E-Prescribing: Benefit, Barrier, and Adopting Challenge in Electronic Prescribing

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Introduction

Manual prescribing (handwritten) is the main communication of drug and therapy options for patients between the doctor as prescriber and pharmacist. The downside of this manual prescribing is the poor handwritten prescription that leads to misreading, misinterpretation risk, and misunderstanding the prescription[1]. Some drugs that are chosen sometimes are expensive so the right drugs of choice could give a big effect on hospital finance and therapy planning. These thing cause the need for a way out to avoid mistakes while adapting Electronic Prescribing (E-prescribing) system. E-prescribing is defined by California Health Care Foundation as "entering a medication prescription into an automated data entry systems such as handheld, PC, or other, and thereby generating a prescription electronically, instead of being written on a piece of paper"[2]. Moreover, according to eHealth Initiative Foundation, E-prescribing is the computer-based electronic generation, transmission and filling of a prescription, taking the place of paper and faxed prescriptions[3]. Although E-prescribing has many advantages, not all health facilities, in this case Hospitals, can adopt E-prescribing system. Therefore, in this journal, we will discuss the benefits and the barriers of E-prescribing as well as factors needed to adopt the E-prescribing system in the Hospital.

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Electronic Prescribing

Electronic Prescribing or E-Prescribing briefly defined as a system that enables electronic transmissions of prescriptions to pharmacies from the provider's office[4]. E-Prescribing system provides prescribing drugs electronically. E-prescribing system can be a stand-alone system or be integrated with Electronic Health Records (EHRs) system. Stand-alone E-prescribing system enables the hospital management (as provider) to store and manage patient's records spesific to the prescribing process, for example medication allergy and medication history. The stand-alone system tends to cost lower and easier to adopt in comparison to the integrated system. The EHR-integrated system, allowed providers to access all patient's data in EHR including patient's diagnosis, problem lists, clinical notes, also laboratory and radiology results that can be considered as a model to develop therapy safety[3,4].

Benefit, Barrier, and Adopting Factor for Electronic Prescribing

There are a lot of things that needed to be prepared before implementing electronic prescribing. User-friendly software

from a certified provider, specific training for the user, collaboration with pharmacy, and also policy and control system are very much needed[6]. Implementing a new system is not easy, we need to consider the benefits, barriers, and adopting factors that can affect the success of the electronic prescribing implementation.

Benefit

In general, the benefits of electronic prescribing implementation are improved patient safety and quality of care, improve patient's comfort and therapy adjustment, cut the time needed for either calls and back-calls from the pharmacist or for faxing prescription to the pharmacist, automatically renewing and prescription consent, formularium renewing that allows the physician to substitute the same drugs to the one with better price, ease the prescriber mobility, and also improve drugs surveillance/recall[3].

The main benefit of E-prescribing for patients is the guarantee of therapy management process safety. E-Prescribing can minimize medication error risk and adverse drug events resulted from manual/handwritten prescribing error and further improve patient safety and quality of care. Misinterpretation of the handwritten prescriptions can be avoided. In an ideal e-prescribing system, the prescription can be adjusted based on the patient's current condition, patient's allergy, diagnosis, weight, and age to reduce the risk of drug interaction and also to see drugs and dose accuracy. E-prescribing can also keep the patient's whole therapy history that allows the prescriber to adjust therapy based on the patient's history and also ease the prescriber to double-check the patient's medical needs. This can reduce the patient's drug costs and also improve prescribing efficiency. The prescription can be sent to the pharmacy of the patient's choice electronically and can be taken immediately when the patient comes to the pharmacy[1,2,3,7,8].

The benefits of E-prescribing for physicians are safety and accuracy of prescription that ensures physician's satisfaction, reduce the possibility of malpractice accusation, and most importantly reduce call back from pharmacy due to prescription errors related to doctor's handwriting[2]. As for pharmacist, E-prescribing facilitates them in the process of drugs preparation with no need to call the physician back to confirm prescribed medication. In addition, communication between pharmacists and physicians is done in a "paperless" manner so that errors related to the prescriber's handwritten can be avoided. These changes can save time and money used in the prescription process[1,3,9].

Barrier

In line with many advantages of E-prescribing system, this adaptation also has several barriers in its implementation.

The most important barrier according to Poterfield's research is the lack of financial support. E-prescribing also uses the newest technology so special training is needed for all workers related to the E-prescribing system and that will cost a lot of money. If the E-prescribing system used is not well designed, there will be new issues related to hardware problems, workflow issues, software problems, and other problems such as cost, time consumption, and connection issues[9]. Guideline therapy that keeps changing also require the system to always be ready to be updated following the latest guideline. In addition, not all e-prescribing systems have the ability to adjust drug doses for special patients such as for kids[10].

E-prescribing has also created some new workflow challenges. There can be some delays on the prescriber and pharmacy side. For example, prescribers might not submit the e-prescription immediately after a patient visit, then cause the delays at the pharmacy, and often resulting in a phone call from the pharmacy to the prescriber's office after a patient waits for some times[7]. E-prescribing system is also not ideal for the Emergency Room (ER) because it takes longer than the manual prescription. Especially between peak hours, the software could be much slower if the server can't adjust. The use of different E-prescribing system at the different hospitals also become a barrier especially for physicians who works at multiple hospital would need even a bigger effort to understand and be able to use all of the systems correctly. This barrier in addition to the lack of user's understanding of E-prescribing benefits could reduce GP willingness to use the system which leads to an imperfect implementation[11].

Based on Almutairi's experiment in 2018, the main barrier in E-prescribing implementation are cost-related, time-related, lack of efficiency, negative perspective with technology, limitation of computer use capability, limitation of interoperability, difficulty to correct the input data, and limitation of system capability to perform the required tasks. Furthermore, there may be concerns regarding differences in healthcare policies and the enforcement of local privacy and data protection laws[12]. Implementation of electronic prescribing will need legislation or rulemaking to provide for clear and concise standards and policies for prescribers, pharmacists, and regulators[13].

In addition, technical error can also happen, like mistyping, computer crashes, entry mistakes, unauthorized record retrieval, etc. Some errors that can still be found including the error in quantity input, directions, dosage, drug type, and also patient's input error[7]. Another difficulty that one might encounter is computer software. Computer software

can't take into account every patient's condition and prognosis; what may be one's contraindication may be a life-saving therapy for another. Warning and alert can be dangerous for some medical practice[13]. Besides, electronically transmitted and stored data are susceptible to a host of security issues such as hacking and virus attacks. Such issues may lead to not only breaches of patient privacy, but also be used for other criminal purposes such as inappropriate prescribing of controlled substances or high-cost medications[7].

Adopting System's Challenges

E-prescribing system can simplify the process of prescribing if it's done with the right tools and methods. Following the results obtained later, changing into an E-prescribing system would have a lot of challenges and can be difficult in its implementation process. The main challenge is financial cost related to the implementation and maintenance of E-prescribing system adoption[3,14,15]. Physician as the main prescriber especially who works in a primary health facility are more likely to have a heavier burden that is not worth the income they get. This relates to the adaption of the E-prescribing system which indirectly requires the prescriber to update the hardware, software, and other costs needed depending on the system they used whether in the form of EHR system or stand-alone system. Even physicians receiving free e-prescribing systems may face financial costs in the areas of practice management interfaces, customization, training, maintenance, and upgrades as well as time and efficiency loss during the transition period. Research conducted on 443 primary care physicians, mentioned that the problem faced in E-prescribing implementation process will likely require collaborative efforts by e-prescription networks, e-prescribing software vendors, payers, pharmacies, and prescribers to improve e-prescribing processes[3,15,16].

Changing the manual prescription to the E-prescribing system automatically will require a change of management used in a health facility. Changes in management, especially for providers and staff who are unfamiliar with technology, cannot be made drastically. So it takes time to practice and adapt to work new changes based on the new management. Management change requires careful planning, training, support, and continuous quality improvement for effective management. The next challenge is to choose the right hardware and standardize software, and also maintenance after installation. This is a formidable challenge for physician, especially who works in a small busy clinic because it needs time for hardware installation meanwhile they lack of available technology expert staffs. Besides, in rural areas or areas far away from the city center, the biggest challenge is limited remote access to E-prescribing including digital service and decent internet service. One of the advantages of E-prescribing is that it can provide information to the prescriber about the on-going treatment and the patient's therapy history. These patient's information can be obtained from various sources, therefore prescriber has to ask the patient again to ensure the truth information and to always update the patient's current treatment. In addition, not all stand-alone E-prescribing system have patient's therapy history so it can affect the prescriber's medication decisions. E-prescribing systems should be able to accommodate prescribing when the prescriber uses multiple office sites since there are often different prescriber registration numbers, passwords, etc. that not all E-prescribing systems have this function. It is important to be able to view and manage patient records from one site while working elsewhere[3,15].

The most basic challenge related to the patient is the patient's willingness to use E-prescribing. Some patients may be uncomfortable with E-prescription and rather ask the doctor to provide manual prescriptions. Also some patients that travel frequently or away from home for a certain period of time are more likely to ask for a manual prescription instead of E-prescription[3]. Communication between patient-prescriber-pharmacist also becomes a challenge in E-prescribing implementation. In several studies, patients have reported that they were unaware that an e-prescription was waiting for them at the pharmacy. Perhaps in the future, pharmacies, pharmacists, and researchers may seek to identify ways to facilitate personal communication among the patient, prescriber, and pharmacist to reduce problems arise when dealing with e-prescriptions[16]. The E-prescribing adaptation challenge that deserves attention is the risks associated with legibility, misinterpretation, and falsification of handwritten prescriptions.

In the user's point of view, education and training during pre-implementation are important. User's perspective change is one of the key factors for a successful implementation. Several studies show that physicians become more motivated in using E-prescribing system after using it and feel the benefits on their own. This means that physicians really need to understand the benefits of the E-prescribing system. If users can't feel the benefits of E-prescribing, most likely they will reject the system and prefer the manual prescription which is considered faster and more effective. The vendor must prove to the user that the efficient use of E-prescribing is worth the cost they spent on the system so the cost problem won't become a barrier any longer. The vendor should also provide a free-trial E-prescribing software program so that the users who plan to use the system will be more motivated to adopt the system[11,17].

Pizzi in his journal stated that the strategy needed to increase the successful implementation of E-prescribing is divided into two parts, namely techology level and health care system. In the technology level, the key to emphasize is that it's important to understand how doctors and pharmacists "work" so that the implementation is maximized. It's better to avoid inefficient E-prescribing systems. Data entry should be minimal and follow a logical flow and also improving the user-friendliness may be needed to ease the user. Meanwhile at the health care system level, health care delivery and professional organizations should commit to the E-prescribing system and communicate this commitment to each of their employees or members. This requires an organizational vision and strong leadership who must involves employees in the whole implementation process. Also, relevant professional organizations and technology vendors must standardize products as much as possible byensuring a minimum similarity in product functionality andconsistency in clinical nomenclature[14].

Conclusion

E-Prescribing system provides prescribing drugs electronically that facilitate communication and minimize problems that occur between the prescriber, pharmacist, andpatient. Implementing an E-Prescribing system requires a lot of consideration in terms of advantages, barrier, and challenges to be faced. The main advantage of using a E-Prescribing system is to increase patient safety, which is minimizing medication errors and preventing adverse events. Meanwhile, the biggest barriers and challenges are cost- related and adaptation of the E-Prescribing system by health facilities and related health workers.

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