature of the qualitative approach with a case study design, this study's results cannot be generalized to all of the hospitals in Indonesia. However, the findings explain the dynamic interactions between people, technology, and organizations regarding e-prescribing implementation, by design. These findings could give insight into the authority in developing the digital health system in this country and other countries with similar context (Kemenkes RI, 2013; Konduri *et al*., 2018).

CONCLUSIONS

Users' views regarding e-prescribing implementation generated by this study provide an optimistic view of the future application of this new IT. Users expressed their capability in

using e-prescribing technology. The technology is perceived as having advantages in improving the users' task performance. Facilities provision is not a major concern, but the user's acceptance and the organizational involvement are the critical factors for sustainable implementation. Organizational culture and behavior is a unique situation that plays a pivotal role in the failure or success of new technology implementation. Therefore, the organization is called on to provide policy, conduct capacity building, and do quality assurance regarding the e-prescribing implementation to ensure a more sustainable practice.

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