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Integration of Smartphones into clinical pharmacy practice: An evaluation of the impact on pharmacists' efficiency

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KEYWORDS

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Abstract

Background: Personal smartphones are used frequently by healthcare practitioners in hospitals to assist in the provision of care. Island Health is one of the first health authorities in Canada to endorse the iPhone[®] smartphone as a potentially valuable tool for clinical practice.

Objective: To measure smartphones effect on pharmacists' efficiency, to assess pharmacist acceptance of corporate smartphones, and to investigate how these devices are being utilized.

Methods: This multi-center time-trial, survey, and observational prospective study enrolled 90 pharmacists across eight hospitals on Vancouver Island. Participants performed a time-trial of 22 situational drug information questions before and after receiving an iPhone[®]. They also completed demographic and satisfaction surveys. A subset of 14 of the 90 pharmacists participated in a pre- and post- iPhone[®] implementation eight hour direct observation study. Lastly, communication data from the phone service provider was collected and analyzed.

Results: Smartphone use was associated with a faster median response time of approximately six minutes for all situational time-trial questions combined (48 min:15 s pre-iPhone[®] vs. 42 min:18 s post-iPhone[®]) ($p=0.039$). Smartphone use did not significantly influence time spent walking to obtain a resource, time spent using computers, or time spent answering of clinical questions during observation. Almost half of pharmacists reported that using the smartphone increased their confidence and competence to resolve drug therapy problems.

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Conclusions: Pharmacists readily accepted smartphones into their practice and felt positively about using them. Smartphones did not improve direct observation measures of workflow, but they did improve pharmacists' efficiency in the answering of hypothetical drug information questions ($p=0.039$). This study indicates that if smartphones are incorporated into pharmacy practice in a structured, organized manner with supports and training in place, smartphone uptake will occur and pharmacists will adapt and incorporate this technology into their daily routine with no predicted deterioration in the quality of their work. The impact of improved efficiency on patient care resulting from an increased reliance on technology and time spent on devices needs to be further assessed.

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Introduction

Smartphones have the potential to help pharmacists deliver quality pharmaceutical care more efficiently. Pharmacies seeking to increase efficiency have already realized the importance of information technology [1]. One reason clinical pharmacists are relied upon as active members of patient care teams is because of the growing need for drug information as pharmaco-therapeutic regimens become ever more complex [2]. Therapeutic decision support tools such as the resources available on smartphones, as with other electronic drug information databases, can aid pharmacists in their provision of care [3].

Adoption of smartphones for use in hospital-based care has been studied in a small number of articles [4,5]. Despite documentation of perceived improved efficiency over the use of pagers for physicians, nurses, and allied health professionals, limited budgets and security concerns may have constrained the widespread adoption of this technology by health care delivery organizations. As with other electronic drug information databases, the value of a smartphone can be described in terms of its benefit relative to its cost [2]. Benefit, in this case, can be defined as time saved. Time savings can be realized from decreased time to answer clinical questions, improved communication, and improved time management. The benefit can then be compared to the cost of purchasing and maintaining the device. The objective of our study was to investigate the benefit of smartphones by performing the following: measuring the effect on pharmacists' efficiency expressed as time taken to answer situational drug information questions, assessing pharmacist acceptance of corporate smartphones, and investigating how these devices were being used in clinical practice.

The authors of a recent 2014 article titled 'Smartphones in Clinical Pharmacy Practice: Is it evidence based?' reviewed and evaluated evidence regarding the impact of mobile device use, and more specifically smartphone use, by hospital-based clinical pharmacists. Their search terms would have captured articles on smartphones based on different operating systems (e.g. BlackBerry®) and other handheld computers such as tablets (e.g. iPad®). They found one literature review and five original research articles relevant to this topic. The majority of the available literature pertained to the use of Personal Digital Assistant (PDA) devices by physicians. Due to the overall lack of published evidence supporting the use of smartphones by hospital-based clinical pharmacists, they suggested a need for prospective studies evaluating the

impact of smartphones on clinical pharmacy practice to support their ongoing use [6].

In a 2013 study, investigators assessed the impact of mobile technology (the iPad®) on order verification during pharmacist participation in rounds and found a significant decrease in the average time required for order verification relative to computer-terminal based methods (7.5 min versus 38.6 min), and proposed that the implementation of mobile communication technology is essential to allow pharmacists to provide clinical services to all patients [7].

Researchers of an observational study conducted in 2012 looked at the effect of smartphones (BlackBerry®) on pharmacist-physician communication and found no significant difference in the total time to resolution of drug therapy problems when communicating through BlackBerry® devices compared to traditional communication modes. They did find, however, that clinicians reported improved communication, decreased wait times, decreased disruptions, and superior triaging of issues [5].

While there is limited literature on the use of recent smartphone technologies (e.g. iPhone®, BlackBerry®, Android™) in pharmacy practice, there is literature on other personal digital assistants (PDAs) with mobile phone functionality (e.g. Palm Pilot®) aiding clinician practice [1-3,6,8-14]. This literature describes the potential benefits of smartphones and potential methods for evaluating their use in clinical pharmacy practice. Literature on PDAs suggests that the devices have been used by pharmacists for the following purposes: to calculate stroke risk of patients with atrial fibrillation at the bedside; to document interventions and medication errors; to access patient information including electronic medical records; to record patient history; to obtain drug information; to request and receive laboratory tests; to communicate with physicians; to provide patient education and recommend websites; to access the internet; to consult with peers; to use personal organizers such as calendar and contacts; to use as medical calculators; to verify patient eligibility for medications; to check hospital formulary; to implement protocols and guidelines; and to generate a patient's discharge medication list without the need for manual transcription [2,3,9-13]. All of these numerous activities facilitated by PDAs have ultimately supported the provision of patient care [3,8].

The effect of physician access to a drug information database via PDA was researched in 2002. Physicians stated that it reduced the rate of adverse drug events, improved patient care by allowing physicians to better inform

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