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**ELECTRONIC DRUG PRESCRIPTION ON ACHIEVING EXCEL-
LENCE IN NURSING**

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ABSTRACT

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<p>The purpose of this study was to identify how electronic drug prescription (E-Prescription) helps nurses achieve excellence in nursing field. The study was aiming to find whether E-Prescription was important in nursing work and how nurses actively responded and participated in the eHealth program. In addition, the study also provides more information as to why E-Prescription is widely used in the current health care.</p> <p>The research was conducted as a literature review. Data was acquired from different databases such as, Science Direct, SAGE publications, Emerald, EBSCO and PubMed. 11 articles were selected, as they met the criteria employed by the researcher (i.e. not older than ten years and focusing on the topic of research).</p> <p>The articles selected were both quantitative and qualitative. The findings revealed that the implementation of e-prescription in health care enhances the ability of a nurse to provide quality care that is efficient, cost-saving and time-saving. As such, this finding highlights the need for the implementation of e-prescription in nursing.</p>		

Key words

E-Health, medication, electronic prescribing, information technology, drug-related problems, health care, nursing, medical error

LIST OF ABBREVIATIONS

DRP	Drug Related Problems
HIT	Health Information Technology
PDMPs	Prescription Drug Monitoring Programs
E-Prescription	Electronic Prescription
ADEs	Adverse drug events
MDS	Medication decision support
KELA	The Social Insurance Institution
EHRs	Electronic Health Records

TABLE OF CONTENTS

ABSTRACT

LIST OF ABBREVIATIONS

TABLE OF CONTENTS

1 INTRODUCTION.....1

2 ELECTRONIC PRESCRIPTION (E-PRESCRIPTION).....3

1.1 Medication Error4

1.2 Advantages of Electronic Prescription in Nursing.....5

1.2.1 Cost Savings and Time Saving Associated in E-prescription.....5

1.2.2 Reduction of Prescription Errors6

1.2.3 Communication between Health Care Professions.....7

3 PURPOSE AND RESEARCH QUESTIONS.....8

4 METHODOLOGY.....9

4.1 Literature Review9

4.2 Data Collection.....9

4.3 Data Analysis.....10

5 RELIABILITY AND VALIDITY13

6 RESULTS15

6.1 Benefits Associated with the Implementation of E-Prescription.....15

6.1.1 Reduction of Prescription Errors15

6.1.2 Improvement of Communication16

6.2.3 Cost Savings Associated with E-prescribing17

7 DISCUSSION18

7.1 Methodological Considerations and Limitations18

7.2 Ethics.....18

7.3 Discussion of Findings18

7.4 Implication of the Study to Nursing.....20

7.5 Implication of the Study to the Learning Process.....20

8 CONCLUSION.....21

9 REFERENCES.....22

APPENDIX: RESULTS26

1 INTRODUCTION

Nursing is among the most rewarding professions. However, it is a challenging and exhausting profession physically, psychologically and emotionally. The goal of nurses today is to provide best-practice care that is efficient, cost-effective, and evidence-based in different health institutions. According to Taegtmeyer (2011), medication is essential in health care because it enables the prevention and treatment of many conditions or diseases. However, medication errors and drug-related problems (DRP) are more frequent and it causes suffering to the patients and massive costs to society or to the government. Medication management is a complex process, and the implementation of the medication process requires the cooperation of various healthcare professionals including the nurses. Nurses take a long period of their working time on each shift handling various aspects of medication management and administration. Advanced health information technology (HIT) in nursing, is absolutely helping nurses to provide good care for their patients or clients. In relation to this, Taegtmeyer (2011) points out that HIT in current world is used in collecting, storing, retrieving, and transferring clinical and administrative health information electronically.

Smith, 2006 & Samadbeik, (2013) informed that electronic prescription (E-Prescription), is a part of current e-health approaches as the electronic handling of prescriptions by health care professionals. E-prescription is a way where the prescriber, for instance the doctor or any other health care provider who is legally allowed to give patients' prescriptions electronically and send them directly to the pharmacy or other health institutions in the case of continuation of care. Electronic prescription has widely opened the possibility of connecting a big range of health care services and facilities. Nurses are primary users of e-prescription. On every ward or other health institutions an e-prescription system is always in use. Once the medicine has been prescribed, the nurse adds the medicine to the medicine list of the patient and distributes the doses to specific drug round times (Smith, 2006; Samadbeik, 2013). Moreover, he/she indicates in the documentation at which the first dose is to be given.

In Finland, e-prescription is widely used. The health care facilities are undergoing changes due to the implementation of the electronic prescription system mostly known as 'e-Resepti' in Finnish. The main reasons behind this implementation were to improve patient safety and savings in operational costs. The prescription is entered into a centralised database called the

prescription centre. The Social Insurance Institution also known as 'Kela' in Finland controls this prescription centre. The overall medication of the patient is first checked from the prescription centre on demand and then the information is available in the health care services but only to the doctors and nurses treating the patient following the patient's consent to view his or her information.

Despite the wide application of the e-prescription system in Finland, limited information/literature exists concerning the effectiveness of this system in enhancing the efficiency of nursing operations. Besides, there is no literature on the deployment of the e-prescription system in the country, as well as how the system is handled. As such, there is a significant need to execute a research with the aim of establishing the benefits of this system in order to encourage more organizations to adopt and implement it. Such an undertaking will also provide a suitable platform on which the mechanisms that can be employed in further improvement of the system can be identified or developed (Martinson & Vallikivi, 2016)

Nurses play a significant role in health care institution and need to ensure that the latest information and knowledge about the evolving HIT needs are being met. Rahmner et al., (2014) asserted that, to gain such information, they need to undergo different trainings and share ideas between other health care providers to enable them improve the quality and readiness of health care service delivery in all areas of care.

The purpose of this study was to identify how electronic drug prescription helped nurses achieve excellence in nursing field. The study was aiming to find whether electronic prescription was important in nursing work and how nurses actively responded and participated in the e-Health program. In addition, the study also provides more information as to why e-Prescription is widely used in the current health care.

2 ELECTRONIC PRESCRIPTION (E-PRESCRIPTION)

Prescribing of drugs is one of the most numerous interventions done by health care professionals related to prevention or curing many diseases, which also helps to increase quality of life among patients. Different age groups often use medicine depending on the morbidity, age, gender and socioeconomic factors. According to Smith (2006) & Samadbeik (2013), appropriate use of medications is when a professional health care provider accomplishes four objectives. The first objective is prescribing appropriate drugs to the patients according to the patients' clinical needs. The second goal is to give proper doses that meet individual requirements. The third aspect is ensuring that adequate time is provided to the patient for consumption of the medicine. Finally, the fourth objective is the aspect of lowest cost to patients and communities' expenses.

Many technologies are currently evolving in the development of e-health; hence, the internet will clearly continue to be the primary driver in the foreseen future of health care. Health care providers or professionals and patients or clients are turning toward the internet, which has greatly enhanced the reach of the potential customer base. This standard of technology has started to make the health care providers comply with participating in the world of e-prescription. Smith (2006) & Taegtmeyer (2011) asserted that, with the huge amount of legal drugs increasing, e-prescription has brought a number of benefits to all parties involved in the exchange of patient prescription information

Soon after the implementation of e-prescription, it was found out that weaknesses related to reliability, functionality, and usability could affect patient safety. For an improved e-prescription, the need of a holistic approach of technology users to help in implementation of the system was taken into consideration. Therefore, sharing of information, support in decision making, education, as well as clarification of responsibilities was to involve the health care providers which included nurses (Rahmner et al. 2004). These changes have extremely helped nurses increase patient safety because they get to view the medical list of patients and administrate medicines as required. According to Smith (2006) & Taegtmeyer (2011) nurses are now able to minimize the DRP due to the use of drugs and the proportions of people prescribed multiple drugs are decreasing.

In parallel to the improvement in technology, e-prescription, which has been developed to prevent errors, involves direct transmission of prescriptions from the working environment of physicians to pharmacies or other parts of health care facilities via computers. E-Prescription systems are able to store all updated information of a prescription in electronic environment. Health care institutions and pharmacies can access prescription data to the extent they are authorized to. In relation to this, Sebetci & Ceti (2015) argued that all activities regarding the registered supply, refund, and follow-up of medications can be performed in electronic environment.

Prescription drug monitoring programs (PDMPs) are electronic databases that collect data on controlled substances. These databases consist of a suitable way that doctors and nurses responsible for the patient are able to check the amount and types of drugs that have been prescribed for the patient by other health care providers (Worley, 2012; Samadbiek, 2013). Therefore, PDMPs have been known to decrease illegal drugs for non-medical use target. However, health care providers must register to use the program and for them to be able to access the patient's files, they need to enter patient's name and date of birth. On the other hand, Worley, (2012); Samadbeik (2013) & LeMire et al., (2012) point out that the information concerning the party or individual that has accessed the patients' data can be also retrieved.

1.1 Medication Error

According to Villasenor & Piscotty (2016), executions of medical orders happen to be a significant aspect of patient's care and the healing process. Besides, it is the principle element of nursing performance, and contributes significantly to patient safety. Escobar-Rodriguez et al., (2012) informed that, errors associated with medication can significantly impact treatment cost and patient safety and cause hazards for patients as well as their families. The issuance of medicine is one of the prominent responsibilities of nurses, as the resulting errors may lead to unintended, serious outcomes for patients. Escobar-Rodriguez et al., (2012) added that errors arising from medication can lead to adverse consequences like increased period of hospitalization, increased medical expense, and increased mortality.

According to Black (2013), nursing medication errors are often common despite these errors being caused by all healthcare team members. Black (2013) added that the principal reason for the prevalence of nursing medication errors is that nurses spend approximately 40% of

their working time administering medicines in hospitals. Devine et al., (2010)) pointed out that, nursing medication error cases or rates are high in both the developing and developed nations. According to Devine et al., (2010) approximately one-third of complications arising from medicines are associated with medication errors.

Medication management is one of the main responsibilities of a nurse in any kind of health care setting. It is a complex process, which involves different phases. These phases include, prescribing, transcribing, ordering, dispensing, supplying, administering and storing. The nurses particularly deal with ordering, administering and storing. Baril et al., (2014); Lisby et al., (2012) & Allison et al., (2015) informed that error at each phase of the process may occur and this will influence patient's safety. It also brings extra costs to individuals and has financial impacts on the government. Medication administration by the nurse is a vital phase since most medication prescription and dispensing errors are detected during this phase. Medication errors have many causes. Some of these causes can be poor medication-knowledge and omitting to clarify before prescribing or administering. Furthermore, improper nursing practices, lack of supervision and poor documentation. Most of these medication errors are related to human factors.

According to Baril et al., (2014); Lisby et al., (2012) & Allison et al., (2015), electronic prescription has been shown to reduce consistently drug prescription errors. Baril et al., (2014) continued to elaborate that, when a medication error has occurred, the nurse has a responsibility to report immediately any incident or accident that had resulted from her actions or omissions so that the situation can be corrected without delay. Therefore, immediate actions must be taken to increase patient safety.

1.2 Advantages of Electronic Prescription in Nursing

According to Samadbeik (2013), implementing electronic prescription system has overcome many DRP compared to paper prescription process which offers numerous advantages. When all the patient's prescriptions are entered in the Prescription Centre, the doctor and the nurse with the patient's consent, check his/her overall medication history and this will help to prevent possible adverse drug interactions and overlapping.

1.2.1 Cost Savings and Time Saving Associated in E-prescription

Cost savings and reduced expenses of health care for patients and health care providers including nurses are achieved throughout the prescription processing system. Large savings mostly occur with the reduction of visits to primary care offices and emergency rooms. Previously, nurses indicated that their work associated with drug prescribing was both time-consuming and exhausting (Rahmner et al., 2004). Usually before a patient is prescribed medicines the doctor or nurses ask the patients about their current or past drug use. Most patients especially the elderly do not remember the dosage or strength, and sometimes not even the names. Consequently, nurses could have to call the health care center, nursing home or families to be able to obtain information. However, sometimes information cannot be obtained on time or even at all and they still have to treat the patient's symptoms especially during emergencies. Instead, Rahmner et al., (2004) argued that electronic prescribing has opened the possibility of connecting a wide range of e-health support services directly to the prescribing process, which further has reduced the error rates.

Black (2013) added that connecting pharmacy and physician systems has minimized paper work, as well as the associated errors that can arise from dependence on handwritten notes, which in turn has produced cost and time savings for all individuals and parties involved. According to Villaseñor & Piscotty (2016), the potential of e-prescription for cost saving is estimated to be \$28 billion every year in the U.S. These researchers added that, costs savings associated with e-prescription are created via improved access to formularies on the part of providers and improved efficiency. Devine et al., (2010) point out that the time spent handling clarifications is also reduced in a significant manner when using e-prescriptions, thereby enabling providers to focus adequate attention on patient care. Escobar-Rodriguez et al., (2012) added that, e-prescription has led to the reduction of cases of pharmacy-initiated clarifications, thereby decreasing the time spent by providers and pharmacists on the phone and therefore shortening the time needed to fill in prescriptions and delivering them to patients.

1.2.2 Reduction of Prescription Errors

At the point of patients' care currently, medication errors are decreasing gradually. The nurse is able to identify the prescribed drugs, which provides a safe instrument for electronic access to updated medical information and patient medication history during medical care. Lisby et al., (2012) & Taegtmeier (2011) added that nurses help in analyzing patients' electronically

stored prescriptions in order to detect potential DRP for instance drug-drug interactions, high dose, drug-allergy reactions and inappropriate drugs for the patient. This finding is supported by the finding of Escobar-Rodriguez et al., (2012) that established that, e-prescription decreases errors associated with medication and prescriptions and has led to limited cases of call-backs from pharmacies for clarification from physicians.

Black (2013) also pointed out that e-prescription contributes to the efficiency of patient care by streamlining the process involved in delivering prescriptions to the pharmacy, obtaining refills, and dispensing medication. As such, the chances of losing prescriptions are limited. The researcher added that, e-prescription eliminates errors associated with illegibility and assists providers to make informed or better decisions concerning the medications that should be prescribed in relation to the histories of patients and allergy data, which are found within systems integrated with electronic health records (EHRs).

1.2.3 Communication between Health Care Professions

E-prescription provides safe, two-way and electronic communication between nurses and other health care professions (Lisby et al., 2012). This finding is in line with the finding of Taegtmeier (2012) that established that; e-prescription offers a secure, mutual communication between nurses and other health care practitioners. This has improved inter and intra-team work in medical field. Increased legibility, correction, sharing knowledge for better patient care had also been seen. In addition, it has reduced improper verbal relationship and poor handwritten prescription. According to Lisby et al., (2012), nurses can also store prescription data securely and communicate to other members of the health care team without the risk of paper medical records being lost. Escobar-Rodriguez et al., (2012) added that e-prescription has enabled prescribers to electronically convey or send prescription information of patients to pharmacy and within health care settings, thereby improving communication efficiency.

3 PURPOSE AND RESEARCH QUESTIONS

The purpose of this study was to identify how electronic drug prescription (E-Prescription) helps nurses achieve excellence in nursing field. The study was aiming to find whether E-Prescription was important in nursing work and how nurses actively responded and participated in the eHealth program. In addition, the study also provides more information as to why E-Prescription is widely used in the current health care. The study aims to address the following research questions:

1. How does electronic drug prescription (e-prescription) help nurses achieve excellence in nursing field?
2. What is the significance of e-prescription in nursing work?
3. What is the response and participation of nurses in the e-health program?

4 METHODOLOGY

This chapter presents the method that was employed to execute the research. The chapter begins by focusing on the literature review, data collection, and data analysis.

4.1 Literature Review

Building a framework in research depends upon using previous work or studies in such a way as to provide an overview of a concept, theory, or literature base. The literature review demonstrates how the study advances knowledge by presenting existing knowledge to build a case that clearly shows the gap the study will address. Literature review has five functions. First, it builds a framework in the study. Second, it exhibits how a study advances knowledge. Third, it deliberates the study. Fourth, it assesses research design and instrumentation, and fifth, it provides a reference point for interpretation of findings. The introduction section of research or study usually includes the problem statement, purpose, and a discussion of the relevant literature, concepts that build the argument for the importance of the study. The literature used to build the framework is then used to connect the findings, discussions and conclusion to the introduction section of the study (Tonette & Rocco, 2009).

Considering the findings of the existing literature, it can be noted that researchers have managed to identify the benefits of e-prescription in the nursing discipline. E-prescription offers several benefits to nurses. These benefits are provision of secure, mutual communication, reduction of cost and time associated with prescriptions, and reductions of errors during prescription (Tonette & Rocco, 2009). In relation to this, this study will focus on investigating the contribution of e-prescription in enhanced efficiency in nursing.

4.2 Data Collection

The research was conducted as a literature review. Data was acquired from different databases such as, Science Direct, SAGE publications, Emerald, EBSCO and Pub Med using different keywords to help in answering the question: How does e-prescription helps nurses to achieve excellence in nursing care? The following key words: e-medication, e-health, medication, e-prescribing, electronic prescribing, information technology, drug-related problems, health care, nursing and medical error were used. A comprehensive search strategy included all articles published in English between the years of 2004-2015. These articles were screened by title, screened by abstract and screened by full text. The articles that were relevant to the

topic and those that could answer the research question were selected for inclusion and exclusion in the research.

4.3 Data Analysis

Data was acquired from different databases such as, Science Direct, SAGE publications, Emerald, EBSCO and Pub Med and the results were categorized according to the key words used. The keywords: Electronic drug prescription and e-prescription, which yielded 21 articles, 11 of the articles contained the abstract and 10 of them contained full text, 17 of them did not meet the criteria and the author was able to read and analyse them and 4 of the articles were able to answer the research question.

The keywords: information technology, e-health, healthcare, and nursing yielded 30 articles in totals. 15 of the articles contained only an abstract without a full text, and 15 of them contained full text, which the author was able to read and analyse and 28 of them did not meet the criteria for inclusion. The author managed to select 2 of the articles which were able to answer the research question.

Other keywords used were; e-medication, medication, which yielded 17 articles in total and 7 of the articles contained abstract and 10 of them contained full text, 14 of them did not answer the research question and the author was able to obtain 3 of the articles which were able to answer the research questions.

The keywords also used included drug-related problems and medical error, which yielded 14 articles in total and 8 of the articles contained only an abstract without a full text. 6 of them contained full text, 12 of them did not meet the criteria for inclusion. The author was able to obtain 2 articles which were able to answer the research question. All the articles that managed to meet the selection criteria were 11, as shown in table 1 below:

The articles selected for inclusion were:

1. Written in English.
2. Published and reviewed journals between 2004 and 2015.
3. Contained a specific research method of data collection and analysis.
4. Involved the keywords as main things that the author was going to research on.

Reasons for excluding articles were based on the criteria provided by (Coughlan et al., 2013) as shown below:

1. The articles did not answer the relevant study question.
2. The title did not relate to the research question.
3. The original text was not accessible for instance only abstracts were available.
4. Written in other languages

The table below shows the criteria and data selection process that was employed in the study:

Table 1: Criteria and Data Selection

Database and search words	Screened by title	Screened by abstract	Screened by reading full text	Excluded (not meeting inclusion criteria)	Included (relevant to research questions)
Science Direct, SAGE publications, Emerald, EBSCO and Pub Med. Electronic drug prescription and E- prescription	21	11	10	17	4
Science Direct, SAGE publications, Emerald, EBSCO and Pub Med. information technology, E-health, healthcare and nursing	30	15	15	28	2

Science Direct, SAGE publications, Emerald, EBSCO and Pub Med. E- medication, medication	17	7	10	14	3
Science Direct, SAGE publications, Emerald, EBSCO and Pub Med. drug-related problems, medical error	14	8	6	12	2
Total	82	41	41	71	11

In table 1, above, it can be seen that the articles that managed to meet the criteria of selection were 11. These articles were scrutinized using quantitative and qualitative study methodologies.

5 RELIABILITY AND VALIDITY

According to Colepicolo (2015), reliability is one of the criteria that are composed of quality and credibility. The study was done using reliable articles from different scientific databases, which included the following: Science Direct, SAGE publications, Emerald, EBSCO and Pub Med. These databases contained journals for health care sector. The databases also provide free access to various journals that contained full-text articles. In each database, the author used the same procedure and criteria in selection in order to acquire valid and reliable information.

Adequate care was taken during the selection of the study articles to enhance the validity of the research. Once the articles were obtained, they were read thoroughly followed by the comparison of the main points to enable the identification of their relevance in terms of content and the results obtained. These articles were also critically appraised for validity.

Colepicolo (2015) defines critical appraisal as a systematic process employed to point out the weaknesses and strengths of a research article with the aim of assessing the validity and usefulness of research findings. The appraisal process focuses on the assessment of the appropriateness of the research or study design selected for research questions. Key methodological features associated with the study designs employed in these articles were also evaluated. Furthermore, the appropriateness of the statistical methods employed, as well as their subsequent interpretation, the research relevance to the study, and potential conflicts of interests were considered.

When it comes to the aspect of ethics, all information that was derived from the secondary articles (i.e. reviewed articles) was referenced with the relevant source (i.e. citing the names of the authors associated with the research. Quotes were not copied in a direct manner from these sources, but rather paraphrased. Prior to the making of conclusions, noted points within the research were compared in a careful manner. In the referencing section, all the researchers that partook in the various studies were acknowledged by providing their names in the referencing of their work.

The aspect of bias was also taken into consideration. The researcher eliminated any aspect of bias by ensuring that all the articles that had relevant information were appropriately incorporated in the study. It is also vital to note that source of the study information were only ob-

tained from databases that provided free access, as this indicated the willingness of the original researchers to allow other scholars to refer to their work.

6 RESULTS

According to Devine et al., (2010), one of the vital aspects in the delivery of quality patient care is elimination of medical errors. In relation to this, Pagan et al., (2009) pointed out that numerous deaths often result from errors associated with medication, and mistakes in medication filling and prescribing happen to be the prevalent sources of medical errors. McMullen et al., (2013) defined medical error as preventable circumstances that may result into or lead to harm or inappropriate employment of medications to patients during the use of medication by a consumer, patient, or healthcare professional. Pevnick et al., (2014) argued that these errors or mistakes can be experienced in any stage of the medication employment process including errors associated with prescription to dispensation of drug, as well as monitoring how the drug is taken. Jeffrey & Mary (2009) pointed out that the ambulatory care happens to be the most common area or place where errors associated with medication prescriptions often occur. (See Table 2 in the appendix for more details).

An adverse drug event (ADEs) can arise due to non-preventable or preventable medical interventions associated with medications. Sebetci, et al., (2014) pointed out that ADEs are perceived as preventable when they result from medication errors or mistakes, while non-preventable ADEs are mistakes that could cause harm to patients or to a patient. Crosson et al., (2011) asserted that an error cannot harm a patient when it is detected prior to it reaching the patient or when it lacks a negative impact.

6.1 Benefits Associated with the Implementation of E-Prescription

6.1.1 Reduction of Prescription Errors

Jeffrey & Mary (2009) informed that, patient safety can be enhanced via e-prescribing by increasing the legibility of e-prescription, reducing the time needed to prescribe and dispense medication to patients, and limiting ADEs and medication errors. When e-prescription is a component of a system of EHR, the checking of prescriptions can be done for interaction with the medications prescribed to patients, allergies, and health conditions. Pagan et al., (2009) established that the rates of errors fell from 43% per 100 prescriptions to 6% per 100 prescriptions within a year, approximately a seventh of the former level following the implementation of e-prescribing. The finding of Jeffrey & Mary (2009) that the rates of prescribing error declined from 47% for every 100 prescriptions to 9% for every 100 prescriptions in a year, after the implementation of e-prescription, also support this finding.

In a prospective case study or research of 15 physicians executed by Grossman et al., (2007), the researchers established that the errors associated with prescription declined from 36.7% for every 100 prescriptions to 11.6% for every 100 prescriptions within just a year after the implementation of e-prescription (See table 1 in the appendix).

According to Sebetci et al., (2014), most of the e-prescription systems integrate medication decision support (MDS), which assists providers to prevent errors during the prescription process and ADEs. This intervention checks for drug-allergy, drug-disease, and drug-drug interactions. It also checks for dosing recommendations and drug cost. On the contrary, Devine et al., (2010) and Pevnick et al., (2014) established limited proof concerning the benefit of MDS employed in this way to patient safety, and the limitation of medication errors in relation to execution of the prescription as a component of the stand-alone model or system.

6.1.2 Improvement of Communication

E-prescription contributes to the improvement of communication during the process of prescribing, leading to efficiency. Even though the inputting of a novel prescription takes approximately 20 seconds more for every patient in relation to prescription writing, the fact that limited clarification is required for e-prescription offsets this longer period, as it saves time Sebetci, et al., (2014). More of the prescribers' time was spent on computer, which was an average of 8 minutes 25 patients each day Sebetci, et al., (2014). Devine et al., (2010) also established that the reduction of medication error was due to the enhanced communication among physicians due to the presence of an e-prescription system. The increase in efficiency is evident in the limited issues and paper work that require resolution (Devine et al., 2010). The prescriber and patient names are automatically matched up by the system, whereas other fields are automatically populated, but always need manual manipulation. The major fields are patient instructions, drug quantity, and drug name (Devine et al., 2010).

Providers have established that limited time is taken to resolve issues with pharmacies including refill requests and prior authorizations. The availability of information on the patients' eligibility and prescription formularies enables prescribers to pick a suitable medication and limit the chances of getting a pharmacy call to substitute the medication with an alternative (Jeffrey & Mary, 2009).

6.2.3 Cost Savings Associated with E-prescribing

E-prescription contributes largely to the reduction of costs in nursing. Carling et al., (2013) established 18% decline in prescription for drugs associated with high costs among the intervention groups relative to the control group. Such a reduction resulted into savings amounting to \$109.976 on novel or new prescriptions within 12 months. Crosson et al., (2011) found that, for every case of hospitalization arising from an adverse drug event (ADE) cost approximately \$9,500; every emergency room visit costs \$430; and every visit to the office of the doctor costs \$112. Yearly savings of approximately 403, 607 were established based on these figures. Martinson & Vallikivi (2016) stated that, with the implementation of the e-prescription system, there were improved outcomes on patient health and \$150 billion to \$260 billion in approximated savings, majorly via enhanced adherence to medication over a ten-year period. Besides, increase of 12% in prescriptions picked-up or succeeded when prescribed in relation to written prescriptions. McMullen et al., (2013) found that a cost of \$ 41, 343 was needed to implement a system of e-prescribing, with yearly costs following the implementation of approximately \$16, 332 per year. Moreover, Hernandez et al., (2015) maintained that a cost of \$43, 233 was required to implement a system of e-prescribing, with yearly costs following the implementation of approximately \$15, 624 per year. Carling et al., (2013) also established an 18% reduction in prescription for drugs associated with high costs among the intervention groups relative to the control group. Such a reduction resulted into savings amounting to \$109.976 on novel/new prescriptions within 12 months (Carling et al., 2013).

7 DISCUSSION

This chapter discusses the findings of the study in relation to the findings of past researchers (i.e. literature review section). The chapter begins by discussing the methodological limitations and considerations, and ethics, after which it proceeds to the explanation of the study's findings.

7.1 Methodological Considerations and Limitations

The research was conducted as a literature review. Data was acquired from different databases such as, Science Direct, SAGE publications, Emerald, EBSCO and Pub Med. The search strategy or approach employed in the study, as well as publication bias and the number or quantity of databases explored could be the principal limitations to this study. These factors might have limited articles that were accessible or available for the study's review.

7.2 Ethics

Ethical consideration plays a critical role in research work and can be outlined from various angles. In the research work, breaking the ethical rules must be strictly avoided. All the articles used in the case of study are not under copyright violation. To retrieve information from the academic databases, official access should be carried along in the process (Alfano, 2013). The means and progress of nursing research are very much guided by a research nursing ethic. Quotes are not copied directly from the article and all the used quotes are referenced in the reference page. Noted points in the research were carefully compared before making a conclusion. At this level of study, it is understood that recommendation is not allowed, thus, suggestions were only made in the end. To avoid bias; all the studies that contained relevant information were included appropriately. The sources of the research information were only secured from those databases that offered free access.

7.3 Discussion of Findings

The study aimed at exploring the advantages associated with the implementation of the e-prescription system in nursing, in relation to the accuracy and efficacy of medication prescription. The study's findings indicate that the increasing employment of the e-prescription in nursing has resulted into improved communication among physicians and nurses, limited

prescription errors, and reduced prescription costs and time, thereby leading to a more efficient and streamlined process of medication prescription in nursing

Currently, the increase in the prescription of medications has open doors for more errors associated with drug prescription. E-prescription has led to the elimination of the possibilities of error and can significantly assist in the prevention of approximately 2 million ADEs every year (Jeffrey & Mary, 2009). E-prescription has also been established to minimize errors associated with medication within the ambulatory setting. E-prescription eliminates errors associated with illegibility and assists providers to make informed decisions concerning the medications that should be prescribed to patients. To accomplish this goal by focusing on patients' allergy data and histories, all of which are found within systems that are incorporated with EHRs. Such systems notify prescribers when an interaction or association with other medicines or an allergy occurs or health condition is identified. However, the principal limitations of these alerts or notifications are that, in some situations, they occur when there is limited risk or threat or occur in the absence of true complications. Providers may be overwhelmed with notification, clicking through them, as opposed to reading each of them. As a result, providers may end up missing a significant association/interaction.

E-prescription also contributes to the efficiency of patient care by improving communication among or between physicians and nurses. E-prescription streamlines the process involved in taking the prescription to the pharmacy, obtaining refills, and dispensing the medication (Escobar-Rodriguez et al., 2012). Since the patient is not granted the prescription's hardcopy, the chances of losing the prescription are reduced (Black, 2013). Cases of pharmacy-triggered clarifications have also been limited, decreasing the time spent by providers and pharmacists on the phone, and therefore shortening the time required to fill prescriptions and get it to patients. Increases in monitoring and compliance also result from the implementation of e-prescription.

E-prescription has also been established to contribute significantly to the reduction of costs. Costs savings are realized through improved efficiency, reduction in ADEs, and improved access to formularies on the part of providers (see the table in the appendix for more details on cost reductions by e-prescription). The time spent in handling clarifications is significantly reduced, enabling prescribers to concentrate on patient care. The aspect of cost savings along with improved efficiency and incentives will increase the employment of e-prescription in the

future. These findings match the earlier finding of (Villaseñor & Piscotty, 2016) that, e-prescription reduces costs.

7.4 Implication of the Study to Nursing

This study highlights the need of nurses to embrace technology in their process of care delivery. Embracing technological advancements such as e-prescription enhances the ability of a nurse to provide quality care that is efficient, cost-saving, and time-saving. As such, the implementation or adoption of E-Prescription in the current health care will ensure that nurses not only eliminate medical errors, but also offer quality care to patients in a timely manner. Costs that are incurred in the production of books or documents for preserving patients' medical information will also be eliminated as this information will be stored electronically. It is also vital to note that the process of retrieving or tracking patients' medical information will be made easier and efficient, thereby enhancing timely provision of care to patients.

7.5 Implication of the Study to the Learning Process

This research emphasized the need of the learning process to be tailored to meet the technological requirements of nursing, particularly in relation to the use of services such as e-prescription. As such, the study of technological innovations that enhance the delivery of care should be integrated in the nursing learning process. Such an undertaking will ensure that nursing graduates that come from various learning institutions are equipped with relevant knowledge that will enable them to respond effectively to the needs of patients in the dynamic field of health care. Such an undertaking will also rid medical institutions or hospitals from the expenses of providing E-Prescription training to their staff. Thus, there is a significant need for educators and practitioners to embrace technological innovations and integrate them in the learning process.

8 CONCLUSION

This study's findings suggested that e-prescription had several benefits when it came to increasing the efficiency of nursing in the delivery of patient care. E-prescription results into a reduction in the prescription cost and time, improvement of communication between nurses and physicians, and reduction in prescription errors.

The goal of nurses today is to provide best-practice care that is efficient, cost-effective, and evidence-based in different health institutions. This objective can be accomplished when adequate care is embraced during the delivery of nursing care to patients. With the presence of electronic prescription, the possibility of connecting a big range of health care services and facilities has widely been opened. Nurses are primary users of e-prescription. In Finland, e-prescribing is widely used. This study focuses on identifying how electronic drug prescription (e-prescription) helps nurses achieve excellence in nursing field. The study accomplishes this goal by conducting a review of 11 articles. The findings of the study revealed that e-prescription had several benefits when it comes to increasing the efficiency of nursing in the delivery of patient care. E-prescription results into a reduction in the prescription cost and time, improvement of communication between nurses and physicians, and reduction in prescription errors.

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APPENDIX: RESULTS

Author and Year	Study Design	Results/Outcomes
Hernandez et al. (2015)	Case study examining the costs and implementation of a system of e-prescribing within a 10-FTE practice of psychiatrists within a non-profit public agency for mental health.	Researchers established a cost of \$43, 233 to implement a system of e-prescribing, with yearly costs following the implementation of approximately \$15, 624 per year.
McMullen et al., (2013)	Administration of internet survey to a nationwide convenience sample of physicians to monitor the implementation and cost of e-prescribing.	Researchers found a cost of \$ 41, 343 to implement a system of e-prescribing, with an annual costs following the implementation of approximately \$16, 332 per year.
Devine et al., (2010)	A literature review of e-prescription with MDS (medication support decision) to establish where MDS improves patient safety	Researchers established little proof that e-prescription with a MDS intervention is more helpful/advantageous to the safety of the patient and medication errors reduction than when e-prescribing is a component of stand-alone model or system
Pevnick et al., (2014)	A literature review of e-prescription with MDS to establish where MDS enhances	limited evidence that e-prescription with a MDS intervention is more advantageous to the safety of the pa-

	the safety of patients	tient and medication errors reduction relative to when e-prescribing is a component of stand-alone system
Jeffrey & Mary (2009)	A non-random prospective research of 12 providers who used e-prescribing relative to 12 providers who continued using paper prescriptions in monitoring the rates of prescribing mistakes	Rates of prescribing error declined from 47% to for every 100 prescriptions to 9% for every 100 prescriptions in a year, after the implementation of e-prescription
Martinson & Vallikivi (2016)	Reviewers evaluated de-identified sets of data from 35 million records of prescription that compared the aspect of adherence to medication in patients associated with e-prescriptions to faxed, phoned-in, and paper prescriptions.	Researchers established improved outcomes on patient health and \$150 billion to \$260 billion in approximated savings, majorly via enhanced adherence to medication over a ten-year period. Besides, increase of 12% in prescriptions picked-up/succeeded when prescribed in relation to written prescriptions.
Pagan et al., (2009)	A non-random prospective research of 16 providers who employed e-prescribing relative to 16 providers who still employed paper prescriptions in monitoring the rates of prescribing errors	Rates of prescribing error declined from 43% to per 100 prescription to 6% per 100 prescriptions within a year, approximately a seventh of the former level following the implementation of e-

		prescribing.
Grossman et al., (2007)	A prospective case study of 15 physicians within an educational ambulatory clinic having an enhanced e-prescribing system that supports clinical decision-making; the study aimed at observing prescribing errors.	The rates of prescribing error declined from 36.7% for every 100 prescriptions to 11.6% for every 100 prescriptions after a year of e-prescription, an improvement attributed to increased or enhanced communication among physicians/clinicians during drug prescription.
Sebetci, et al., (2014)	A time-motion and direct observation research executed within three community-based clinics (i.e. primary care clinics) to assess the effect of e-prescribing on the efficiency of the prescriber.	More of the prescribers' time was spent on computer. An average of 8 minutes 25 patients every day.
Crosson et al., (2011)	A study/research of 280, 630 alerted/notified prescriptions from clinicians within an ambulatory care with the help of an e-prescription system to approximate the severity and possibility of an adverse drug event (ADE) with every alert or notification	Every case of hospitalization arising from an adverse drug event (ADE) cost approximately \$9,500; every emergency room visit costs \$430; and every visit to the office of the doctor costs \$112. A yearly savings of approximately 403, 607 was established on the basis of these figures.

Carling et al., (2013)	Follow-up assessment with 2 databases queries to determine extra prescription claims information/data for all patients of the Network Health Plan included within the authors' former/original six-month research/study	Established an 18% reduction in prescription for drugs associated with high costs among the intervention groups relative to the control group. Such a reduction resulted into savings amounting to \$109.976 on novel/new prescriptions within 12 months.
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