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Effectiveness of training intervention to improve medical student's information literacy skills

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This study aimed to assess the efficiency of delivering a 4-month course of "effective literature search" among medical postgraduate students for improving information literacy skills. This was a cross-sectional study in which 90 postgraduate students were randomly selected and participated in 12 training sessions. Effective search strategies were presented and the students' attitude and competency concerning online search were measured by a pre- and post-questionnaires and skill tests. Data were analyzed by SPSS version 16 using t-test. There was a significant improvement (p=0.00), in student's attitude. The mean (standard deviation [SD]) was 2.9 (0.8) before intervention versus the mean (SD) 3.9 (0.7) after intervention. Students' familiarity with medical resources and databases improved significantly. The data showed a significant increase (p=0.03), in students' competency score concerning search strategy design and conducting a search. The mean (SD) was 2.04 (0.7) before intervention versus the mean (SD) 3.07 (0.8) after intervention. Also, students' ability in applying search and meta search engine improved significantly. This study clearly acknowledges that the training intervention provides considerable opportunity to improve medical student's information literacy skills.

Key Words: Education, Online search, Information literacy, Medical students, Health services

Introduction

Search skills and strategies play an important role in locating relevant information since the emergence of evidence-based medicine (EBM) by health care staff; however, there are many medical students graduating from medical schools without acquiring these skills which are crucial in their career lives [1,2].

Recently, "medical information systems" course has been integrated into the curriculum of medical educa-tion, and is often perceived as a prerequisite of learning about the practice of EBM. Several research studies have been applied in several studies to survey the impact of training intervention on students' skills in online search [3].

However, there is a small, but growing research on identifying what is the best practice in educating students and clinicians to conduct effective search. For example, Ghali et al. [4] carried out a before and after study by teaching mini courses in EBM for medical students in four sessions focusing on writing clinical

questions, searching Medline, having critical appraisal, and applying evidence. The results of this study showed significant improvement in students' search skills in the four aforementioned areas [4].

This study aimed to assess the efficiency of delivering a 4-month course of "effective literature search" among medical postgraduate students for improving their attitudes and skills regarding online literature search.

Subjects and methods

This was a cross-sectional study administrated in October 2015 and January 2016 subsequently. This pre-post design was intended to assess the effect of one-semester training intervention of "effective literature search" among medical postgraduate students of Tabriz University of Medical Sciences.

The participants in this study were postgraduate students who participated in 4-month course of "effec-

tive literature search." As for the sample, from 197 postgraduate students (n=197), 90 students were selected by stratified randomized sampling scheme, with stratification for master of science (MSc) students (65%), and doctor of philosophy (PhD) students (35%).

In October 2015, before the training begins, students' perception toward online search, and their search skills were assessed by a researcher-made questioners and on the basis of a literature review. The survey included structured questionnaire in four areas addressing in prior paragraph. "Totally agree," "agree," "neutral," "disagree," and "totally disagree," formed the questionnaire which was based on a 5-point Likert scale.

Five faculty members of medical education department confirmed the content and face validity of the study instrument. Cronbach's α coefficient revealed a high degree of internal consistency (0.9). Also, the reliability of the questionnaire was measured by test-retest (0.9).

Participants took part in 12 training sessions, in which familiarity with medical resources and databases, design

Table 1. Demographic Details of the Students Participated in the Present Study

Component	Item no.	Item
Attitude toward online literature searching	1	Search and retrieval of information is often difficult and a burden to me.
	2	I have the skills necessary for searching and finding relevant information.
	3	Most of the time, I am successful in searching and finding relevant information in my field of study.
	4	Finding articles and scientific information from the internet and databases requires certain skills and expertise.
Familiarity with medical resources and databases	6	I am familiar with databases providing full-text articles.
	7	I am familiar with databases relevant to my fields of study and I can name them.
	8	I begin the search for retrieval of information from the specific relevant data basis in my field of study I am familiar with.
	9	I am familiar with scientific portals and vortals and I use them in my search.
	10	I am familiar with electronic databases and I know how to access them.
Ability to design search strategy and conduct a search	14	I can formulate and develop the search question in finding information.
	15	I can apply "phrase searching" and "filtering" in searching databases.
	17	I can use and apply medical subject headings (MeSH).
	18	I can modify the results of the search very well.
Ability to applying search and meta search engine	19	I can work with search engines such as Google, Yahoo, and Bing.
	20	I can work with specific search engines to find relevant information in a specific field.
	21	I can work with meta search engines such as Mama and Dogpile, in search.
	22	I can work with search directories such as Yahoo and Vivisimo and usually use them in search.

search strategy and conduct a search, and applying search and meta search engine, were presented by highly qualified teacher (HQT).

In January 2016, after a 4-month course of "medical information systems," students' perception and their search skills were reassessed. Participants took part in a practice test that was conducted by HQT. In practice test, the students' information literacy competency in designing search strategy, formulating search questions, finding keywords, applying Boolean logic and using other search functions such as search filtering and transaction were assessed.

All data from pre- and post-survey were entered in SPSS software using a t-test to compare score changes in four areas form before intervention versus after inter-

vention. Table 1 shows the questions used in the survey measuring the various components of the study.

Demographic information of the study showed that the majority of the participants (70.2%) were female (Table 2). More than 45 percent of participants were in the age range of 25 to 30 with the mean age of 27.3. The data also showed more than 64 percent of students had MSc. Table 3 shows that there was a significant change in students' attitude which improved considerably toward online literature search after the training. The data from Table 3 also showed students' familiarity with medical resources and databases as well as their ability to apply search strategies and skills improved significantly. Likewise, there was a significant change in students' ability to apply search and meta search engines.

Table 2. Demographic Information of the Participants

Demographic	Category	Frequency	Percent	Mean	Standard deviation
Gender	Male	10	11.11		
	Female	78	86.60		
	Missing	2	2.20		
	Total	90	100		
Age (yr)	22–25	16	17.77	27.8	2.3
	25–30	54	60		
	30–35	13	14.44		
	Missing	7	7.70		
	Total	90	100		
Grade	MSc	58	64.40		
	PhD	32	35.50		
	Missing	0	0		
	Total	90	100		

MSc: Master of sciences, PhD: Doctor of philosophy.

Table 3. Students Competency Score across Online Literature Searching before and after Intervention

Component	Before intervention		After intervention		Paired samples test		Result
	Mean	SD	Mean	SD	t	p-value	
Attitude toward online literature searching	2.90	0.85	3.92	0.7	−9.24	0.00	Significant
Familiarity with medical resources and databases	3.01	0.93	4.02	0.9	−8.39	0.00	Significant
Ability to design search strategy and conduct a search	2.04	0.72	3.07	0.8	−7.24	0.03	Significant
Ability to applying search and meta search engine	3.02	0.94	4.50	0.9	−8.76	0.04	Significant

SD: Standard deviation.

Conclusion

The finding of this study provides considerable evidence that training in online literature search has a marked effect on students' attitude and skills which are vital for the efficient use of online databases.

In terms of the impact of training intervention on students' attitude and their perception toward online literature search, the data shows a significant change after the intervention. This finding is in line with the findings of several studies reporting improvement in student's perception and the performance after training [5,6,7,8,9].

Concerning the impact of training intervention on students' familiarity with medical resources and databases, the results of paired samples test indicated a significant improvement after the intervention. Likewise, Ren [6], Kroustallaki et al. [10] found that training had a significant impact on users' familiarity with resources and databases [7]. Therefore, training intervention and information skills training are worthwhile and effective methods to efficient use of information and resources, provided students put skills into practice.

Regarding the impact of training on students' ability to develop search strategies, Table 2 shows significant improvement after training. This finding supports the findings of Ghali et al. [4], Eldredge et al. [8], and Kroustallaki et al. [10] reporting training had direct and significant effect on users' ability of query formulation and information selection.

Finally, concerning the impact of training intervention on students' ability in applying search and meta search engine, the results showed a significant change in students' skills. Students' ability in performing efficient search engine selection, using Boolean logic operator, and applying search strategies based on search engines tips improved significantly after training. Similarly, Ghali et al. [4] and Gruppen et al. [3] found that training had direct and significant impact on users' ability in applying search and meta search engine.

Although the findings of this study adds to the literature in supporting the role of training in improving students' attitude and skills, the limited number of participants, and students' self-reported behavior changes are the limitations of the study.

In conclusion, our study suggests that training is an effective method for delivering information literacy skills to students and has a significant impact on students' competency in efficient use of online resources. The results of this study showed students' attitude toward online literature searching, their familiarity with medical resources and databases, their ability in developing search strategy and applying search and meta search engine significantly improved after the intervention providing them a great opportunity to practice search skills and improve health care services on the ground of evidence based medicine.

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