AWARENESS AND USE OF ICT APPLICATIONS FOR ACCESSING CLINICAL INFORMATION RESOURCES AMONG THE FACULTY AND STUDENTS OF HEALTH SCIENCE UNIVERSITIES IN KARNATAKA: A STUDY

GANESHA Y S

* *Librarian, Government First Grade College, Tarikere.*
E-Mail: bptganesh@gmail.com

ABSTRACT

In the changing epidemiological scenario, the study emphasized the need for revitalizing the health information system and the study has special focus on awareness and use of Information and Communication Technology applications for accessing web based clinical information resources among the faculty and students. The advent of ICT has provided the opportunity for the widespread access to medical information. However medical Practitioners need more constant in touch with new discoveries in web based resources and services. In this concern researcher has made an attempt to study the awareness and use of various ICT applications while accessing clinical information resources at the point of care. This study aims is to describe the use of clinical information resources and services on the web from Health Science University, Deemed University / Constituent Medical Colleges located at Karnataka state. While much attention has been devoted to study the awareness and use of ICT applications by the faculty and students to locate and apply Clinical Information resources in clinical practice.

KEYWORD: Clinical Information Resources, Information and Communication Technology, Information Retrieval, World Wide Web.

1. Introduction

Effective health care delivery ensures the universal access to health care for all the people, developing an effective health care delivery is depend on the quality of the medical education system. The advent use Information and Communication Technology applications in medical library lead effective searching and retrieval of information resources and services from the web.In recent years web based information resources are very informative and resources for medical information can be access through web by various applications.

Faculty and Students by their nature of work and clinical practice they need ready access to medical information, Computer literate faculty and students may feel more comfort while using electronic information sources for their clinical practices and thus gain more from using them. The evaluation of web based technologies enabled to access health information in digital formats of textbooks, research articles, reference materials, clinical trials, reports, thesis and dissertations, medical images and audio-video materials etc. Along with print resources medical libraries today are providing access to online resources such as e-books, e-journals, e-databases, e-thesis and dissertations and supporting with various information services like e-mail, newsgroup, social networking other online contents to users.

The primary objective of the medical library is to support the Research and Development activities and to deliver the Information resources and service on the interest of the user. Web-based clinical information resources it provides clinicians with access to patient records, It also contains links to sources of health knowledge such as Medical Information, Micromedex, BMJ Best Practice, Dyna Med, MD Consult/ clinical key, Embase, Medline, Psych Info, ProQuest, Ovid SP, PubMed, Web of Science, Psychiatry Online, Clinical Guidelines etc. These resources should be accessible accurate, authoritative and timely.

2. ICT in Libraries

Information and Communication Technology (ICT) consists of all technical means used to handle information and aid communication, including computer and network hardware, communication middleware as well as necessary software. Today the library services are transitioning from local traditional collection to global resources provided on demand via the most advanced networking technologies. One of the largest challenges in libraries today is offering webbased services, Information and Communication Technologies have effectively improved the ability of the system to store, access, manipulate and use information in varieties of ways. For the Libraries, ICT's has tremendously changed the management print and electronic resources and various library services are being delivered. Internet has been used extensively as a resource as well as a tool to deliver the library and information Services.

The Information and Communication Technologies have enabled libraries provide the following solutions,

- Opportunities to deploy innovative methodologies and to deploy more interesting material that creates an interest in the librarians.
- Enables better management of library by librarian thereby improving the productivity of the tutor as well as the taught.
- Enables the librarian to concentrate on other tasks such as research and good practice.
- Enables optimum utilization and sharing of resources among institutions thereby reducing the costs of implementing ICT solutions.

3. Clinical Information Resources and Services

Clinical Information Resources are those information sources that can be used at the point of clinical care. These resources are used to provide clinical care to patients by medical practitioners, nurses and other health care providers. Clinical Information delivery can be disseminating using network operations, email, patient history record, patient records, laboratory records and electronic information resources. Clinical Information Resources may play a major role in clinical decision making that require timely and appropriate patient care. These resources provides evidence based guidelines for solve therapeutic decision making. Web based clinical information resources provides access to clinical data access, information resource access and integrated information resources of the subject.

4. Review of Literature

Hunt (1998) reviewed the need of computer based clinical decision support system on physician performance and patient outcomes. MEDLINE, EMBASE, INSPEC, SCISEARCH, and the Cochrane Library bibliographic databases from 1992 to March 1998 have been considered. Author states that CDSSscan enhance clinical performance for drug dosing, preventive care, and other aspects of medical care, but not convincingly for diagnosis.

Edejer (2000) examine the potential of advances in information and communication technologies and the role of internet to disseminate health information in developing countries. Researcher provided Information on international health research Information and communication technologies and stated that they have not been harnessed systematically to improve the health of populations in developing countries.

Joc and Lovett (2006) investigated the role of Personal Digital Assistants (PDAs) in the clinical rotation components of many medical programs. Researchers find that few medical schools have actively utilized these devices in the first year of medical studies.

Kamel and Wheeler (2007) discussed about the emerging Web 2.0 social software in health and health care education for organizations, clinicians, patients and laypersons. Researchers include social networking services, filtering, social bookmarking, social search engines, file sharing, tagging, mashups and instant messaging.

Pacheco and Grant (2010)reviews the use of web 2.0 technologies by librarians in UK Medical schools using Email survey. Authors explicate that Web 2.0 has been hailed as an innovation for facilitation of two way communication on the net. The social nature of Web 2.0 can be particularly appropriate for undergraduate medical students who fit their studies around the unsocial hours and geographical isolation of clinical placements.

Farahi (2011) conducted a survey to elicit IT skills needed for LIS professionals working in medical, dental, and pharmacy colleges affiliated to Rajiv Gandhi University of Health Sciences (RGUHS) in Karnataka, India and Ministry of Health and Medical Education and Islamic Azad University (MOHME & IAU), Iran. Results revealed that all the skills listed under IT basics andinternet were considered important by medical librarians in India and Iran.

Brennan (2011) in his study addresses the accessing medical subject using Dynamic Links in the integrated library system (ILS). Author opinions that searching and browsing for materials in medical subject areas can be difficult. Users must typically be cognizant of a number of options to perform an effective search.

Goldbachet. al. (2014) conducted a study on use of mobile phone while accessing medical information, study aims to compare the performance of resident physicians in answering clinical scenarios using PubMed. Researcher states that while mobile access to primary literature remains important and serves an information niche, mobile applications with condensed content may be more appropriate for point-of-care information needs.

Barakah, Shira and Alwakeel (2015)explains the use of Information technology systems and applications at medical at Saudi hospitals in their daily clinical practice. This study aims towards assessment of the medical staff proficiency in using IT based technologies in clinical tasks, in using new Eclinical systems (e.g. CPOE, PAC etc.) and to estimate the adoption rates of IT technologies for enhancing medical knowledge, continuing education and medical research. Based on various results collected researchers deduced that the adoption rate of IT technologies among KSMC medical and healthcare practitioners in clinical tasks, use of clinical systems, is comparable to their counterparts in advanced countries.

5. Need and Purpose of the study

Medical practitioners need to have quick access to the vast amount of medical literatures and they cannot afford to ignore new developments in the medical sciences. Accessing new medical information has always been an important but challenging process for the faculty and students as they engaged with teaching and clinical practice. Karnataka state has many well recognized Health Science Universities among the top health science universities in India in spheres of health care services.The present study aims to evaluate use of Information and Communication Technology applications for accessing clinical information among

faculty and students and to know about meeting the clinical information needs from the web by Faculty and students at the point of care and provides suitable recommendations for their unmet needs.

In order to serve the faculty and students for academic work efficiently and effectively it is necessary to ascertain the extent use of ICT applications and use of web based clinical information resources and services in the web environment. Information and Communication technologies have enabled the popularity and use of medical literatures from the web, it is necessary to find, what the awareness level about various ICT applications and tools? To find out awareness about Clinical Information Sources available on Web? What is the awareness among the Faculty and Students of Health Science Universities about available online clinical information resources and services? What is the role of web while disseminating the clinical information?

6. Methodology

Researcher has chosen survey method to study the extent use and awareness of ICT for accessing Clinical Information Resources and Services from the web by the Faculty and Students of Health Science Universities in Karnataka State. The study Sample includes the Faculty and Students from 10 Health Science Universities / Deemed Universities and its Constituent Colleges located in Karnataka as mentioned in the table-1.

Table-1: List of Medical Colleges.

Name of the College	Name of the University / Deemed University	Established Year
B. M. Patil Medical College	BLDE University, Bijapur	1986
JSS Medical College	JSS University, Mysore	1984
Jawaharlal Nehru Medical College	KLE University, Belgaum	1963
Kasturba Medical College	Manipal University, Manipal	1953
National Institute of Mental Health and Neuro Sciences (NIMHANS)	NIMHANS, An Institute of National Importance, Bangalore	1974
K. S. Hegde Medical Academy	NitteUniveersity, Mangalore	1999
Rajiv Gandhi University of Health Sciences	RGUHS, Bangalore	1996
Sri DevrajUrs Medical College	Sri Dev Raj Urs University, Kolar	1986
Sri Siddhartha Medical College	Sri Siddhartha Academy of Higher Education and Research, Tumkur	2008
Yenepoya Medical College	Yenopoya University, Mangalore	1999

7. Data Analysis

The study covered Faculties and Students from 10 constituent medical colleges of universities/ deemed universitieslocated across Karnataka State. In these relation total 1700 questionnaires randomly distributed, among 500 questionnaire were distributed to faculty members and 1200 questionnaires were distributed to students. Total 500 questionnaires was sent to faculty members among 356 returned duly filled with 71.20% response rate and 1200 questionnaires sent out to students, 922 were ultimately returned giving a 82.17% response rate, which can be considered good, taking into account the difficulties faced while data collection.
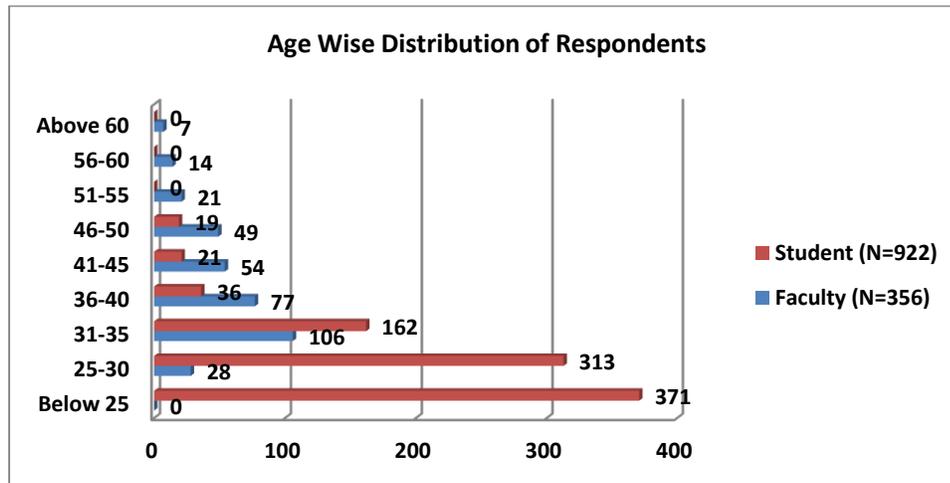
Age Wise Distribution of Respondents

Age	Faculty (N=356)	Student (N=922)
Above 60	0	7
56-60	0	14
51-55	0	21
46-50	19	49
41-45	21	54
36-40	36	77
31-35	106	162
25-30	28	313
Below 25	0	371

Figure-1: Age wise distribution of respondents

Figure-1 presents the number of participants in different age category. It can be seen that on an overall basis, a little more than half of the respondents were of below 30 years of age. Majority of the student respondents were below the age of 25 years (n=371, 40.24%), followed by 25-30 years (n=313, 33.95%) and about 17.57% of them were in the age range of 31-35 years. Highest number of faculty respondents fall in the age group of between 31 and 35 years, 106 (29.78%) followed by 36 to 40 years, 77 (21.63%).
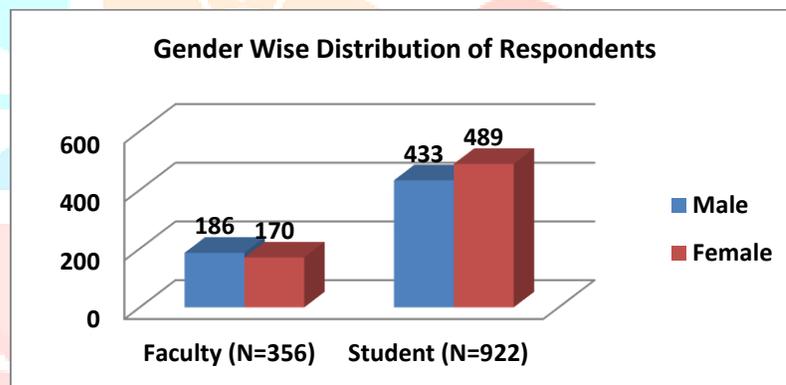
Gender Wise Distribution of Respondents

	Male	Female
Faculty (N=356)	186	170
Student (N=922)	433	489

Figure-2: Gender wise distribution of respondents

Figure-2 shows gender wise distribution of the respondents. It can be noted that the sample of respondents are almost an equal mix of both the genders. However, a small majority of males can be seen among faculty group (n=186, 52.25%) and females among students group (n=489, 53.04%).
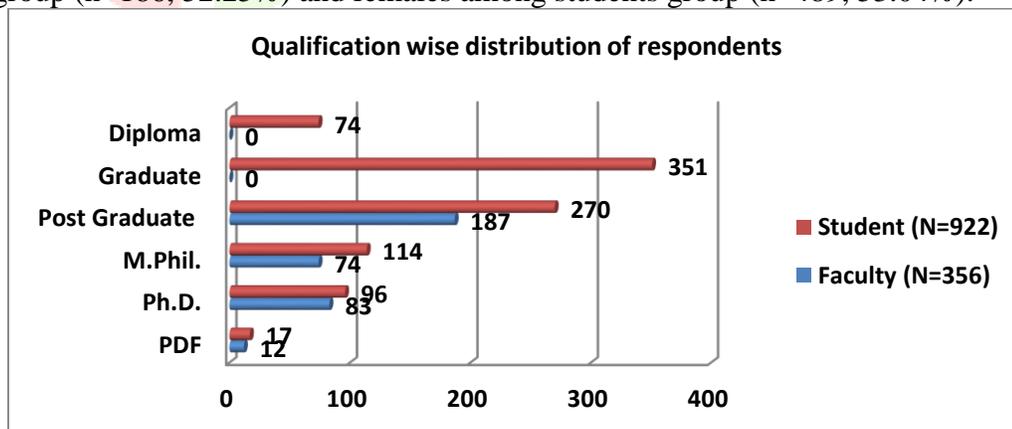
Qualification wise distribution of respondents

Qualification	Faculty (N=356)	Student (N=922)
Diploma	0	74
Graduate	0	351
Post Graduate	187	270
M.Phil.	74	114
Ph.D.	83	96
PDF	12	17

Figure-3: Gender wise distribution of respondents

Figure-3 represents the cross-tabulation of respondents by their designation and qualification. It reveals that among the entire faculty have minimum of post graduate level of education. Followed by holders of PhD degree 23.31% (n=83) and MPhil degree 20.70%% (n=74). Only about 3.37% of them have PDF qualification, whereas the percentage of students with PDF is about 1.84%. The qualification levels among students are low as compared to the faculty group as expected. Most of the students were

undergraduates or diploma holders (about 46%), followed by post graduates (n=278, 29.28%), MPhil (n-114, 12.36%) and PhDs (n=96, 10.41%).
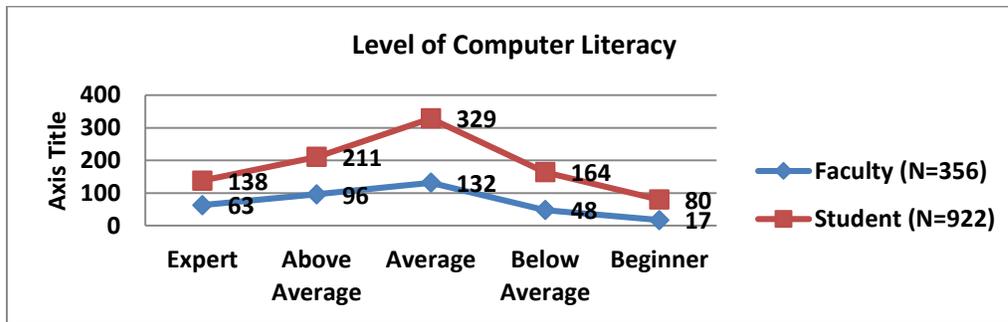

Figure-4: Level of Computer Literacy

Figure-4 shows the faculty's and students compute literacy level, data reflects that 132 (37.08%) of faculty and 329 (35.68%0 of students express that they have 'average' literacy skill, 96 (26.97%) of faculty and 211 (22.89%) of students mentioned that they have 'above average skill' and 63 (17.70%) of faculty and 138 (14.97%) of students said that they have 'expert' at computer literacy level. It is observed form the table that major percentages of respondents were average in computer literacy skill.
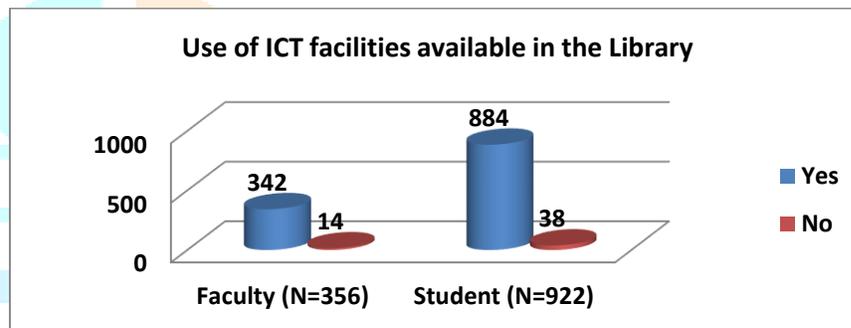

Figure-5: Use of ICT facilities available in the library.

Figure-5 shows the opine about use of ICT facilities provided by the library among the faculty and student for accessing clinical information from the web, it is clear that the majority of both faculty and students responded positive opinion, on an overall basis 342 (96.07%) faculty and 884 (95.88%) students said 'yes'.
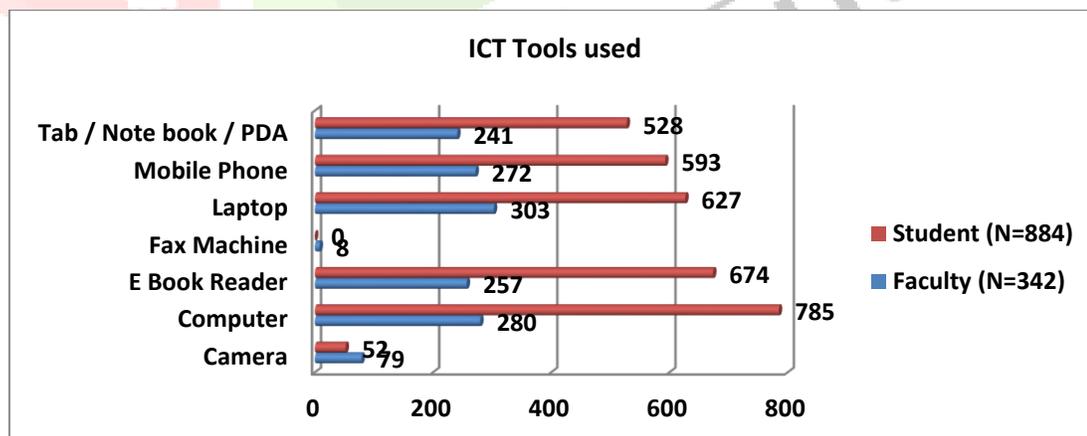

Figure-6: ICT tools used in Library

With the increasing impact of information technology on various library services the respondents were asked to indicate their level of knowledge towards usage of computers and other devices. The figure-6 gives detailed information about the usage of ICT infrastructure in Health Science University libraries. It is revealed from the figure-6 that majority of the faculty about 303 (88.60%) use 'laptop' to access web resources, followed by 280 (81.87) of faculty use 'computer', 272 (79.53) of faculty use 'Mobile phones', 257 (75.15%) of faculty use 'E-Book Reader', 241 (70.47%) of faculty use 'tab/ notebook/ PDA' and very less no of faculty i.e. 79 (23.10%) and 8 (02.34%) use camera and faxx machine accessing web

resources.Among 884 students about 785 (88.80%) of students use 'computer' to access web resources, followed by 674 (76.24%) of students use 'E-book reader', 627 (70.93%) students use 'laptop', 593 (67.08%) of students use 'mobile phone', 528 (59.73%) of students use 'tab/ note book/ pda' and 52 (05.88%) of students use camera' for accessing web resources.
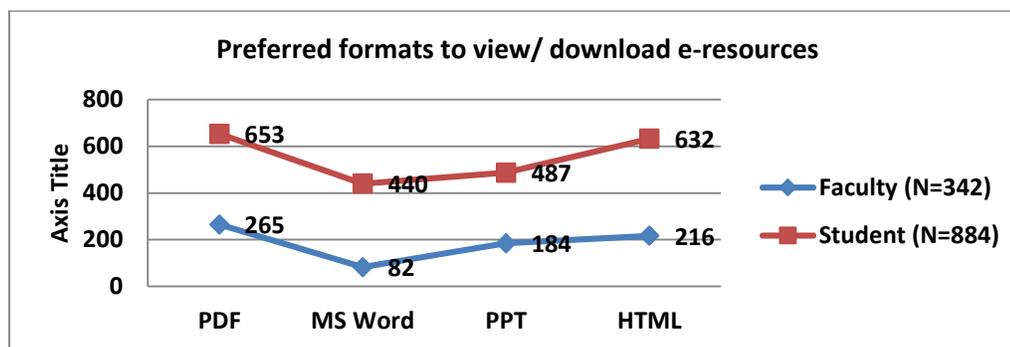

Figure-7: ICT tools used in Library

Figure-7 shows faculty and students opinion about preferred format for access/ download the clinical information form the web. Data reflects that 265 (77.49%) of faculty and 653 (73.87%) of students prefer to have PDF, further majority of the respondents i.e. 848 (69.17%) have preferred HTML format, 671 (54.73%) of respondents prefer PPT and 522 (42.58%) of respondents prefer MS Word format for collecting, storing and retrieving clinical information from the web.

Table-2: Level of Skill in using the following Information Technology applications

Level of Skill in using ICT Apps (N=1226)					
ICT Applications	Outstanding	Very strong	Competent	Fair	Poor
E-Journal Databases	200 (16.31)	380 (31)	331 (27)	218 (17.78)	97 (7.91)
E-Mail	319 (26.02)	426 (34.75)	281 (22.92)	144 (11.75)	56 (4.57)
Operating Systems (Windows, Linux etc.)	236 (19.25)	309 (25.2)	358 (29.2)	235 (19.17)	88 (7.18)
Podcasting (Publishing to Internet feed)	173 (14.11)	247 (20.15)	287 (23.41)	311 (25.37)	208 (16.97)
Reference Manager Applications	204 (16.64)	285 (23.25)	369 (30.1)	261 (21.29)	107 (8.73)
Social Networking (Blog, Facebook etc.)	238 (19.41)	328 (26.75)	365 (29.77)	215 (17.54)	80 (6.53)
Subject Gateways	217 (17.7)	276 (22.51)	349 (28.47)	255 (20.8)	129 (10.52)
Web Browsers (Netscape, Firefox)	201 (16.39)	273 (22.27)	346 (28.22)	267 (21.78)	139 (11.34)
Wikis (Editable, collaborative sites)	214 (17.46)	274 (22.35)	421 (34.34)	255 (20.8)	62 (5.06)
World Wide Web / Interner	253 (20.64)	294 (23.98)	369 (30.1)	229 (18.68)	81 (6.61)

Note: Numbers within the parenthesis represents the percentage

Responetns were asked to indicate their level of skill while using ICT applications, the statement about which the level of skill known while using ict apps had the following responses.Data reflect that most of the total respondents have 'very strong' or 'competent' skill in using various ICT skills, among 1226 of total respondents 319 (26.02%) of respondents have 'Outstanding' and 426 (34.75%) have 'very strong' skill in using E-mail, 380 (31.00) or 331 (27.00%) of total respondents have 'very strong' and 'competent' skill in using e-journal databasesfollowed by 369 (30.10%) respondents have said they have 'competent' skill in using web/ internet. Further 309 (35.20%) and 358 (29.20%) have 'very strong' and 'competent' skill in using operating systems. As for as concerned to Reference Manager 369 (30.10%) of respondents have 'competent skill', 365 (29.77%) of respondents have 'competent' skill in social networking applications like Blog, Facebook etc. Very less number of respondents have 'outstanding' (14.11%) in using podcasting applications. Also it can be seen that majority of the total respondents have 'competent' skills in web browsers, wikis, podcast and other web applications.

Table-3: Sources prefer to obtain information related Clinical Practice through web

Web based Information Sources (N=1226)					
Web based Information Sources	**Always**	**Most of the Time**	**Often**	**Rarely**	**Never**
E Journals Databases	339 (27.65)	404 (32.95)	258 (21.04)	157 (12.81)	68 (5.55)
Physicians' Websites	269 (21.94)	352 (28.71)	376 (30.67)	157 (12.81)	72 (5.87)
Patient information sites	260 (21.21)	383 (31.24)	275 (22.43)	214 (17.46)	94 (7.67)
Continuing Medical Education	226 (18.43)	303 (24.71)	346 (28.22)	229 (18.68)	122 (9.95)
Clinical practice guidelines sites	316 (25.77)	386 (31.48)	291 (23.74)	149 (12.15)	84 (6.85)
Professional Medical Associations sites	197 (16.07)	287 (23.41)	328 (26.75)	234 (19.09)	180 (14.68)
Medical school sites	200 (16.31)	274 (22.35)	326 (26.59)	226 (18.43)	200 (16.31)
Medical Related Mobile App.	159 (12.97)	275 (22.43)	404 (32.95)	308 (25.12)	80 (6.53)

Note: Numbers within the parenthesis represents the percentage

To assess the sources of clinical information resources researcher raised a question that what are the major sources normally faculty and students refer for their clinical practices to know how they are utilized those web based clinical information resources. Table-3 represents the number of faculty and students who refer various sources of clinical information for research and clinical practice.It can be seen that among the total respondents major percentage of respondents prefer E-Journal databases as a major sources of clinical information, about 339 (27.65%) have 'always' and 404 (32.95%) of respondents have 'most of the time' used E-Journal databases, further it can be noted that 316 (25.77%) have 'always' and 386 (31.48%) have 'most of the time' used clinical practice guideline sites, 352 (28.71%) have 'most of the time' or 376 (30.67%) have 'often referred physicians websites. It observed that 383 (31.24%) of respondents 'most of the time' prefer patient information sites, 346 (28.22%) of respondents said that they 'often' used continuing medical education sites and data reveals that majority of the respondents have 'often' used medical school sites (26.59%), professional medical association sites (26.75%) and medical related mobile app (32.95%) for accessing clinical information for their research and clinical practice. Due to innovations in the cell phone and network, faculty and students access clinical information through mobile phones at anywhere, anyplace. Data reflects that mobile also one of the major sources for clinical information for faculty and students.

Table-4: Electronic Information Resources you refer for clinical practice

Electronic Information Resources	Always	Most of the Time	Often	Rarely	Never
Electronic Information Resources you refer for clinical practice (N=1226)					
Full Text Electronic Databases					
EBSCO	287 (23.41)	283 (23.08)	302 (24.63)	259 (21.13)	95 (7.75)
Scopus	163 (13.3)	256 (20.88)	333 (27.16)	310 (25.29)	164 (13.38)
JSTOR	131 (10.69)	206 (16.8)	238 (19.41)	365 (29.77)	286 (23.33)
Ovid	276 (22.51)	336 (27.41)	374 (30.51)	193 (15.74)	47 (3.83)
Proquest Medical Complete	206 (16.8)	337 (27.49)	390 (31.81)	142 (11.58)	151 (12.32)
Pub Med Health	365 (29.77)	452 (36.87)	237 (19.33)	132 (10.77)	40 (3.26)
Wiely Online Databases	210 (17.13)	284 (23.16)	363 (29.61)	259 (21.13)	110 (8.97)
Psychiatry Online	82 (6.69)	140 (11.42)	210 (17.13)	400 (32.63)	394 (32.14)
SpringerLink	226 (18.43)	269 (21.94)	244 (19.9)	340 (27.73)	147 (11.99)
Elsevier	377 (30.75)	480 (39.15)	234 (19.09)	82 (6.69)	53 (4.32)
Oxford University Press	315 (25.69)	393 (32.06)	261 (21.29)	187 (15.25)	70 (5.71)
Sage Database	238 (19.41)	325 (26.51)	184 (15.01)	291 (23.74)	188 (15.33)
Taylor & Francis	201 (16.39)	293 (23.9)	341 (27.81)	214 (17.46)	177 (14.44)
Thieme	113 (9.22)	133 (10.85)	212 (17.29)	403 (32.87)	365 (29.77)
Lippincott Williams & Wilkins	208 (16.97)	260 (21.21)	290 (23.65)	363 (29.61)	105 (8.56)
Nature Pub	132 (10.77)	203 (16.56)	335 (27.32)	384 (31.32)	172 (14.03)
BMJ Pub	105 (8.56)	195 (15.91)	266 (21.7)	323 (26.35)	337 (27.49)
Bentham Science	111 (9.05)	174 (14.19)	299 (24.39)	283 (23.08)	359 (29.28)
Bibliographic Databases					
Pubmed - Medline	304 (24.8)	424 (34.58)	265 (21.62)	178 (14.52)	55 (4.49)
IndMed	113 (9.22)	130 (10.6)	255 (20.8)	364 (29.69)	364 (29.69)
ERIC Database	65 (5.3)	105 (8.56)	198 (16.15)	341 (27.81)	517 (42.17)
PsychInfo	86 (7.01)	168 (13.7)	271 (22.1)	344 (28.06)	357 (29.12)
Web of Science	334 (27.24)	434 (35.4)	200 (16.31)	198 (16.15)	60 (4.89)

Note: Numbers within the parenthesis represents the percentage

Table-4 depicts the use of electronic information resources and services subscribed by the library and information centre, table represents that among 1226 total respondents majority of the respondents have used Elsevier, PubMed, Oxford University Press, EBSO databases. Majority of the respondents have 'always' (30.75%) or 'most of the time' (39.15%) used Elsevier database, further 452 (36.87%) and 393 (32.06%) of respondents have 'most' of the time preferred to use PubMed Healht and Oxford University Press respectively. 302 (24.63%) of respondents have 'often' used EBSCO database, about 374 (30.51%) respondent have 'often' used ovid database It can be seen from the table that moderate percentage of used 'always' (19.41%) and 'most of the time'. 340 (27.73%) of respondents have 'often' used Springer Link Database, 363 (29.61%) of respondents have 'often' and 'rarely' used Wiley Online database and Lippincott Williams and Wilkins publishers respectively. The table shows that 341 (27.81%) and 333 (27.16%) of respondents have 'often' usedtaylor&francis and scopus publication. Also it can be seen form the table that major percent of respondents have 'rarely' used Nature Pub (n=384, 31.32%), JSTOR (n=365, 29.77%), Thieme (n=403, 32.87%) and Psychiatry online database (n=400, 32.63%). Data reveals that 359 (29.28%) and 337 (27.49%) of respondents have said that they 'never' used the Bentham Science and BMJ Publication for the reference work purpose.

Bibliographic Databases are the one of the sources major sources of information for faculty and students, concerned to bibliographic databases major percent of respondents have shown interest on PubMed and Web of science databases. Among the total respondents 304 (24.80%) of respondents have 'always' used pubmed database, 334 (27.24%) have 'always' or 434 (35.40%) have 'most of the time' used web of science database, it is seen that moderate percentage of respondents have 'rarely' and 'never' used indmed (n=364, 29.69%) database and major percent of respondents have 'never' used the ERIC (n=517, 42.17%) and PsychInfo Database (n=357, 29.12%)

Table-5: Use of Web based Clinical Information Resources

Clinical Information Resources Preferred (N=1226)					
Web based Clinical Information Resources	Always	Most of the Time	Often	Rarely	Never
Clinical E-Databases					
Access Medicine	270 (22.02)	394 (32.14)	305 (24.88)	17 4(14.19)	83 (6.77)
BMJ Best Practice	192 (15.66)	317 (25.86)	336 (27.41)	201 (16.39)	180 (14.68)
CINAHL(Ebsco)	187 (15.25)	262 (21.37)	287 (23.41)	324 (26.43)	166 (13.54)
Dyna Med	117 (9.54)	193 (15.74)	297 (24.23)	277 (22.59)	34 2(27.9)
Embase (Elsevier)	304 (24.8)	369 (30.1)	338 (27.57)	135 (11.01)	80 (6.53)
Lexi-Comp	109 (8.89)	210 (17.13)	282 (23)	290 (23.65)	335 (27.32)
MD Consult / Clinical Key	295 (24.06)	413(33.69)	301 (24.55)	150 (12.23)	67 (5.46)
Micromedex	114 (9.3)	144 (11.75)	236 (19.25)	306 (24.96)	426 (34.75)
MIMS DrugAlert	94 (7.67)	118 (9.62)	241 (19.66)	263 (21.45)	510 (41.6)
Scopus	276 (22.51)	330 (26.92)	357 (29.12)	189 (15.42)	74 (6.04)
UpToDate	275 (22.43)	345 (28.14)	368 (30.02)	150 (12.23)	88 (7.18)
Clinical Access	192 (15.66)	311 (25.37)	360 (29.36)	277 (22.59)	86 (7.01)
Open Access Clinical E-Databases					
Clinical Trails	174 (14.19)	301 (24.55)	337 (27.49)	240 (19.58)	174 (14.19)
Cochrane Library (Wiley)	185 (15.09)	291 (23.74)	389 (31.73)	267 (21.78)	94 (7.67)
eMedicine--MedScapeReferenc	113 (9.22)	151 (12.32)	210 (17.13)	310 (25.29)	442 (36.05)
Medline Plus	234 (19.09)	273 (22.27)	336 (27.41)	238 (19.41)	145 (11.83)
Pro-ACT	94 (7.67)	160 (13.05)	228 (18.6)	267 (21.78)	477 (38.91)

Note: Numbers within the parenthesis represents the percentage

Web is a grand place where various types of clinical information resources can be access, with increasing sources of clinical databases over the web respondent were asked to indicate their lever of knowledge about those web based clinical information resources. The table-5 gives the detailed information about the various clinical information databases. It is evident from the table that among the total respondents majority of them have used Embase, MD Consult, Scopus, Up To Date and Access Medicine clinical databses. It can be seen from the table 369 (30.10%) of respondent have 'most of the time' used Embase (Elsevier) product, further 413 (33.69%) of respondents 'most of the time' used MD Consult / clinical key database. It can be noted that 330 (26.92%) of respondents have 'most of the time' and 357 (29.12%) of respondent have 'often' used Scous database, respondents have 'most of the time' (28.14%) and 'often' (30.02%) used UpToDate database, majority of the respondents have i.e. 394 (32.14%) of them 'most of the time' used Access Medicine database, further 336 (27.41%) of respondents have 'often' used BMJ Bset Practice database. It is observed form the table that respondent have 'often' used Dyana Med (24.23%) database and moderate percentage of respondents said they 'rarely' used the CINAHL (Ebsco) (324%) and respondents have 'never' shown the interest on the Micromedex (34.75%), Lexi-Comp (27.32%) and MIMS Drug Alert (41.60%). Along with the clinical databases researcher included some of the open access clinical database for medical practitioners

available on the web, it is observed form the table that minimum percentage of the respondents have used open access clinical databases. Whereas concerned to open access clinical database most of the respondets use medline for 'always' (19.09) and 'often' (27.41%), followed by 389 (31.73%) of respondents have 'often' used Cohrance Library (Wiley), followed by 337 (27.49%) of respondents have 'often' used clinical trails. Respondents have 'never' used the eMedicine-Medscape Reference (36.05%) and Pro-Act (38.91%).
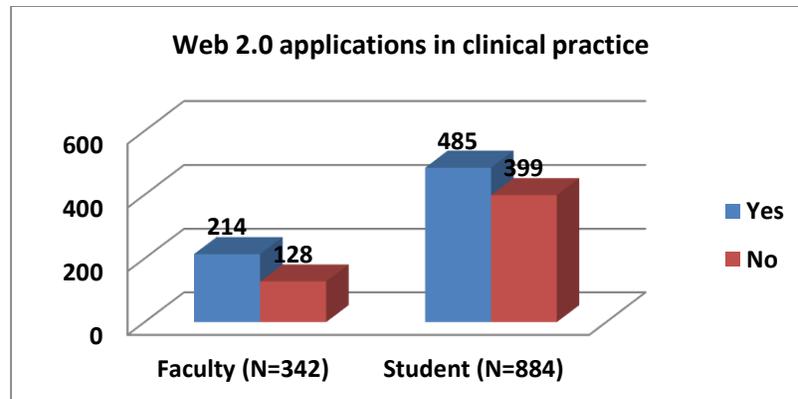

Figure-8: Web 2.0 applications in clinical practice

Mere knowing about the social networking sites in terms for research and reference many not be sufficient to fulfil the needs of information required by medical practitioners, faculty and students also posses skill to use them in efficiently and effectively. The respondents were asked to indicate whether they have using social networking or web 2.0 applications in their clinical practice. It is evident form the figure-8 that 214 (62.57%) of faculty and 485 (54.86%) of students have said 'yes' i.e. they were using web 2.0 applications like blogs, wikis, personnel websites, facebook and other professional social networking sites and it is observed that 128 (37.43%) of faculty and 399 (45.14%) of student have said they have not used web 2.0 applications.
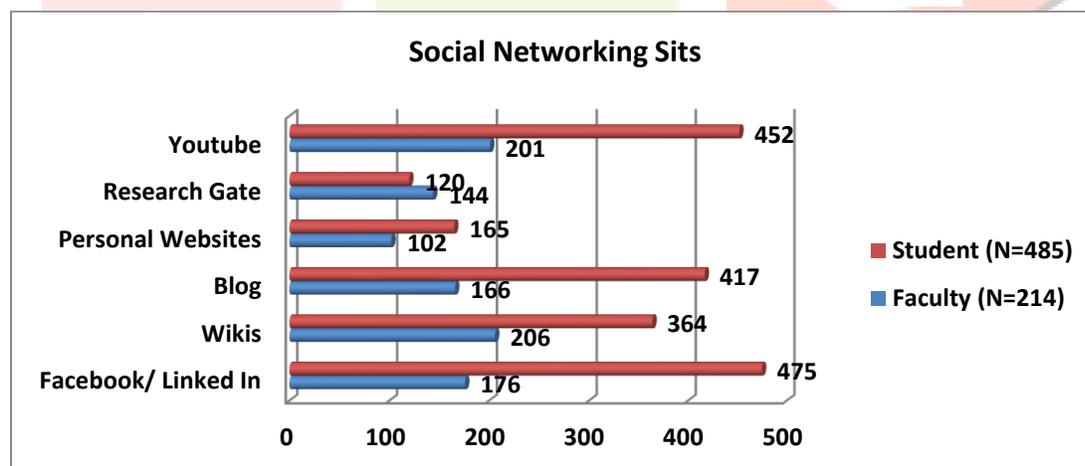

Figure-9: Social networking sites used

To explore the extent awareness about various web 2.0 applications related to this domain were included in the questionnaire. The figure-9 describes the awarenss about various social networking sites among 214 faculty and 485 students, 176 (82.24%) of faculty and 475 (97.94%) of students said they known about Facebook/ Linkedin, further 206 (96.26%) of faculty and 364 (75.05%) of students said that they used Wikis, related to blogging sites 166 (77.57%) of faculty and 417 (85.98%) of students were said they were aware about blogs, further moderate percentage of faculty i.e. 112 (52.34%) have said they use personal websites and 320 (65.98%) of students have told they were aware about personal websites. Whereas concerned to research gate for sharing reserch papers website less number of faculty 144 (67.29%) and 120 (24.74%) of students said they used research gate webite, youtube is a popular video sharing site, it is found that 201 (93.93%) of faculty and 452 (93.20%) of students have used this website for general, entertainment and resrach purpose also.

Table-6: Factor has helped to using the Internet in your Clinical practice

Factor has helped to use Internet in your Clinical practice (N=1226)					
Factors	Strongly Agree	Agree	Moderately Agree	Disagree	Strongly Disagree
Faster Internet Connection	349 (28.47)	413 (33.69)	246 (20.07)	137 (11.17)	81 (6.61)
Time Saving	403 (32.87)	531 (43.31)	203 (16.56)	57 (4.65)	32 (2.61)
Reduced costs	202 (16.48)	321 (26.18)	399 (32.54)	194 (15.82)	110 (8.97)
Technical support at work	259 (21.13)	357 (29.12)	396 (32.3)	144 (11.75)	70 (5.71)
Relevant Information	344 (28.06)	436 (35.56)	299 (24.39)	100 (8.16)	47 (3.83)
Easier and Convenient	344 (28.06)	374 (30.51)	266 (21.7)	161 (13.13)	81 (6.61)

Note: Numbers within the parenthesis represents the percentage

Respondents were asked to indicate the factors which has influenced to use internet in clinial practice, related to this questiones have been raised in the questionnaire by the researcher and the findings have been summariesed in the table-6. On the overall among the total respondents majority of the respondents have 'agree' for the time saving (n=531, 43.31%) factor and they said that web is a time saving thing while browising informaltion, considering web is an easier and convenient channel for accessing clinical information 374 (30.51%) respondents expressed that web is a convenient, 436 (35.26) of respondents opinioned that web has helped to access relevant information. Further it can be seen that 399 (32.54%) of respondents have 'moderately agree' for the factor reduced cost and 413 (33.69%) of respondents 'agree' that faster internet connection is a factor to use web based clinical information resources and services.It is evident from the table that majority of the faculty and students have said that they have been influence by time, convenient, cost and other factors while accessing the information.

Table-7: Problems do you face with Web Based Clinical Information Resources and Services

Problems do you face with Web Based Clinical Information Resources (N=1226)					
Discouraging Factors	Strongly Agree	Agree	Moderately Agree	Disagree	Strongly Disagree
Lack of time	165 (13.46)	211 (17.21)	433 (35.32)	288 (23.49)	129 (10.52)
Limited access to a computer terminal	237 (19.33)	346 (28.22)	349 (28.47)	178 (14.52)	116 (9.46)
Lack of IT knowledge to effectively utilize services	159 (12.97)	237 (19.33)	267 (21.78)	314 (25.61)	249 (20.31)
Using Clinical Information on Website often detracts me from doing my other work	130 (10.6)	177 (14.44)	206 (16.8)	553 (45.11)	160 (13.05)
Non-cooperative attitude of the staff to facilitate easy access	203 (16.56)	238 (19.41)	238 (19.41)	434 (35.4)	113 (9.22)
Lack of network facility	246 (20.07)	398 (32.46)	288 (23.49)	196 (15.99)	98 (7.99)
Lack of Maintenance of infrastructure	246 (20.07)	387 (31.57)	327 (26.67)	186 (15.17)	80 (6.53)
Lack of user education program	222 (18.11)	291 (23.74)	335 (27.32)	307 (25.04)	71 (5.79)
Low Speed Internet	231 (18.84)	330 (26.92)	328 (26.75)	223 (18.19)	114 (9.3)

Note: Numbers within the parenthesis represents the percentage

Researcher also asked the respondents to mention the discouraging factors in utilizing the web based clinical information resources and services from the library. Table 7 explores the discouraging factors while utilizing web based clinical information resources and services. among the total respondents table-7 represetns that majority of the respondents were 'agree' (n=398, 32.46%) that they have lack of network facility, about 335 (27.32%) of respondents reacted 'moderately agree' for the statement lack of user education program, followed by 387 (31.57%) of respondents were 'agree' for the factor lack of maintenance and ICT infrastructue at the library and information cente. About 434 (35.40%) of respondents

'disagree' with the statement that non-cooperative attitude of the staff to faciliatate easy access. About 314 (25.61%) of respondetns were 'disagree' for the factor that they have lack of IT knowledge to effectively utilize services, about 433 (35.32%) of respondents were 'moderately agree' abo the factor lakc of time and about 553 (45.11%) of the repondents 'disagree' for the factor given in the table that using clinical informlaiton on website often detracts them form doing other work.

8. Findings and Suggestions

Based on the result from the analysis of data gathered, the following findings, suggestions / recommendations and conclusion have been summarized below.

- A little more than half of the respondents were of below 30 years of age. Majority of the student respondents were below the age of 25 years (n=371, 40.24%).
- It can be noted that the sample of respondents are almost an equal mix of both the genders.
- It reveals that among the entire faculty have minimum of post graduate level of education and most of the students been undergraduates.
- 132 (37.08%) of faculty and 329 (35.68%0 of students express that they have 'average' literacy skill in using computers.
- Both faculty and students about 342 (96.07%) faculty and 884 (95.88%) students said 'yes' for they use ICT facilities provided by the library.
- It is revealed from the figure-6 that majority of the faculty about 303 (88.60%) use 'laptop' to access web resources, followed by 280 (81.87) of faculty use 'computer' and about 785 (88.80%) of students use 'computer' to access web resources.
- Data reflects that 265 (77.49%) of faculty and 653 (73.87%) of students prefer to view information in a PDF format.
- Majority of the respondents have 'outstanding' skill in using E-mail, e-journal databases and using web/ Internet.
- About 339 (27.65%) have 'always'prefer E-Journal databases as a major sources of clinical information, further they prefer clinical practice guideline sites, physicians websites and other medical educations sites.
- Majority of the respondents have used Elsevier, Scopus,Proquest, Pubmed health, Oxford University Press, EBSO databases.
- Concerned to bibliographic databases major percent of respondents have shown interest on PubMed and Web of science databases.
- It is found form the study that among the total respondents majority of them have used Embase, MD Consult, Scopus, Up To Date and Access Medicine clinical databases.
- Whereas concerned to open access clinical database most of the respondets use medline
- Study found that 214 (62.57%) of faculty and 485 (54.86%) of students have said 'yes' i.e. they were using web 2.0 applications like blogs, wikis, YouTube, personnel websites, facebook and other professional social networking sites.
- Majority of the respondents have 'agree' that good Information and Communication Technology applications leads to save time, reduces cost, provides relevant information, gives faster internet connections and said it is easier and convenient to access.
- Lack of network facility, low bandwidth speed and lack of training are the discourage factors for accessing clinical information for the faculty and students.

9. Recommendations

Based on the findings the following suggestions are made to improve the Information and Communication technological infrastructures at the constituent medical colleges affiliated to Medical Universities / Deemed universities.

- The adoption of ICT should not be considered as a luxury, but as an added tool to provide the current information effectively to fulfil the complex needs of the user.
- To achieve the effective curricula among medical students medical universities / deemed universities have to review and regularly analyze the ICT Infrastructure.
- It is recommended that the Medical Libraries should be equipped with advance collection of Electronic Resources, Consortia and Digital Library facilities
- It is recommended that data access speed (Networking Infrastructure) should be increased. Appropriate action should be taken by Medical Libraries to develop state of the art library services.
- Information Retrieval is an important component of Library Services, it is suggested that provision should be made to train the medical students even from a very basic level and this should be further followed by the latest IT applications

10. Conclusion

Information and communication Technologies (ICTs) play an important role in enhancing efficiency & development of library services. Efficient infrastructure and resources provides an opportunity for faculty and student to access with latest clinical research. clinical information resources support patient-specific information needs when clinicians use and those resource should well utilized by the students and the library and information centres should support on contributing clinical information for better patient care by helping and assisting the students in optimizing the clinical information delivery by providing unbiased and relevant information for better patient care. The response from the study revealed that faculties and students are well skilled in using ICT based resources and services, proper ICT Infrastructure can help practitioners in the use of Web-based resources. Medical library professionals have to incorporate with the new technology and help the clinicians in guiding and locating the required information collaborating with the digital information services. The findings and observations in the present study underscore the need to offer more opportunities for policy makers and library professional to develop competitive personnel in a technologically advanced world for skill based ICT applications for library activities.

Reference:

1. Hunt DL, Haynes RB, Hanna SE, Smith K.Effects of computer-based clinical decision support systems on physician performance and patient outcomes: a systematic review. Jama.1998;280(15):1339-46.
2. Edejer TTT. Disseminating health information in developing countries: the role of the internet. Bmj. 2000;321(7264):797-800.
3. Joc K, Thompson C, Lovett DG. Application and Usage of Wireless PDAs in a First-Year Medical Curriculum. Journal of Electronic Resources In Medical Libraries. 2006;3(1): 89-94.
4. Kamel Boulos MN,Wheeler S. The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education. Health Information & Libraries Journal. 2007;24(1):2-23.
5. Pacheco J, Kuhn I,Grant V. Librarians Use of Web 2.0 in UK Medical Schools: Outcomes of a National Survey. New Review of Academic Librarianship.2010;16(1):75-86.
6. Farahi, Mina Tavassoli. IT skills among LIS Professionals of Medical Libraries in India and Iran: A comparative study [doctoral thesis]. Mysore, Karnataka; University of Mysore; 2011.
7. Brennan DP. Accessing Medical Subject Content Using Dynamic Links in the ILS. Journal of Electronic Resources in Medical Libraries. 2011;8(4):339-47.

8. Goldbach H, Chang AY, Kyer A, Ketshogileng D, Taylor L, Chandra, A,Kovarik CL.Evaluation of generic medical information accessed via mobile phones at the point of care in resource-limited settings. Journal of the American Medical Informatics Association,2014;21(1):37-42.

9. Barakah DM, Shira MM, Alwakeel SS. Information Technologies Adoption in Medical Education, Research and Advancement Clinical Treatment at King Saud Medical City. Journal of Advances In Information Technology,2015;6(2):63-66.