

Full Length Research Paper

Utilization of electronic scientific information resources among undergraduate dental students in Kingdom of Saudi Arabia

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This study aimed to evaluate undergraduate dental students' utilization of electronic scientific information resources and to identify the specific trends found among students at different years of study. A cross-sectional web survey of all undergraduate dental students in Riyadh Colleges of Dentistry and Pharmacy was conducted. Descriptive analysis was undertaken and differences between groups were examined using Chi-square test. A response rate of 40.5% (n = 740) was achieved. 44% of the respondents used Medline for study purpose and 47.8% for research. 56.1% used full-text journal articles online for both study and research purpose. Only 25.9% searched Medline at least 1 to 7 times/month for study purpose and 22.2% for research. 42% used full-text journal articles at least 1 to 7 times/month for both study and research purpose. Clinical students were more likely to use full-text journal articles for study and research and female students were more likely to use Medline for research (p < 0.05). A majority of the respondents were non-users of Medline. The use of Medline and full-text journal articles increased moderately toward the end of the study. Training dental students in effective information searching and including the use of full-text articles in the dental curriculum will increase the use of electronic scientific resources.

Key words: Medline, full-text articles, dental, students, electronic resources.

INTRODUCTION

Information nowadays is widely available through the internet and an efficient internet user would be able to reflect and conceptualize this information. Electronic scientific information resources have great significance in the progression of teaching and learning. E-learning resources and tools like database software and database websites such as Medline are key items in dentistry (Mattheos et al., 2008). Students can find the information available in the internet overwhelming; hence skills are

essential for identifying and verifying the quality of information. In addition, training is needed to learn how to proficiently use the web-based search tools and standardized filtering techniques in order to find high-quality information resources. A recent study among research scholars and postgraduate students reported that the majority used electronic scientific resources for research and study purpose (Sonkar et al., 2014). Few studies have been published on dental students'

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Table 1. Demographic characteristics of respondents

Variable		%	N
Age (years)	18-22	66.8	500
	23-27	29.9	216
	28 and above	3.2	24
Gender	Male	42.0	314
	Female	56.4	422
Year of study	Year 1	14.7	110
	Year 2	23.0	172
	Year 3	18.5	138
	Year 4	17.1	128
	Year 5	12.0	90
	Year 6	11.2	84

utilization of electronic scientific information resources. One such study in India reported that the majority used internet and electronic resources for finding health/dental sciences information and felt that they cannot be replaced by physical resources (Manhas, 2008). Indian and Jordanian dental students of clinical years used internet and Medline for their studies more than pre-clinical year students (Kumar et al., 2009; Rajab and Baqain, 2005). Another study amongst Iranian dental students reported that the majority knew how to use PubMed database to find their preferred references but only a few were able to use Medline (Hamissi et al., 2013). Only one-tenth of Finnish dental students were regular users of full-text articles. However, the use of full-text articles and Medline increased toward the end of the study (Romanov and Aarnio, 2006). This study was conducted among dental students of Riyadh Colleges of Dentistry and Pharmacy (RCsDP) in Kingdom of Saudi Arabia. The college offers a six-year dental curriculum made up of two phases: a three-year preclinical phase and a three-year clinical phase. The final year ends with a written scientific essay based on research that the students have conducted. As part of the curriculum, during the first year, dental students participate in a course in introduction to computer, which presents principles of searching scientific literature to obtain information from the Internet for study and research. With the implementation of complete computer based information system and the Saudi Digital Library (SDL) in RCsDP, this study aims to examine the utilization of electronic scientific resources among the undergraduate dental students and to identify the specific trends found among students at different years of study.

METHODOLOGY

A cross-sectional population survey of all undergraduate dental students enrolled at Riyadh Colleges of Dentistry and Pharmacy

was conducted in 2014. This study involved an electronic questionnaire survey of 1825 dental students at RCsDP. The questionnaire consisting of 17 items was piloted on a representative sample of students who were not part of study population. During the pilot study, the face validity of each item of the questionnaire was examined and the collected data were used to assess the internal reliability of the questionnaire. Questions from the validated questionnaire were taken with slight modifications. The final questionnaire (17 items) had sections examining the use of scientific information resources in electronic form, the frequency of using different electronic scientific resources, the use of additional computing applications of information seeking/processing, and demographics. Among the choices on the questionnaire were:

- (1) Medline database separately for study and research
- (2) Electronic full-text articles
- (3) Electronic textbooks
- (4) Medical/dental information from the World Wide Web (WWW).

Closed questions which are very specific and offer the participants a fixed range of answers were utilized. The use of electronic scientific information was self-assessed with 0 (for 'no'), 1 (for 'yes') and the frequency of use on a four-point scale ranging from 1 (for "not at all") to 4 (for "at least once weekly"). Demographic details included age, gender, and year of study. The student data were collected using the electronic questionnaire. By means of e-mail lists, the survey was addressed to all dental students during the three-week survey period. Two reminder messages were used to promote response. A completed questionnaire indicated the consent to participate in the study. Anonymity and confidentiality was assured. There was no personal identifier on the questionnaire and no records were kept of students participating in the study. The quantitative data was entered onto computer for analysis using Statistical Package for Social Science (SPSS) version 18 for Windows. Descriptive analysis was undertaken to present an overview of the findings from this population. Differences between groups were examined using Chi-square test for linear trends across the rated questions, and cross tabulations to compare responses from different groups. The level of significance was set at $p \leq 0.05$.

RESULTS

Demographics

Among 740 respondents (response rate = 40.5%), the majority ranged from an age group of 18 to 22 years and were females (56.4%, $n = 422$). 56.2% ($n = 420$) of the respondents were pre-clinical students (year 1 to year 3) and 40.3% ($n = 302$) were clinical students (year 4 to year 6) (Table 1).

Use of internet and electronic resources

The majority accessed internet and electronic resources from home (91.4%, $n = 684$), only 5.6% ($n = 42$) accessed from college. WWW (46%, $n = 344$) was the most preferred internet service and e-books (76.7%, $n = 568$) was the most preferred electronic resource. The most common features of computer used by the respondents for studies was internet (42.8%, $n = 320$).

Table 2. Use of Medline and full-text articles by year of study.

Year of study	Year 1 [n (%)]	Year 2 [n (%)]	Year 3 [n (%)]	Year 4 [n (%)]	Year 5 [n (%)]	Year 6 [n (%)]	All [n (%)]	p-value
Use of Medline in study	33 (29.8)	79 (46.2)	55 (40.0)	54 (42.1)	50 (55.8)	47 (56.1)	318 (44.0)	0.096
Use of Medline in research	48 (43.5)	79 (46.2)	63 (45.3)	67 (52.6)	48 (53.5)	49 (58.5)	354 (47.8)	0.665
Use of full-text journal articles in study and research	53 (47.9)	84 (48.8)	69 (50.0)	81 (63.2)	61 (67.4)	57 (68.3)	405 (56.1)	0.078

Table 3. Use of Medline and full-text journal articles by gender and course of study.

Variable	Gender		p-value	Course of study		p-value
	Male [n (%)]	Female [n (%)]		Pre-clinical [n (%)]	Clinical [n (%)]	
Use of Medline in study	118 (37.6)	184 (43.6)	0.505	167 (39.8)	151 (50.0)	0.073
Use of Medline in research	118 (37.6)	218 (51.7)	0.027	190 (45.2)	164 (54.3)	0.096
Use of full-text articles in study and research	148 (47.1)	236 (55.9)	0.183	206 (49.0)	199 (65.9)	0.003

Over half (54%, n = 404) the respondents utilized the computer and one-third (32.9%, n = 246) used internet every day for academic activities in dentistry. Just over half the respondents (52.4%, n = 392) felt that internet and electronic resources can replace physical (print) resources. The majority of the respondents graded their search skills (73%, n = 546) as intermediate and were confident with regard to the accuracy (91.8%, n = 686) and relevance (90.1%, n = 674) of information on the internet.

Information searching skills

13.9% (n = 104) reported average skills in searching Medline, 11.5% (n = 86) in SDL, 21.9% (n = 164) in other medical database, 17.4% (n = 130) in full-text articles, 27% (n = 202) in electronic textbooks, 35% (n = 262) in advanced search engines, and 24.1% (n = 180) in professional medical information.

Use of Medline and full-text articles

Only 25.9% (n = 194) searched Medline at least 1 to 7 times/month for study purpose and 22.2% (n = 166) searched Medline at least 1 to 7 times/month for research. 42% (n = 314) used full-text journal articles online at least 1 to 7 times/month for both study and research purpose (Figure 1). 44% (n = 318) of the respondents used Medline for study purpose and 47.8% (n = 354) for research. Just over half the respondents (56.1%, n = 405) used full-text journal articles online for both study and research purpose (Table 2).

Non-users of electronic information resources

The majority of the respondents were non-users of Medline for study (56%, n = 404) and research purpose (52.2%, n = 368). 43.9% (n = 317) were non-users of full-text journal articles online. 43.3% (n = 324) were non-users of SDL, 23.3% (n = 174) electronic dental/medical handbooks, and 19.3%

(n = 144) other medical databases. 15% (n = 112) never searched the web for professional dental/medical information (Figure 2). Chi-square test showed a statistical significant relation between age and search skills, use of full-text journal articles for study and research purpose (p < 0.05). There was a statistically significant relation between gender and use of internet services, electronic resources, and search skills (p < 0.05). Males were more likely to use WWW, e-books, and have higher search skills than females. Clinical students were more likely to use full-text journal articles for study and research than pre-clinical students and females are more likely to use Medline for research than males and was statistically significant (p < 0.05) (Table 3).

DISCUSSION

The purpose of this study was to examine the use of electronic scientific resources among the undergraduate dental students in RCSDP using a

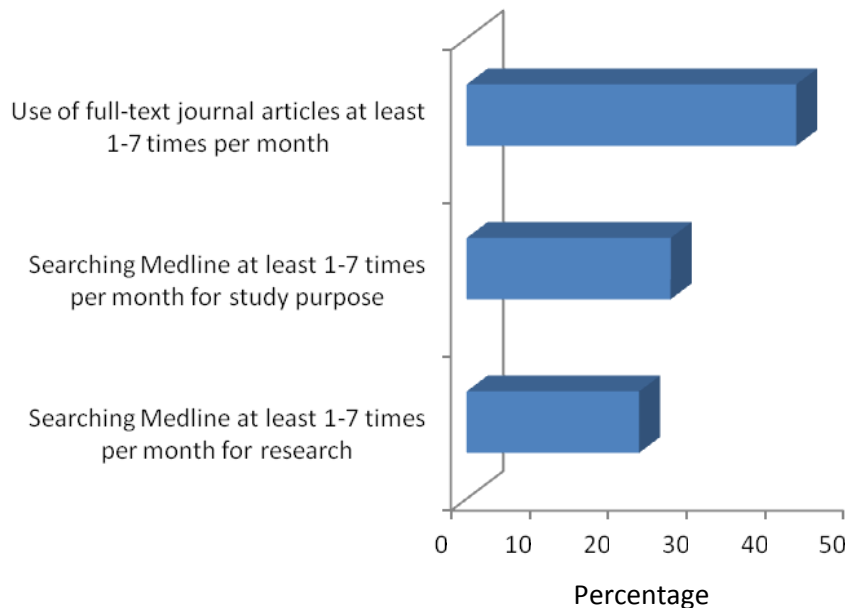


Figure 1. Searching Medline and use of full-text articles among dental students.

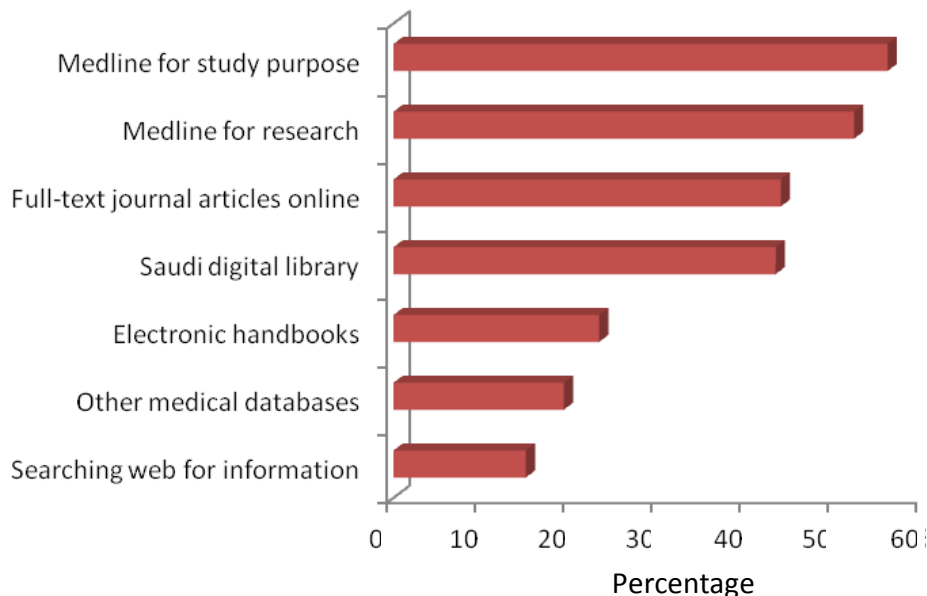


Figure 2. Non-users of electronic information resources.

web survey. WWW and e-books were the most preferred internet service and electronic resource among the students. The majority of the students reported below average skills in searching Medline. Fewer than half the respondents used Medline for study and research purpose and just over a half used full-text journal articles online for both study and research purpose. Only about a quarter of the students searched Medline at least 1 to 7 times/month for study and research purpose. Just under

half the respondents used full-text journal articles online at least 1 to 7 times/month for both study and research purpose. However, the use of Medline and full-text journal articles online increased moderately toward the end of the course for study and research purpose. In the present study, the majority of the dental students had an average level of internet and computer knowledge comparable to the findings in the previous studies (Ghasempour and Jarideh, 2014; Smith et al., 2009).

Over half the dental students in our study reported that internet and electronic resources can replace print resources in contrast with the Indian dental students (Manhas, 2008) where the majority felt that the Internet and electronic resource could only supplement the print resources. The majority of the students in the current study were confident in the accuracy and the relevance of information from the internet and was similar to the findings of Nigerian dental students (Butali et al., 2011). The dental students in this study graded their basic PC skills higher than their search skills corresponding with the findings of dental students in Finland (Romanov and Aarnio, 2006).

The findings on the frequency of the use of Medline for study and research purpose in our study were consistent with the past studies (Ayatollahi et al., 2010; Romanov and Aarnio, 2006). However, the frequency of use of full-text articles for study and research purpose was higher than the Finnish study (Romanov and Aarnio, 2006). Students of clinical years used internet and Medline for their studies more than pre-clinical students which were similar to the previous studies (Kumar et al., 2009; Rajab and Baqain, 2005). The use of full-text journal articles and Medline increased moderately toward the end of the course which was comparable to the studies in Turkey and Finland (Komerik, 2005; Romanov and Aarnio, 2006). This could be due to students' involvement in research activities, more intensive clinical practice, and getting familiar with the use of information resources at the end of their study years. RCsDP is the first private school which offers both undergraduate and postgraduate programs in dentistry and has the highest number of student intake in Kingdom of Saudi Arabia. However, the views of these dental students may not be representative of the national picture. Moreover, data collection by means of an electronic survey may have overestimated the use of electronic scientific resources and a modest response rate may have biased our results. Approximately half the respondents were non-users of full-text journal articles online and Medline for study and research purpose which should be taken into account for developing curriculum. To encourage students to access and utilize the electronic scientific information resources, the dental curriculum should include the use of full-text article and train students in effective searching references from databases.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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