

Opinion Article

Students Opinion on Consumer Based Drug Identification Internet Resources

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Abstract

Purpose: Drug identification is the concept of being able to identify a drug based on certain marks, colors or imprints that are on the drug. The imprint is the text that is printed on a pill or capsule to help medical professionals and laymen know what drug it is. One of the ways in which we are able to identify these drugs is via different medical information websites. We compared the ability of six common drug identification websites that are consumer-oriented to help identify drugs. The goal of this study was if there are any differences among these websites regarding the content and ease of use in terms of pill identification. .

Methods: Data was collected from 38 professional students who enrolled to take a Drug Information Course as a part their curriculum. The data collected was then entered in to SPSS software for analysis. Descriptive statistical data based on their work experience, level of degree obtained, gender and whether or not they were able to find information in a particular category across each website was also collected. The data for each website was then compared against each other using different methods of statistical analysis such as the Wilcoxon Signed Rank Test and Binomial Tests to detect significance among the databases. Data was screened for outliers. All analysis was conducted using SPSS at an alpha of 0.05.

Results: Data was collected on a total of 38 professional pharmacy students, 15 males and 23 females. About 71% of the students reported having at least a bachelor's degree while 13.2% said they didn't have a degree. (This 13.2% participated in bridge programs so they didn't obtain a bachelor's degree before gaining admission into pharmacy school). About 60.5% of the students said they had work experience while 28.9% said that they had no prior work experience. From the results, it's clearly obvious that among all of the six free data websites that are studied in this project, the students found Medscape and Drugs.com to be the best at finding information regarding drug identification as over 92.1% of the students in both cases said that they were able to find information.

Conclusions: Conclusively, there is a high evidence that some websites in this case Drugs.Com and Medscape are better at identifying unknown pills in comparison to other websites according to our results. However further improvement is still needed in the design of these websites to ensure that the results are more comprehensive so as to include a large drug base that will take into account drugs even outside of the US.

Introduction

Drug identification is the concept of being able to identify a drug based on certain marks, colors or imprints that are on the drug which enables medical professionals and laymen to know what drug it is. The imprint is the text that is printed on a pill or capsule to help identify it. Prescription and over-the-counter drugs in the United States are required to have an imprint [1]. Although the ability to quickly identify a tablet or a capsule ingested by a patient can potentially mean life or death, federal regulations that required imprinting of solid oral-dosage forms for most prescription, OTC, biologic, and homeopathic drug products, has not been implemented until 1995. Request for identification of oral dosage forms usually generated in emergency situations where patients may be overdosed or mix ups. Therefore, it is critical that healthcare professionals are aware of the resources available to identify drugs by their imprint. There are number of websites and resources to identify tablet or capsules by their given imprints or marks. These resources usually provide information about drugs either using their imprint or using the shape or color of the tablet or capsule.

The goal of this study is to compare 6 consumer-based websites that have the ability to identify sold dosage forms by their imprint. The brief description of these websites is given below. A study conducted by Shenker compared the accuracy of standard pill identification websites by entering visual characteristics [2]. In their study a set of images of 451 pills was prepared and visual characteristics were entered in to two Internet search engines and three pill identification applications. They compared Google and Drugs.com and Bing websites. In our study, we asked students to answer pill identification related questions and their response was summarized. They were also asked their opinion regarding the friendliness of the site and ease of use of the website.

WebMD (<https://www.webmd.com>)

This website is an American corporation known primarily as an online publisher of news and information pertaining to human health and well-being. The site includes information pertaining to drugs and drug related issues. Its headquarters is in New York City, New York and was founded in 1996 by internet entrepreneur Jeff Arnold. WebMD allows users to enter the shape, color, or imprint of a prescription or OTC drug and then display results that match up with the supposed drug [3].

Drugs.com (<https://www.drugs.com>)

This website is an online pharmaceutical encyclopedia which provides drug information for consumers and healthcare professionals, primarily in the USA. It was founded on September 2001. The Drugs.com website is owned and operated by the Drug Site Trust, which is a privately held trust administered by two New Zealand pharmacists, Karen Ann and Phillip James Thornton. Drugs.com also has a drug imprint section which allows enter the shape, color, or imprint of a prescription or OTC drug as well search by national drug code [4].

RxList.com (<https://www.rxlist.com>):

This website was founded in 1995 by Dr Neil Sandow a pharmacist and is a very popular online medical resource of US prescription medications providing full prescribing information and patient education. RxList is an owned and operated site in the WebMD Consumer Network and was acquired by WebMD in December 2004. RxList has a drug imprint very similar to the previous websites mentioned [5].

Medscape.com (<https://www.medscape.com>)

Medscape is a website providing access to medical information for clinicians; the organization also provides continuing education for physicians and health professionals. It references medical journal articles, Continuing Medical Education, a version of the National Library of Medicine's MEDLINE database, medical news, and drug information (Medscape Drug Reference). Medscape was launched in 1995 by SCP Communications, Inc. under the direction of its CEO Peter Frishauf. Medscape's Pill Identifier allows you to ID generic and brand name prescription drugs, OTCs, supplements as well as search from over 10,000 tablets and capsules by imprint, color, shape, form, and scoring [6].

Medicine Net (<https://www.medicinenet.com>)

This website is a medical website that provides information about diseases, conditions, medications and general health. MedicineNet.com launched in 1995. William Shiel co-founded Medicine Net and continues today as the Chief Medical Editor. Medicine Net is an owned and operated site in the WebMD Consumer Network and was acquired by WebMD in December 2004. [7].

Mayo Clinic (<https://www.mayoclinic.org>)

Mayo Clinic is a website of Web professionals, medical reviewers, subject matter experts and other content contributors who collaborate to ensure accurate, relevant and actionable information to provide site visitors with access to the knowledge, experiences and services of Mayo Clinic. [8].

Methods of Research

Data was collected from 38 professional students who enrolled to take a Drug Information Course as a part their curriculum. The students were given questions related to drug identification and asked to navigate each website to get the answers. Students worked independently and were required to submit their findings by the end of the class. The data collected was then entered SPSS software for analysis. A descriptive statistical data we obtained that was based on their work experience, level of degree obtained, gender and whether or not they were able to find information in a particular category across each website. The data for each website is then compared against each other using different methods of statistical analysis such as the Wilcoxon Signed Rank Test and Binomial Tests to detect significance factors among the databases. Data was screened for outliers. All analysis was conducted using

SPSS at an alpha of 0.05 and 0.01. Each website was evaluated on a specific category and it was determined that if 80% or more of the students were able to find information in that specific category that that website was highly effective. In this particular instance however we focus mainly on drug identification.

Results

Data was collected on a total of 38 professional pharmacy students, 15 males and 23 females. About 71% of the students reported having at least a bachelor's degree while 13.2% said they didn't have a degree. About 60.5% of the students said they had work experience while 28.9% said that they had no prior work experience. The following Tables summarizes statistical breakdown of the student's responses in whether they were able to find information on drug identification across the six free data websites aforementioned earlier (Tables 1,2).

Websites	Yes	No
	(Able to find information)	(Not Able to find information)
RxList	92.10%	7.90%
WebMD	78.90%	21.10%
Drugs.com	92.10%	7.90%
Medscape	76.30%	23.70%
Medicine Net	7.90%	92.10%
Mayo	5.30%	94.70%

Table 1: The summary of response to the question stated as, "Where you able to find information on the drug identification questions given to you".

From the results, it's clearly obvious that among all of the six free data websites that are studied in this project, the students found Medscape and Drugs.com to be the best at finding information regarding drug identification as over 92.1% of the students in both cases said that they were able to find information.

Website	Test Proportion	Exact Sig (1-Tailed)
RxList	0.80	0.039
WebMD	0.80	0.500
Drugs.Com	0.80	0.039
Medscape	0.80	0.345
Medicine Net	0.80	0.000*
Mayo Clinic	0.80	0.000*

Table 2: Summary of Which Free Data Website Was More Significant using Binomial test.

*Significant because the observed population was much lower than the test proportion and because it showed that majority of the students were NOT able to find the information. Based on the results, it's obvious that among all of the six free data websites that are studied in this project, the students found Rxlist and Drugs.

com to be the best at finding information given that both websites showed significance with a p-value of 0.039 with alpha set 0.05.

Discussion

It is known that the ability to quickly identify a tablet ingested by a patient can a potentially mean life or death decision. The federal regulations allow a drug firm to use its own system to convey enough information about the drug to allow for identification. Some product may have multiple strengths and thus are required to be distinguishable from each other. There is no uniformity at this time mandated to standardize imprint on solid dosage forms. Currently, an imprint code may consist of any single letter or number or any combination of letters, numbers, marks, or symbols. The imprint code may also include words, the company name, all or part of the National Drug Code, or a monogram. Firms that use product logos or symbols are encouraged, but not required, to include some of these elements [9]. The evolution of imprinting from a voluntary, unregulated, paper system in the mid-1980s to a state-of-the-art, comprehensive and accessible database today is the result of a collaborative mission among government, advocacy groups, and industry. Drug identification websites are widely used to help medical professionals identify unknown medication with ease in both the inpatient and outpatient setting. All approved prescription and over-the-counter solid, oral dosage form medications in the U.S. are required by the Food and Drug Administration (FDA) to have a unique imprint.

The unique imprint, when used in conjunction with the product's size, shape, and color, permits the identification of the drug product, the active ingredient(s), strength, and the manufacturer or distributor of the product. An imprint is defined as any single letter, number, or combination of letters and numbers, including words, company names, National Drug Code, mark, symbol, logo or monogram. This allows the Food and Drug Administration to prevent counterfeit drugs from ruining the market [10]. This research project sought to compare the strength of six free data websites based on their ability to give information regarding drug identification based on the responses of 38 pharmacy students at Howard University College of Pharmacy. Out of 38 students, 36 of students showed cohesively that the websites Rxlist and Drugs.com were far superior than their counterparts in finding information regarding drug identification. Medicine Net and Mayo clinic proved be the least effective in terms of drug identification given the fact that 92.1% and 94.7% of the students said they weren't able to find information on drug identification respectively.

A study similar to ours was also conducted by Weaver, et al. [11] in which six databases were evaluated for their ability to identify solid oral dosage forms. The researchers found that 93% of the unknown SODFs were identified by using Physician Desk Reference compared with 96.4% identified by using Identidex. However, their study focused mainly on nonprescription drugs and dietary supplements. In comparison, the study conducted by Shenker which was mentioned earlier in the paper, the researchers prepared a set 451 pill images and visual characteristics and entered them into two Internet search engines and three pill identification

applications. Head to head comparisons of correct identifications were made using McNemar's test and the p-value was set to 0.00001. That notwithstanding, the difference in both these studies is that it was factual and didn't take into account student's opinion. However, it is necessary to point out that there are indeed some notable limitations to this study. One factor that may inflate the estimate of products that are identifiable by this study is sample time bias. This retrospective sample includes products that have been on the market for an extended period of time. This methodology fails to measure the likelihood of identifying new products, which are subject to a lag time between the marketing of a new product and the identifier information being incorporated into the databases. Our analysis did not differentiate products on the basis of time on the market. Another limitation of our study is that we only compared but so many websites due to the fact we used only websites that didn't require subscriptions. Also, very little research on drug identification websites has been conducted so it is hard to make facts concrete unless they are replicated multiple times [11].

Conclusion

Identifying oral dosage forms by their mark is critical particularly in emergency. Despite such critical significance, there is no mandated regulation to standardize the imprint code of pharmaceutical products. In our study, we identified 6 websites that provide free information on a drug using imprint codes or color and shape of drugs. Pharmacy students were given assignment to identify randomly selected tablet imprints or marks and to rate each of the websites identified. There was a great evidence that

some websites are better at displaying drug identification more than others according to our results. Students found Medscape and Drugs.com to be the best at finding information regarding drug identification. However further research periodically is needed because most of these websites upgrade their resource on a regular basis.

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