Role of libraries in Pharmacy Education and Perceptions of library Professional's about their job

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ABSTRACT

Introduction: In pharmacy education, library use do appear independent contributions to desirable outcomes of the institution. Librarians' role is also important to make students information literate. **Objective:** This objective of this study to know about the role of libraries and library professional's experience in pharmacy colleges. **Materials and Methods:** The data represent responses from 44 library professionals' during the period 2013-2014 to the questionnaire. To explore role of libraries in pharmacy colleges, current status on collections and digital library facilities are discussed and to know the perceptions of library professionals', their job satisfaction level is analyzed. **Results:** Pharmacy colleges have numerous seminar materials, sufficient journals, articles and conference papers. Almost all the pharmacy college libraries perform the data entry, circulation services. Some colleges maintain reports and database services (73.5%). Digital library initiative started in many colleges (75.2%). Very few colleges do have connecting networks like UGC Inflibnet (1.7%), Delnet (2.2%). No pharmacy college has got Current Awareness Services (CAS)/Selective Designated Information (SDI) services and computerized bibliographic service. The library professionals' of all designations do have high level of job satisfaction. **Conclusion:** Pharmacy colleges of this study have enough conventional collections, but latest modern technology like connecting network, security measures are to be developed. Since pharmacy graduates get involved in clinical aspects, drug information resources, learning tools and materials and databases for clinical aspects are also required in library. All library professionals' in this study are satisfied with their collection and resources available in the library and nature of their work.

Key words: Collections and facilities in library, Database, Drug information source, Library professionals, Pharmacy education, Role of Library.

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INTRODUCTION

Education is the act or process which imparts or acquires general knowledge, develops the powers of reasoning and judgment, and trains the individual for mature life. It is the result produced by instruction, training or study.[1] Pharmacist today face challenges to ensure access and rational use of efficacious, quality, and safe medicines and health technologies; Strengthening and harmonization of pharmacy education is essential for the de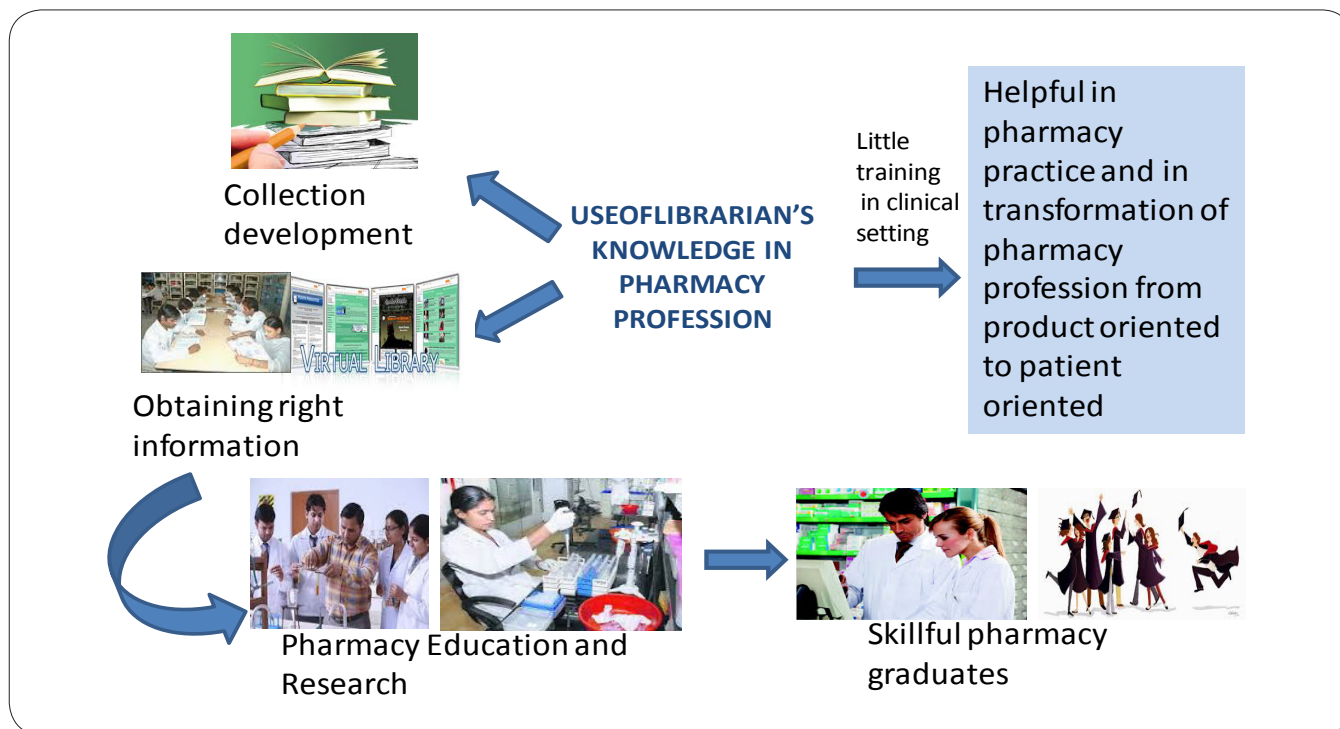velopment of basic medical and pharmaceutical sciences to serve the society. Libraries are pivotal in supporting and achieving the mission of higher education in today's information world. Faculty, students and research scholars always depend on libraries and librarians. Librarians generously share their knowledge with them.[2]

College Libraries

Services rendered by the college libraries can be categorized as reader services and auxil-

Pictorial Abstract

iary services. Reader service include services related to reference collection, to satisfy the user by serving with appropriate information, to advice the students about what to read, tracing periodicals and books, to assist in formulating bibliographies, to organize exhibition, to arrange lectures and to play a role of information mediator. The auxiliary services include documentation services like current awareness list, selective dissemination of information, indexing and abstracting services, translation services, reprographic services, micro recording, microfilm, micro card, microfiche, filmstrip, to work as a documentation centers and to work as a formation centers.

In 21st century, academic libraries have undergone newer developments to support a series of new scenarios.[3]

• Scholarly communication and new publication and scenarios.
• Optimum use of digital resources.
• Handling heterogeneous student population.
• Managing high demand from users for traditional resources.
• Adapting to new modes of study, including ICT-based and distance learning.
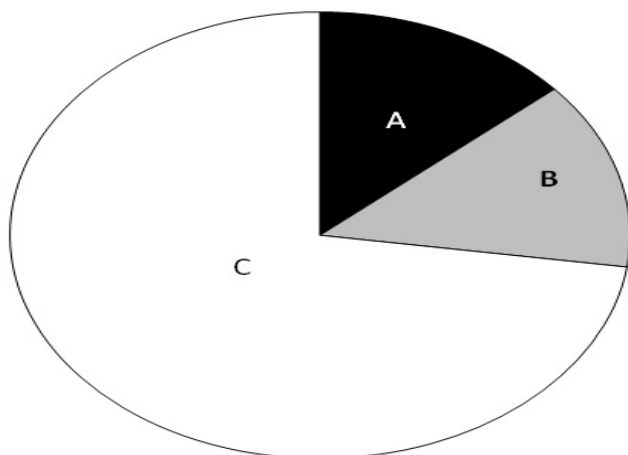• Adjusting with reduced human resources leading to enormous pressures on individual staff.

Pharmacy education in India

At present, more than 1500 institutions provide several pharmacy education programmes across the country.[4] Nearly 100,000 students get enrolled into pharmacy colleges annually. High influx of students into pharmacy

colleges is observed at an all time. The pharmacy degree programs offered in India include: Diploma in Pharmacy (D.Pharm), Bachelor of Pharmacy (B.Pharm), Master of Pharmacy (M.Pharm), Master of science in Pharmacy [Ms (Pharm)], Master of Technology in Pharmacy [M.Tech (Pharm)], Doctor of Pharmacy (Pharm D), Pharm D Post baccalaureate and Doctor of Philosophy in Pharmacy (Ph.D)[5]. Integrated courses such as B.Pharm + MBA or M.Pharm + MBA are available in few colleges. Pharmacy educational institutions in India provide students adequate knowledge and necessary skills to practice the profession of pharmacy. Pharmacy institutions provide complete knowledge of formulation, synthesis and analysis of medicinal agents, their mode and mechanism of action, adverse drug reactions, drug interactions, patient counseling techniques and adequate technical information to be exchanged with the physician and other health professionals. Concepts of community pharmacy, quality assuarance, and regulatory issues are also taught in pharmacy colleges. Pharmacy institutions focus on training student in producing medicines, ready to use in the market and to train them to act as interface between the physician and patients for achieving better health of community.

Pharmacy education in Tamil Nadu

 Now there are around 64 institutions offering pharmacy courses at bachelor level. Most of the colleges have started offering post-graduate courses. Many teachers attached to the institutions have also completed Ph.D. in pharmacy. There has been a substantial quantitative

Figure 1: Designation of library professional's of Pharmacy colleges
Values are frequency percentage.
A-Assistant Librarian (13.64%) ; B-Deputy Librarian (13.64%) ; C-Librarian (72.73%)

Table 1: Collections of pharmacy college libraries			
Colletions	**Mean**	**Sum**	**Maximum**
Books	25246.02	1110825	160000
Current periodical	120.61	5307	542
Back volumes	1562.36	68744	6000
Online journals	1002.45	44108	33000
Projects	703.55	30956	5000
Electronic projects-UG	104.55	4600	2000
Electronic projects-PG	27.82	1224	584
CD	2166.66	95333	7300
Floppy	50.07	2203	1000
Video tape	43.84	1929	200
Palm leaves	.00	0	0
Micro fiche	.00	0	0
Thesis	157.64	6936	3026
Directory	31.39	1381	203
Annual reports	50.02	2201	742
Manuals	22.75	1001	500
Others	1.14	50	50

(Source: Original)

growth of pharmacy institution in the state towards the promotion and development pharmaceutical field. Since 2007, focusing more on clinical aspects, new courses Pharm D (6 years) and Pharm D Post Baccalaureate

(3 years after B.Pharm) have been started.

Librarian's role in the learning and teaching context

- Working together with faculty and other specialists for delivery of information and instruction;
- Designing instructional programs for information access;
- Teaching students and faculty how to access information, whatever its format or location and how to evaluate what they find;
- Serving as consultants on information resources, issues, and problems;
- Developing and implementing information policy; Creating information access tools;
- Selecting, organizing, and preserving information in all formats; serving as leaders and facilitators by introducing information technologies and ensuring their effective use.[6,7]

Nowadays due to the unlimited access to information via internet, need for actual library and physical material are less. Digital libraries provide many facilities to education in general education and higher education in particular.[8] In the past, information about what was worth reading and collecting could be obtained from knowledge gatekeepers (journal editors and librarians). Today students make their own judgment without assistance. Challenging role of librarians in this situation is to inform the users that not everything available electronically is valid and reliable.[9] Library collection must include resources like

print, non-print, electronic resources, digital resources.[10] The libraries in pharmacy colleges should have enough collections and services facilitate the rapid information retrieval focused to the needs of the user. This article gives an overview about the information sources and services of college libraries and experiences of librarians work in pharmacy colleges of Tamil Nadu.
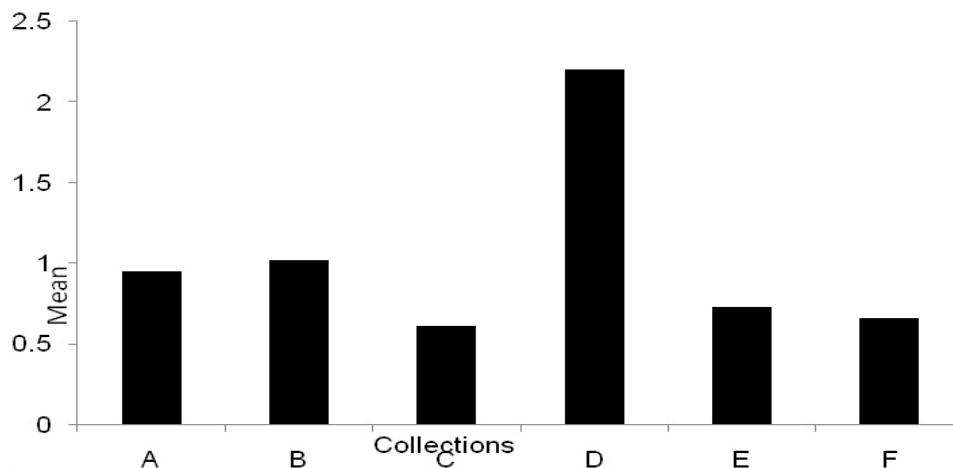
MATERIAL AND METHODS

The data collected through questionnaire distributed among library professional's during the period 2013-2014. The responses collected from 44 filled in questionnaire. Library professional's filled the information regarding the collections and resources available in library and their experience in library is recorded using 5 point Likert scale as strongly agree, agree, undecided, disagree, strongly disagree and the score of the response are calculated by the score ranges between 5 and 1, say score 5 given for most favorable response (strongly agree) and score 1 for least favorable response (strongly disagree).[11]

Data analysis

On the basis of the responses in received questionnaires, the opinion of library professionals' on several library resources services were analyzed using SPSS software.

Statistical methods

Basic descriptive staistics include mean, standard deviation, maximum and minimum. Kruskal Wallis test

Figure 2: Conventional collections of pharmacy college libraries
Values are mean of conventional collections in pharmacy college libraries.
A-Books ; B-Journals ; C-Articles ; D-Seminar materials ; E-Conference paper ; F-Others

Table 2: Information technology application in pharmacy college libraries	
INFORMATION TECHNOLOGY APPLICATIONS	PERCENT OF CASES
Data entry	100.0%
Circulation	98.3%
Report	70.9%
Networked with other department	20.6%
Database services are available	73.5%
UGC/Inflibnet	1.7%
Delnet	2.2%
Others	21.5%
Digital library initiatives	75.2%
Computerized CAS/SDI service	0%
Computerized bibliographic services	0%
Internet services	82.1%
Others	4.0%

(Source: Original)

CAS-Current Awareness Services; SDI-Selective Designated Information services

is used to find the perceptions of library professional's based on the designation regarding collection and resource of Pharmacy colleges. The Kruskal-Wallis test is a rank-based nonparametric test that can be used to determine if there are statistically significant differences between two or more groups of an independent variable on a continuous or ordinal dependent variable.[12] Here we used the different groups of different designation. After checking the significance we compare the mean of the descriptive statistics.

RESULTS

Designation of library professional in most of the pharmacy colleges is Librarian (72.73%) and some colleges have Assistant Librarian (13.64%) and Deputy Librarian (13.64%). Library assistants help them in library services. The details are shown in Figure 1. Based on the responses filled by the library professionals' the present collections available in pharmacy college libraries include books journals, articles, seminar, conference materials, and other non print and digital materials. Palm leaves and microfiche are not available. Details are shown in Table 1. The mean of the conventional collection of libraries in pharmacy colleges is depicted in Figure 2. Mean of seminar material is 2.2 shows that pharmacy colleges have numerous seminar materials which would enable the students to know current aspects of the field. They have sufficient journals, articles and conference papers too.

Table 2 explains the available internet technology applications in pharmacy college libraries. Almost all the pharmacy college libraries perform the data entry, circulation services. Some colleges maintain reports and database services (73.5%). Digital library initiative started in many colleges (75.2%). Very few colleges do have connecting networks like UGC Inflibnet (1.7%), Delnet (2.2%). No college has got Current Awareness Services (CAS)/Selective Designated Information (SDI) services which would be very useful to know number of items available in various categories of collections in the library. A computerized bibliographic service is also available in none of the pharmacy college libraries.

To know the perceptions of library professionals' regarding collection and resource of pharmacy colleges the information of descriptive statistics and Kruskal Wallis test are used and data are given in Table 3 and 4.

Null Hypothesis (H1): There is no significant difference exists between library professional opinions based on designation. Since for all the questions, the p values in Table 2 are greater than the tabulated value (0.05), we

Table 3: Descriptive Statistics on perceptions of library professionals' regarding collection and resource of Pharmacy college libraries

	N	Mean	Standard Deviation	Minimum	Maximum
Acquisition of collection development	44	4.23	.721	1	5
Adequate training relating to my job	44	3.62	1.213	1	5
Modern technology library	44	3.86	1.123	1	5
Comfortable using online resources	44	4.24	.713	1	5
Your work is not secretarial service	44	3.66	.944	1	5
Sufficient manpower available-technical	44	3.46	1.243	1	5
Sufficient manpower available-non-technical	44	3.33	.814	1	5

(Source: Original)

Table 4: Kruskal Wallis test on perceptions of library professional's regarding collection and resource of Pharmacy colleges

Questions	Designation	N	Mean Rank	Test Statistic	
				Chi-Square	Asymp. Sig.
Acquisition of collection development	Assistant Librarian	6	152.22	.424	.809
	Deputy Librarian	6	157.01		
	Librarian	32	149.59		
Adequate training relating to my job	Assistant Librarian	6	145.31	452	.798
	Deputy Librarian	6	155.91		
	Librarian	32	151.61		
Modern technology library	Assistant Librarian	6	149.51	.796	672
	Deputy Librarian	6	159.80		
	Librarian	32	149.37		
Comfortable using online resources	Assistant Librarian	6	162.57	1.142	.565
	Deputy Librarian	6	149.98		
	Librarian	32	149.29		
Your work is not secretarial service	Assistant Librarian	6	145.57	1.321	.517
	Deputy Librarian	6	161.89		
	Librarian	32	149.67		
Sufficient manpower-technical	Assistant Librarian	6	158.34	2.730	.255
	Deputy Librarian	6	164.56		
	Librarian	32	145.74		
Sufficient manpower-non-technical	Assistant Librarian	6	158.40	3.348	.187
	Deputy Librarian	6	163.35		
	Librarian	32	146.10		

(Source: Original)

Table 5: Cross tabulation of job satisfaction of library professionals based on designation				
		Job satisfaction classification		
		Low	High	Total
Assistant librarian	Count	1	5	6
	% within designation	16.7%	83.3%	100.0%
Deputy Librarian	Count	1	5	6
	% within designation	16.7%	83.3%	100.0%
Librarian	Count	4	28	32
	% within designation	1.3%	87.5%	100.0%
Total	Count	5	39	44
	% within designation	11.4%	88.6%	100.0%

(Source: Original)

Table 6: Drug Information Resource[14]		
Clinical Aspect	Preferred suggestion	Alternate Suggestion
Adverse Effects	AHFS Drug Information, Clinical Key-Drugs, Drug Facts and comparisons,LexiComp, MICROMEDEX	DailyMed, PubMed (articles), Manufacturer's Websites
Bio equivalency	Orange Book: Approved Drug Products with Therapeutic Equivalence Evaluations	Red Book (Part of Micromedex-Only Accessible from BPL)
Chemical Data	ChemIDplus Lite, SciFinder Registration, SciFinder On Campus Access, SciFinder Off Campus Access	AHFS Drug Information
Clinical Trials	ClinicalTrials.gov	CenterWatch
Comparative Information	Pharmacist's letter, AHFS Drug Information, Drug Facts and Comparisons, MICROMEDEX	PubMed
Contraindications	AHFS Drug Information, Drug Facts and Comparisons, LexiComp, MICROMEDEX, ClinicalKey-Drugs	DailyMed, Manufacturers' Web sites, PubMed
Current News	Medscape Pharmacists-News, Pharmacist's Letter	Drug Facts and Comparisons, Lexi-Comp
Disease State Information	Up To Date, Access Pharmacy (Pharmacotherapy: A Pathophysiologic approach) Access Medicine, MedlinePlus (for consumers)	Micromedex
Dosage	AHFS Drug Information, ClinicalKey-Drugs, Drug Facts and Comparisons,LexiComp, MICROMEDEX	DailyMed, Manufacturers' Web sites
Drug Administration	AHFS Drug Information, Drug Facts and Comparisons, Lexi-comp, MICROMEDEX, ClinicalKey-Drugs	Manufacturers' Web sites
Drug Interactions	Drug Facts and Comparisons, Lexi-Comp, Natural Medicines Comprehensive Database (drug-food, drug-herb, herb-herb only), Natural Standard, Handbook on Injectable Drugs	PubMed, MICROMEDEX
Foreign Drugs	Martindale: The Complete Drug Reference	MICROMEDEX, Lexi-Comp (Select Indexes and Lexi-Drugs International Online.)
Herbs and Natural Products	Natural Medicines Comprehensive Database, Natural Standard,ConsumerLab	Drug Facts and Comparisons, Lexi-Comp

(Source: The Ohio state university libraries, http://library.osu.edu/find/subjects/pharmacy/drug-information-sources/)

Table 7: Drug Information Resource[14]		
Identification	**Drug Facts and Comparisons, MICROMEDEX**	**Lexi-Comp, Drugs.com(select Pill Identifier)**
Immunization Schedules	CDC Web Site, Epidemiology and Prevention of Vaccine-Preventable Diseases (The Pink Book)	Immunization Action Coalition
Investigational and New Drugs	ClinicalTrials.gov	Drugs.com-New Drug Approvals , Drug Facts and Comparisons,IPA,Pubmed
Laboratory Values	Drug Facts and Comparisons, Lexi-Comp, Access Medicine	Tietz Guide to Clinical Laboratory Tests (RB38.2 C55 2006),
Manufacturer's Information	DailyMed	Physicians' desk reference
Over-the-Counter Drugs	Drug Facts and Comparisons, Lexi-Comp, MICROMEDEX	Handbook of nonprescription drugs : an interactive approach to self-care
Patient Counseling and Education	OSU Wexner Medical Center Patient Education Handouts, Pharmacist's letter, (Pharmacist Resources→Patient Education Handouts)	Micromedex, Lexicomp Patient Education, Natural Medicines Comprehensive Database
Pharmacogenomics	Lexi-Comp (Special section on pharmacogenomics), FDA package inserts	Micromedex, Drug Facts and Comparisons
Pharmacokinetics	AHFS Drug Information, Drug Facts and comparisons, MICROMEDEX, Access Pharmacy, Pharmacy Library	Manufacturers' Web sites,PubMed
Pharmacology	AHFS Drug Information, MICROMEDEX, Access Pharmacy (Goodman and Gilman's The pharmacological basis of therapeutics)	PubChem, Manufacturer's Web sites
Pregnancy/ Lactation	Drugs in Pregnancy and Lactation: a Reference Guide to Fetal and Neonatal Risk, Lexi-omp	AHFS Drug Information, LactMed
Prices	Red Book - Part of Micromedex, this is only accessible from BPL.	Drugstore.com
Regulatory/Legal Information	Ohio State Board of Pharmacy	Laws Enforced by the FDA and Related Statutes
Therapeutic Use (Off-label)	MICROMEDEX, IPA	PubMed, Pharmacist's Letter
Therapeutic Use (Approved)	Lexi-Comp, MICROMEDEX, AHFS Drug Information, Drug Facts and Comparisons, IPA	FDA Web site, Manufacturers' Web sites
Toxicology/ Poisoning	MICROMEDEX	PubMed, Lexi-Comp

(Source: The Ohio state university libraries, http://library.osu.edu/find/subjects/pharmacy/drug-information-sources/)

accept the null hypothesis. There is no significant difference exists between opinions of library professional's based on their designation. We compare the mean of their descriptive statistics. Respondents ranked first that they are comfortable using online resources reveals that they can guide the students also for the effective utilization of modern digital and online resources. They are consulted for the collection and development is ranked second reveals that the librarians have adequate knowledge to serve the needs of the user with appropriate information. Modern technology library is ranked third by the respondents show that libraries in pharmacy colleges are equipped with latest technologies, but still it has to be improved with digital library, connecting networks, more online databases, modern security measures like RFID (Radio frequency Identifier) and Automation of library. Library professional professional's s ranked last that they receive insufficient manpower including both technical as well as non technical.

Data in Table 5 shows that the library professional's of all designations do have high level of job satisfaction (above 83%). It means they can work happily to serve the users' need as well as for the growth of the institution.

Table 8: Database for Evidence Based Practice	
Free Evidence –Based Database	**Subscription Evidence –Based Database**
Pubmed www.pubmed.com	ACP Medicine www.acpmedicine.com
National Guideline Clearing house www.guideline.gov	Clinical Evidence http://clinical evidence.bm/com
TRIP Database www.tripdatabase.com/index.html	Clinical Pharmacology www.clinicalpharmacology.com
	First Consult www.firstconsult.com
	Essential Evidence Plus www.essentialevidenceplus.com
	Physician's information and education resources http://pier.acponline.org

(Source: *US Pharmacist*, 2009)

CURRENT SCENARIO

Database

- Pharmacy colleges have some for accessing online journals. Databases available in pharmacy colleges are.
- Bentham-Bentham Science publishers publishes articles in 91 titles, which serve the information needs of the pharmaceutical, bio-medical and medical research fields. During 2008, they have launched "Bentham OPEN" with 200 plus peer-reviewed open access journals, this database provides full-text coverage of more than 29 journal title and back issues for specially pharmacy education knowledge.[13]
- Elsevier-Elsevier provides nearly 79 e–journals to pharmacy education, it deliver spans peer-reviewed articles, conferences and patents, and covers the latest research information such as patent records, approved drugs, events and other news with the pharmacy science which is essential to pharmacy researcher, students and faculty.
- Pharmacopeias-Pharmacy college libraries have various pharmacopeias contain drug information and they have updated editions too.

Drug Information Resources

As students in pharmacy colleges get engaged themselves with clinical aspects, library professionals' can suggest students to use online facilities to get drug information for various clinical regarding drug information sources. Table 6 and 7 list drug information resources.[14]

Learning Tools: which could help evidence based Practice also should be available in library.

Examples include

JAMA evidence[15,16] It provides basic tools to understand and apply the medical literature and to make clinical diagnoses. It helps users to access the Rational Clinical Examination series and the 2008 edition of the User's Guide to the Medical Literature with additional teaching tools, such as two textbooks, education guides, glossary, calculators, worksheets, question wizards, weekly RSS feed of featured JAMA articles, compiled clinical scenarios, podcasts, and user-level customization features.

McMaster University:[16] Resources for Evidence-Based Practice-Has excellent sections on "About EBP" and "Forming Questions." OSU does not have all the resources listed.

Evidence Based Practice[16]–Available from Duke University (Free).

Pharmacists should be adequately equipped with knowledge of evidence based medicine. The practice should start from the student level, students of Pharm D and post graduate students of pharmacy practice branch in particular should have the knowledge of evidence based medicine. They can do literature research for the best evidence on a clinical question by consulting good database .They may answer clinical questions with accuracy. There are few free and subscription based databases are available listed in Table 8.[17]

DISCUSSION

Libraries are important in providing adequate information services to users of pharmacy colleges. The current situation of collections of pharmacy college libraries and feelings of library professional's about their job are analyzed. Adequate collections both print, non print and digital form exists in the library of pharmacy colleges. Library professional's are comfortable using online resources so it is easy for them to guide the students. There is insufficient manpower available in library both from technical as well as non technical side which is to be increased. This finding correlates with the finding of Mondal and Bandyopadhyay[18]. Increase in technical manpower will reduce the pressure on individual and increase in non technical manpower will be helpful in maintaining clean environment providing good drinking water and photocopying of material. All colleges must have one librarian, one assistant Librarian or deputy librarian and minimum of one library assistant. Most

of the pharmacy colleges do have regular services but modern technology is not up to the mark in the libraries. Though many colleges started initiative works regarding digital libraries but they don't have services like Delnet, UGC Inflibnet and computerized bibliographic databases. The library professional's of all designations have high level of job satisfaction. This finding is supported by the research work carried out by Asadulla[19], he reported that in India, library professional with higher qualification was more satisfied with job than with less qualification. All participants in this study are highly qualified. The findings of the present study are limited in its scope in regard to sample size and regions. The study can be extended with huge number of sample including participants of different regions.

CONCLUSION

Academic libraries play a major role in pharmacy education in enhancing the knowledge of the students and faculty. Though the pharmacy college libraries do have adequate collection as a blend of print and non print forms, they are in lack of networked information services, security services and automation. The future libraries will have all these facilities. Library professional's must assist students and suggest to select, judge correct information and to opt for materials for self-paced learning and programs that support new ways of teaching and delivering information resources. The academic library should be flexible, creative, and closely allied with the academic disciplines. The library professionals' participated in this study are satisfied with the collections and their job.

CONFLICT OF INTEREST

The Authors do not have any conflict of interest.

SUMMARY
- Adequate collections both print, non print and digital form exists in the library of pharmacy colleges.
- There is insufficient manpower available in library both from technical as well as non technical side which is to be increased.
- Though many pharmacy colleges have regular services and started initiative works regarding digital library but they don't have services like Delnet, UGC Inflibnet and computerized bibliographic databases.
- The library professionals' of all designations have high level of job satisfaction.

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