Preferences and Utilization of Drug Information Resources by Practicing Pharmacists

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Abstract

Objective: This study was designed to identify preferences and utilization of drug information (DI) resources, and to assess perceived level of drug information skill for pharmacists enrolled in a Non-traditional Doctor of Pharmacy (NTDP) program.

Background: The ability to search for, utilize and apply drug information is an essential skill for pharmacists to fulfill their role as the primary source of drug knowledge. However, with exponential growth in the abundance of information, the increasing availability of an array DI resources and as a advocacy measures for provider status and MTM reimbursement intensify, knowing appropriate DI skills has become a challenge for pharmacists. Therefore, understanding the baseline knowledge of practicing pharmacists, such as those in NTDP programs, is crucial for determining how to design effective training measures.

Methods: An 18-question survey was distributed to the participants (n=18) to assess their drug resource preferences and perceived skill level. Descriptive statistics were used and Chi-square analysis was performed using IBM SPSS 23.

Results: General search engines (55.6%)was the most preferred tool for respondents' drug information search activities, while 72% of respondents frequently used Google for drug information inquiries. However, only 17%of the respondents always cross-checked preliminary search results with other resources, and only 22 percent always verified the authenticity of the websites used. The level of confidence in drug information skills and in the accuracy of information obtained was notably high amongst NTDP students with 72% and 100%, respectively, selecting confident or very confident.

Conclusion: Observation from the study suggests that pharmacists should be more aware of the possible risks to patient safety inherent in using Google or other search engines, and should be steered toward utilization of more reputable, evidence-based DI resources.

Introduction

The ability to search for, utilize, and apply drug information is an essential skill for pharmacists to fulfill their role as the primary source of drug knowledge [1]. However, with exponential growth in the abundance of information, the increasing availability of an array DI resources, and as a advocacy measures for provider status and MTM reimbursement intensify, knowing appropriate DI skills has become a challenge for pharmacists [2]. Furthermore, the functions afforded by use of drug information skills are numerous and diverse, from ensuring medication safety to evaluation of clinical trials that validate treatment usefulness [1]. The work place setting in general, however, does not allow ample time for pharmacists to respond drug information inquiries, yet current literature purports that pharmacists should be able to anticipate the DI needs at any setting in which they work [2]. This current trend highlights the importance of having a

concrete drug information educational foundation at all levels to maintain one's competency as a drug expert [3].

A Non-Traditional Doctor of Pharmacy (NTDP) Program provides an opportunity for practicing pharmacists to earn a doctor of pharmacy degree through coursework that combines distance learning techniques and in-class activities. This design allows institutions to create a more customized experience for pharmacists who are concurrently practicing in a variety of settings. Howard University College of Pharmacy is one of only [4] US pharmacy schools to administer a full-time NTDP program.4Drug information class sessions were designed for Howard University NTDP students to promote effective drug information and evaluation skills, while enabling them to service accurate in-depth information requests using appropriate communication and documentation procedures [4].

This study was conducted to assess the preferences and utilization of drug information resources by pharmacists enrolled in an NTDP program, as well as to determine their perceived level of drug information skill. The study was designed to identify areas for

improvement of the drug information coursework administered to the students based upon analysis of study findings.

Method

A survey consisting of 18 questions was distributed to the NTDP students (n=18) at Howard University. The survey questions were mainly intended: 1) to identify key demographics, such as level of education and number of years in the field; 2) to determine the preferences and utilization patterns for drug information resources; 3) and to identify perceptions about the accuracy of drug information search results confidence level for drug information skill.

Participants were asked to either select the choice with the most suitable description or fill in the blank by writing a specific response, if applicable. For some of the questions, participants were instructed to choose one of the following options under each potential response: Frequent Use (Frequent), Occasional Use (Moderate), Rare Use (Infrequent), and Never Use (Never). Only the percentage calculation for Frequent Use (Frequent) was used to determine the preference based upon each question.

Participants were characterized by years of pharmacy-related experience, less than 10 years (n=8) versus 10 years or above (n=10). Responses from these two cohorts were then compared to determine how the duration of pharmacy experience affects drug information resource utilization habits and the confidence level for search results and abilities.

The data collected from the survey was transferred to IBM SPSS 23 software to compute frequency, and to perform Chi-square and one tailed t-test analysis.

Results

Among a total of 18 participants, most were in-between the age of 30-39 (44.4%). No participants were less than 30 years of age. The number of female participants was greater than male, 61.1 percent versus 38.9 percent, respectively. When the respondents were asked to identify their educational backgrounds other than pharmacy, the majority (44.4%) percent reported earning a bachelor's degree followed by 27.8% with an associate's degree and 22.2% with a master's degree. The mean number of years of pharmacy-related experience was 15.2 years 10.1 (Tables 1 and 2).

Variable	Frequency (Percentile)
Age Range	
20-29	0 (0)
30-39	8 (44.4)
40-49	5 (27.8)
>=50	5 (27.8)
Gender	
Male	7 (38.9)
Female	11 (61.1)
Highest Education	
Associate	5 (27.8)
BA/BSC	8 (44.4)
MS/MA	4 (22.2)
Ph.D.	1
Working Experience(in Years)	
0-5	4 (22.2)
6-10	4 (22.2)
11-15	3 (16.7)
16-20	1 (5.6)
21-25	2 (11.1)
26-30	3 (16.7)
31-35	1 (5.6)

Table 1: Demography of the participant.

Q: Which reference resource(s) you normally use when you need drug or health related information?					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Google or other search engines	55.56	33.33	0	5.56	5.56
Textbooks/Journals	38.89	33.33	11.11	5.56	11.11
Package Inserts	33.33	33.33	11.11	5.56	16.67
Other Subscription based database	27.78	33.33	27.78	5.56	5.56
Q: Which search engine do you normally use to look up for drug or health related questions?					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Google	72.22	22.22	0	0	5.56
Yahoo	27.78	5.56	5.56	27.78	33.33

Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Bing	0	11.11	5.56	38.89	44.44
Ask/MSN	0	5.56	11.11	33.33	50
Q: Frequency of subscription based drug information reference use (in the past 2 years)					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Drug Facts and Comparison	44.44	44.44	0	0	11.11
AHFS Drug Information	22.22	27.78	22.22	0	27.78
Micromedex or Clinical Pharmacology	44.44	33.33	22.22	0	0
Physician Desk Reference	16.67	16.67	22.22	11.11	33.33
Q: If you receive a question about a potential adverse effect of a drug from patients, the most likely reference you normally use to answer such question is:					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Google or general internet search	33.33	27.78	5.56	0	33.33
Package insert	44.44	22.22	11.11	0	22.22
Resources available through your company	27.78	33.33	11.11	5.56	22.22
Textbook	22.22	22.22	16.67	11.11	27.78
Q: If you have searched for medical/health or drugs information, which category is the most common reason(s) for your search?					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Drug identification	50	16.67	16.67	0	16.67
Indications/Use	66.67	27.78	0	0	5.56
Adverse drug events/Side Effects	72.22	22.22	0	0	5.56
Dosage/Administration	66.67	27.78	0	0	5.56
Q: If a patient calls you to identify a tablet by its shape, imprint or color which reference you normally you use?					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Google or general internet search	27.78	16.67	11.11	5.56	38.89
Indentidex	55.56	11.11	0	16.67	16.67
Drug-Reaction	0	11.11	16.67	16.67	55.56
The dispensing system at work	33.33	11.11	0	16.67	38.89
Q: A reference source that you normally use to find a US equivalent drug of foreign drugs not available in the US is:					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Google or general internet search	27.78	27.78	5.56	5.56	33.33
Martindale	33.33	38.89	16.67	5.56	5.56
Drug Facts and Comparisons	22.22	22.22	5.56	5.56	44.44
Index Nominum	0	16.67	22.22	22.22	38.89

Table 2: The preferences assessment.

Most respondents researched drug/health-related information multiple times a day (44.4%), followed by once a day (27.8%). For amount of time spent on a drug information search, most spent less time, with 1 to 5 minutes ranked highest (38.9%), followed by 6 to 10 min (33.3%).Respondents with 10 years or more of pharmacy experience demonstrated slower processing time, with 22.2% spending more than 15 min vs. 5.5% of respondents with <10 years of experience (p=0.0006).

To the questionnaire also assessed the participants' preferences for search tools used to address drug information inquiries. Google or

other general search engine (59.5%) received the highest percentage of "Frequent Use" ratings. Twenty-four percent preferred package inserts, followed by textbooks/journals (22.2%). Subscription-based databases were the least favored among all categories (18.3%).

When asked which specific search engine was preferred for responding to DI inquiries, Google was the most preferred, receiving a "frequent use" rating from 72% of respondents, and considerably out-performing other high traffic search engines such as Yahoo (27.2%). Bing and Ask/MSN were not preferred by any respondents.

Despite the hazard associated with disseminating largely unverified information provided by search engines, only 17% of the participants responded that they "always" cross-check or verify their preliminary search results with other resources. A lower verification rate was observed from those with less than 10 years of pharmacy experience (12.5%) versus those with greater than 10 years of experience (20.2%; p=0.18).

Participant were also asked whether they verify the authenticity of the website or check the website sponsors before using the information obtained. Only 22% of respondents indicated that they "always" verify the authenticity of the website. Nearly three quarters of respondents indicated that they "sometimes" verify or chose "never/I do not remember." Though differences were not significant, the less experienced cohort demonstrated weaker verification efforts than on the more experienced cohort, 25% and 30%, respectively (p=0.37).

The most preferred subscription-based drug information references were Drug Facts and Comparisons and Micromedex and/or Clinical Pharmacology, with each category receiving a rating of "frequent use" from 44.4% of respondents. . Although the "frequent use" rate was identical, the "never use" rate was higher for the Drug Facts and Comparisons (22.2%) compared to Micromedex and/or Clinical Pharmacology (0%). Physician Desk Reference (PDR) and AHFS Drug Information were rated the lowest at 22.2% and 16.7% respectively.

Adverse drug events (72.2%) were the most common reason for a drug information search by pharmacists according to survey results. Other reasons for drug information search, such as indications/use, drug identification, and dosage/administration, also demonstrated relatively high rates "frequent use" at50.0%, 66.7% and 66.7%, respectively.

A follow-up questionnaire was administered to further assess preferences for resources used for investigating adverse events for a specific drug. About 44.4% responded that package insert was their preferred source, followed by Google or other general internet search engine (33.3%), and resources provided by their employers (28.2%). Textbook was the least favorable resource with, only 22.2% citing "frequent use".

About 55.6% of the respondents cited "frequent use" of Identidex as their reference source when identifying an unknown tablet or capsule by its imprint or color. The dispensing system provided by the employer was the second most frequently used resource (33.3%), followed by Google or general internet search (27.8%).

No resources received significantly higher "frequent use" rating than another for researching a US equivalent drug. However, Martindale was used slightly more than other resources (33.3%).The confidence level for the accuracy of search results was high, 100% signified that they felt confident about the accuracy of search results The confidence level for their drug information skills was also very high, with only 27% of the respondents feeling "not fully confident" about their searching skill.

The two major limitations of the study are the small sample size and the fact that the participants were in the non-traditional doctor of pharmacy program. Although it was difficult to make a strong conclusion given these limitations, the study is an indication of the trend of drug information preferences among pharmacists which may stimulates a larger and more compressive study.

Discussion

General search engines were the most preferred tool employed by the participants for the purpose of obtaining information for drug information inquiries. Not surprisingly, Google was the most preferred search engine at a 72% "frequent use" rate, as since Google takes holds a 64.1% market share in the U.S. according to the market research by comScore in 2015 [5]. The quality of search results from Google is questionable, however, due to Google's PageRank algorithms, ranking websites based on popularity (the number visits per search term) versus the verifiable accuracy and quality of the information provided [6]. The information retrieved using Google or any of the search engines is seldom verified by appropriate and credible authorities, lacking the evidence-based feature coveted by individuals with any level of scientific training.

Perhaps the most concerning study finding was that despite the high use of Google and other general internet search engines, results indicated that survey participants were unlikely to verify the authenticity and/or cross-check preliminary search results with other resources. This practice was observed at a higher rate in participants with less pharmacy experience, which can place patients at undue risk of harm, as these individuals may have an even greater need to cross-check information than their more experienced counterparts. A study conducted by Cardoni on how drug information service impacts patient care, warned of the importance of accurate information for the sake of patient's safety [3]. It should be noted, however, that the data in the study at hand was not statistically significant, likely due to the small sample size.

Participants also demonstrated a high level of confidence on their drug information skill (87%) and the quality of search results (92%). These findings may be a worrisome indicator because pharmacists might not be aware of what appropriate drug information skills entail. They will also be more likely to confidently disseminate or utilize inaccurate information that can result in patient harm and reduced pharmacist credibility to other members of the healthcare community.

The most common reason for drug information search was adverse events or ADE (72%). Although package insert was the most preferred resource in obtaining information on adverse drug events, there one-third of the participants still frequently used search engines. Because ADE is a particularly delicate area of pharmacy knowledge, meaning that "getting the data wrong" is more likely to result in morbidity and mortality, liability issues, and lost trust, than other knowledge areas, it can be particularly troubling when pharmacists are not using the most appropriate resources.

The majority of the participants rated Identidex as most preferred for identifying unknown tablet or capsule by its imprint or color, followed by Google and dispensing systems provided by employers. Martindale was preferred for finding a US equivalent drug of foreign drugs, though findings were not statistically significant. These results

demonstrate that pharmacists may be using more appropriate resources for searching questions related to topics with lesser consequences if incorrect information is provided versus ADEs.

Conclusion

Google was a widely-accepted resource for drug information search activities by pharmacists enrolled in the NTDP program for various purposes, including investigating adverse events. Google and other searching engines, by design, are not set up for close monitoring of the information put forth. Although the measures for ensuring information accuracy are strongly recommended for pharmacists for those reasons, as evidenced by results of this study, educational efforts have not been sufficient enough to minimize use of such search engines as primary resources. Pharmacists should be more aware of the possible risks to patient safety inherent in using Google or other search engines, and should be steered toward utilization of more reputable, evidence-based DI resources. However, further study is needed on a larger scale to verify the accuracy of these findings.

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