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Indian Pharmaceutical Industrial Libraries: An Overview

Pratibha Gokhale [1]; H A Biradar [2]

Retd.-Head of DLIS and I/C Librarian, University of Mumbai,

kaliana Vidyanagari ,Santacruz (E) , Mumbai-400098 [1];

Research Scholar, DLIS, University of Mumbai,

Kalina, Vidyanagari, Santacruz(E),Mumbai-400098 [2]

pratibha_gokhale@yahoo.com[1]; hbiradar@gmail.com[2]

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ABSTRACT

This paper describes primary and secondary information sources available in the pharmaceutical industry and also attempts to highlight about the problems in retrieving the online information sources and increasing trends in the use of electronic information sources in the pharmaceutical industry.

Keywords: Information Sources, Retrieving information, pharmaceutical Industry,

1. INTRODUCTION

User is the key person in any information system, as all of information revolution & problems of information explosion are centeredaround the user & his convenience. The basic saying in business is "know thy customer." In Library & Information centre environment this axiom is yet to take a firm root, although a considerable progress has been made over the years. A library can achieve its goals more effectively, if it designs its resources & services based on the results of in-depth study of its users at its institutional level. This is apt in views of its limited funds to achieve its set goals.

In a library or information centre environment, the users are an important link or the recipients of the information in the communication cycle. There are number of terms used as synonyms to user such as patron, reader, member, customer, etc. The user is an important component in an information system. This vital fact was not recognized for a long time by our information managers.

1.1Indian Pharmaceutical Industry: An Overview

The evolution of the Indian pharmaceutical industry can be broadly divided into two periods, the process patent regime and the product-patent regime. In the process-patent regime (before 2005), India recognised only process patents, which helped in buildingthe basis of a strong and competitive domestic industry. In 2005, India entered the product patent regime which marked the end of a protected era, and signalled a new phase in the integration of Indian players into the global market. While the earlier process patent regime helped the Indian pharmaceutical industry develop into a world-class generics industry, the product patent regime is aimed at encouraging new drug discoveries over the long-term. However, the launch of patented products in India has been slow. (Annual Report EXIM Bank, 2015)

India gained a foothold in the global arena, with reverse-engineered generic drugs and active pharmaceutical ingredients (API). India now seeks to become a major

player in outsourced clinical research and the contract research and manufacturing services (CRAMS) segments. India has the highest number of manufacturing facilities (332 sites) approved by the US Food and Drug Administration (US FDA). Further, in 2011, one third of all Abbreviated New Drug Applications (ANDA) approved by the US-Food &Drug Administration, belonged to Indian companies.(**Annual Report EXIM Bank, 2015**)

1.11 Health Scenario in India

India, a country with a centuries-old heritage of medical science, first became familiar with the modern systems of medicine in the 17th century. India became an independent nation in 1947 and became a Republic country in 1950.There have been various developments in the health sector in the post-independence era. But problems like higher population density, low socioeconomic status of a significant number of people and low literacy rate in some parts of the country, have resulted in poor health indicators.

1.12 Historical Background

India has a rich, centuries-old heritage of medical and health sciences. The approach of the ancient Indian medical system was one of holistic treatment. The history of healthcare in India can be traced to the Vedic times (5000 BCE), in which a description of the Dhanwantari, the Hindu god of medicine, emerged. Atharvaveda, one of the four Vedas, is considered to have developed into Ayurveda, a traditional Indian form of holistic medicine. The philosophy of Ayurveda, "Charaka Samhita" (the famous treatise on Medicine compiled by Charaka), and the surgical skill enunciated by Sushrutha, the father of Indian surgery, bear testimony to the ancient tradition of scientific healthcare amongst the Indian people. Historically, the most outstanding hospitals in India were those built by King Ashoka (273-232 BCE). Medicines based on Indian medical principles were taught in the Universities of Takshila and Nalanda.**(Jawahar,2006-2007)**

Transition from Traditional to Modern MedicinesAyurveda applies the Thridhosha theory of disease. Thridhosha describes three dhoshas, or biological elements, which are linked to a patient's health: Vata (wind), Pitta (gall) and Kapha (mucus). Disease is explained as a disturbance in the equilibrium of the three dhoshas, a concept similar to the theory put forward by Greek medicine. Other non-modern systems of medicine, like Unani and homeopathy, are not of Indian origin, but are popular in India even today.

During the 17th and 18th centuries, there was a slow and steady growth of the modern system of medicine in India, starting with the arrival of European Christian missionaries in South India in the 17th century. In 1664 at Chennai, the British opened the first modern hospital for soldiers and, in 1688, another for the civilian population. Organized medical training began with the opening of the first medical college in Calcutta in 1835, followed by a school in Mumbai in 1845 and one in Chennai in 1850.Health scenario over the past decade, healthcare services available in India have increased dramatically

India is a nation with more than one billion population with literacy rate of 72%. Per capita income is of the order of Rs.14712.4. 25% of population is below poverty line. In India, life expectancy at birth, increased to 68 years in 2014 from 67.6 years in previous years and 53.9 years in 1980.However ,India has registered an impressive decline in maternal and child mortality in the past 5-7 years .For instance, the infant mortality ratio declined from 55 per 1000 live births to 40 per1000 live births between 2006 and 2013,while maternal mortality ratio fell from 254 per 100 000 live births to 167per 100 000.Death rate per 1,000 of population has changed from 27 at the time of independence to 8.7now[3]. More than 16 million people suffer from iodine deficiency, 14 million from TB, 6 million from blindness, and 1.5 million from cancer and In 2015 India has been placed 130th by The Human Development Index from 135th in 2014.(**UNDP REPORT 2015**)

Challenges:

New Molecule discovery program: The main weakness of the industry is an underdeveloped new molecule discovery program. Even after the increased investment, market leaders such as Glenmark, Dr.Reddy's Laboratoriesspent only 5-10 per cent of their revenues on research& development, Due to the difference in between curriculum and industry requirements, pharmaceutical industries in India also lack theacademic collaboration that is crucial to drug development in the West.

IP leakage

IP leakage is one of the major concerns by companies outsourcing research work to India. So any major incident of IP leakage by Indian company can affect the image of whole industry.

Safety concerns

With recent high profile product withdrawals, there are also concerns that regulatory

agencies will tighten up safety and efficacy testing requirements. A particular focus will be on the application of pharmacogenomics techniques to improve safety profile, but the advent of such techniques in the long run will improve industry productivity as more pharmacogenomics data is collated.

Generic competition

Generic substitution is a policy for healthcare cost containment. National reimbursement and insurance bodies are providing physicians and pharmacists with incentives for prescribing cheaper generic drugs. There is increased pressure on revenues for pharmaceutical companies, which have to concentrate on lifecycle management. The pharmaceutical industry will experience a significant reduction in the revenues associated with their blockbuster products as generic competition captures market share. As a result, given that research and development productivity is low and the cost of developing new drugs at an all time high, the pharmaceutical industry faces considerable hurdles with respect to maintaining revenue and earnings growth in the future

Opportunities

The Indian pharmaceutical industry has a lot of strengths and hence ample of opportunities.

A few important strengths are mentioned below.

Competent workforce

India has a pool of personnel with high managerial and technical competence as skilled workforce. It has the largest English speaking population in the world. Professional services are easily available.

Cost-effective Chemical Synthesis

Its track record of development, particularly in the area of improved cost-beneficial chemical synthesis for various drug molecules is excellent. It provides a wide variety of bulk drugs and exports sophisticated bulk drugs.

Information and Technology

It has a good network of world-class educational institutions and established strengths in Information Technology.

Globalization

The country is committed to a free market economy and globalization. It has a 70 million middle class market, which is continuously growing.

Consolidation

The international pharmaceutical industry is finding great opportunities in India as the

process of consolidation has started taking place in India.

Low priced products

The industry has thrived so far on reverse engineering skills exploiting the lack of process patent in the country. This has resulted in the Indian pharmaceutical players offering their products at some of the lowest prices in the world.

Quality assurance

The quality of the products is reflected in the fact that India has the highest number of manufacturing plants approved by US Food &Drug Administration (61 plants), which is next only to that in the US.

Dominance in the market

Multinational companies have traditionally dominated the industry, which is another trend seeing a reversal. Currently, it is the Indian companies which are dominating the marketplace with the local players dominating a number of key therapeutic segments.

Self-reliance

Displayed by the production of 70 per cent of bulk drugs and almost the entire requirement of formulations within the country.

Other Strengths

Low cost of production, Low research & development costs, Innovative Scientific manpower and increasing balance of trade in Pharma sector are also significant strengths of the Indian pharmaceutical industry.

Research and Development

India's Pharmaceutical Industry both the Indian central and state governments have recognized research& development as an important driver in the growth of their pharma businesses and conferred tax deductions for expenses related to research and development. They have granted other concessions as well, such as reduced interest rates for export financing and a cut in the number of drugs under price control. Government support is not the only thing in Indian pharmaceutical industriesfavour, though; companies also have access to a highly-developed Information Technology industry that can partner with them in new moleculediscovery.

1.2.Information Sources for Pharmaceutical Industry:

Pharmaceutical Scientists have a constant need for reliable and current information and in the modern world information is everywhere. It is presented on the television and radio, sent from computer to computer over the internet, and passed from person to person using telephones and fax machines. The great challenge is sorting out the current information from the dated, the reliable from the questionable, and the actual from the imagined. The Scientists must be able to find and identify different types of information in a variety of formats and media. Some of them are available in the following formats

1.21.Printed Sourcesare most widely used sources but due to the advent of electronic information sources the usage of it has been reduced significantly. The most frequently used print sources are

a.Text Booksare usually thought of as being written for students, but they can also serve as summaries for a particular area. In medicine, certain textbooks are held in such high regard that editions continue to be produced long after the original authors are gone.

Remington: The Science and Practice of Pharmacy (ARGennaroed.)

Goodman and Gillman's The Pharmacologic Basis of Therapeutics (Hardman J G , and Limbird L Leds, NewYork McGraw Hill). Text books can serve as an introduction to the new area.

b. Pharmacopoeias The USP/NF (United States Pharmacopoeia/National Formulary) has been published as one volume since 1980.now its publishing in three volumes with supplemented by two supplements. After the USP/NF the best known pharmacopoeia is the British Pharmacopoeia authorized by the government of Great Britain. The European Pharmacopoeia, published by the Council of Europe. Martindale: The extra pharmacopoeia, despite its title is not a pharmacopoeia but rather a drug compendium and will be described as Foreign Drug Compendia.

1.22.ElectronicSources The rapid growth of new technologies has changed the communication process between people and reduced the cost of communication for individuals. Electronic information sources can be seen as the most recent development in information technology and it is one of the most powerful tools ever invented in human history. In modern era it has created the way, the people communicate with each other and the way, the information is accessed. It has rapidly become an established medium of communication and connects people across the globe, removing geographic boundaries and simplifying access to information. The electronic sources of information are becoming more and more important for the user community in accessing information at the right time and in the right form. The use of information in an electronic environment becomes more pronounced when information becomes more readily available in electronic formats. This would result in an increase use of Primary resources and Secondary resourcesand the Internet.Below are the some of the resources which are frequently accessed in electronic format in pharmaceutical Industry

1.221Select Primary Sources:

Science Direct:

The Science Direct provides access to full text contents of about 35,000 books and over 3800 journals published by Elsevier Science. The database for books and journals are distinct from each other and needs subscription separately. It is one of the largest databases for primary information on chemistry including pharmaceutical chemistry worldwide.

Wiley Online Library:

Wiley Online Library is one of the world's broadest and in-depth multidisciplinary collections of online resources covering subjects like life sciences, Health Sciences, and Physical Sciences Social Sciences. It provides access to fulltext contents of about 1500 journals and almost 20000 online books and hundreds of reference works and laboratory protocols. It is of immense value to a searcher as it provides valuable primary information in the field of pharmaceutical Chemistry. The database has a simple interface and expanded functionalities and range ofpersonalization and alerting options.

United States Patent and Trademark Office (USPTO)

The United States Patent and Trademark office (USPTO) is the federal agency for granting United States Patents and registering trademarks. The USPTO website provides free electronic copies of issued patents and patent applications. The site also provides Boolean search option analysis tools.

Espacenet (Esp@cenet)

Afree online servicefor searchingpatents and patent applications. Espacenet was developed by European Patent Office (EPO) together with member states of European Patent Organisation in 1996. There are presently 38 member states. Each member state has an Espacenet Service in its national language, and access to the ESPACENET worldwide database, most of which is in English. Espacenet provides free access to more than 70 million patent documents worldwide .Besides European patents, it also provides access from most countries in the world including US, Canada, Japan, Korea, China, India.

1.222. SELECT SECONDAY SOURCES:

Online databases because of their convenience and ubiquity are now the first choice to consult for locating pharmaceutical literature. Of the hundreds of

databases available few of them are of particular interest to pharmaceutical scientists

Scifinder

The database is used for literature search on patent and non-patent references. This being the basic requirement to retrieve scientific literature on compounds. It is of immense value to a searcher as it provides valuable secondary information in the field of pharmaceutical Chemistry. The database has a simple interface and expanded functionalities and range of personalization and alerting options.

Reaxys: The database allows searching by Molecular Formula, Chemical Structure/Substructure, Chemical Name and patents The results for searches will display together with links to details of preparations and reactions of the compound, followed by patent and non-patent references. This being the basic requirement to retrieve scientific literature on compounds. It is of immense value to a searcher as it provides valuable secondary information in the field of pharmaceutical Chemistry. The database has a simple interface and expanded functionalities and range of personalization and alerting options.

Thomson Reuters- Integrity: Thedatabase provides secondary information on following sections:

a. Drugs& Biologics: Essential chemical and pharmacological information, and the development status of bioactive compounds in the drug pipeline.

b.Experimental Pharmacology: Data from experimental studies that delineate drug/receptor and enzyme/target cell interactions.

c.Experimental Models: Animal models data used in drug development.

d.Pharmacokinetics/Metabolism: Data from experimental and clinical studies that delineate the absorption, distribution, metabolism and excretion (ADME) profile of a drug

e.Organic Synthesis:Routes of synthesis (schemes, intermediates, reagents, end products) for drugs currently on the market or in development

f. Disease Briefings: Dynamic executive summaries on the current status of and future trends in drug therapy.

g.Genomics: Genes and diseases information and their relationships into the underlying biological mechanisms.

h.Targets & Pathways:targets data inventory and their role in pathological pathways.

i.Clinical Studies: Information on clinical trials of drugs currently under study or in use in humans.

Benefits: Making smart, fast decisions that empower your drug research and development and reduce your time to market.

Rapidly access recent, relevant and refined scientific information

Make faster and better decisions with advanced knowledge management tools

Lower risk and prioritize your projects using information integrated from multiple fields of drug research and development,

Stay at the cutting edge of drug research and development with daily updates

1.3.Problems in Retrieving the Information Sources:

• Lack of information about how to use the electronic information resources

•.Lack of time to acquire skills needed to use electronic information resources.

•.Many a times publishers" website reflects the message that the website is undermaintenance.

•.Even some times the file does not open properly reflecting the message that there was an error opening document. The file is damaged and could not be repaired.

•. If the subscription period is over & renewal is not done then the access is completely denied including for earlier issues.

•. If the archival access is needed then sometimes separate subscription price has to be paid yearly

•. For accessing each electronic source signing of agreement is compulsory which is unjustified if the downloaded data needs to be deleted.

Therefore the real challenge lies in creating the awareness about the information sources for effective retrieval.

CONCLUSION:

With these trends, It is clear from above mentioned facts that the use of electronic information sources expected to increase in future and there is a vast scope for searching mechanism. In this connection library authority, may take initiatives to improve the information searching mechanism on electronic resources among users. These initiatives can be in terms of formal and informal Information Literacy programmes specific to searching information sources on the web. Library and information professionals should take initiatives to prepare list of e-resources and their techniques for retrieving relevant information. Orientation programmes/ training should be provided for the use of resources. There is also a need to

formulate search mechanism guidelines for better utilization of resources.

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