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LITERATURE REVIEW

Smartphones in clinical pharmacy practice: Is it evidence-based?

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Abstract
Smartphones are increasingly relied upon by healthcare professionals to facilitate communication, information retrieval and patient care documentation. The use of mobile technology, primarily by physicians, has been studied in various clinical settings and has been subjectively associated with positive outcomes; however, there is a lack of published evidence supporting the use of smartphones by hospital-based clinical pharmacists. Clinical pharmacists' activities have been shown to improve healthcare outcomes and a chronic shortage of these professionals has heightened the need for efficient delivery of clinical services; therefore, our objective was to review and evaluate the available literature pertaining to the use of smartphones or other mobile technology by clinical pharmacists. With the postulation that smartphones can improve pharmacists' time management, point of care access to information and intervention documentation, Vancouver Island Health Authority (VIHA) has recently deployed iphones to its clinical pharmacy staff. Given the significant investment associated with these devices and the current lack of evidence with regards to their use by pharmacists, there is a need for prospective studies evaluating the effects of smartphones on clinical pharmacy practice in order to support their ongoing use.
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Contents

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Introduction

Pagers and personal digital assistants (PDAs) in the healthcare setting are quickly becoming obsolete as healthcare professionals increasingly rely upon smartphone technology for communication and timely information retrieval. It has been reported that 78% of Canadian households now have cellular phones with 50% of households of those aged 18–34 years old using cellular phones exclusively [1]. Given this high prevalence of cellular phone usage, it is not surprising that smartphones appear to be the device of choice amongst most healthcare professionals, with one survey of physicians at a university-affiliated teaching hospital reporting that 89% of residents and 98% of faculty owned a smartphone device [2]. A smartphone, as defined by Oxford Dictionaries is 'a mobile phone that is able to perform many of the functions of a computer, typically having a relatively large screen and an operating system capable of running general-purpose applications' [3]. It can be presumed that the many features of smartphones, such as their multifunctionality as communication, information and documentation tools, as well as their portability, size and applications make them appealing devices in a busy healthcare system where timely access to people and resources is essential. It should be noted that a smartphone is distinct from a PDA, as the latter is defined as 'a palmtop computer that functions as a personal organizer but also provides email and Internet access' [4] and as such lacks the mobile phone capabilities of a smartphone. The purpose of this paper was to review the available literature pertaining to the use of smartphones and other mobile technology by clinical pharmacists.

Clinical pharmacy services

The Canadian healthcare system has been experiencing a critical shortage of hospital-based clinical pharmacists as evidenced by a reported vacancy rate of 8.2% across 160 hospital sites in Canada from 2009 to 2010.[5] With literature to support the value of clinical pharmacy services, this shortage invariably has a negative impact on patient care. Bond et al. [6] identified seven core clinical services that were associated with a reduction in mortality rates, which included performing admission drug histories, participating in medical rounds, adverse drug reaction (ADR) management, drug protocol management, providing drug information, in-service education and participation in cardiopulmonary resuscitation (CPR). Similarly, Kaboli et al. [7] described the effects of clinical pharmacists interventions and found that pharmacists' participation on rounds, interviewing of patients, medication reconciliation, discharge counseling and post-discharge follow-up reduced adverse drug events, medication errors and length of hospital stay and improved medication adherence, knowledge and appropriateness of drug therapy. The Canadian Society of Hospital Pharmacists has partnered with a Canadian clinical pharmacist key performance indicator (cp KPI) working group whose purpose, as reported in a presentation by Slavik [8], is "to develop a core set of national cp KPIs for hospital pharmacists via a systematic national evidence-informed consensus process" in order to increase the implementation of evidence-based activities and improve patient outcomes. Given the chronic shortage of hospital clinical pharmacists in Canada, efficient use of their time to allow maximal participation in activities shown to improve patient outcomes is increasingly important. Smartphone technology may be able to maximize pharmacist efficiency through such mechanisms as timely access to drug information, ease of communication with other healthcare professionals and efficient documentation of clinical interventions.

Communication technology

Historically, mobile healthcare professionals such as physicians and clinical pharmacists have carried numeric pagers; however, the unidirectional nature of these devices and lack of information content can impede timely communication between healthcare providers. When first introduced, pagers did improve communication between mobile healthcare providers, however contact via pager requires the use of a landline telephone followed by a waiting time for a return phone call. This is an inefficient process that may reduce the number of cp KPIs performed by a pharmacist during a given work day and thereby negatively impacting overall patient care. Another mobile device that has been used in recent years by healthcare providers is the personal digital assistant (PDA), which can improve access to medical information, however generally does not have a communication function, and therefore is likely inferior to currently available smartphone devices. Recently, the Vancouver Island Health Authority (VIHA) Pharmacy Department, located in British Columbia, Canada, purchased smartphones for

Table 1 Criteria for smartphone deployment to Vancouver Island Health Authority pharmacists.

Front line staff
Permanent full-time or part-time
Provides unit-based clinical service greater than 50% of the time
Routinely takes scheduled on-call shifts
Leaders/project staff
Holds a leadership position as coordinator or above
Job requires travel to multiple sites

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