GAVIN PUBLISHERS

International Journal of Pharmaceutical Care & Health

Smalls D, et al. Int J Pharma Care Health: IJPCH -104.

DOI: 10.29011/IJPCH-104. 000004

Opinion Article

Students' Opinion on Access of Drug Information Among Six Free Consumer Health Information Resources on the Internet

DeAna Smalls[1], Ositadinma B. Akaeme[1], Bisrat Hailemeskel[*2], Mary Maneno[2]

[1]Department of Pharmacy, Howard University, Washington, USA

[2]Department of Clinical and Administrative Pharmacy Sciences, Howard University, Washington, USA

[*]**Correspondence Author:** Bisrat Hailemeskel, Department of Clinical and Administrative Pharmacy Sciences, & Co-Director for International Grants, College of Pharmacy, Howard University, 2300 4th Street, NW Washington, DC 20059, USA. Tel: +1-2028064214; Fax: +1-2028064478; Email: bhailemeskel@Howard.edu

Citation: Smalls D, Akaeme OB, Hailemeskel B, Maneno M (2019) Students' Opinion on Access of Drug Information Among Six Free Consumer Health Information Resources on the Internet. Int J Pharma Care Health: IJPCH -104. DOI: 10.29011/IJPCH-104. 000004

Received Date: 29 November, 2018; **Accepted Date:** 10 January, 2019; **Published Date:** 21 January, 2019

Abstract

Objective: To determine the availability of drug related information on six open access drug information websites

Methods: First year pharmacy students at Howard University College of Pharmacy were asked to answer several drug related questions using each of the six databases and determine whether the information was present on the website

Results: Of the six websites utilized by the 38 students of the first-year class, RxList.com, WebMD.com. and Drugs.com had the highest frequency of availability of drug related information. Of the drug information questions, disease condition, drug interactions, and dosing information were the most frequently found among the first-year students.

Conclusion: From this study, RxList.com proved to have the most information available regarding common drug information queries. However, due to the small sample size, a larger study is needed in order to increase the validity of the results.

Introduction

Drug information databases are great tools to use when one wants to quickly access information to complete a case, inform a patient, or review health related literature. Studies show that pharmacy students frequently use drug information, especially during rotations to access clinical data pertaining to their patients. Though the more commonly used sites are those that are subscription based, students tend to utilize sites that are free for them to use. These sites include both those paid for by their institution or those that are free to download via a mobile app [1]. These sites tend to differ on the various ways they provide information. This includes, but is not limited to: presentation, organization, the depth of information, and content, just to name a few. In fact, an article from 2016 compared three authoritative websites-sites maintained by government health departments and health institutions- (RxList, Electronic Medicines Compendium, PDRhealth) and three review sites-sites carrying user contributed information (WebMD, RateADrug, PatientsLikeMe) in order to identify the type of drug information available on these sites [2].

User reviews for nine drugs (three drugs for each of three chronic diseases-diabetes, hypertension and asthma) were downloaded from three drug review sites and compared to drug information on three authoritative websites. It was found that the difference in the type of information found on authoritative drug information verses the drug review sites included: storage recommendations, dosage forms, recommended time and method to consume drug, pharmacology, special population considerations, contraindications, and drug interactions. Types of information found only on drug review sites included drug efficacy, cost of drug, difficulty in using the drug, comparison with other similar drugs, and personal advice and encouragement. Differences among the authoritative sites were also noted and included the depth and detail of information, how the content is structured, and presentation style. Differences among the review sites mainly included drug efficacy ratings [2].

Another study conducted in 2012 compared 47 government funded and 60 commercially funded websites on their readability. Each website in this study was searched using common disease

states relevant to consumers.[3] This included: arthritis, asthma, depression, diabetes, erectile dysfunction, heartburn, high cholesterol, hypertension (searched as high blood pressure), influenza (or flu), and obesity. Once the information was found, the authors determined the readability of each site by using the Flesch Reading Ease, Flesch Kincaid formula, and the SMOG grading formula. From these formulas the mean readability for each website was compared. The results showed that with the Flesch Reading Ease that government funded sites were significantly easier to read that commercially funded sites ($p = 0.002$). This result was consistent with the results of the Flesch Kincaid formula which showed that government funded sites were written with a mean grade level of 9.3 versus 10.1 with the commercially funded sites ($p = 0.012$). However, there was no significant difference between the two classification of sites when the SMOG method was used. From these results, the authors concluded that, though government funded sites were easier to read, the overall readability for all these sites were poor. This is believed to be due to the sites being written on a high school level versus the recommended eight grade reading level for public information [3].

These results were consistent with a study that evaluated consumer online medical information. Though the study was smaller and focused on only three drug information sites (WebMD, Yahoo Health, Medline Plus), it also determined that the readability of these sites to be on a high school level [4]. Differences like these, whether the site is authoritative, or review based, can be determinant factors among health care providers on what database they choose to utilize when looking up drug information. The purpose of this study was to evaluate the differences among the websites and identify if they effect the opinions of first year pharmacy students in regard to their satisfaction of the information provided by the databases.

Methods

First professional year pharmacy students were given several category of drug information questions and instructed to answer the questions from the six websites identified. The assignment was given as part of Drug Informatics course which is a two-credit hour mandatory course for all entering pharmacy students in to the professional program. The websites identified are (1) Rxlist.com-WebMD owned and operated site that provides full prescribing information and patient education for US prescription medications [5]; (2) WebMD.com-a site ran physicians, journalists, and community moderators offers health related information and community support [6]; (3) Drugs.com-Provides prescription drug information and news for professionals and consumers [7]; (4) Medscape.com-provides the latest medical news and expert perspectives, essential point-of-care drug and disease information, and relevant professional education [8]; (5) MedicineNet.com-an online, healthcare media publishing company that provides authoritative medical information. Owned and operated by WebMD [9]; and (6) MayoClinic.org-a nonprofit organization that focuses on patient care, research, and education [10].

These free consumer-based health information websites were evaluated based on the overall satisfaction of student while navigating the sites. Students were instructed to access common drug information on each of the sites. This information included: disease information, dosing information, drug identification/imprint, medical dictionary, diagnostic procedure/tests, drug-food interactions, and drug-drug interactions. After navigating through the sites, students were then instructed to evaluate the information retrieved from each website based on how easily they were able to access and utilize the information on the site. This was assessed by asking the following four questions (1) I found it easy to locate the information I needed using this website; (2) I am impressed with the depth of the content and the quality of information available; (3) I have the least difficulty to download the web site or the information I needed; and (4) I was able to find information related to the website; such as the history, who owns the information, and how frequently it was updated.

These scores were tallied up and placed into groups based on basic satisfaction scale (5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree, 1-Strongly Disagree). The scores were then running in SPSS using One-Sample Wilcoxon Signed Rank Test. With this test, we sought to determine which sites obtained a total score of 4 or better (Tables 1,2).

Results:

Table 1: Descriptive statistics of the study population.

Descriptive Statistics	
Age (N = 35)	In years
Mean	24.51 +3.584
Range	20 - 39
Gender (N = 38)	Percentage
Male	39.50%
Female	60.50%
Work Experience (N = 38)	
Has worked before	60.50%
Never Worked	28.90%
Prior Degree (N= 38)	
Degree	71.10%
No Prior Degree	13.20%

Table 2a: Summary of the overall satisfaction (opinion) of free access drug information databases (N = 38).

Overall Opinion (in %)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
RxList	44.7	50	2.6	0	1.6
WebMD	47.4	31.6	15.8	2.6	2.6
Drugs.com	42.1	44.7	10.5	0	2.6
Medscape	39.5	28.9	23.7	7.9	2.6
Medicine Net	28.9	24.2	28.9	7.9	2.6
MayoClinic.org	0	42.1	44.7	10.5	2.6
Average	33.77	36.92	21.03	4.82	2.43

Table 2b: Summary of the overall satisfaction (content) of free access drug information databases (N = 38).

Content (in %)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
RxList	7.9	65.8	26.3	0	0
WebMD	0	55.3	44.7	0	0
Drugs.com	2.6	34.2	63.2	0	0
Medscape	0	47.4	52.6	0	0
Medicine Net	0	78.9	21.1	0	0
Mayo Clinic	18.4	76.3	2.6	2.6	0
Average	4.82	59.65	35.08	0.43	0.00

The six websites were compared using a One-Sample Wilcoxon Signed Rank Test. The test was designed so that sites that obtained a majority of scores less than 4 were measured for their significance. The total tabulation in which students rated each site and the significance of these findings are displayed in (Tables 3-8). When we averaged those who rated Strongly Agree or Agree, RxList website scored the highest followed by Drugs. Com and WebMD. WebMD rated second when it comes in "Content" category and Drugs.com is ranked second in the "Opinion" category.

Table 3: Summary of overall satisfaction based on ease of access.

Question	Rating	Ease?	Depth?	Difficulty?	History?
RxList.com	Strongly Agree	8	13	13	10
	Agree	26	17	12	10
	Neutral	2	6	12	13
	Disagree	0	0	0	4
	Strongly Disagree	1	1	0	0
	P-value	0.675	0.58	0.853	0.043
WebMD.com	Strongly Agree	15	11	11	8
	Agree	12	13	12	16
	Neutral	2	9	11	10
	Disagree	8	4	1	3
	Strongly Disagree	0	0	2	0
	P-value	0.901	0.177	0.179	0.079

Drugs.com	Strongly Agree	14	14	9	9
	Agree	18	14	15	14
	Neutral	5	8	13	12
	Disagree	0	1	0	2
	Strongly Disagree	0	0	0	0
	P-value	0.144	0.728	0.239	0.112
Medscape.com	Strongly Agree	12	15	9	6
	Agree	9	12	12	12
	Neutral	9	4	14	15
	Disagree	6	6	1	2
	Strongly Disagree	1	0	1	2
	P-value	0.052	0.776	0.061	0.003
MedicineNet.com	Strongly Agree	9	7	8	6
	Agree	11	14	12	11
	Neutral	13	12	12	13
	Disagree	4	4	2	5
	Strongly Disagree	1	0	3	2
	P-value	0.01	0.015	0.014	0.001
MayoClinic.org	Strongly Agree	9	6	7	8
	Agree	14	11	14	11
	Neutral	11	16	14	13
	Disagree	2	4	2	4
	Strongly Disagree	1	0	0	1
	P-value	0.088	0.002	0.023	0.01

Table 4: I found it easy to locate the information I needed using this website

Websites	**Rating**				
	S. Agree	**Agree**	**Natural**	**Disagree**	**S. Disagree**
Drugs.com	36.8	47.4	13.2	0	0
WebMD	39.5	31.6	5.3	21	0
Medscape	31.6	23.7	23.7	15.8	2.6
RxList	13.2	68.4	5.3	0	2.6
Medicine Net	23.7	26.3	34.2	10.5	2.6
Mayo Clinic	23.7	36.8	29	5.3	2.6
Average	28.1	39	18.5	8.8	1.7

Table 5: I am impressed with the depth of the content and the quality of information available

Websites	Rating				
	S. Agree	Agree	Natural	Disagree	S. Disagree
Drugs.com	36.8	36.8	21	2.6	0
WebMD	29.9	34.2	23.7	10.52	0
Medscape	39.5	31.6	10.5	15.8	0
RxList	34.2	44.7	15.8	0	2.6
Medicine Net	18.4	36.8	31.6	10.5	0
Mayo Clinic	15.8	29	42	10.5	0
Average	29.1	35.5	24.1	8.3	0.4

Table 6: I have the least difficulty to download the web site or the information I needed.

Websites	Rating				
	S. Agree	Agree	Natural	Disagree	S. Disagree
Drugs.com	26.7	36.8	31.6	0	0
WebMD	28.9	31.6	28.9	2.6	5.26
Medscape	23.7	31.6	36.8	2.6	2.6
RxList	34.2	31.6	34.2	0	0
Medicine Net	21.1	31.6	31.6	5.3	6.1
Mayo Clinic	18.4	36.8	36.8	5.3	0
Average	25.5	33.3	33.3	2.6	2.3

Table 7: I was able to find information related to the website; such as the history, who owns the information, and how frequently it was updated.

Websites	Rating				
	S. Agree	Agree	Natural	Disagree	S. Disagree
Drugs.com	23.7	36.8	31.6	5.3	0
WebMD	21.1	42.1	26.3	7.9	0
Medscape	15.8	31.6	39.5	5.3	5.3
RxList	26.3	34.2	34.2	10.5	0
Medicine Net	15.8	29	34.2	13.2	5.3
Mayo Clinic	21	29	34.2	10.5	2.6
Average	20.6	33.8	33.3	8.8	2.2

Table 8: Overall summary of rating in all categories.

Websites	Ave Score		
Rating	S. Agree	Agree	Total Ave
Drugs.com	31	39.45	35.2
WebMD	29.9	34.88	32.4
Medscape	27.7	29.63	28.7
RxList	27	44.73	35.9
MedicineNet	19.8	30.93	25.4
MayoClinic	19.7	32.9	26.3
Average	25.8	25.8	25.8

Descriptive Statistics of Study Sample

Thirty-eight 38 first professional year pharmacy students from Howard University used each of the six websites to access drug information. Of these students, the majority (60.5%) were female with an average age of 24.5 years. 60.5% of students have held a pharmacy related job, while an additional 71.1% of students obtained another degree prior to enrollment.

On the other hand, Medicine Net scored significantly lower for each question pertaining to the site (ease: p= 0.010, depth: p= 0.015, difficulty: p= 0.014, history: p= 0.01). The second lowest performing website was Mayo Clinic, which performed significantly lower in three of the four opinion questions asked to the students (difficulty: p= 0.023, depth: p= 0.002, history: p= 0.010).

Discussion

Drug information databases are important tools utilized by consumers, students, and health care professionals to quickly obtain important prescription and over-the-counter related information. When conducting a general search for such information, the most common sites for information are the ones that offer free drug information, including the sites reviewed in this study. Though these sites serve the same function, they differ in terms of both the information that they provide and by their user interface. These differences are important things to consider when users are deciding which site to use to access the data that they need. In this study, we sought to determine the opinions of pharmacy students when it comes to some of the common free rug information databases and what their overall satisfaction is with these sites in terms of ease of navigation, depth of content, download speed, and availability of information pertaining to the website. Through the use of a one sample Wilcoxon signed test, it was determined that MedicineNet and Mayo Clinic scored significantly lower among students for all four of the satisfaction questions. In contrast, WebMD and Drugs.com received overall high rating in all four categories.

Though there is existing literature with similar study designs and ours, none of them focus solely on the free access drug information sites. Rather they tend to compare select free access sites with subscription-based sites, and such a comparison does not give us a clear assessment of the trend in opinions of free access databases among their users. For example, a study conducted in 2010 sought to determine the preference and frequency of app use for drug information among student pharmacists. In this study 298 students from 3 different schools completed a survey to rank their preferred site.[1] The top three databases from this study were Lexicomp, Epocrates, and Micromedex. More importantly, however, though subscription based sites were the most frequently used, it was determined that use of drug information sites among pharmacy students was more prevalent if the site or subscription was freely accessible to the student [1]. An almost identical study was conducted among physicians in order to determine the most frequently used sites to gather medical information. In this study 381 physicians answered questions about their preferred resource to access information. The results showed that the top sites included Up-to-date (10%), Medscape (8.4%), WebMD (5.5%), MD Consult (4.7%), and Emedicine (2.9%) [11]. Though this study did not focus on drug information, it does highlight the importance of freely accessible sites to access information, no matter what setting.

There were some limitations present in this study. First, this study included a small sample size which reduces the power of our results, possibly skewing our results. Second, students in this study were enrolled in a drug informatics course where they were taught how to optimally access information on drug information sites. Because of this training, our results may not be applicable to users who have not have experience utilizing drug databases and may not reflect the ease at which patients can navigate the sites. Finally, this survey was part of a graded assignment for the first professional year class, so the quality of the results may be affected since achieving a high grade may have been the primary motivation for some students.

Summary

This study reported the finding from first professional year pharmacy students which was done as a part of the Drug Informatics course. The students were asked to answer several questions in various categories using selected consumer-based free health and drug information websites. After completing answering the questions, they were asked to rate each of the websites based on their opinion over the following factors: easy of locating the information, depth of the information obtained, difficulty of navigating the website, and access to additional about the publishers of the sites. The six-website selected for this project were RxList.com, WebMD, Medscape, Drugs.com, MedicineNet, and MayoClinic. Based on the survey participant responses, RxList and Drugs.com ranked the highest in all categories. Students found these sites to be easy to navigate, provided in depth information, and they had the least difficulty to navigate the website. WebMD is rated second when students are asked about the content category. On the other hand, the least performed sites based on the student opinions were MedicineNet and MayoClinic. WebMD and Medscape scored in the middle. However, because of the small size of participants, it is recommended to have a larger study to further confirm these findings.

References

1. Park SK, Purnell MC, Freeman MK, Reese RV, Varga S (2017) Preference and Frequency of Mobile Phone App Use for Drug Information Among Student Pharmacists. Journal of Pharmacy Technology 33: 87-95.

2. Chew SW, Khoo CSG (2016) Comparison of drug information on consumer drug review sites versus authoritative health information websites. Journal of the Association for Information Science and Technology 67: 333-349.

3. Cochrane ZR, Gregory P, Wilson A (2012) Readability of consumer health information on the internet: A comparison of US government–funded and commercially funded websites. Journal of health communication 17: 1003-1010.

4. Kim KY, Metzger A, Wigle PR, Choe PJ (2011) Evaluation of online consumer medication information. Research in social and administrative pharmacy 7: 202-207.

5. http://www.webmd.com. Accessed on 12/4/2018

6. http://www.drugs.com Accessed on 12/4/2018

7. http://www.rxlist.com. Accessed on 12/4/2018

8. http://www.medscape.org. Accessed on 12/4/2018

9. http://www.medicinenet.com. Accessed on 12/4/2018

10. http://www.mayoclinic.com. Accessed on 12/4/2018

11. Leo GD, LeRouge C, Ceriani C, Niederman F (2006) Websites most frequently used by physician for gathering medical information. AMIA Annu Sympo Proc 902.