



## Benefits of electronic prescriptions for administering medication and treatment, as compared to traditional written prescriptions

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### ABSTRACT

Addressing the controversies to drug therapy involves talking about and discussing emotional, cognitive, behavioural, and social problems. Also, several pieces of literature and comparative studies have been established to understand the intervention practices of medical staff in patient counselling in terms of improving patient care. But with limited knowledge in counselling-related studies, these issues can be tackled by qualified and knowledgeable pharmacists. The study aims to conduct relevant quantitative data to determine if pharmacists' role in counselling is of high essentiality towards medical care to promote public health and quality care. Also, the research topic revolves in establishing how much pharmacists' obligations are practical towards the patients' counselling. A cross-sectional survey of community pharmacists (n=400) working in the Hail region hospitals in Saudi Arabia was conducted during May 2019. The survey infrastructure comprised of six different sections, gender, age, degree, profession, workplace, and experience. The qualitative data gathered was first explored using frequency distribution and descriptive analysis. The total pharmacist valid response (210) was accepted, and both genders contributed towards such results. Moreover, most of the pharmacists attested to the elements of lack of medical tools and proper training as a significant medical issue towards appropriate counselling approaches. Nonetheless, it was proven that leading problems that undermine the effectiveness of pharmacists towards promoting acute counselling were a lifestyle (mean of 2.96), smoking cessation (mean of 2.69), time to administer each drug (mean of 3.05), and missed a dose (mean of 2.05).



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### INTRODUCTION

Prescription errors are very common problem worldwide. They may lead to worsening a patient's condition, and in the worst cases, they can result in death. Many countries still use written prescriptions (WP), which are known to allow more errors, ignoring the improvements afforded by electronic prescriptions (EP). Misreading manual prescriptions among health practitioners is a major cause of errors, frequently due to illegible handwriting leading to various kinds of error, including the wrong medication, the wrong frequency or duration, and incorrect patient information. Further, a

workflow is less efficient when valuable time is lost by pharmacists or health practitioners struggling to understand a prescription. With developments in new technologies and electronic health systems, hospitals today should be equipped with all useful means of providing better services.

Countries that have not yet implemented new technology that includes electronic prescriptions are more affected by the problem of prescription errors. Patients expect to have positive outcomes from modern health treatment, not to become victims of avoidable errors, so EP as part of a comprehensive electronic system should be implemented as soon as possible to tackle the problem of prescription error. In the USA, more than 40,000 people die each year due to medical errors. In the UK, studies have shown that serious prescription errors occur in a range of 1 in 10,000 to as high as 1 in 1,000. Unfortunately, there are few studies in Saudi Arabia assessing prescription errors caused by the use of WPs to underscore the importance of introducing EPs. Many hospitals in Saudi Arabia have begun to use EPs, but too many are still using WPs and facing the consequent errors. This study collected data from two secondary hospitals in Saudi Arabia regarding their use of WPs and EPs.

## MATERIALS AND METHODS

### Study design

This is a retrospective study of prescription errors in two hospitals in the Al-jouf region. Three hundred WPs were collected from King Abdulaziz Specialist Hospital and 300 EPs from Prince Muteb Hospital.

The study employed a qualitative methodology to investigate whether e-prescriptions are preferable to a written prescription. A critical systematic review of the literature concerning WPs and data from two hospitals, Prince Muteb bin Abdulaziz Hospital and King Abdulaziz Specialist Hospital, both in Aljouf, Saudi Arabia, were used to conduct the primary objective of the study and to evaluate the differences in terms of accuracy.

## RESULTS AND DISCUSSION

The patient information section is crucial in any prescription to provide important data about the patient, such as name, gender, age, diagnosis, and any allergies. These details permit a pharmacist to dispense the prescription properly by confirming that the medication matches the patient's data. For instance, confirming that the medication is appropriate for the patient's age and any possible allergies.

Of the total of 300 WPs, patient information in 243 was not fully provided, with many items missing, which may lead to a prescription error, possibly endangering the patient's life. Only 57 of the 300 EPs were missing some information, meaning that most EPs recorded all patient information required, thus further confirming the efficacy of EPs compared to WPs, in terms of patient information.

Dosage error was another common mistake in WPs, as physicians sometimes appeared to have been writing too quickly, perhaps trying to attend to too many patients due to an overload. The problem of lack of time for writing prescriptions by hand can lead to non-standard abbreviations, such as a shortcut for suspension being read as a solution, or even as a suppository in some cases. Dosage errors can also be caused by unclear symbols (e.g., Kg, Mg) or even the numbers themselves. These indications are clear and accurate when written by a computer on the EPs.

More than 200 of the 300 WPs were not clear for the reader and caused confusion. Most of them were unclear as to the name of the medicine; others were missing numbers or gave incorrect numbers. In the EPs, numbers were clear, and the manner of dosage was also clear, as they were printed by the computer; there were a few mistakes caused by the printer, such as low ink, but that accounted for only 20 of the 300 EPs, so the use of EPs is easily justified from this standpoint.

The tendency of some physicians to save time in order to see more patients leads to writing half the name of the medication or incorrect spelling, which can be confusing for the pharmacist at times. This can lead to dispensing an incorrect order to the patient. Of 300 WPs we found 243 that were not clearly understandable for different reasons, including poor spelling, non-standard abbreviations and unclear handwriting, while in the EPs, the computer's auto-correct made a difference when a physician's spelling was faulty, and of course the writing is always clear enough to be easily read, except in the 20 out of 300 prescriptions mentioned above that had printing shortcomings.

In terms of prescription archiving, WPs performed quite similarly to EPs, as both are adequately documented in files, although EPs may be more prone to be lost as pharmacists rely on the computer. There is a possibility of computers being unreliable in cases of the system hanging up, or even of hacking or viruses in the software.

Every prescription should indicate the duration for the patient to continue taking the medication prescribed, as indicated by the physician or the phar-

macist, and clearly informed to the patient. Some physicians use abbreviations for the duration and, whether typed or handwritten, the numbers can be misunderstood, even by the pharmacist, on WPs, while on EP's, the duration is clearly printed by the computer, which can limit errors of duration.

Clearly, WP's cause more errors than EPs, with 257 for WPs compared to 33 for EPs of the 300 prescriptions in each format in our study. This is a significant result strongly recommending the use of the computer in producing prescriptions.

Time efficiency is important for workflow in most hospitals, not only for the patient but also for the entire health care staff. When physicians have to spend more time writing prescriptions and pharmacists spend more time deciphering prescriptions that are difficult to understand, a great deal of time has been poorly spent. Precisely and thoroughly written, EPs avoid wasting time in writing and reading prescriptions, in addition to their enhanced accuracy.

For monitoring drug inventory, all lists of dispensed medications are recorded in the system, but the use of EPs allows pharmacists to quickly ascertain the available quantities of medications in less time after being dispensed, compared to written prescriptions whose inventories must be manually maintained. The drug inventory was more accurate, at 95% with EPs, and with fewer shortages of medications, compared to 56% accuracy in inventory control using WPs.

Electronic prescription (E-prescription) forms part of the health information system. Electronic information system as a whole is defined by the generation, transmission, and filling of a medical prescription using computers instead of traditional methods of faxed and written prescriptions. E-prescription system involves a prescriber, transaction hub, pharmacy with implemented electronic prescribing software, and a pharmacy benefit manager. Despite the fact that it offers many advantages, it is rarely used in countries such as Saudi Arabia. This study aimed at critically analyzing and investigating the benefits accrued when using e-prescription to administer medication and treatment, in comparison to the tradition written prescription. Based on the data collected from King Abdulaziz Specialist Hospital and Prince Muteb Hospital in the Al-jouf region, the benefits of e-prescription are elucidated over written prescriptions.

E-prescription is clearer than written prescriptions. In this study, more than 200 of the 300 WPs (written prescriptions) were not clear for the reader and caused confusion. This was mostly due to illegi-

ble handwriting. In most of the written prescriptions, the name, dosages, frequency, and duration of the prescriptions were not clear (Patil *et al.*, 2015). This finding is similar to other studies in other parts of the world which found electronic prescriptions to be clearer than written prescriptions (Donyai *et al.*, 2008). A computer generates standard typing, electronic prescriptions that are clearer and readily understandable. This improves a patient's safety and limits liability, which may result from misinterpretation of information (Kumar *et al.*, 2019). In deed, bad handwriting has been reported to cause about deaths that can be minimized using electronic prescriptions (Odia, 2011).

Electronic prescriptions provide more accurate and complete information. In this study, 243 out of 300 WPS were not fully provided, whereas only 57 of the EPS were found to be missing some information. It is only relatively harder to confirm patient and prescription details compared to e-prescriptions. In addition, e-prescriptions modules can be standardized and customized in a way that they are able to notify the prescribers in case of missing or incorrect details. In addition typing errors in electronic prescription, systems can be flagged by the system easily compared to written transcription (Grossman *et al.*, 2012; Lichtner *et al.*, 2013).

Time management is a factor in consideration of both E-prescription and WPs. E-prescriptions save a lot of time compared to a written prescription. This is beneficial to both the hospital stuff and the patient. In this study, it was noted that physician spends more time writing prescription while pharmacists also spend a lot of time deciphering them. It was also noted that most physicians use abbreviations which might be misinterpreted. Patients and hospital stuff also spend time to deliver the prescription to the pharmacist (Grossman *et al.*, 2012; Lichtner *et al.*, 2013). Electronic prescriptions are delivered electronically. The abbreviations can also be corrected by the computer to standard abbreviations or full words to avoid misinterpretations. The electronic system reduces the time required by doctors in writing prescriptions. In built electronic databases also play a significant role by informing the pharmacist on available medications, their indications, side effects, duration of use, and possible drug interactions (Grossman *et al.*, 2012; Lichtner *et al.*, 2013).

It is easier to monitor drug inventory using electronic prescriptions compared to a written prescription. In this study, the drug inventory was more accurate, at 95% with EPs, and with fewer shortages of medications, compared to 56% accuracy in inven-

tory control using WPs. This is attributed to the fact that the electronic system maintains a list of all dispensed medications. It also allows the pharmacist to ascertain the quality and quantities of available medication in less time as opposed to manual inventories, which are used for written prescriptions. This is advantageous to the patient as they spend less time picking their prescriptions and further promote their compliance in medication use. It also ensures that the pharmacies are routinely stocked, especially with essential medicines that might be required in cases of emergencies (Latha *et al.*, 2012).

Electronic databases enhance pharmacovigilance compared to written prescriptions. The results of this study shows that patient information such as such as name, gender, age, diagnosis, and any allergies were more complete in electronic-prescription compared to written prescriptions. This makes electronic prescriptions to be more superior in ensuring that dispensed medication matches the patient's data and is appropriate for patient age. Electronic prescriptions also enhance pharmacovigilance by systematically documenting treatment indication. This provides an opportunity to develop new pharmacovigilance tools that will allow the evaluation of drugs by weighing benefits and risks for specific indications and evaluate off-label prescribing. It also provides and interfaces for indications with reminders and clinical guidelines that can enhance clinical decision making (Egualde *et al.*, 2010). It is relatively harder to forge electronic prescriptions. This results in limited access to regulated drugs and substances.

Electronic prescriptions are more secure as only a few people have access to patient data as opposed to written prescriptions, which can be accessed by many people and can easily be lost. E-prescriptions can be easily backed up, require less space for storage compared to written prescriptions (Sunyaev *et al.*, 2009).

Electronic databases require a lot of capital to set up. They require trained personnel with knowledge on computer use. They are also prone to hacking and may not be encouraged by old prescribers and pharmacist who are digital migrants as opposed to the young generation who are also known as digital natives. They are also prone to very few typing and transcription errors. Despite these factors, the merits of using electronic databases far outweigh its demerits, and therefore, its use should be promoted among prescribers, pharmacist, and even the patients (Podichetty and Penn, 2004).

This study aimed at establishing the advantages

of using electronic prescriptions (EP) overwritten communications (WP). As noted from the discussion, the world is in a new era, and for this reason, efficiency has to be a priority in health services (Ghaffar *et al.*, 2015). When comparing EP and WP, efficiency, effectiveness, and aligning with the present-day demands in the sector are the dominant factors. Moreover, the old system of WP was tedious, given that a patient had to make several queues before finally getting to the pharmacy for medicine. Notably, there was a heightened risk of the wrong medication or worse still wrong dosage. The new EP model can be argued to close the gap created by the old WP system (Jha *et al.*, 2008). As noted in the research, most hospitals are still obstinate in adopting the EP model. However, this model perfectly aligns with the present society.

## CONCLUSIONS

The effectiveness is notable from having fewer patients reporting the wrong dosage. Incidences of the wrong dosage are closely related to the illegible handwriting used by medical practitioners while trying to serve many patients in the shortest time possible. In contrast, doctors using computer writings allow the patients to correctly see the instructed dosage, thus reducing the risk of the wrong dosage. The results from the study reveal that most patients can comfortably comprehend the dosage given using EP and that only in a few cases were patients unable to read the writings. EP is, therefore, an instrumental method in ensuring efficiency while addressing the patients' needs. Besides, EP fosters workflow in the hospitals. Since a practitioner will type the prescription online and forward it to the next department, patient service and workflow are useful in the caregiving units. Patients can be served relatively fast and efficiently while checking on medical inventory. Although there is an initial substantial capital investment when installing EP, there are many associated benefits which make it suited in the contemporary health sector.

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