Evaluation of information literacy status among medical students at Shiraz University of Medical Sciences

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Introduction: The information literacy status and the use of information technology among students in the globalization age of course plans are very momentous. This study aimed to evaluate the information literacy status and use of information technology among medical students of Shiraz University of Medical Sciences in 2013.

Methods: This was a descriptive-analytical study with cross-sectional method. The study population consisted of all medical students (physiopathology, externship and internship) studying at Shiraz University of Medical Sciences. The sample size (n=310) was selected by systematic random sampling. The tool of data gathering was LASSI questionnaire (assigned by America research association) with 48 closed items in five-point LIKERT scale. The questionnaire included two distinct parts of demographic questions and the information literacy skills based on the standards of information literacy capacities for academic education. The content validity was acquired by professors' and experts' comments. The reliability was also calculated by Cronbach's alpha (0.85). Data were analyzed in both descriptive (frequency- mean) and analytical level (t-test, analysis of variance) using SPSS 14 software.

Results: 60.3% of the participants were females, and the remaining (29.7%) were males. The mean score of information literacy and its five subgroups among the students weren't at a desirable level. The mean scores of information literacy for educational grades from the highest to lowest belonged to the internship, physiopathology and externship. The results showed that the highest average was related to the effective access ability to information among interns (9.27±3.57) and the lowest one was related to the ability of understanding legal and economical cases related with using information among externs (3.11±1.32). The results of ANOVA showed that there wasn't a significant difference between educational grades and information literacy. Finally, the result of independent t-test did not show a significant difference between the two genders in information literacy.

Conclusion: Regarding the importance of information literacy for medical students and undesirable status of information literacy among students, the current educational plans will need to be revised.

Keywords: Medical students; Information literacy; Technology; Medical informatics

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Introduction

Considering the huge information in the field of medical sciences called information explosion in the present century, access to required information through the dense of available information, demands special skills which are phrased as information literacy (1). Information literacy is defined as "an intellectual and rational cast for perception, find, evaluation and use of information". Such a perception of information literacy emphasizes the importance of university performance as well as continuous learning. Information literacy may include learned skills or an educational process through which a person learns how to use the effective and efficient information in a complex and fast growing environment. Lack of abilities brings problem in the process of knowledge acquisition, the attitude toward information and information skills as the main recognizing factors in the information society (2, 3). Information literacy is the major key in formal curriculum continual learning and the main mission of educational institutes in the today world (4-6).

Although the universities are equipped with electronic databases, websites, multimedia and dense information, students do not have the adequate knowledge about how to use these facilities. In other words, they don't know learning which an important slogan of meta-cognitive scientists is (7, 8). In order to act successfully against problems and difficulties in this complex and changing world, students need a meta-competence, one important of which is perception of how to find and utilize information efficiently (9). For this purpose, students must recognize and apply the information search and backup tools (10).

Detection of information literacy leads to incorrect and inefficient use of resources which wastes the intellectual power of educated individuals within the society- professors and scientists- and unfortunately in some cases it leads to plagiarism (11-14). To become an informational literate, a person must pose his problems in the form of a question or query; in other words, he must ask a question and be able to obtain, critically appraise and effectively and morally use the required information (15-17).

Medical practice requires the students to update their information permanently for evidence-based medicine; that's why they are exposed to information literacy development programs. The awareness of information circulation manner in this field and the quality and quantity of medical student's knowledge about information literacy is helpful in solving lots of medical education problems (18, 19). In Iran, several studies have been conducted about information literacy measurement among students of medical sciences (20-22). In other countries also several studies such as Weber and Johnston have been performed. They studied on the relationship between information literacy concepts from the students' perspective. They argued that students recognize information and resources searching and the concept of information literacy and emphasis on the role of informational technology which refers to the first three stages of Bros information literacy. During the courses, the information literacy of students toward the concept of informational technology was changed and then from their perspective information literacy was boded as information assessment, application and organizing and these refer to Bros information literacy (23).

A study with the aim of students' self-assessment about information literacy skills before and after education accomplishment was performed in the Technology University of Queensland of Australia. The participants in a pilot study of online education of information literacy after their registration and graduation from 2008-2011 assessed their academic writing and research skills before and after the course. The results confirmed the effectiveness of education with emphasis on including information literacy education in nursing course plans in order to promote the knowledge quality of graduates. The researchers concluded that the inclusion of such education in nursing courses would be beneficial (24).

School of health in Niger Delta University conducted a study to determine the students' awareness rate and their use of informational resources, demonstrating that the students frequently rely on the courses materials, medical journals, Internet, coworkers and the virtual library of Nigeria University in order to obtain their required information. However, they rarely use the electronic resources like MEDLINE, Cochran Library and Ebsco Host. This may be due to lack of knowledge and skills in searching databases. Some expressed issues include lack of time, challenges of professors, inability in using medical libraries and weakness in searching information (25).

Therefore, major actions must be taken to make the students and learners capable of access and use of information in universities and academic institutes. The little knowledge in searching information among the students about to graduation shaped the idea of the current study. The barriers like the students'

unfamiliarity in positioning and accurate informational assessment and, on the other hand, unawareness of information a experts about the students' performance during information searching leads to the students' failure to retrieve information (26). On account of labeling Shiraz University of Medical Sciences to one of mother universities with brilliant background and rich resources of information in education and research, the evaluation of students information literacy and the rate of their familiarity with independent and continuous learning skills will assist the development and educational grades of this society as well as resolving its probable shortages. This study mainly aimed to evaluate the information literacy among medical students.

Methods

This was a cross-sectional study performed in 2013. The statistical population included all medical students studying at Shiraz University of Medical Sciences. The sample size in the current study was calculated 310 students studying at different educational grades (physiopathology, externship and internship) by Morgan Formula through systematic random sampling. The setting of the study included schools, hospitals or dormitories of Shiraz University of Medical Sciences. The data gathering tool was LASSI questionnaire (assigned by American research association) with 48 closed questions in five-point Likert scale. This questionnaire consisted of two distinct parts: the first included demographic questions and the second part measured the students' information literacy skills based on the standards of information literacy capacities for academic education (27). The questions were arranged based on the performance indicators. The questionnaire of this study was translated into Persian by 2 experts and then back translated to English by researcher to be contextualized. The reliability of the questionnaire was calculated by Cronbach's Alpha which equaled to 85% (Table 1) while its validity was confirmed by professors and experts. Grading of this closed questionnaire was as follows: for each correct response to questions with one or several options, the score

of one (1) was allocated. Thus, if the participant selected the correct response in a single option question, the grade would be 1 (one); however, if the participant selected the correct response in multiple choice questions like three option question, the grade would be three (3). Therefore, according to the number of questions and their related correct answers, the maximum score for an informational literate student was 77 and its midpoint was also 38.5. Also, maximum score for subgroups (the determination ability scope and nature of information, the effective access ability to information, the critical appraisal ability information, the ability of information targeted application, and the ability of understanding legal and economical cases related with using information) were 13, 22, 12, 22, and 8, respectively. The students participated and distributed the questionnaires; gathering of the participants was voluntary and the questionnaires were anonymous. So those students who were reluctant to participate could quit this study. After gathering and completing the data, the codes were transferred to SPSS, version 14. Then descriptive analysis (frequency, mean) and analytical statistics (t-test, analysis of variance) were applied on the basis of study goals ($p<0.05$).

Results

In the current study, 60.3% of the population were female, and their mean age was 21.88±2.70. As to educational grades, 19.4% of the students were in the stage of physiopathology and 53.7% in externship and 26.9% in internship period. Table 1 demonstrates the reliability of information literacy options.

According to Table 2, the most distribution of scores was related to the subgroup of the effective access ability to information (Mean±SD=8.80±3.41) and the lowest distribution of scores belonged to the subgroup of the ability to understand legal and economical cases related to the use of information (Mean±SD=3.28±1.44). Also, the mean scores of information literacy and its subgroups among students were not at a desirable level.

Results obtained from descriptive analysis of

Table 1: The reliability of information literacy components

Information literacy option	Standard	Cronbach's Alpha coefficient (CI=95%)
The determination ability scope and nature of information	S1	0.82
The effective access ability to information	S2	0.75
The critical appraisal ability information	S3	0.71
The ability of information targeted application	S4	0.80
The ability of understanding legal and economical cases related with using information	S5	0.77

Table 2: The score distribution of each subgroup among medical students in Shiraz University of Medical Sciences

Information literacy option	Standard	Maximum score	Midpoint	Mean±SD
The determination ability scope and nature of information	S1	13	6.5	4. 73±2.30
The effective access ability to information	S2	22	11	8. 80±3.41
The critical appraisal ability information	S3	12	6	4. 21±1.94
The ability of information targeted application	S4	22	11	5. 93±2.82
The ability of understanding legal and economical cases related with using information	S5	8	4	3. 28±1.44
Information literacy		77	38.5	26.96±9.3

information literacy are demonstrated in Table 3. Based on the results, mean and standard deviation of information literacy in physiopathology students, externs and interns were 28.00±9.01, 26.8±10.2 and 28.8±8.08, respectively. The effective access ability to information gained the highest average among the interns (3.57±9.27) and the ability to understand legal and economical cases related to the use of information ranked the lowest average among the externs (1.32±3.11). The mean scores of information literacy for educational grades from highest to lowest belong to the internship, physiopathology and externship. According to the definition of the desired level of information literacy among medical students (more than midpoint), the status of students' information literacy in each educational stage (internship, physiopathology and externship) was not desirable. Also, the status of the students in all subgroups of information literacy was not desirable.

For more assessment of information literacy differences among the students, one way ANOVA was used. Results derived from one way ANOVA (Table 4) did not reveal a significant difference between information literacy and its subgroups in different levels of education.

According to the results (Table 5), the mean score of information literacy was 27.38±9.84 for males and 26.66±8.76 for females. Besides, the result of independent t-test did not show a significant difference between the two genders (p=0.75). However, the mean of information literacy among the male students was higher than that of females.

It can also be concluded that the male students had a better score and performance in the subgroups (the determination ability scope and nature of information, the effective access ability to information, the critical appraisal ability information, the ability of information targeted application) than female students, and only in the subgroup of the ability to understand legal and economical cases related to the use of information, female students had a better score and performance than male students.

According to Table 6, in the subgroup of determination ability about the scope and nature of information, the highest mean was related to the pathophysiology female students (6.0±4.41) and lowest mean to the internship male students (4.13±1.35) and externship female students (4.13±2.21). In the subgroup of the ability of effective access to information, the highest mean belonged to the internship male students (9.7±4.49) and the lowest to the internship male students (4.13±1.35) and pathophysiology male students (7.75±2.87). In the subgroup of the critical appraisal ability information, the highest mean was related to the pathophysiology

Table 3: The score distribution of each subgroup among medical students in Shiraz University of Medical Sciences divided by educational stages

Educational grades	Mean±SD		
Sub group (Standard)	Physiopathology	Externship	Internship
The determination ability scope and nature of information (S1)	3.66±5.69	2.12±4.67	1.38±4.83
The effective access ability to information (S2)	3.09±8.38	3.56±9.11	3.57±9.27
The critical appraisal ability information (S3)	1.80±4.54	2.07±4.08	1.75±4.83
The ability of information targeted application (S4)	2.73±5.85	3.30±5.83	2.33±6.44
The ability of understanding legal and economical cases related with using information (S5)	1.26±3.54	1.32±3.11	1.42±3.27
information literacy	28.00± 9.01	26.8±10.2	28.8± 8.08

Table 4: The differences between educational levels in information literacy and its subgroups

		Sum of squares	df	Mean square	F	Sig.
The determination ability scope and nature of information (S1)	Between groups	10.193	2	5.097	0.929	0.400
	Within groups	351.269	64	5.489		
	Total	361.463	66			
The effective access ability to information (S2)	Between groups	6.741	2	3.371	0.277	0.759
	Within groups	778.244	64	12.160		
	Total	784.985	66			
The critical appraisal ability information (S3)	Between groups	7.191	2	3.595	0.949	0.393
	Within groups	242.481	64	3.789		
	Total	249.672	66			
The ability of information targeted application (S4)	Between groups	4.863	2	2.432	0.275	0.760
	Within groups	565.137	64	8.830		
	Total	570.000	66			
The ability of understanding legal and economical cases related with using information (S5)	Between groups	2.100	2	1.05	0.513	0.601
	Within groups	131.06	64	2.04		
	Total	133.16	66			
Total information literacy	Between groups	49.69	2	24.85	0.276	0.760
	Within groups	5760.7	64	90.01		
	Total	5810.4	66			

Table 5: The score distribution of each subgroup among medical students in Shiraz University of Medical Sciences divided by gender

Information literacy option (Standard)	Students' mean and standard deviation		t	p
	Female (N=166)	Male (N=144)		
The determination ability about scope and nature of information (S1)	4.73±2.73	4.83±1.53	0.179	0.85
The effective access ability to information (S2)	8.77±3.44	8.79±3.47	0.025	0.98
The critical appraisal ability information (S3)	3.95±1.79	4.62±2.11	1.45	0.15
The ability of information targeted application (S4)	5.84±2.90	6.10±2.79	0.383	0.70
The ability of understanding legal and economical cases relatedto the use of information (S5)	3.36±1.25	3.03±1.65	-0.962	0.33
Total information literacy	26.66±8.76	27.38±9.84	0.319	0.75

Table 6: The score distribution of Information literacy among medical students in Shiraz University of Medical Sciences divided by gender and educational grades

Gender	Male			Female		
Information literacy option (Standard)	Educational grad			Educational grad		
	Physiopathology (Mean±SD)	Externship (Mean±SD)	Internship (Mean±SD)	Physiopathology (Mean±SD)	Externship (Mean±SD	Internship (Mean±SD)
S1	5.0±0.816	5.75±1.48	4.13±1.35	6.0±4.41	4.13±2.21	5.40±1.17
S2	7.75±2.87	9.58±2.99	9.7±4.49	8.66±3.31	8.9±3.85	8.90±2.84
S3	5.50±1.91	4.83±2.32	5.0± 2.20	4.11±1.69	3.71± 1.87	4.70± 1.41
S4	6.50±1.73	6.0±3.54	6.4±2.92	5.56±3.12	5.75±3.30	6.50±1.90
S5	3.25±0.50	2.75±1.05	2.75±1.03	3.11±2.08	3.6±1.38	3.7±2.00
Total	27.38±9.84			26.66±8.76		

male students (5.50±1.91) and the lowest to the externship female students (3.71±1.87). In the subgroup of the ability of information targeted application, the highest mean was related to the pathophysiology male students (6.50±1.73) and internship female students (6.50±1.90) and the lowest to the pathophysiology female students (5.56±3.12). Finally, in the subgroup of the ability to understand legal and economical cases related to the use of information, the highest mean belonged to the internship male students (3.7±2.00) and the lowest to the internship male students (2.75±1.05) and externship female students (2.75±1.03).

Results of experts' analysis indicated that possible reasons for students' weakness in review and application of information according to what exists in libraries were dividing into 2 categories

of student-based and instructor-based reasons:

Student-based weaknesses are as below:
• lack of appraisal ability of information
• No application of findings in action
• lack of enough motivation among students

Instruction-based weaknesses are as below:
• Weak instructors
• Weak different groups related to information literacy such as librarians

Discussion

This study aimed to evaluate the informational literacy skill of medical students. The findings showed that the mean score of information literacy of students wasn't desirable. The results of this research were not in the same line with that of Ghasemi et al. in which the postgraduate students showed higher information literacy than the mean (24). Shojaee et al. studied on the status of information literacy among the students of North Khorasan. They reported a positive significant relationship between the rate of multimedia use, cultural investments and parents' education with students 'multimedia literacy'. They argued that the students of North Khorasan were in the moderate level of information literacy (28). The results of the current study were in line with results of Merriland university study and some other studies in Iran which reported undesirable information literacy among the students. In the mentioned studies, the majority of students had a superficial perception of information literacy skills and most of them were unfamiliar with the concepts of searching methods, the way of quality determination, reference bias, the correct citation methods or copy right. Flaspohler (2003) also demonstrated that although students had proper computer literacy, they may not be information literacy capable in all categories (29). New students received higher scores in the standards of 1, 4 and 5 (The determination ability scope and nature of information, the ability of information targeted application, the ability to understand legal and economical cases related to the use of information).

Based on the results obtained, the effective access ability to information gained the highest mean among the interns and the ability to understand legal and economical cases related to the use of information gained the lowest average among the externs. The mean scores of information literacy for educational grades from highest to lowest belonged to the internship, physiopathology and externship stages. The information literacy of students in different stages (physiopathology, externship and internship) was different. In other words, the students were not equal in information literacy, but these differences were not statistically significant. Also, the status of students' information literacy in each educational stage (internship, physiopathology and externship) wasn't in a desirable status. However, it is inferred that the plans and contents of educational system need to be revised to enable the students in this field. It is essential that educational system attempts to provide more critical teaching on information literacy.

Conclusion

According to the findings of this study, the following recommendations are made in order to improve the level of the students' information literacy:

• In order to acquire information literacy, written scientific policies and special position should be defined when designing educational programs.

• It would be worth predicting the teaching informal information literacy in the format of course credit.

• The students' information literacy status of various grades and fields of study should be assessed in different periods to detect the deficiencies and solve the problems before their graduation.

• The application competency of active learning strategies in the transmission of information literacy education was another important issue which several studies have affirmed.

• The quality of educational workshops should be enhanced for instruction.

• Cultural enhancement and enriching libraries are recommended in order to attract students more.

Limitations

There were several limitations in this study. First of all, survey data was based on individuals' self-reporting of perceived needs and abilities, which is subject to bias. Due to limitation of the study population to the medical sciences students, the generalization of the current study results should be done with caution. One of the main problems of this study was the feature of self-reporting. Measuring the students' information literacy with practical exams would provide much more precise results.

Conflict of Interest: None declared.

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