ORIGINAL ARTICLE

How are our medical students using the computer and internet? A study from a medical college of north India

Khan Amir Maroof, Pawan Parashar[1], Rahul Bansal[1]

Department of Community Medicine, UCMS and GTBH, Delhi, [1]Subharti Medical College, Meerut, India

ABSTRACT

Background: In today's world, use of Internet has become indispensable. Medical students have much to gain from the Internet technology that has revolutionized the medical field. There is a very rapid change in the way communication technology is being handled and our medical students should also be ready to embrace it. Very few studies have been done on this topic in India. The aim was to find out the knowledge, practice, and barriers of Internet use among the medical undergraduates of Subharti Medical College, Meerut. **Materials and Methods:** A cross-sectional study was conducted among the MBBS students belonging to the first, second, third, and fourth years of their course during August to October 2009. A pretested questionnaire was used collecting information on their Internet usage patterns, knowledge about information technology, and barriers to using it. Data were entered in Microsoft Excel and appropriate statistical tests were applied for analysis. **Results:** The proportion of respondents having a laptop were more in cohort of students belonging to the admission year 2009 (65.8%) followed by 2008 (54.7%), 2007 (53.0%), and 2006 (38.0%), i.e., a gradual increase in newer cohorts. About half (57.4%) of the students had some sort of formal training in computer and Internet use. Knowledge about Internet was more among the junior cohorts compared to the senior cohorts ($P<0.0001$). Only about one-fifths of the respondents used Internet for searching literature for projects from medical journals on the Internet. Majority of the respondents accessed Internet for less than 3 hours per week. About one-tenth (8.0%) of the students felt that Internet is totally useless in medical field. The major barrier (54.4% of the respondents) to using Internet was lack of time. **Conclusions:** Further research should focus on designing and implementing computer and Internet training for medical students.

Key words: Computer, Internet, medical students, north India

Address for correspondence:
Dr. Khan Amir Maroof,
Assistant Professor,
Department of Community Medicine,
University College of Medical Sciences and GTB Hospital,
Delhi-110095, India.
E-mail: khanamirmaroof@yahoo.com

INTRODUCTION

Internet is a network of networks, joining many government, university, and private computers together and providing an infrastructure for the use of E-mail, bulletin boards, file archives, hypertext documents, databases, and other computational resources.[1] The Internet has become the world's biggest library, where retrieval of scientific resources can be done within minutes.[2] Internet has also revolutionized the medical practice with the increasing use of telemedicine and evidence based medicine.[3] One of the major goals of medical education is to encourage students to maintain their knowledge of medical science by becoming lifelong learners. Adequate skills in information seeking and regular use of original scientific sources are key elements in this process.[4]

It has a lower cost compared to paper-based dissemination of information and also has an added advantage of being available worldwide instantly on demand. Therefore, there is a need not only to equip medical fraternity with adequate skills for use of Internet but also to make Internet facility available in institutions providing medical education and health care.[5] One estimate has suggested that by the year 2010, 30% of a physician's time will be spent using modern information tools.[6] For medical students, the Internet offers a great potential to meet their academic needs and to promote learning.[7]

Access this article online	
Quick Response Code:	Website: www.nigeriamedj.com
	DOI: 10.4103/0300-1652.103549

Few studies are available on this topic from the Indian subcontinent.[4,5] This study has been conducted with the objective to know the knowledge regarding computer and Internet and patterns of and barriers to Internet use among the medical students.

MATERIALS AND METHODS

A cross-sectional study was done between August 2009 and October 2009 among the first-, second-, third-, and fourth-year medical students of Subharti Medical College, Meerut. This medical college, with an annual intake of 100 students for the 4.5-year M.B.B.S. course is situated in Uttar Pradesh, the largest state of India and it has students mainly from the north Indian states. A self-administered, predesigned and pretested schedule was used. The questions consisted of details regarding bio-social characteristics, questions to test the knowledge about computers and Internet, duration and amount of Internet and computer use, type of work performed done using and the barriers, if any in usage of the same. Knowledge about computer and Internet was assessed by asking questions and giving one point for each correct answer; the maximum possible score being ten and minimum being zero.

Data were collected by going to the respective classes and administering the questionnaires. A total of 30 minutes was given to them to fill the questionnaire and return it. No specific sampling technique was used to select the students as it was feasible to study all the students. Those students who were not available in the first visit were followed in the next consecutive lecture, which was the last attempt to get the information from the student. Data were entered in Microsoft Excel spreadsheet and analyzed using SPSS 11.5 statistical software. Chi-square for proportions, Kruskal Wallis ANOVA, and Mann–Whitney U test was used for analysis. A P value <0.05 was considered significant.

RESULTS

A total of 272 subjects (68.0%) were studied out of a total of 400. The mean age of the studied subjects was 19.71±1.63 years with a range of 17–26 years. Majority (96.7%) belonged to 17–22 years age group. A total of 56.2% of the study subjects were males and 43.8% females. Majority (91.9%) was Hindus and remaining were Muslims and Sikhs [Table 1]. All of the respondents reported using computer and Internet.

About half (53.7%) of the respondents possessed a personal computer; with the higher proportion being among the junior cohorts. About four–fifth (78.7%) of the study subjects had an email id and about one-third (31.3%) had an Internet data card for wireless Internet access [Table 2]. The main use of the Internet was for communication (58.5%) and entertainment, i.e., downloading movies and games (46.3%). Overall the first-year students were using Internet more than their senior cohort groups, for each task enquired for. Searching for medical literature and medical procedures, pictures, and videos was observed to be low, i.e., 21.7% and 32.4%, respectively, in our study [Table 3].

About one-fifth (22.8%) of the respondents used Internet for a duration of more than 3 hours per week. Among the various cohorts studied, prevalence of

Table 1: Biosocial characteristics of the study subjects

Biosocial characteristic	1st year	2nd year	3rd year	4th year	Total
Age (years)					
17-19	72 (98.6)	48 (64.0)	9 (13.6)	0 (0.0)	129 (47.4)
20-22	1 (1.4)	27 (36.0)	53 (80.3)	53 (91.4)	134 (49.3)
≥23	0 (0.0)	0 (0.0)	4 (6.1)	5 (8.6)	9 (3.3)
Sex					
Males	38 (52.1)	33 (44.0)	50 (75.8)	32 (55.2)	153 (56.2)
Females	35 (47.9)	42 (56.0)	16 (24.2)	26 (44.8)	119 (43.8)
Religion					
Hindus	70 (95.9)	71 (94.7)	55 (83.3)	54 (93.1)	250 (92.0)
Muslims	1 (1.4)	1 (1.3)	7 (10.6)	2 (3.4)	11 (4.0)
Sikhs	2 (2.7)	3 (4.0)	4 (6.1)	2 (3.4)	11 (4.0)
Total	73 (26.8)	75 (27.6)	66 (24.3)	58 (21.3)	272 (100.0)

Figures in parenthesis are in percentage

Table 2: Variables related to computer and internet use

Variables	1st year, n = 73	2nd year, n = 75	3rd year, n = 66	4th year, n = 58	Total, n = 272
Possess laptop/desktop	48 (65.8)	41 (54.7)	35 (53.0)	22 (38.0)	146 (53.7)
Formally trained in internet use	48 (65.8)	46 (61.3)	29 (43.9)	33 (56.9)	156 (57.4)
Have email id	68 (93.2)	56 (74.7)	50 (75.8)	40 (69.0)	214 (78.7)
Have Internet data card	20 (27.4)	22 (29.3)	26 (39.4)	17 (29.3)	85 (31.3)

Figures in parenthesis are in percentage

Table 3: Pattern of utilization* of internet among the students in different years of their courses

Utilization pattern	1st year, *n* = 73	2nd year, *n* = 75	3rd year, *n* = 66	4th year, *n* = 58	Total
Communication	52 (71.2)	40 (53.3)	30 (45.5)	37 (63.8)	159 (58.5)
Entertainment	38 (52.1)	33 (44.0)	30 (45.5)	25 (43.1)	126 (46.3)
Medical procedures pictures and videos	40 (54.8)	22 (29.3)	11 (16.7)	15 (25.9)	88 (32.4)
News/general information	30 (41.1)	17 (22.7)	21 (31.8)	14 (24.1)	82 (30.1)
Online banking, reservation	30 (41.1)	17 (22.7)	15 (22.7)	15 (25.9)	77 (28.3)
Medical literature search	17 (23.3)	12 (16.0)	15 (22.7)	15 (25.9)	59 (21.7)

*Multiple responses allowed; Figures in parenthesis are in percentage

students using Internet for more than 3 hours per week was highest (47.0%) among third-year students and minimum (4.1%) among the first-year students. A total of 29.4% of the males were using Internet for more than 3 hours per week compared to females (14.3%). The difference in duration of Internet use was significant between the various cohorts and also between the sexes [Table 4].

The mean knowledge score calculated for computer and Internet use of the students was highest among the first-year students (7.23±1.2) and decreased with seniority, i.e., for second-, third-, and fourth-year students, it was 6.67±2.2, 5.85±2.0, and 5.57±1.9 respectively. As the knowledge score data were not normally distributed, Kruskal–Wallis ANOVA was applied, which showed that the differences in knowledge scores among the cohorts was significant (P<0.0001). But the difference in knowledge scores regarding computer and Internet use was not found to be significant (P=0.748), between males (6.36±2.0) and females (6.42±2.0), by applying Mann–Whitney U test for rank comparisons.

Majority (54.4%) of the respondents cited lack of time as the major deterrent to using Internet, followed by lack of access (23.6%). About one-tenth reported lack of skills and slow Internet speed as barriers to using Internet. Only 7.4% reported that high cost is limiting the use of Internet. A total of 8.0% felt that Internet use is irrelevant in the medical field [Table 5].

DISCUSSION

All of the respondents reported using computer and Internet, irrespective of the frequency of its use. This is an encouraging sign and shows that these medical students have a strong base to utilize information technology for medical profession. This was higher than that reported from studies among medical students in south India as well as north India.[5,8] A study from Nigeria found that only 42.6% of medical and nursing students could use a computer while about 60% had used the Internet.[9] As these studies were conducted in 2004, it can be inferred that during the last 5 years there has been an increase in use of information technology by the medical students.

Table 4: Duration of internet use per week with respect to the year of course and sex of the respondents

Variables	Duration of internet use		Level of significance χ2 test
	<3 hours/week	≥3 hours/week	
Year of course			
1st year	70 (95.9)	3 (4.1)	χ^2=39.71
2nd year	55 (73.3)	20 (26.7)	d.f.=3
3rd year	35 (53.0)	31 (47.0)	P<0.0001*
4th year	50 (86.2)	8 (13.8)	
Sex			
Males	108 (70.6)	45 (29.4)	χ^2=8.703
Females	102 (85.7)	17 (14.3)	d.f.=1
			P=0.003*
Total	210 (77.2)	62 (22.8)	

*Statistically significant

Possession of a personal computer was found to be 53.7% in our study, comparable to that reported by a from a study on medical students in south India (58.8%) in 2008.[4] This was higher than 39.1% as reported in a study from Sudan in 2005.[10] Lack of a personal computer by about half of the medical students may be due to the lack of a felt need from their side as well as from their parent's side for possessing it. Computers are thought to be a necessity for the engineering students but not so much for the medical students.

A total of 57.4% of the respondents from our study reported being trained in computer use was higher compared to 35% of the medical students reported from a study done in Nigeria in 2004.[11] The high proportion of first-year students from our study reporting as having had some training in computer use also highlights the fact that in many schools at present, computer training is a part of the curriculum and the proportion of such schools is rising. Possession of Internet data card by about one-third of the students studied is an encouraging sign in the direction of using Internet by the students; given the fact that Internet facility is available to the students in the campus itself at a nominal cost.

The most common use of the Internet by the study subjects was communication (58.5%) which was comparable to the

Table 5: Barriers* to using internet among the students belonging to different years of their courses

Barriers	1st year, *n* = 73	2nd year, *n* = 75	3rd year, *n* = 66	4th year, *n* = 58	Total, *n* = 272
Lack of time	40 (54.8)	37 (49.3)	36 (54.5)	35 (60.3)	148 (54.4)
Inaccessibility	20 (27.4)	30 (40.0)	19 (28.8)	17 (29.3)	86 (31.6)
Lack of skills	11 (15.0)	4 (5.3)	15 (22.7)	16 (27.6)	46 (16.9)
Slow internet speed	11 (15.0)	17 (22.7)	2 (3.0)	7 (12.1)	37 (13.6)
Irrelevant	3 (4.1)	2 (2.7)	14 (21.2)	10 (17.2)	29 (10.7)
High cost	1 (1.4)	2 (2.7)	9 (13.6)	8 (13.8)	20 (7.4)

*Multiple responses allowed

figures reported by other studies among medical students from various parts of India.[4,5] Another study medical students from south India has reported a higher usage (97.3%) of email for Internet use.[8] Other studies done among medical students around the world have reported that e-mailing is the most frequent reason for accessing the Internet.[9,12,13]

The proportion of medical students accessing Internet for entertainment purpose in our study was comparable to a study conducted in Government Medical College Jammu, whereas it was higher than that reported from another study from north India (13.2%).[5,14] Studies from south India and a study from Sudan have reported a higher proportion of medical students using Internet for entertainment compared to our study.[4,8,10]

About one-fourth of the medical students studied accessed Internet for online banking and ticket reservation indicating that these medical students have started using Internet for their day-to-day activities. Online banking was reported by only 5.4% of the undergraduate medical students in a study from south India.[8] Using Internet for medical literature was only about one-fifth of the respondents of our study. This is quite low compared to that reported from other studies among medical students conducted in India.[5,8] Our results are comparable to the finding of a survey done among the medical students at the King Abdul Aziz University, Jeddah where 21.9% of the respondents accessed Internet for academic purposes.[15]

About three-fourth of the respondents accessed Internet for less than 3 hours per week in our study which was higher than that observed in a study on medical students from south India.[4]

There are many barriers faced by medical students in using Internet, the most common (54.4%) reported to be lack of time in our study. A study among doctors and residents, from Sudan in 2005, has reported that barriers to better use of the Internet mentioned by students included poor skills, high costs per hour in the Internet cafes, failure to find the required information, poor knowledge of the English language and time constraints.[10] A total of 80% of the final-year medical and dental students from a Nigerian study reported lack of proper skills to be adversely affecting their Internet use.[16] A surprising finding was that 8.0% of the respondents reported that Internet was irrelevant in medical education; and this proportion was higher among the third- and fourth-year students (19.4%) compared to first- and second-year students (3.4%).

Further research should focus on designing and implementing computer and Internet training for medical students.

ACKNOWLEDGMENTS

We would like to thank the MBBS students of Subharti Medical College, 2006 batch, Anshuman Srivastava, Nimisha Gupta, Neha Tyagi, Manvi Tyagi, and Ankita Tyagi for their help in data collection and data entry for this study.

REFERENCES

1. Slater WF. Internet history and growth. 2002. Available from: http://www.isoc.org/internet/history/2002_0918_Internet_History_and_Growth.ppt. [Last cited on 2010 Mar 5].
2. Yadav H, Jain S, Kapila S, Prasad G. Internet resources for diabetes. Indian J Med Sci 2005;59:32-42.
3. Wiecha JM. Collaborative Online Learning (COL). A new distance education method. Essential Drugs Monitor. Vol 33. Geneva: World Health Organization; 2003. p. 36. Available from: http://apps.who.int/medicinedocs/pdf/s4941e/s4941e.pdf. [Last cited on 2012 May 7].
4. Unnikrishnan B, Kulshrestha V, Saraf A, Agrahari AC, Prakash S, Samantaray L, *et al*. Pattern of computer and internet use among medical students in coastal south India. South East Asian Journal of Medical Education 2008;2;18-25.
5. Lal P, Malhotra R, Ahuja C, Ingle GK. Internet use among medical students and residents of a medical college of north India. Indian J Community Med 2006;31:293-4.
6. Duffy M. The internet as a research and dissemination resource. Health Promot Int 2000;15:349-53.
7. Peterson MW, Rowat J, Kreiter C, Mandel J. Medical students' use of information resources: Is the digital age dawning? Acad Med 2004;79:89-95.
8. Inamdar SC, Rotti SB. Computer use among medical students in an institution in southern India. Natl Med J India 2004;17:8-10.
9. Ajuwon GA. Computer and internet use by first year clinical and nursing students in a Nigerian teaching hospital. BMC Med Inform Decis Mak 2003;3:10.
10. Ahmed AM, Yousif E, Abdalla ME. Use of the internet by Sudanese doctors and medical students. East Mediterr Health J 2008;14:134-41.
11. Bello IS, Arogundade FA, Sanusi AA, Ezeoma IT, Abioye-Kuteyi EA, Akinsola A. Knowledge and utilization of information technology among health care professionals and students in

ile-ife, Nigeria: A case study of a university teaching hospital. J Med Internet Res 2004;6:e45.
12. Huntley AC, Conrad SJ. Internet tools in the medical classroom. Med Educ 1994;28:508-12.
13. Nurjahan MI, Lim TA, Yeong SW, Foong AL, Ware J. Utilization of information technology in medical education, a questionnaire survey of students in a Malaysian institution. Med J Malaysia 2002;57 Suppl E:58-66.
14. Sharma R, Verma U, Sawhney V, Arora S, Kapoor V. Trend of Internet use among medical students. JK Science: Journal of Medical Education & Research 2006;8:101-2.
15. Mansoor I. Computer skills among medical learners; A survey at King Abdul Aziz University, Jeddah. J Ayub Med Coll Abbottabad 2002;14:13-5.
16. Odusanya OO, Bamgbala OA. Computing and information technology skills of final year medical and dental students at the college of medical university of Lagos. Niger Postgrad Med J 2002;9:189-93.

How to cite this article: Maroof KA, Parashar P, Bansal R. How are our medical students using the computer and internet? A study from a medical college of north India. Niger Med J 2012;53:89-93.

Source of Support: Nil, **Conflict of Interest:** None declared.