INTERNATIONAL JOURNAL OF MEDICAL INFORMATICS 78 (2009) 679–687

journal homepage: www.intl.elsevierhealth.com/journals/ijmi

Evaluation of nursing-specific drug information PDA databases used as clinical decision support tools☆

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ARTICLE INFO

Article history:
Received 3 February 2009
Received in revised form 6 May 2009
Accepted 19 June 2009

Keywords:
Clinical decision support tools
Nursing
Personal digital assistant
Drug information

ABSTRACT

Background: Nursing is arguably the most organizationally diverse healthcare profession. Educational backgrounds may vary, even among similarly credentialed nurses. Drug information databases used as clinical decision support tools can improve access to pharmacologic information at point-of-care when housed on personal digital assistants. They may also help address the disparity in drug information and pharmacology education between nurses.

Objectives: To evaluate nursing-specific drug information database content on personal digital assistants (PDAs).

Methods: Seven nursing-specific PDA databases were evaluated for scope (absence or presence of an answer) and completeness (three-point scale) via the use of 80 general category and 80 subspecialty drug information questions. Erroneous information was also tracked. Individual scope and completeness scores were delineated by rank order and chi square was performed to determine differences in scope and completeness scores between the databases.

Results: Davis's Drug Guide for Nurses (DDGN) and Nursing Lexi-Drugs (NLD) tied for the highest scores for scope, including each answering 72.5% of the 160 evaluation questions. No significant differences existed between their scores and those earned by Nursing2008 Drug Handbook ($p < 0.05$). The highest scores for completeness were earned by NLD with 58.1% and DDGN at 57.1%. Saunders Nursing Drug Handbook was the only database that showed a significantly lower score in completeness as compared to the other six databases ($p < 0.05$). A 4.2% overall error rate was found among database answers.

Discussion: Significant differences were found among the performances in the databases evaluated in this study for their ability to answer commonly encountered drug information

☆ The methodology of this project was presented at the 2007 American Medical Informatics Association Meeting and the results were presented at the 2008 Nursing Symposium.

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doi:10.1016/j.ijmedinf.2009.06.003

issues in nursing practice. All databases contained some erroneous information and even the top performers failed to provide answers to more than one-fourth of the questions posed. The availability of accurate and timely drug information at point-of-care can play a vital role in patient management and outcomes, but current resources that are available need to be improved.

1. Introduction

1.1. Background

Nursing is arguably the most fluid profession in healthcare. It is also the most organizationally diverse in terms of roles and expertise as evidenced by the credentialing of licensed practical nurses (LPNs), licensed vocational nurses (LVNs), registered nurses (RNs), advanced practice nurses (APNs), and nurse practitioners (NPs) [1]. Educational backgrounds may vary, even among similarly credentialed nurses. One such situation is the RN who becomes eligible for licensure by completing a bachelor of science in nursing, an associate degree in nursing, or a nurse diploma program [2]. Although all paths enable a graduate to sit for the state licensure exam to be an RN, the depth and breadth of content in a nurse's education, such as pharmacology, may be largely institution and even instructor dependent. This is despite the fact that the need for knowledge of pharmacology and drug information has been identified in the following roles of nurses: patient assessments, drug administration, patient education, discharge counseling, and (in some cases) prescribing [3]. Recent studies have focused on issues in pharmacology education for nurses, such as the breadth and depth of drug information being taught, as well as the confidence of nurses in their knowledge of pharmacology [3–6]. In fact, one study of NPs identified pharmacology as the single most important or substantial area of their education (99%), whereas only 54% of those nurses felt they were generally or well-prepared in this area [6].

The utilization of a clinical decision support tool (CDST), most broadly defined as "any computer program designed to help health professionals make clinical decisions," could improve access to pharmacologic information at the point-of-care and could help address this potential lack of confidence and knowledge [7]. CDSTs are becoming more popular in today's healthcare climate because of their potential to improve patient safety [8,9]. Additionally, this type of tool can be employed at point-of-care, where nurses need it most, when housed on a personal digital assistant (PDA). PDAs are small, handheld electronic devices that can provide instant access to patient care guidelines and information at the point-of-care [10,11]. However, nurses, as with other professions, sometimes struggle with incorporating this kind of technology into their day-to-day clinical practice.

Perhaps the single most compelling reason to encourage adoption of technologies such as PDAs is the report from the Institute of Medicine (IOM) which identified preventable medication errors as a leading cause of patient harm [12]. Other studies have reiterated this finding and have specifically demonstrated that having timely access to drug information can reduce those incidences and greatly improve outcomes [13–15]. The IOM further recognized that healthcare professionals can no longer rely on memory or what was previously learned, and that a PDA is one tool that can make nursing practice more efficient, safer, and of higher quality. One of the most commonly adopted tools that nurses use on PDAs to improve patient care is the drug information database [16,17]. One study reported that 97% of nurses who owned PDAs had installed drug information references on them [18]. Other studies have shown that technology such as PDAs offer nurses easy access to a variety of CDSTs, which in turn can increase nurse autonomy [19,20]. Efforts have been made to address the adoption of CDST use in nursing; however, since CDST vendors initially targeted physicians and pharmacists and have only recently focused on nursing, the level of familiarity with these tools is still suboptimal [21,22].

The role of PDAs in nursing has been tracked [23], examined in research [20] and practice [24,25], and explored extensively in education [26–29]. There have also been a handful of studies conducted which evaluated PDA-based drug information databases for pharmacists and physicians [30–34]. However, despite fairly well-defined literature on the aforementioned aspects of PDA use in nursing, there is no guidance for nurses to select the most credible and clinically dependable nursing-specific drug database. Such guidance offers the potential to both inform and increase adoption of these tools [35].

1.2. Objective

The objective of this study was to evaluate nursing-specific PDA drug information database content in order to determine which can best serve the needs of nurses as CDSTs.

2. Methods

2.1. Category development

Categories of drug information questions targeted for database evaluation were developed based on the input of an external panel of nurses representing varying specialties and levels of experience. Panelist specialties and practice settings included certified diabetes education, emergency room (ER), intensive care unit (ICU), oncology, obstetrician, and surgery, while panelists' experience ranged from new graduates to practitioners with over 20 years of experience. To be included, a category had to achieve 100% consensus from the panel. After all solicited input was received and the question categories were finalized, they were weighted based on importance to practice in conjunction with the interdisciplinary team of authors including nurses, pharmacists and physicians. Categories that were deemed critical to direct patient care and safety, such as administration, adverse