ORIGINAL ARTICLE

Computer Literacy among the Medical Staff at Avicenna Medical College and Hospital

SANOBER MASOOD, RANA AKHTAR KHAN, GULFREEN WAHEED

ABSTRACT

Objective: To explore the computer literacy among the medical staff and after the results make recommendations and suggestions to improve.
Study design: Cross sectional
Purpose of study: To assess the computer knowledge of among medical staff of Avicenna Medical college and hospital
Study place: Avicenna medical college and teaching hospital at phase 1X defense Lahore cant.
Study duration: May- August2010
Methodology: It is a cross-sectional survey, carried out by the department of community medicine, at Avicenna medical college and hospital. The staff in study was professors, associate professors, assistant professor, senior demonstrators and demonstrators. A questionnaire was made about the computer literacy and distributed to the staff. The staff filled up and returned it to the department. Results were made after the studying of these questionnaires.
Results: Forty (40) questionnaires were distributed to the medical staff.0nly 32[80%] responded back. Six [19%] were professors and fourteen [44%] were assistant professor, three [9%] were the senior demonstrators and only nine [28%] were the demonstrators. The survey responses reflected the opinions of the hospital medical faculty with a broad range of practice experience in their own specific specialty fields. Most respondents had home access to personal computers, and regularly used computers in the work environment for drug distribution, information management, and communication purposes. Software use experience varied according to application. Although getting general information on net about patient-care information software and e-mail were commonly used, experience with spreadsheet, statistical, and presentation software was negligible. The respondents were familiar with Internet search engines, and these were reported to be the most common method of seeking clinical information online. Although many respondents rated they as being generally computer literate and not particularly anxious about using computers, the majority believed they required more training to reach their desired level of computer literacy. Lack of familiarity with computer-related terms was prevalent. Self-reported basic computer skill was typically at a moderate level, and varied depending on the task. Specifically, respondents rated their ability to manipulate files, use software help features, and install software as low, but rated their ability to access and navigate the Internet as high.
Conclusions: Most doctors believed they needed to upgrade their computer skills. Medical database and Internet searching skills were identified as those in greatest need of improvement for the purposes of improving practice effectiveness.
Key words: Computer literacy, healthcare, clinical informatics; needs assessment; medical staff& medical students; survey

INTRODUCTION

Computer skills are vital for medical practitioners of the future. A survey performed in. To use technology effectively for the advancement of patient care and the education of the medical students, medical staff must possess a variety of computer skills. Medical field is an information intensive profession. The availability of affordable computers and the advancement of information technology have resulted in our ability to rapidly and effectively access, retrieve, analyze, share, and store large volumes of information pertinent to patient care and for learning process in a teaching hospital[1]. To use technology effectively for the advancement of patient care, the medical faculty must possess a variety of computer skills. We surveyed through a questionnaire in our clinical and teaching health facility, aimed at the improvement of the applied informatics abilities of our members. In keeping with the broad mandate, this

Avicenna Medical College Lahore
Correspondence to Dr. Sanober Masood
Email: masood_29@hotmail.com Cell: 0305-4338393

study was conducted to gain a better understanding of the computer skills and needs of our fellow physicians. With the development of computers and evolution of internet, Information Technology (IT) has had a positive impact on health care delivery system worldwide, particularly in the areas of disease control, diagnosis, patient management and teaching[17,18,19]. Computer literacy has been a subject of educational research ever since the personal computers were introduced to the classroom, either as teaching aids or as tools for self study. Advances in telecommunication technology in the last two decades have led to the development of computer network that allow access to vast amount of information and services[20]. The past few years have seen rapid advances in information and communication technology, and the pervasiveness of World Wide Web in everyday life has important implications for education. Internet is now one of the most important sources of information for students in institutions of higher learning throughout the world. It has also become a popular medium for delivering educational materials[24]. The internet has been used for medical education in diverse ways including teaching of organs, diagnosis of diseases and conduct of medical examinations and it is also being used as an important source of information for medical research[25]. As in many other fields, the Internet is also present in medical domain. The development of the Internet, as a vehicle for World-wide communication, and the emergence of the World Wide Web, has made instantaneous access to much of the entire body of medical information an exciting one[23]. It is now one of the most important sources of information for students in institutions of higher learning throughout the world. It has also become a popular medium for delivering educational materials. The Internet has been used for medical education in diverse ways including teaching of organs, diagnosis of diseases, and conduct of medical examinations[24,25]. It is also being used as an important source of information for medical research[26].

MATERIAL AND METHODS

A structured questionnaire was used to gather data in six parts. There were thirty two (32) questions included in the questionnaire. Data were analyzed using appropriate statistical test.

Some knowledge and experiential domains were adopted from this previous literature, and questions that were applicable to our purposes were either adopted or modified for inclusion in our survey. The majority of questions were developed internally by author consensus. Our survey was constructed to elicit information in six primary domains relevant to identifying training needs and system barriers to the expanded use of technology in clinical practice for patients and medical students, . These domains were: 1) basic computer operation and concepts; 2) word processing skills; 3) internet /web skills; 4) multimedia skills; 5) email skills; 6) access to a computer.

Accordingly to the questions answered in yes or no scale was implicated where self-assessment questions were posed. Clinical database and search-engine questions were limited to the hardware, software, and online resources that were currently available to our members. Permission from the administration was obtained The survey was distributed personally to 40 full-time medical staff physicians at medical college and hospital. A covering letter was attached explaining about the survey objectives and requesting return of the survey within two weeks. The consent of the participating was included in this cover page. The consent was compromising about the objective of this study, and getting information about the participant. The information was collected like name, age, gender. Contact information , qualification and post in the relevant department.

RESULTS

Of the 40 surveys distributed to the medical staff at Avicenna Medical College & Hospital, 32 surveys (80%of total) were returned within the two-week study period. Surveys were completed by 32 medical faculty members, including 6 (19%) were professors, 14(44%) associate professors, 3(9%) senior demonstrators, and 9 (28%) demonstrators. The questions in the questionnaire were required to circle either yes or no. Thirty (94%) of 32 respondents had understanding of the basic function of the computer hardware such as CPU (central processing unit, monitor, key board, printer and disk while 2respondents (6%) had no basic understanding about the computer. Twenty (62%) respondents could find and launch specific software programs and navigate between programs, whereas twelve (38%) respondents could not know. Twenty six (81%) respondents could create folders and access information in these folders while six (19%) could not perform this. Twenty eight (87%) could save work to the folders in the hard disk of the computer and disk. on the other hand four (13%) respondents unable to save work either on computer hard disk or the floppy disk. Twenty seven (84%) respondents could exist/quit and application and they knew also how shutdown the computer properly. Five (16%) could

not perform this activity like exist /quit and also to shutdown the computer properly.

Table 1: Basic computer operation and concept

	Yes	No	Frequency Yes(n=32)
Basic function of computer	94	6	30
Find and launch	62	38	20
Program – create & access folder	81	19	29
Hard & floppy disc – exist and quit application	84	16	27

The medical staff were asked the questions about word processing skills twenty two (69%) could create and save a new word processing document while ten (31%) respondents were marked no for this application; they could not create and save a new word processing document. Twenty six (81%) marked yes for the cut, copy and paste the text in a document, while six (19%) could not cut, copy, &paste the document. Twenty four (75%) could change font style and size in a document, and eight (25%) did know to perform this application. Twenty three (72%) marked yes for the justifying the text and change line spacing in a document. Fifteen (47%) could set text & select page orientation in a word processing program While seventeen (53%) respondents could not set text & select page orientation in a word processing program. For the question to include the page number and running headers/footers in a document, it was answered as 50/50. Sixteen (50%) respondents marked this as yes while equal amount sixteen (50%) of the staff could not apply this applications. The questions about to create a numbered or bullet list in a document twenty four (75%) were answered yes on the other hand eight (25%) respondents marked this as no, means they could not create numbered or bullet list in a document. Twenty one (66%) medical staff could create tables in a document, while eleven (34%) were not marked this as yes, means they could not create tables in a document .out of these word processing skills the respondents were asked about creating the forms then thirteen (41%) could do this activity, while majority nineteen (59%) could not know how to use this activity. Majority of the respondents twenty five (77%) did not know to insert hyperlinks in a document, only a small number seven (23%) knew to insert hyperlinks in a document. When the respondents were asked about inserting media elements (graphics, images, clips art) in a document nineteen (60%) knew this application, while thirteen(40%) could not use this activity .when the respondents were asked about using the excel and data sheets, not a big amount know this to use it. Only fifteen (47%) were able to use this application while seventeen (53%) could not know to use excel and data sheet.

Internet/web skills: In the third part of the questionnaire the questions were asked about internet /web skills. When the respondents were asked about to go to a specific site on the World Wide Web given a URL (universal resource locator) Twenty (72%) were able to perform this activity while nine (28%) were not aware to go to specific site on the World Wide Web. Regarding the use of the browser to browse a web site, and then move forward and backward. Twenty two (69%) knew to browse on the net, and even also comfortable to move forward and backward. While ten (31%) did not know how to browse at net and move forward, backward. Another skill that was asked to save the URL of web site so one can return to the page at a later time("bookmark", favorites").twenty one (66%) could perform this activity while eleven (34%) could not able to save and later on come back see the previous site. About the usage of the internet search engine (yahoo, bingo, Alta vista etc). Mostly respondents knew to use this application. Twenty five (77%) of the respondents knew to use the search engine, on the other hand only seven (23%) did not know to use the search engine. Regarding about the downloading, saving and installing. Twenty five (77%) of the staff could download, save files from WWW (e.g. text, graphic, PDF files) while only seven (23%) of the staff could not perform this application's.

Table 2: Word Processing skills

	Yes	No	Frequency (n=32)	
			Yes	No
Create & save new doc	69	31	22	10
cut, copy & paste	81	19	26	6
change font style & size	75	25	24	8
justify text line spacing	72	28	23	9
text margin page orientation	47	53	15	17
include page#, run head/footer	50	50	16	16
numbered bullet list	75	25	24	8
create tables	64	34	21	11
create forms	41	59	13	19
Insert hyperlinks	23	77	7	25
insert media element	60	40	19	13
work with excel, data sheet	47	53	15	17

Table 3: Internet/web skills

	Yes	No	Frequency Yes(n=32)
Brows at URL	72	28	23
Use web browser	69	31	22
Save URL & come back	66	34	21
Use search engine	77	23	25
Download & save files	77	23	25
Install plugs-ins	47	53	15

Multimedia and email skills: Only 2 questions were asked about the multimedia skills .the questions were about the use of power point for presentation. Other question was about inserting the graphics into power point files. Twenty two (69%) answered positively about the usage of the power point for presentation. While ten (31%) could not use power point presentation. for inserting the graphics into the power point looked harder than using the power point presentation. It was a less percentage who could do this activity comfortably. Twenty (62%) could insert the graphics into the power point presentation, while twelve (38%) could not do this application. When the respondents asked about the email skills, mostly fellows knew much about of these skills, reason is the email is now a common tool for communication everywhere. Every respondent knows how to read the email the result for this question was 100%, all the staff member thirty two (100%) could read the email. Reading was the easy task as compare to compose and send the electronic message. Thirty (94%) could compose and send the email messages, while two respondents (6%) were not familiar doing this job. when the question was asked about the replying of the email messages, the twenty eight (87%) could reply the messages to all or one, four (13%) respondents could not do this activity.

Table 4: Multimedia & email skills

	Yes	No	Frequency (n=32)	
			Yes	No
Use power point	69	31	22	10
Insert graphics	62	38	20	12
Read email	100	0	32	0
Compose & send message	94	6	30	2
Reply to email message	87	13	28	4
Manage email by coping , saving	94	6	30	2
Send & receive	84	16	27	5
Attachments print receive	94	6	30	2
Own computer	97	3	31	1

The next question was about the copying, saving, forwarding and deleting the messages. For this application twenty seven (84%) knew this action to perform, and five (16%) respondents did not know about doing the copying, saving, forwarding and deleting the messages. The next question was about receiving the attachments and saving these attachments in appropriate box. Majority of the fellows thirty (94%) knew it how to receive the attachments and then how to put them back to see next time. Only two (6%) did not know how to receive and save the attachments in an appropriate box.

DISCUSSION

Computer literacy has been a subject of educational research ever since personal computers were introduced to the classroom, either as teaching aids or as tools for self-study. In the 1980s, research on computer literacy focused on the question whether medical staff and students were ready for the foreseeable omnipresence of computers in the future doctors' professional environments[2,3,4,5], i.e., whether they possessed the necessary computer skills[3,6-10]. The vision of a knowledge-based society saw future economic wealth dependent on people's abilities to deal with the growing information load and to adapt to an ever-changing working environment[11,12,13,14]. It was assumed that computers would become ubiquitous tools for managing medical knowledge[15].

The Importance of Computer Literacy For over fifty years a revolution has been taking place in the United States and all over the world[16]. The personal computer has changed the way many people think and live. With its amazing versatility, it has found its way into every area of life, and knowing how to operate it is a requirement for today's world. Those who have not taken the time to learn about computers often do not even know what to do once one has been turned on, and this problem should be corrected. The most important reason for required computer education, however, is the enormous amount of information available on the Internet. The Internet is a 24 hours a day, 7 days a week information resource that cannot be beaten by any library in the world. An experienced user can connect and find the information that he is looking for in as little as ten minutes, without leaving the comfort of his own home. The Internet will only continue to grow as time passes, and being able to navigate quickly and successfully is becoming more and more important. A computer education is an advantageous investment in a physician's future with today's technology. A personal computer is the most diverse machine in the world and being familiar with its uses is a must to be successful. The amount of practical application that it

will have is astounding, and it will make more successful in today's changing world.

The response rate was 80% in present study which shows high interest of medical staff in computer field. Analyzing information and technology skills is especially difficult when comparing results over many years: what would have been seen as a trivial computer task today might have required advanced knowledge a few years ago. The overall impression of present study was that medical faculty has comparable computer literacy skills and availability of computers and internet at their homes. Present study has shown statistically significant association for having computers at home thirty one (97%). Participants replied that computer is a machine, very intelligent and very useful in medical field and research. Also significant number of students replied both hardware and software correctly this shows awareness of medical students about the computers.

A vast diversity was observed about the ` knowledge to use of various aspects of Microsoft office, like use of spread sheet, note pad, MS word, MS excel, MS PowerPoint, MS FrontPage, MS Outlook Express, and type of operating system used in computers.. They were not much aware about the function of the spread sheet, but were found to be more aware about notepad, word, excel, power point, and outlook express use. Many doctors lack the knowledge of the basic technological aspects of the Internet. Medical staff was aware the use of the search engine like yahoo Alta vista. They were also comfortable to download save file from WWW. When they were asked download and install browser plug-ins such as real player and real video, seemed lack of the doing these.

E-mail was the most popular of the Internet services used by the faculty. E-mail is the fastest and cheapest means of electronic communication in the world today. Access to this service has increased in recent years in Pakistan due to the proliferation of cyber cafes in many towns and cities, which in turn has reduced the cost of this service. However, access to e-mail services is not readily available to many people living in rural areas of the country. All the participants agree to use the email efficiently. Reading was not the problem. With other tricks to the email was the task like composing and sending the email. Thirty (94%) respondents agree they could perform this activity while two (6%) unable to do this application. When it was asked about the replying of the email then at this level twenty eight (87%) agreed that they are using this application. Four (13%) could not make this activity. In summary, this study has provided us with valuable insight into the current status of the computer skills and needs of our medical staff. We will utilize this information to address the applied informatics needs of our members and help them use technology to enhance their knowledge, manage patient-care information, and improve their practice effectiveness. We recommend other groups consider undertaking a similar assessment of computer skills and needs, particularly if considering the implementation of an applied informatics program.

CONCLUSION

The present study suggests a significant need for the computer learning classes and short courses regarding the health care organizations for the medical staff. This suggests that appropriate computer training may be necessary in future medical curricula. There should be introduction of a novel applied informatics program in this hospital clinical service unit to enhance the informatics skills of our members.

Medical faculty certainly needs some kind of formal introduction and education to the new information technology for learning purposes. The results of this study indicate that medical faculty had access to substantial information technology resources and demonstrated knowledge towards computer and internet. Provision of structured computer and information technology training for medical staff would equip them with the skills they need to practice up to date and evidence based medicine in future, which are essential to improving the quality of medical care. Further research should be done with focus on designing and evaluating computer and information technology training for students and medical faculties also.

REFERENCES

1. Balen RM, Miller P, Malyuk DL. Medical informatics: pharmacists' needs and applications in clinical practice. J Inform Pharmacother 2000;2:306-318 [FREE Full text]
2. Bresnitz EA, Stettin GD, Gabrielson IW. A survey of computer literacy among medical students. *J Med Educ.* 1986; **61:410**–2. [PubMed]
3. Osman LM, Muir AL. Computer skills and attitudes to computer-aided learning among medical students. *Med Educ.* 1994;**28**:381–5. [PubMed]
4. Koschmann T. Medical education and computer literacy: learning about, through, and with computers. *Acad Med.* 1995;**70**:818–21. doi: 10.1097/00001888-199509000-00018. [PubMed] [Cross Ref]
5. McGowan JJ, Berner ES. Computer in medical education. In: Norman GR, van der Vleuten CPM, Newble DI, editor. *International handbook of research in medical education.* Dordrecht (Netherlands): Kluwer; 2002. pp. 537–79.

6. *Survey of European universities skills in ICT of students and staff Final report.* Edinburgh (United Kingdom): University of Edinburgh; 2003. SEUSISS Project. Http
7. Asgari-Jirhandeh N, Haywood J. Computer awareness among medical students: a survey. *Med Educ.* 1997;**31**:225–9. [PubMed]
8. Seago BL, Schlesinger JB, Hampton CL. Using a decade of data on medical student computer literacy for strategic planning. *J Med Libr Assoc.* 2002;**90**:202–209. http://www.pubmedcentral.gov/articlerender.fcgi?tool=pubmed&pubmedid=11999178 [PMC free article] [PubMed]
9. Hollander S. Assessing and enhancing medical students' computer skills: a two-year experience. *Bull Med Libr Assoc.* 1999;**87**:67–73. http://www.pubmedcentral.gov/articlerender.fcgi?tool=pubmed&pubmedid=9934531 [PMC free article] [PubMed]
10. Dørup J. Experience and attitudes towards information technology among first-year medical students in Denmark: longitudinal questionnaire survey. *J Med Internet Res.* 2004;**6**:e10. doi: 10.2196/jmir.6.1.e10. http://www.jmir.org/2004/1/e10/ [PMC free article] [PubMed] [Cross Ref]
11. Lyotard JF. *The postmodern condition: a report on knowledge.* Manchester: Manchester University Press; 1994. [1979]
12. Virkus S. Information literacy in Europe: a literature review. *Information Research.* 2003;**8** http://informationr.net/ir/8-4/paper159.html paper no. 159.
13. OECD *The knowledge-based economy.* Paris (France): OECD; 1996. http://www.oecd.org/dataoecd/51/8/1913021.pdf
14. Faughnan JG, Elson R. Information technology and the clinical curriculum: some predictions and their implications for the class of 2003. *Acad Med.* 1998;**73**:766–769. doi: 10.1097/00001888-199807000-00013. [PubMed] [Cross Ref]
15. Mavis BE, Smith JM. Mandatory microcomputers: potential effects on medical school recruitment and admissions. *Medical Education Online.* 1997;**2**:5. http://www.med-ed-online.org/volume2.htm
16. THE IMPORTANCE OF COMPUTER LITERACY http://www.termpapers.masteressays.com/THE-IMPORTANCE-OF-COMPUTER-LITERACY?A=www.essaysample.comwhite
17. Myers, Mary R. Telemedicine: an emerging health care technology. Health Care Manag (Frederick) 2003; 22 (3): 219-223. (s)
18. Edworthy SM. Telemedicine in developing countries. BMJ 2001; 323 (7312): 524-525. [http://www.pubmedcentral.nih.gov/redirect3.cgi?&r&rauth=0LGLKCux0sMkRq0ppOfHEPjw6bLw0T4XDiWCyMAAh&rreftype=extlink&rartid=1550621&riid=134083&rjid=224&rFROM=Article%7CCitationRef&rTO=External%7CLink%7CURI&rarticle-id=1550621&rjournal-id=224&rrendering-type=normal&r&rhttp://bmj.com/cgi/pmidlookup?view=long&rpmid=11546681]. (s)
19. Feliciani, Francesco. Medical care from space: Telemedicine. ESA Bull 2003; 114: 54-59. (s)
20. Glowniak JV. Medical resources on the internet. Ann Intern Med 1995, 123 (3): 123-131. (s)
21. Ajuwon GA. Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital. BMC Medical Informatics and Decision Making 2003, 3:10. [http://www.biomedcentral.com/1472-6947/3/10]. (s)
22. . Virtanen JI, Nieminen P. Information and communication technology among undergraduate dental students in Finland. Eur J Dent Edu 2002, 6 (1): 147-152. (s)
23. Ward JPT, Gordon J, Field MJ, Lehmann HP: Communication and information technology in
24. medical education. *Lancet* 2001, **357:**792-796.
25. Mansor I: Computer skills among medical students: a survey at the King Abdul Aziz University, Jeddah.
26. *J Ayub Med Coll* 2002, **14**(3)**:**13-15.
27. Bio informatics: searching the net *Serm Nucl Med* 1998, 28:177-187.
28. Jones RB, Navin LM, Barrie J, Hillan E, Kinane D: Computer literacy among medical, nursing, dental and veterinary undergraduates. *Med Educ* 1991, 25:191-195. PubMed Abstract
29. Mansor I: Computer skills among medical students: a survey at the King Abdul Aziz University, Jeddah.
30. *J Ayub Med Coll* 2002, 14(3):13-15.