The impact of electronic prescriptions on medication safety in Finnish community pharmacies: A survey of pharmacists

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ABSTRACT

Objectives: The purpose was to explore pharmacists' opinions regarding the impacts of electronic prescriptions (ePrescriptions) on medication safety in Finnish community pharmacies. Further objectives were to explore how often and what kinds of ambiguities or errors pharmacists have perceived in ePrescriptions.
Method: A survey of randomly selected dispensers (n = 1004) and pharmacists (n = 228) was conducted in 2014.
Results: Altogether 778 questionnaires were returned, yielding response rates of 64% (n = 635) for dispensers and 65% (n = 143) for pharmacists. The respondents felt that ePrescriptions improve medication safety in many areas: they lower the number of prescription forgeries, reduce the risk of dispensing errors, promote better management of the patient's overall medication, facilitate monitoring of duplicative therapy and drug interactions, and lessen the risk of incorrect interpretation of prescriptions. Many respondents (32%) reported that they had weekly found ambiguities or errors in ePrescriptions that required clarification during the dispensing process. Of the respondents, 18.6% had found such ambiguities or errors daily or almost daily. The three most common ambiguities or errors in ePrescriptions were incorrect total amount of medication (79.0%), missing notation of exceptional dosage instructions or exceptional purpose of use (SIC!) (69.0%), and unclear or incorrect dosage instructions (65.4%). Incorrect strength (14.9%) and incorrect pharmaceutical form (14.2%) were also commonly experienced problems.
Conclusions: According to Finnish community pharmacists, the introduction of ePrescriptions has promoted medication safety in many areas. However, ambiguities and errors are common in ePrescriptions. Some of these can delay dispensing of the medicine, whereas others can cause serious risks to medication safety.

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1. Introduction

Improvement of patient safety, including medication safety, has been viewed as one of the most important objectives in global health policy [1,2]. It is widely recognized that the majority of adverse events in healthcare are related to medicines [3,4]. A prescription is an essential means of communication between physicians, pharmacists and patients. However, it is also one potential source of errors that could endanger medication safety [3,5–9]. Conventional prescriptions (paper, telephone, fax) have several well-known problems such as legibility or interpretation problems due to physicians' poor handwriting, leading to dispensing errors at pharmacies [8]. There is also the risk of prescription forgeries.

In addition, the management of patients' overall medication has been difficult because the necessary information has been scattered rather than collected in one particular place [10,11]. During the past few decades an electronic prescription (ePrescription) system has been promoted and adopted as one potential tool for improving medication safety by eliminating the problems related to conventional prescriptions [12,13].

In the European Union, ePrescribing is interpreted as "the process of electronic transfer of a prescription by a healthcare provider to a pharmacy for retrieval of the medicine by the patient" [14]. Dispensing information is also recorded electronically. However, the term ePrescription may have different meanings and the systems may vary between countries [12,15,16]. For example, in some countries ePrescribing comprises only electronic issuing and data transmission. A fully operational and nationwide ePrescription system has been implemented in only a few European countries, among them Denmark, Sweden, Estonia, Iceland, and Finland [12,14]. ePrescriptions are also widely used in the United States [15]

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and Canada [17], and pilots employing them have been planned or carried out in many countries across Europe [12,14].

Studies concerning the impacts of electronic prescribing systems on medication safety have been conducted in various settings, primarily in hospitals [18–20]. From the pharmacy perspective, previous studies have shown that ePrescribing improves the quality and safety of prescriptions and hence improves patient safety [21–23]. It has been proposed that improvements in quality and safety result from fewer prescription errors [23–25], less misinterpretation of, or ambiguity in, prescriptions [21,23–27], and fewer prescription forgeries [26]. In addition, an ePrescription can support the management of the patient's medication treatment because it allows pharmacies to view all the patient's prescription information [24,26]. Despite the several positive effects of ePrescriptions, many studies have also reported that they are a potential source of medication errors [21,23,26–31]. These studies have highlighted the possibility that ePrescriptions might increase the risk of incorrect or ambiguous prescribing: for example, incorrect medication, incorrect dosage instructions, or incorrect medicine quantity.

The aim of this study was to explore pharmacists' opinions regarding the impacts of ePrescriptions on medication safety in Finnish community pharmacies. Further objectives were to explore how often pharmacists have perceived ambiguities or errors in ePrescriptions, and what kinds of ambiguities or errors have appeared.

2. Materials and methods

2.1. Study context

In Finland (excluding the Åland Islands, which constitute an autonomous and monolingual Swedish region of Finland), a fully operational and nationwide ePrescription system has been mandated by law to be implemented in steps in all community pharmacies in 2012, in public healthcare in 2013, and in private healthcare in 2015 [32]. All healthcare providers will be obliged to implement the system by 2017, and thereafter conventional prescriptions will be allowed only in special cases, such as technical system failures. Finnish community pharmacies dispensed nearly 39 million ePrescriptions in 2014, which was approximately 75% of all prescriptions dispensed [33,34]. In 2015, pharmacies dispensed over 49 million ePrescriptions, which is over 90% of all prescriptions dispensed [34].

In Finland, an ePrescription is signed and transferred electronically by a physician and entered into a centralized database called the Prescription Centre [32]. The Prescription Centre contains all electronic prescriptions and the dispensing records entered on them by pharmacies. ePrescriptions can be dispensed in any Finnish pharmacy. At the pharmacy, ePrescriptions are processed in the pharmacy system, which searches for ePrescriptions in the Prescription Centre. At the pharmacy and in the physician's practice, the patient's consent must always be obtained to access the patient's information held in the Prescription Centre. Only pharmacy staff with a pharmaceutical education are permitted to use the Prescription Centre. These are pharmacists (M.Sc. in pharmacy) and dispensers (B.Sc. in pharmacy). A pharmacist has a five-year and a dispenser a three-year university education. Both are licensed pharmacy practitioners who dispense medicines independently and ensure the safe and proper use of medicines by the public.

ePrescriptions are part of the national data system service for healthcare, pharmacies, and citizens called the National Archive of Health Information (Kanta) (www.kanta.fi/en/). In addition to ePrescriptions, Kanta services include a Pharmaceutical Database, My Kanta website, and a Patient Data Repository. The Pharmaceutical Database contains information necessary for prescribing and dispensing (e.g. prices of medicines and their reimbursement status). The My Kanta website allows patients to check their own ePrescription information. The Patient Data Repository contains patient health records from all healthcare units.

The aims of ePrescriptions were to make the prescribing and dispensing processes easier and more efficient and to improve medication safety in Finnish healthcare [32,35]. Improvements in medication safety were expected to be achieved through the enhanced management of patients' overall medication because prescriptions are visible in the Prescription Centre, thus making it easier to detect drug-related problems (e.g. drug interactions, duplicative therapy, or adverse drug reactions), and also by reducing dispensing errors thanks to less ambiguity of ePrescriptions in community pharmacies [35]. ePrescribing has also been expected to reduce prescription forgeries.

2.2. Data collection

A cross-sectional postal survey was conducted in the autumn of 2014. The questionnaire was sent to a random sample (to one-third) of dispensers (n = 1004) and pharmacists (n = 228) working in community pharmacies. The sample was collated from the registers of The Finnish Pharmacists' Association and The Finnish Pharmacists' Society. The Åland Islands were excluded from the study because ePrescriptions have not been implemented there. A total of 1232 questionnaires were mailed. One reminder was sent to each recipient. The response period was two weeks in both mailing rounds. The questionnaire was available in Finnish and Swedish, both of which are official languages in Finland.

The four-page questionnaire contained 23 questions, both structured and open-ended and also Likert scale questions. The main themes of the questions concerned the usability of the ePrescription system, the impacts of ePrescriptions on the dispensing process and medication safety, and the main benefits and problems of ePrescriptions. The questions were designed on the basis of the objectives of ePrescriptions as set by law [32], the anticipated impacts of ePrescriptions [35], and some previous studies [26,36]. The questionnaire was piloted with some pharmacist colleagues with experience in processing ePrescriptions and in two local pharmacies in the spring of 2014. Minor modifications were made to the questionnaire on the basis of the pilot. This paper examines the responses to questions concerning the impacts of ePrescriptions on medication safety and perceived ambiguities or errors in ePrescriptions.

The respondents' opinions on medication safety were measured with eight statements covering medication safety issues. The statements were designed on the basis of the Government proposal concerning the anticipated impacts on medication safety of ePrescriptions before they were introduced (see Study context) [35]. The respondents were instructed to answer using a five-point Likert scale for their degree of agreement, defined as 1 = I fully agree, 2 = I agree somewhat, 3 = I disagree somewhat, 4 = I fully disagree, and 5 = I don't know. Dispensers' and pharmacists' experiences regarding perceived ambiguities or errors in ePrescriptions were measured with the structured question: "Of the ePrescriptions you have dispensed, how often have there been ambiguities or errors that have required clarification during the process?" The question had six possible answers: 1. Daily or almost daily, 2. About once a week, 3. A few times a month, 4. About once a month, 5. Less than once a month, and 6. Never. The respondents were also asked to specify what kinds of ambiguities or errors have been found in ePrescriptions, with a list of several fixed response answers to choose from and also space for an open answer. In that question, the respondents were required to choose the three most common ambiguities or errors that have emerged. Background information (gender, age, how often (s)he processes ePrescriptions, the propor-