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A quantitative and qualitative assessment of the utilization of mobile computing devices by clinical pharmacists

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KEYWORDS

eHealth;
Mobile application;
Clinical pharmacist;
Therapeutic decision making;
Adoption;
Task-technology fit

Abstract

Objective: The primary objective of this study was to characterize mobile computing device (MCD) usage by clinical pharmacists who provide direct patient care in an institutional setting. The secondary objective was to gain insight into pharmacists' decision-making processes for choosing applications to use in practice.

Methods: A cross-sectional survey and focus group-based study was conducted at a large multi-site health authority. Descriptive statistics were used to analyze the survey responses with between-group comparisons being made as appropriate. A mixed-methods approach was used to analyze the quantitative and qualitative data obtained in this study.

Results: One hundred and thirty-six pharmacists responded to the survey with eighty-nine (65%) reporting that they used a MCD at work. Devices were most frequently used to access point of care references (97%) and online search engines such as Google or Wikipedia (90%). Participants most often used between 1 and 5 mobile and website based applications for 30-60 min each day to support clinical decision-making. Increased efficiency, trust in their institutional review process, and the reputation of the app developers were the main influences on which apps pharmacists chose to use in practice.

Conclusions: While the pharmacists studied were making daily use of their own MCDs, they were used for a limited range of functions. Using apps that are decision support tools, especially those with integrated patient specific information, may assist pharmacists in making health care decisions and could further enhance the care they provide.

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Background

The use of mobile computing devices (MCDs, including smartphones and tablets) has risen dramatically since their introduction in the 1990s, with a survey in 2012 finding that 45% of US adults owned a smartphone, half of whom used it to search for health information [1]. Many of the newer uses of MCDs beyond text messaging and voice calls have arisen through the development of mobile applications. Mobile applications, or apps, were first introduced in 2008 with a mere 500 apps initially being offered [2]. Apple recently celebrated its 50 billionth download and now has more than 850,000 apps offered for iPhone, iPad, and iPod touch users around the world [2]. Similarly, for Android users, there are now over 780,000 apps to choose from while Blackberry currently offers a reported 120,000 apps to its consumers [3,4]. Apple now offers almost 20,000 medical apps through its iTunes store; while there are just over 8000 medical apps available on the Google Play store.

Uptake of MCDs and mobile apps is also reflected in surveys of physicians and medical residents [5-7]. A national online survey in the US targeting Accreditation Council for Graduate Medical Education-approved residency and fellowship programs found that over 85% of the respondents used a smartphone and 56% reported using apps in their clinical practice [6]. The most commonly used apps were drug guides (79%) and medical calculators (18%) [6].

Hospital-based clinical pharmacists provide direct patient care by optimizing medication therapy and are expected to provide drug therapy information and therapeutic recommendations at the point of care. Hence, they are potentially key users of MCDs in the clinical arena. Very little study of pharmacists' integration of smartphones into their clinical practice has occurred [8-11]. Knowledge of whether and how pharmacists use MCDs is important to understand the extent to which these tools are accepted by pharmacists compared to other health professionals, what they use them for, identifying untapped potential for improving patient care through their use, barriers to their use, and as a basis for understanding the reliability and factors affecting adoption of apps by pharmacists [12]. The primary objective of this study was to characterize MCD usage by clinical pharmacists who provide direct patient care in an institutional setting. The secondary objective was to gain insight into pharmacists' decision-making processes for choosing applications to use in practice.

Methods

Design

This was a cross-sectional survey and focus group-based observational study.

Population

Clinical pharmacists practicing in a large multi-site Canadian health authority. All participants had access to patient-specific clinical information via electronic medical records terminals in patient care areas.

Inclusion criteria

Clinical pharmacists, defined as pharmacists practicing in a direct patient care role at a site in the study health authority with $\geq 33\%$ of their time spent providing direct patient care at the bedside or in an ambulatory care clinic. Clinical pharmacists spent their time in patient care units or clinics assessing patients, rounding with interprofessional teams, providing education to patients and health care professionals, with the goal of optimizing each patient's drug therapy. In the study health authority, the $\geq 33\%$ criterion customarily distinguishes pharmacists who primarily provide centralized drug distribution services from those who provide direct patient care by spending 50+% of their time on patient care units. Potential participants were identified via a departmental database of all pharmacists and the study criteria were ascertained via the initial screening questions in the study invitation and survey. There were no exclusion criteria. Importantly, the health authority in which the study occurred did not issue MCDs to pharmacists, so those in use were owned by the user, who also had control over which apps they installed and used. The employer did not prescribe nor pay for MCD software.

Sampling method

Five hundred and seventy-four pharmacists employed at a large multi-site health authority were sampled.

Intervention

Online survey and focus groups

An online survey tool was developed by the investigators based on the study objectives using questions derived from prior studies [5,7,13-16] and found via an extensive literature review. The survey tool was deployed in Fluid Surveys (www.fluidsurveys.com), piloted on a small cohort ($n=5$) of the target population and refined based on their feedback for ease of use and clarity. An email invitation to participate was then sent to the target population. Three email reminders were sent over 2 months after which the survey was closed. The survey was conducted between November 2013 and January 2014.

The survey was designed to elicit participant demographics, type of mobile device(s) used (if any), number and identity of medical related clinical applications used. Some survey questions included pick-lists naming specific medical applications. These were based on lists of most popular medical apps in the stores of the three main platform stores (Apple AppStore, Google Play, BlackBerry World) and a search of the Apple App Store, which contains the most apps. Search terms were "pharmacy apps", "pharmacy", "medical apps", "medical", "pharmacy guidelines", and "guidelines". Other online app stores (Google Play and Blackberry World) were searched for relevant medical or pharmacy-related apps, however most were duplicates of ones in the Apple App Store. Survey questions that categorized apps used the Apple App Store categories.

Focus groups were composed of survey participants who indicated that they would be willing to participate. Four focus group sessions were conducted at four different sites.

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