An Overlook on the Web Based Drug Information Resources

Keerthy J[1], Venkateswaramurthy N[*1], Sambathkumar R

1. J.K.K.Nattraja college of Pharmacy, Kumarapalayam, Tamilnadu-638183.

ABSTRACT

The purpose of this work was to familiarize the Pharm. D students with the various web based drug information resources with its advantages, usefulness and limitations and to develop skills in retrieval and evaluation of drug information. This review work is useful for Pharm. D students and is extremely reliable. This work helps in understanding the types of drug information resources available, to develop skills to find the suitable and appropriate answer; to select suitable search strategy and appropriate drug information resources; to develop skills in accessing web based drug information resources and its applications; to understand the various limitations and the advantages of various resources; and to chose appropriate resources to answer the drug related queries. To guide the Pharm. D students, data regarding various web based resources (databases and websites) were collected, analyzed and categorized according to the requirements of the needed drug information. This review work will help and enable the students in utilizing drug information resources effectively. The usefulness of this information reflects upon their practice and can enlighten them.

Keywords: Web, drug information, limitations.

INTRODUCTION

Medical science is an ever evolving and changing field. Each year accounts for numerous discoveries in medical field. In the last decade, hundreds of drugs have been approved. It is estimated that the overall depth of knowledge on drugs and disease amplifies every year. Drug information can be presented in different forms like pharmacy newsletters, verbal presentation, formal lectures, books, journals, printed materials or through websites and databases. In this scenario of vast development, the pharmacist must be keen in updating themselves. Information on drugs must be genuine, well referenced, up-to-date, critically evaluated and quickly available. It is at times like this when the need of online drug information sources are at most and therein relies the task in choosing a right source. Websites and medical databases are widely viewed and accessed source of information by both health care professionals as well as public. Hence the need in identifying apt source that provide quality data is extremely essential as health is unquestionably the most valuable and irreplaceable aspect in life. Sound information also helps in improving therapy and in medication usage evaluation. The pharmacists access to user-friendly online resources which quickly provide current, and accurate medication data has become significantly important, especially in hospital and clinical pharmacy practice, where pharmacists are involved in the therapeutic decision-making process. With the enormous developments of the drug literature and the availability of several databases for utilizing it, users sometimes find it confusing to decide which database would serve them best. Most of the top databases are subscription based. The budgets of hospitals or clinical organizations may not always allow for subscriptions to multiple web based drug information resources. When accessing these resources, it will be a great task in selecting the most reliable one. Unfortunately the choice between databases cannot be made effectively always due to many factors. First there is no time in this busy era to evaluate the effectiveness personally. Secondly, there are a vast number of websites and databases providing drug related and disease related information which can be confusing. Too much of information as well as too less of information can be unreliable. Every database has its own focus, and collects primary literature in a certain field about a disease, drug-information, or literature related to patient care to stand out. The value or the effectiveness of a web based drug information database can be described in terms of its usability relative to its cost, user friendly both in quality and performance basis, and the cost includes the purchase cost and as well as the time spent retrieving the desired information. The users experiences and the results from searching the same online drug information source through various platforms may differ, as better and more sophisticated

analytical and refining tools are being constantly developed and utilized. Therefore, comparative studies and analysis on the electronic drug information resources can be useful in deciding subscription purchases.[1-8]

Study Objective

The objective of this study is to analyze the clinical dependability, completeness, accuracy, and ease-of-use of commonly accessible web based drug information resources. This review work is useful for clinical students like those doing Pharm.D, who are directly involved in the clinical care of patients . This work helps:

1. In understanding the types of drug information resources available. A better understanding always helps in making a proper therapeutic decisions.

2. To develop skills to find the appropriate answer, to select suitable search strategy and appropriate drug information resources. In this scenario of tremendous developments of medical field, the challenges in treatment also have increased. People are more subjected to disease and disease causative agents are becoming more stronger. At this point of time always most accurate and novel techniques and knowledge will pave the path for improved treatment to conquer the pathogens for a healthy tomorrow.

3. To develop skills in accessing web based drug information resources and its applications. Emergence of information in web based form has contributed in developments of numerous websites, databases, journal and blogs. The reliability of most of them is of great confusion. So selecting the most credible source of information is always a challenge.

4. To understand the various limitations and the advantages of various resources. Not all data's provided in online resources are accurate. Some may lack proper basis or proofs or clinical credentials. Understanding the disadvantages and advantages of a resource can be helpful in making judgments.

5. To chose appropriate resources to answer the drug related queries. Pharmacists receives numerous drug and disease related queries from other health care professionals, patients and care takers. Providing the most accurate and unbiased information at proper time is of great importance. Access to most reliable source of information is of prime consideration.

Methods of Study

In order to examine the dependability of the resource, comparison of the websites and databases were conducted. Factors like depth of content provided, its completeness and ease of retrieval and the cost involved were considered.

Databases

The online drug information databases selected for evaluation were the most commonly assessed ones like Medline, Micromedex, Lexicomp online, Facts and comparisons, AHFS DI and MD Consult. The performance and usability of the databases, as well as users preferences, were evaluated for a period of 6 months (from February 2013 to August 2013).

1. ***Facts & Comparisons online*** is a database that comprises all publications from Facts & Comparisons/ Wolterskluwer. The contents of this database is sourced from the following reference (print): A to Z drug facts, Drug Facts & Comparisons, Drug Interaction Facts, : Herbal Supplements and Food, MedFacts, Nonprescription Drug Therapy, and the Review of Natural Products. The features also includes a drug identification tool, daily news update, and patient education materials. Its search interface allows all of the components to be searched simultaneously with the added online content. One of the advantage of this database is that the data comes as a comparative charts that are familiar to the pharmacist. It can be assessed through a 30 days free trial. It is a subscription database. [9]
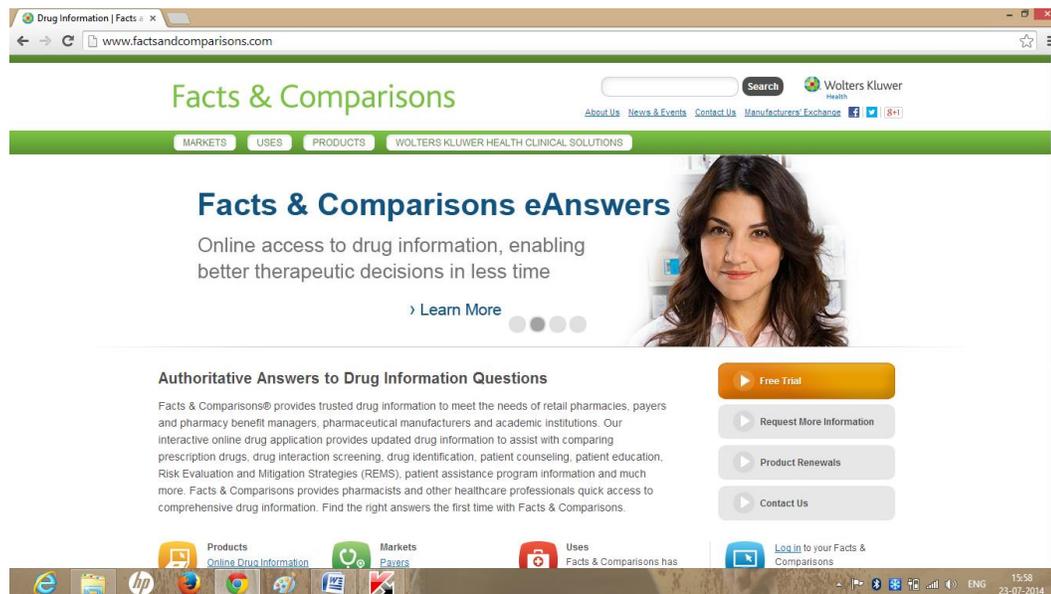
2. ***Lexi Comp Online*** (www.lexicomp.com) uses the share of lexi comp's print library, that has been changed to online database. The featured contents include: Geriatric Lexi Drugs; Infectious Diseases; Lab Tests and Diagnostic Procedures; Lexi Drugs; Lexi Drugs International; Natural Products; Nuclear, Biologic and Chemical Exposure; Pediatrics Lexi Drugs; Pharmacogenomics; and Poisoning and Toxicology. The database also provide charts from the Clinicians Guide to Internal Medicine and tools like Lexi CALC, Lexi drug ID, Lexi Interact and Lexi IV Compatibility. Patient education leaflets are also available in 18 languages, along with pronunciation guide with audio files of drug names. Currently Lexi Comp expanded their depth of information by adding the contents from AHFS essentials and

AHFS Drug information. LC is a quickly assessable concise database. The current version is in accordance with previous bottom line but is encompassed with vast depth of information. LC is not sold to individual users but a single desktop version is available. Institutional licensing is available. [10]

3. ***Thompson Micromedex*** offers evidence based and comprehensive information. Micromedex is a collection of databases offering drug, disease and toxicology oriented information for health care professionals and patients. It offers information on more than 2,300 products. The Micromedex provides information in broadly two categories. Firstly, Micromedex is subdivided as Micromedex and Carenotes. In Micromedex details on drugs, Drug Interactions (includes drug- drug interaction, drug food interaction, drug lab interactions etc), Drug Compatibility, Drugdex, Drug Monographs, Drug Dosing, Adverse Reactions, Side Effects, Indication and so on are presented. Drug monographs can be searched with generic name or brand name, indication, or adverse event and so on. It also contain standard details on adult and pediatric dosing, pharmacology, their kinetics. The database provides a complete information on drugs, making it versatile in function. In Carenotes, patient counseling information on diseases and drugs are available in simple language with pictorial descriptions. A vast area of diseases are covered (more than 2,000 in number). It helps in better understanding of disease,

its management and prevention. The database also contains data on post marketing surveillance, clinical trials, case studies and their contents are referenced. Micromedex is not available for individual subscribers and cost differs from institutional use, depending on the number of users and licensing.[11]

4. *Medline* is a biomedical database, more than 4,800 journals are indexed. It contains over 19 million references to journal articles in life sciences with a greater concentration on biomedicine. Currently, citations from approximately 5,600 worldwide journals in 39 languages; 60 languages for older journals are available. Medline encompass various areas of

the life sciences, behavioral sciences, chemical sciences, and bioengineering needed by health professionals and others engaged in basic research and clinical care, public health, health policy development, or related educational activities. Medline also covers life sciences vital to biomedical practitioners, researchers, and educators, including aspects of biology, environmental science, marine biology, plant and animal science as well as biophysics and chemistry. Increased coverage of life sciences began in 2000.MEDLINE is the primary component of PubMed (http://pubmed.gov); a link to PubMed is found on the NLM home page at http://www.nlm.nih.gov. The result of a MEDLINE/PubMed search is a list of citations (including authors, title, source, and often an abstract) to journal articles and an indication of free electronic full-text availability. Searching is free of charge and does not require registration.[12]
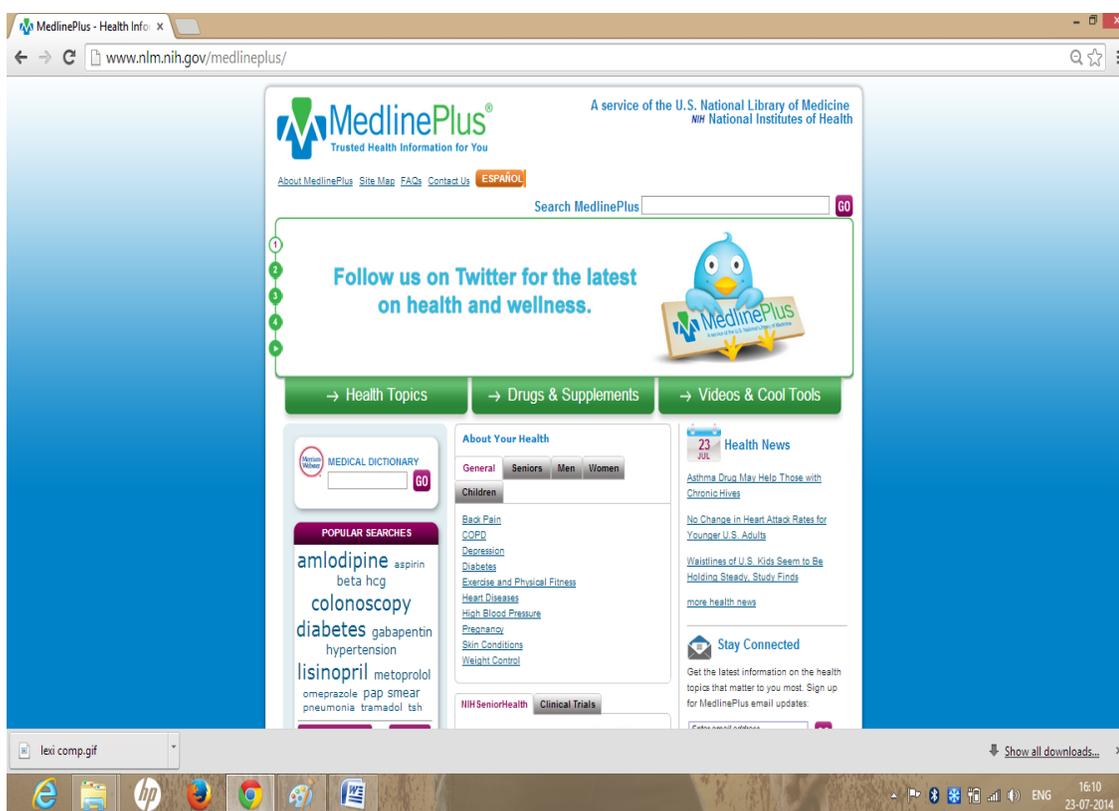
5. **AHFS drug information** database is maintained continuously throughout the year for the purpose of disseminating comprehensive, evaluative drug information to the entire medical and paramedical community, and updates are issued frequently on an ongoing basis in electronic formats. It provides information on drug, drug interaction, consumer medication information; medication guides; Monograph updates. Its services also includes mobile drug references; handbook on injectable drugs; and medication guides.[13]

6. ***MD Consult (clinicalkey)*** is a web-based resource that provides access to the full text of over fifty medical journals, over 50 reference textbooks, about 500 practice guidelines, drug information for over thirteen thousand medications, and value-added current awareness features. The Library subscribes to the MD Consult Core Collection, which covers a wide range of medical specialties. There are two options for MD Consult: generic and personal. An overview of the MD Consult Sections**:**

Books- Over 50 reference text books are included in MD Consult. These reference book resources can be searched simultaneously or browsed individually.

Articles- it includes citations from the National Library of Medicine (NLM). In addition, full-text access is provided to over 80 serials (journals, the *Clinics,* and the *Year book* series).

The Clinics- Provides access to full text comprehensive clinical reviews from the series The Clinics of North America.

Drugs- From Gold Standard's Clinical Pharmacology. This resource includes drug listings by indication, contraindication, and adverse reactions. FDA Approvals and Safety Notices are added when announced by the FDA or drug manufacturer.

News- Provides concise clinical summaries on new developments from all major journals, government agencies, and medical conferences along with medical news

Patient- Nearly 10,000 Patient education handouts from the American Academy of Family Education Physicians, DynoMed.com, Elsevier, McKesson Clinical Reference Systems, and A.D.A.M., Inc. They are printable and can be customized with notes and patient instructions.

Images - Over 50,000 images may be searched and compared.[14]
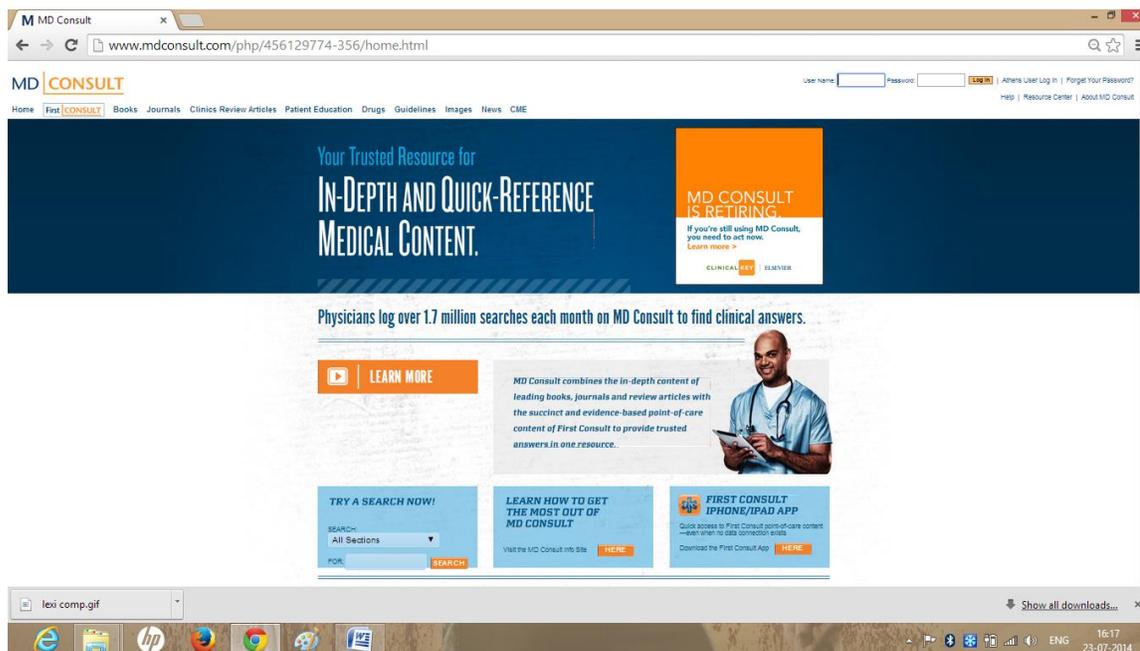
Websites

Websites comes under the category as secondary source to the drug information. Websites are widely viewed and accessed source of information by both health care professionals as well as public. Hence the need in identifying reliable source is extremely essential as health is unquestionably the most valuable and irreplaceable aspect in life. Sound information also helps in improving therapy and in medication usage evaluation.

1. ***Food and Drug Administration(www.fda.gov)***is the official website of U.S food and drug administration. The FDA is the oldest comprehensive consumer protection agency in the U.S. Its responsible for protecting the public health by assuring the safety, efficacy and security of human and veterinary drugs, biological products, medical devices, food, cosmetics and products that emit radiation. The FDA's website is an important source of information regarding the most recent drug-related news, including drug approvals, recalls, and safety warnings. It is the home of Med Watch, the national adverse event reporting system (AERS). Users will also find the Orange Book with therapeutic equivalency codes at this site. FDA provides up-to-date information on Drugs (Emergency preparedness, Drug approvals, Drug safety and availability, Development and approval process, Guidance, compliance and regulatory information, News and events, Science and research); Food; Medical devices; Vaccines, blood and biologics; Animal and veterinary; Cosmetics; Radiation emitting products; Tobacco products ; and Combination products. FDA seeks to make more information available

to the public rapidly in a form that is easily accessible and user-friendly and to foster a better understanding of Agency operations and decision-making.[15]
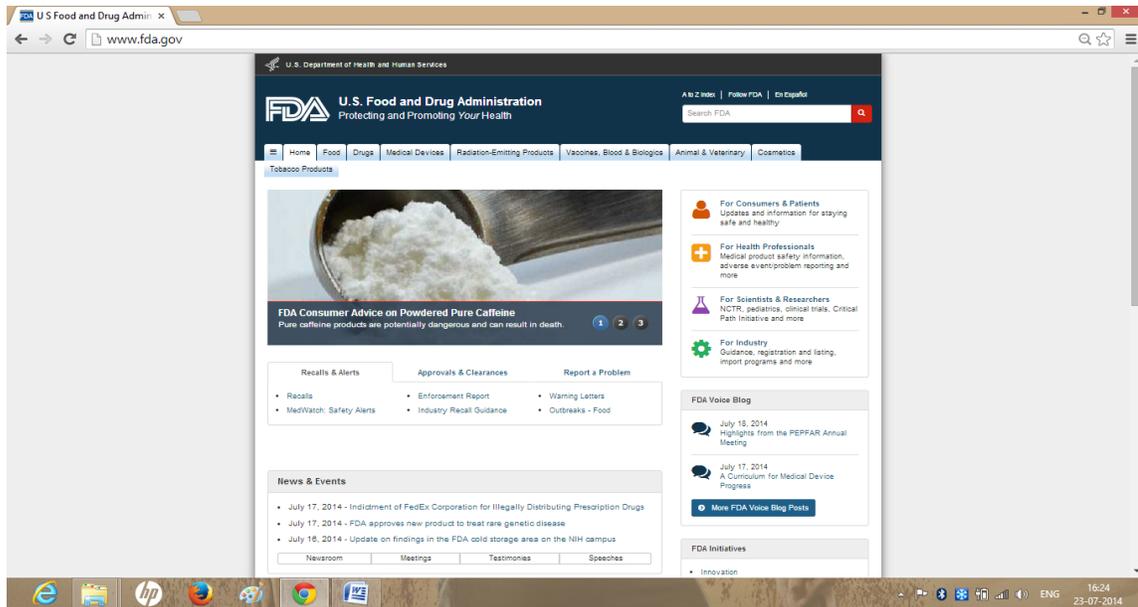
2. *Centers for Disease Control and Prevention (CDC):* The CDC website is an essential resource when looking for information regarding prevention and treatment of infectious diseases. There is an abundance of information to be found on topics regarding infectious disease, including annually updated immunization recommendations and scheduling, travelers' health, and treatment guidelines for infectious diseases.[16]

3. *American Society of Health-System Pharmacists:* One of the most useful aspects of this site is that it provides information about drug shortages, including recommendations for alternative treatments.[17]
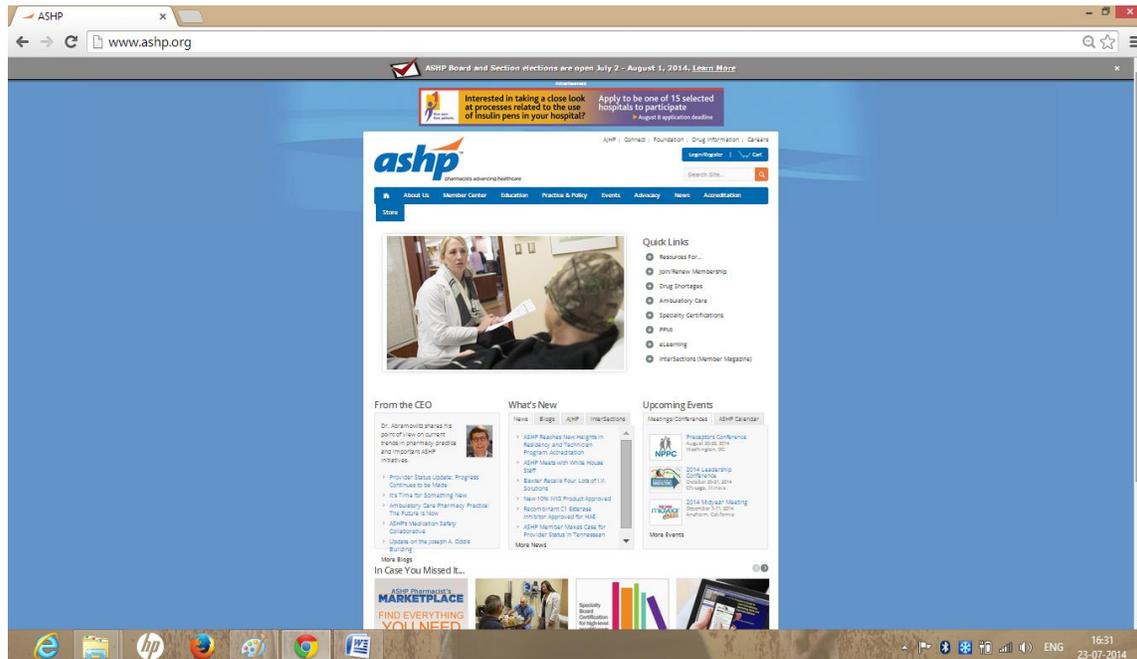
4. *Medscape:* Medscape is a free Internet resource that provides health care professional–specific information. It is organized into sections by medical specialty, including one for pharmacists. The website provides numerous items of evidence-based information, including free access to some journals and many useful review articles.[18]
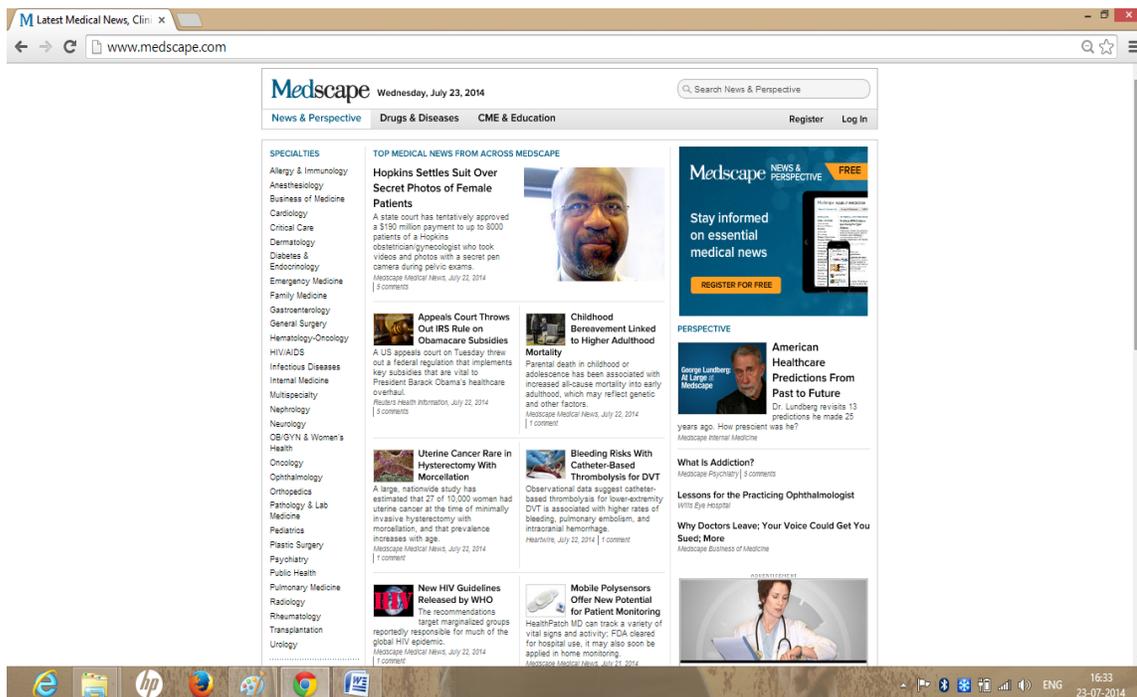
5. ***Drugs.com*** is a popular online source of drug information. This site provides free, peer-reviewed, accurate and independent information on more than 24,000 prescription drugs, over-the-counter medicines & natural products. The featured services of drugs.com includes drug information , A to Z Drug List, Drugs by Condition, Pill Identifier, Drug Side Effects, Drug Dosage, Interactions Checker, News & Articles, FDA Drug Alerts, New Drug Approvals, New Drug Applications, Drug Imprint Codes, International Drugs, Drugs by Category, Pregnancy Warnings, Emergency Contraception, Inactive Ingredients, Video Centre, OTC Database, Medical Conferences, Health Guides, Symptom Checker, FDA Consumer Updates, Medication Record, Clinical Trial Results, Medical Encyclopaedia, Medical Dictionary, Patient Care Notes, Generic Drugs, Veterinary Drugs, Popular Articles, Commonly Abused Drugs, Mobile Apps.

    Data sources of the website include Micromedex, Cerner Multum, and WoltersKluwer.[19]
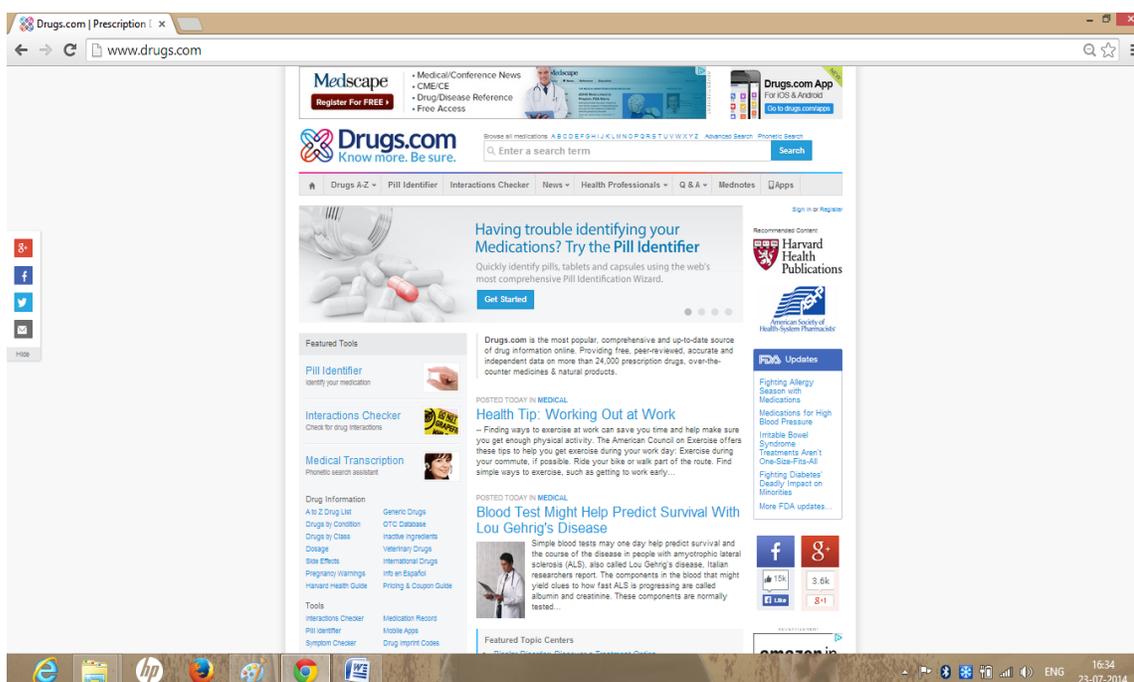
6. ***Rx list.com*** is owned and operated by WebMD and part of the WebMD network. RxList is an online medical resource dedicated to offering detailed and current pharmaceutical information on brand and generic drugs. Founded by pharmacists in 1995, RxList is the premier Internet Drug Index resource. RxList continuously reviews and updates the site with articles written by pharmacists and physicians and data provided by credible and reliable sources like the FDA and First Data Bank, Inc. to ensure the most accurate and beneficial information is provided. RxList provides services like: Information on medications - can be found using the Drugs A - Z list (an alphabetical listing of both brand and generic drug names) ; pill identification tool;

Slideshows and Images; Symptom Checker; Diseases; Dictionary; and Medical Quizzes. Most of the current articles in medical field, updates on treatment, novel discoveries are encompassed in this site. Recent updates and medical news are depicted in a way to attract the viewer this is very informative as well as catchy. The whole content of the site is felicitated in a simple easy to understand language. [20]
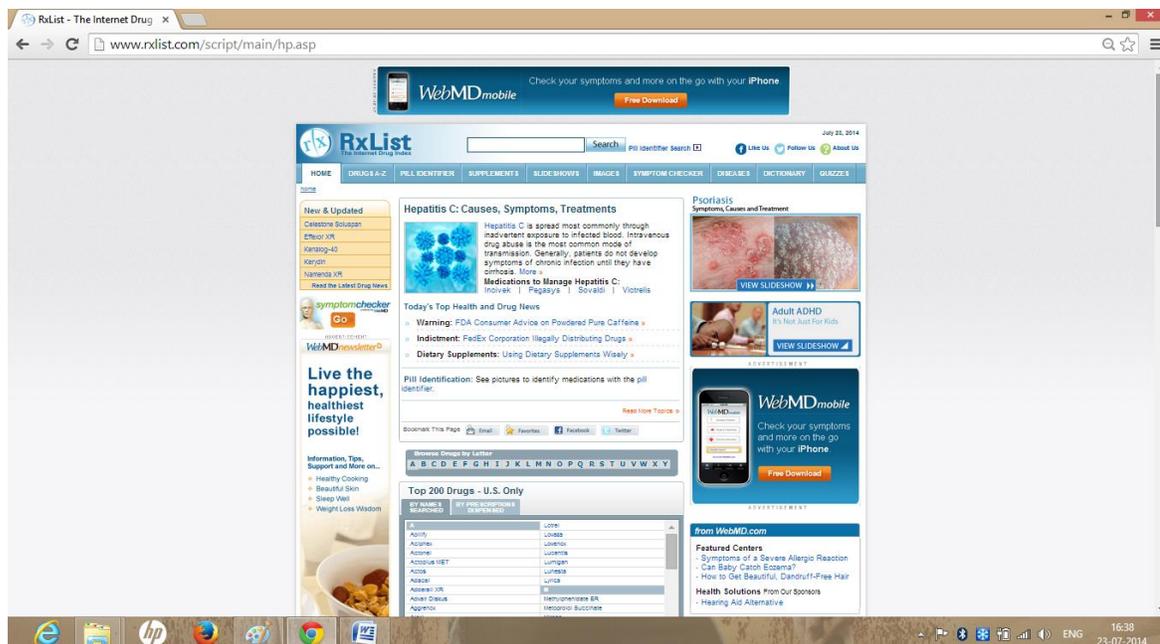
CONCLUSION

The selection of online drug information resource is a task, and choosing an apt one is pretty confusing. Most of the databases and websites provides a vast details on disease as well as drugs. Selection criteria should be based on ease of usage, quality of information obtained rather than quantity with proper reference, and financial options of the individual or of the clinical set up. Each web based resource, databases and websites have their own advantages and limitations. The strength must over weigh the weakness for the chosen source. And no drug database or website is truly comprehensive. Most of them are constantly reviewed and updated. And also the answers provided also did not vary much among the databases. But the dependability of websites is quite confusing. A lot of changes in the data provided by the websites differed from each other. Majority of the websites utilizes the information from databases like Micromedex, Md consult, and Medline. So shifting from websites to databases can be of greater use and will be time saving. The online drug information databases were analyzed and evaluated. Micromedex, Lexi-Comp Online, and Facts & Comparisons 4.0 are the top ranked online information databases. These databases require a subscription

outperformed the free online databases. Micromedex had numerous advantages like broad scope of information, in depth, information on case studies and clinical studies, all the data are well referenced, and weekly updated. Its limitations includes vast and voluminous information that are difficult to navigate, lacks more information on OTC drugs and also prices of drugs can be included. The micromedex was found to be more user friendly when compared to Lexi Comp, Md consult and other databases. These medical databases are extremely reliable and helps the medical and health care professional in arriving at a decision and improving the treatment choices.

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