

# Pharmacists Preferences and Utilization of Drug Information Resources

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## Abstract

**Objective:** The study was designed to evaluate the level of drug information skills for pharmacist in the Non-to identify the participants' preferences for drug information resources.

**Background:** The ability of utilizing proper information is one of the essential clinical skills required by pharmacists to fulfill pharmacist's role as the primary source of drug knowledge. However, pharmacists are facing with the imminent challenge of utilizing proper information as to the increasing number of information. Howard University provides a drug information session to the Non-Traditional Doctor of Pharmacy students to enhance the student's drug information skills. A survey consisting of 18-questionnaires has been distributed to the participants (n=18) to assess the participant's utilization skill and the preference on each resource. Descriptive statistics and chi-square analysis was done using IBM SPSS 23.

**Results:** General search engines (55.6%) was the most preferred tool for their drug information search activities, and among the search engines 72% of the group frequently used Google for drug information inquiries. However, only 17% of the participants responded always cross-checked with other resources, and 22% always verified the authenticity of the website. On contrary to the findings, the level of confidence was notably high on their drug information skill (72%), and on the accuracy of obtained information (100%).

**Conclusion:** The observation from the study suggests that pharmacists should be more aware of the possibilities of risking the client's safety while using Google or other search engines whose information may often not most current and accurate.

**Keywords:** Professional training; Education; Counseling; Lay perspectives; Adverse drug reactions; Patient safety; Health promotion; Pharmaceutical public health; Professional practice; Professional practice

## Introduction

The ability of utilizing proper information is one of the essential clinical skills required by pharmacists to fulfill pharmacist's role as the primary source of drug knowledge [1]. However, pharmacists in the field are facing with the imminent challenge of utilizing both accurate and proper drug information as to the increasing number of information at an exponential pace [2]. Furthermore, the work place setting in general does not allow an ample time for a pharmacist to respond drug information inquiries [1,2]. This current trend addresses the importance of having a concrete drug information educational foundation at any level to maintain the one's competency as a drug expert [3,4].

A Non-Traditional Doctor of Pharmacy (NTDP) Program provides education for practicing pharmacists a doctor of pharmacy degree through distance learning technique and in-class activities. Howard University College of Pharmacy is one of the oldest schools of pharmacy in the United States. Drug information class sessions were designed for the NTDP students to promote effective drug information and evaluation skills, enabling them to service accurate in-depth information per drug information inquires

The study was conducted to assess the pharmacists' preference and utilization of drug information. The need for assessing the participant's drug information skill level was done in order to maximize the educational outcome of the participant. The study was designed to identify the participants' preferences for drug information resources

and make a suggestion for improvement of the Drug Information course based on analyzing the findings.

## Method

A survey consisting of 18-questionnaires has been distributed to the NTDP (n=18) at Howard University, College of Pharmacy.. The survey questions are mainly intended 1) to distinguish demographics, the level of education and the years in the field; 2) to determine the pattern of preference and utilization of the search on drug information; 3) to evaluate the authenticity of the results from the search and the confidence level on their drug information skill.

A participant was asked to either check the most suitable descriptions or fill out the blank by writing specific responses, if applicable. There was also a type of questionnaires, asking to describe the preference for each sub-category under the questionnaire by choosing one of the following options: Frequent Use (Frequent), Occasional Use (Moderate), Rare Use (Infrequent), and Never Use (Never). Only the percentage of Frequent

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Use (Frequent) was concerned while determining the preference for each questionnaire. The total participant group was divided into two groups based on the years of pharmacy related experience, less than 10 years (n=8) versus 10 years or above (n=10). These two groups were then compared one another to demonstrate how the length of experience affects drug information habits and the confidence level on the search activities. The data collected from the survey were transferred to IBM SPSS 23 software to compute the frequency, the Chi-square and the one tailed t-tests.

## Results

Among a total of 18 participants, most of them were in-between the age of 30-39 (44.4%), 40-49 (27.8%), and 50 or above (27.8%). No participants were below 30-year old. The number of female participants was greater than that of male participants, 61.1% versus 38.9%, respectively. When the respondents were asked to identify their educational backgrounds other than pharmacy, 44.4% said Bachelor's degree in science, and 22.2% of Master's degree. The mean year of pharmacy related experience was 15.2 years ± 10.1 (Tables 1 and 2).

The participants responded they researched drug/health related information multiple times a day (44.4%), once a day (27.8%), once a week (11.1%), once a month (5.6%), and once a while (11.1%). Per each drug information search activity, spending 1 to 5 minutes searching was ranked first (38.9%), 6 to 10 minutes (33.3%), second, and 11 to 15 minutes (16.7%) as third. Above 11% of participants said they spent more than 20 minutes. The sub-group with 10 years or more of pharmacy experience demonstrated slower processing time, more than 15 minutes, compared to the other group, 22.2% vs. 5.5%. (p=0.0006).

A questionnaire asked to assess the participants' preferences on searching tools which they use for drug information inquiries. Google or other general search engines (59.5%) was the sub-category with the highest percentage of "Frequent Use" rating. The second highest was package inserts (24.2%), followed by textbooks/journals (22.2%). Subscription based databases was the least favored among all given categories (18.3%).

The following two questionnaires went further to identify the preference over specific websites or resources within the search methods, search engines and subscription based resources. Google was the most preferred search engines, notably outnumbering other high traffic search engines such as Yahoo (27.2%), Bing (0%), and Ask/MSN (0%). In spite of vulnerability of providing unverified information due to the nature of search engines, only 17% of the participants responded always cross-check the results obtained with other resources. As two sub-groups were compared, the lower percentage was observed from the less-than-10-year-experience group (12.5%) than the other group (20.2%; p=0.18).

Another related questionnaire was given to the participant, asking whether they verify the authenticity of the website or check the sponsors before using the obtained information. Only 22% answered always verify the authenticity of the website, and the rest described their verifying efforts either "Sometimes" (23.3%) or "Never/I do not remember" (50%). Again, less experienced group demonstrated lower percentage than the experienced group, 25% and 30%, respectively (p=0.37).

The most preferred subscription-based drug information references are two resources: Drug Facts and Comparison and Micromedex and/or Clinical Pharmacology, 44.4% for each. Although the "Frequent Use" percentage was the same, the "Never Use" percentage was higher for the Drug Facts and Comparison (22.2%) compared to none for Micromedex and/or Clinical Pharmacology. Physician Desk Reference was rated 22.2% of "Frequent Use" and 16.7% for AHFS Drug Information.

Adverse drug events (72.2%) were the most common reason for drug information search by pharmacists according to the result from the survey. Other reasons for drug information search, such as indications/use, drug identification, and dosage/administration, also demonstrated relatively high with "Frequent Use" percentages, 50.0%, 66.7%, and 66.7%, respectively.

The follow-up questionnaire asked further to assess the preference on each resource used for searching adverse events for a specific drug. About 44.4% answered package insert as most preferred source, followed by Google or using a general internet search engine, 33.3%, and resources provided by their employers, 28.2%. Textbook was the least favorable resource among others, only 22.2% rated as "Frequent Use". About 55.6% of the participant rated "Frequent Use" for Identidex as their reference source while attempting to identify an unknown tablet or capsule by its imprint or color. The dispensing system provided by the employer followed the next with 33.3% and Google or general internet search with 27.8%.

There were no dominant resources for searching a US equivalent drug. However, Martindale: The Extrapharmacopoeia was placed the highest among others with 33.3%, followed by Google or general internet search, and Drug Facts and Comparisons, 27.9% and 22.2% respectively. The confidence level on the accuracy of search results was surprisingly high, 27% for very confident and 83% for confident. Combining two gave 100% response for feeling confident on the accuracy of search results although Google and other search engines are rated the top resource choices. The confidence level on their drug information was also very high, only 27% of the participant felt not fully confident on their searching skill.

## Discussion

General search engines were the most preferred tool employed by the participants to obtain information for drug information inquiries.

Variable	Frequency (Percentile)
<b>Age Range</b>	
20-29	0 (0)
30-39	8 (44.4)
40-49	5 (27.8)
≥ 50	5 (27.8)
<b>Gender</b>	
Male	7 (38.9)
Female	11 (61.1)
<b>Highest Education</b>	
Associate	5 (27.8)
BA/BSC	8 (44.4)
MS/MA	4 (22.2)
Ph.D	1 (5.5)
<b>Working Experience (in Years)</b>	
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.

<b>Q: Which reference resource(s) you normally use when you need drug or health related information?</b>					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Google or other search engines	55.56	33.33	0.00	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
<b>Q: Which search engine do you normally use to look up for drug or health related questions?</b>					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Google	72.22	22.22	0.00	0.00	5.56
Yahoo	27.78	5.56	5.56	27.78	33.33
Bing	0.00	11.11	5.56	38.89	44.44
Ask/MSN	0.00	5.56	11.11	33.33	50.00
<b>Q: Frequency of subscription based drug information reference use (in the past 2 years)</b>					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit response
Drug Facts and Comparison	44.44	44.44	0.00	0.00	11.11
AHFS Drug Information	22.22	27.78	22.22	0.00	27.78
Micromedex or Clinical Pharmacology	44.44	33.33	22.22	0.00	0.00
Physician Desk Reference	16.67	16.67	22.22	11.11	33.33
<b>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:</b>					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit Response
Google or general internet search	33.33	27.78	5.56	0.00	33.33
Package insert	44.44	22.22	11.11	0.00	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
<b>Q: If you have searched for medical/health or drugs information, which category is the most common reason(s) for your search?</b>					
Category	Frequent Use	Occasional Use	Rare Use	No Use	Omit Response
Drug identification	50.00	16.67	16.67	0.00	16.67
Indications/Use	66.67	27.78	0.00	0.00	5.56
Adverse drug events/Side Effects	72.22	22.22	0.00	0.00	5.56
Dosage/Administration	66.67	27.78	0.00	0.00	5.56
<b>Q: If a patient calls you to identify a tablet by its shape, imprint, or color which reference you normally you use?</b>					
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	0.00	16.67	16.67
Drug-Reaction	0.00	11.11	16.67	16.67	55.56
The dispensing system at work	33.33	11.11	0.00	16.67	38.89
<b>Q: A reference source that you normally use to find a US equivalent drug of foreign drugs not available in the US is:</b>					
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	0.00	16.67	22.22	22.22	38.89

**Table 2:** The preferences assessment.

It was not surprising to see Google (72.2%) as the most preferred search engine since Google takes account into 64.1% of a market share in the U.S. according to the market research by comScore in 2015 [5]. The quality of search result from Google has been questioned based the website the information was retrieved, however, due to Google's PageRank algorithms, ranking websites based on the number visits per search terms [6]. The information from the various websites retrieved using Google or any of the search engines is seldom verified by authentic entities or organization and given based on popularity rather than credibility.

In spite of the limitation of Google search, somewhat disappointing observation was found throughout the study in terms of believing the accuracy of the information obtained. The data indicated that the effort for verifying the authenticity or/and cross-check with other resources

was not sufficient enough to minimize a risk of providing incorrect information to their clients. Even lower percentage was observed from the less experienced group, less than 10 years of pharmacy related experience. It should be noted that, however, the data was not statistically significant due to the small sample size number.

The participant's search habits could attribute to this tendency while they search on other general topics. However, the drug or health related information differs from any other search topics since it can impact heavily on client's health. Cardoni conducted a study how drug information service impacts patient care, warning the importance of accurate information for the sake of patient's safety [3].

On contrary to the lack of efforts for ensuring credibility, the majority of the participants demonstrated high level of confidence on

their skill (87%) and the quality of search outcome (92%). This gap is a somewhat worrisome indicator because pharmacists might not be aware of a potential risk while providing unqualified information to their clients.

The most common reason for drug information search was adverse events (72%). The other reasons identified at a low rank were indication, dosage regimens, and pill identification. Although other resources are the most preferred resource in obtaining information on adverse drug effects, there were one-third of the participants still frequently used search engines.

The majority of the participants rated Identidex for identifying unknown tablet or capsule by its imprint or color, followed by Google and dispensing system provided by employers. No response rates for each category were equally high among all, making hard to draw a conclusion. Martindale: The Extra pharmacopeia was preferred for finding a US equivalent drug of foreign drugs. When finding US equivalent drug of a foreign drug is concerned, the result suggests that there is no dominant resource that the participants preferred one other.

## Conclusion

Google was a widely accepted resource for drug information

search activities by participating pharmacist for various purposes, including adverse events. Google or other searching engines do not closely monitor the accuracy of information by their nature. Although the activities for ensuring accuracy are strongly recommended for those reasons, it was seen from the study the effort was not sufficient enough to minimize a potential risk of harming public health due to servicing unqualified drug information. This observation suggests that pharmacists to have a higher standard of their role as a primary source of drug information. However, further study is needed to be done in a larger scale to further verify the accuracy of these findings.

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