A Comparison of Different Tertiary Electronic Drug Information Databases Used in Health Care

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ABSTRACT:

The purpose of this study is to review the literature comparing tertiary electronic drug information database systematically. The literature was searched using the MEDLINE, EMBASE and International Pharmaceutical Abstract electronic databases. The search was complemented by reference lists from the relevant articles and online Interface searching of the UK medicine information website. Drugdex , Clinical Pharmacology and Lexi-comp were found to be the most useful and comprehensive drug databases.

Key words: Comparison, Database, Drug information, Tertiary

Introduction

Over the past forty years the pharmacist's role has shifted from simple medicines dispenser into the most trustworthy drug information provider (Kupferberg et al, 2004). Previously, pharmacists used hard copy resources to answer drug related inquiries (Belgado et al, 1997). However, the flow of drug information has amplified as a result of the significant rise in drug marketing which makes it difficult for clinicians to maintain a good level of current knowledge needed (Alnaim and Abuelsoud, 2007). For that reason, full text drug databases were obtained and have become widely used among health care professionals, particularly pharmacists. Consequently, a dramatic increase in the number and features of the tertiary electronic databases has taken place in the last few years. These electronic resources vary broadly in their cost and character. Therefore, deciding which database to consult or purchase became a challenge for the people responsible for purchasing decision making.

Method

The literature were searched by combining a database specific terms with comparison specific terms using the MEDLINE, EMBASE and International Pharmaceutical Abstract electronic databases. The search was complemented by reference lists from the relevant articles and online Interface searching of the UK medicine information (UKMI) website.

The database search resulted in the identification of fifteen papers. Five additional papers were identified through a reference list search. 35 abstracts were identified from searching the UKMI online interface. Papers were retained if they compared tertiary drug information database which can be used in health care institutions and were published in English. Ten papers fulfilled the inclusion criteria and they have been chosen for this review.

Results

General electronic drug databases

Drugdex from Micromedix was reported as the most comprehensive drug database by four studies (Clauson et al, 2007- a; Alnaim and Abuelsoud, 2007; Raschke et al, 2003 and Polen et al, 2008). It was given a score of 97% in both Clauson et al, 2007 and Polen et al, 2008. 77% in Alnaim and Abuelsoud's 2007 study and 86.2% for the Identidex in the study by Raschke et al, (2003). In contrast, Clinical Pharmacology achieved better completeness score, 311 out of 500 and 17 out of 100 while Drugdex scored 284 and 11 in Peak and Girt, 2005 and Belgado et al, 1997, respectively.

In terms of overall performance, Drugdex gained the highest overall score (12.5) in (Belgado et al, 1997) and by librarians (59 points) in (Kupferberg et al, 2004). In addition, Alnaim and Abuelsoud (2007) claimed that both Drugdex and Lexi-Comp were comparable in their completeness and availability of answers but an overall score was not calculated for them. Conversely, Clinical Pharmacology achieved the

maximum overall score in two studies (Clauson et al, 2007-a and Peak and Girt, 2005). Based on composite score Clinical Pharmacology acquired (87.1) followed by MM (85.8) and Lexi-Comp (85.4) (Clauson et al, 2007-a). In Peak and Girt (2005) the number of correct answers provided by Clinical Pharmacology was 64 out of 100 questions; Micromedex and Lexi-Comp answered 59 and 53 questions respectively. Lexi-Comp received the highest overall score by Faculty members while Facts and Comparison ranked as the top database by pharmacy students in (Kupferberg et al, 2004).

With regard to the ease of use, Lexi-Comp smoothly answered most of the questions in three studies (Kupferberg et al, 2004; Alnaim and Abuelsoud, 2007 and Peak and Girt, 2005). 95% of questions in Alnaim and Abuelsoud (2007) were answered without difficulty, versus 78% for Drugdex ($P<0.05$). In Kupferberg et al (2004) all the three groups agreed that Lexi-Comp consumes less time compared with the other databases; it takes about 23 minutes to answer ten questions. In Peak and Girt (2005) 113 was the least number of screens and it was the score of Lexi-Comp, while Micromedex was the most difficult database to use with the highest number of screens (344).

Personal Digital Assistant (PDA) specific databases

Lexi-Drugs was found to be the most useful PDA database in three studies (Galt et al, 2005, Clauson et al, 2004 and Clauson et al, 2007-b). It scored the highest overall score among all examined PDA resources with 2.5 out of 3 in Galt et al, (2005), which was significantly better than MM (t test; $P= 0.05$) and ePocrates Rx Pro (t test; $P= 0.01$). In Clauson et al (2004) Lexi-Drugs was superior in its scope (75.3%) and overall score (132.9) while Triple I Prescribing Guide received the lowest overall score (40.3), despite its high percentage of completeness scores (89.1%). This could be due to its low scope (only 35.6% of questions were answered).

Discussion

Although Drugdex gained high scores within different variables such as scope, completeness and overall performance, many factors could influence these results. For example, familiarity with Drugdex due to the availability of this database in many academic and health care institutions. It was noted also that Drugdex has been evaluated more frequently, in 7 studies, than the other databases. In contrast, many other electronically affordable databases were examined as one of among these ten trials. However, may score better if they were evaluated more than once.

Method of evaluation:

Only the studies by Clauson et al applied the same evaluation method. Peak and Girt (2005) also adapted a similar method in measuring the clinical dependability and ease-of-use. However, the method for measuring completeness was different.

In terms of measuring the ease of use, the number of clicks or screen to locate the answer may not take the amount of time required to reach an answer into account. On the other hand, time calculation could result in 'a learning curve' for the first questions entered into each database (Clauson et al, 2004). In addition, familiarity with some evaluated databases could affect the results for time extensively. Therefore, it would be interesting if a new study apply both, number of steps and time calculation, in measuring the ease of use of electronically available drug database.

Limitations:

Electronic drug information databases are frequently updated and developed resources, involved studies are dated from 1997 to 2008. Subsequently, comparison of the results were made to identify which database has the highest performance, in order to facilitate a decision making on which database to consult or to purchase, may not reflect the truth at the time of this evaluation.

Different study designs, evaluation methods, examiners level of experience and various setting could have an impact on the outcome of this study. However, this limitation can be solved by standardizing the comparison method for electronic databases.

All ten studies were carried out in the United States of America (USA) except one study by Alnaim and Abuelsoud (2007) which was performed in Saudi Arabia. Therefore, results from these studies may not be applicable in different parts of the world, especially those pertaining to drug identification, since different drugs other than those from the USA could be available.

Recommendation:

Although, many European countries especially the United Kingdom have a well developed health care system, general and specialized drug information centres and vast drug marketing. It is clearly observed that there is a gap in the literature in evaluating drug information databases in these countries. Therefore, conducting such study in the UK is extremely important.

It is clearly noted that the highest ranked databases, Drugdex (Micromedex), Clinical Pharmacology and Lexi-comp, were the most frequently analyzed databases while the lowest ranked databases were examined only once. Therefore, it would be interesting if more studies evaluated those low ranking databases to confirm if there is an association between the number of evaluations and the score earned by the database.

No standard database, to which other databases could be compared, was used in all studies. It would be valuable if a database namely Micromedex, with high ranking, familiarity among examiners, ease of access and being the most frequently assessed electronic database, was used as a representative or control database.

Conclusion

In general, the data provided by previous studies indicate that these references; Drugdex, Clinical Pharmacology and Lexi-Comp, commonly provide correct and sufficient information. However, these studies also show that no database could answer all the questions accurately and completely 100% of the time. As a consequence, clinicians should be aware that drug data provided by these databases may be erroneous or deficient

Despite the fact that, the UK medicines information centers are a prominent users of electronic drug information resources, no studies have been performed in this country to evaluate these databases. Accordingly, a study is intended to contrast available databases in the UK medicine information centers and this review will be used to develop and pilot a data collection method for this study.

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