

# Information Retrieval Sources and Skill, and Knowledge of Evidence-based Dentistry Among Iranian Dental Students

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## Research Article

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# Abstract

**Background:** This study aimed to determine the common scientific information sources used, information retrieval skills, and knowledge of evidence-based dentistry (EBD) among graduating dental students in two dental schools in Iran.

**Methods:** In total, 179 final-year dental students from Mashhad University (71%) and Babol University (29%) participated in this anonymous survey in 2019. A valid self-administered questionnaire has been translated using forward-backward method to assess students' use of information sources for the past six months, their information retrieval skills, and knowledge of EBD. We used chi-square test, t-test, and one way ANOVA for statistical analysis.

**Results:** Most commonly used information sources by the students in the university and at home were: personal lecture notes, fellow dental students, and Compact Dentistry References (CDR) books. Proportion of students with good knowledge of EBD was 53.6%. Dental students who sensed to possess weaker information retrieval skills revealed lower EBD scores ( $p=0.01$ ). Students who used at least one evidence-based information source (Cochrane, PubMed/Medline, scientific journals' websites) more frequently sensed to possess better information retrieval skills ( $p=0.02$ ).

**Conclusions:** Commonly used information sources by the dental students were not evidence-based. Those students with better information retrieval skill showed higher EBD knowledge score and used evidence-based information sources more frequently. Therefore, more efforts should be put to basic skill of information retrieval and EBD in Iranian dental curricula.

## Background:

Over the past two decades, evidence-based (EB) approach reforms oral health care and improves patient care outcomes [1]. The key factors to improve patient care outcomes are; strong educational basis, using a source of current best evidence, and embracing and using evidence-based dentistry (EBD). Paying attention to these factors is essential to support decision making and treatment planning [1].

Increasing number of clinical information available in databases and rapid advancement of scientific reports require new approaches to determine which is the best to use in clinical decisions and treatment planning [2]. Targeted evidence-based training such as integrating EB concepts into the basic, preclinical and clinical courses has been suggested as an effective model [3].

Some studies revealed deficient knowledge and skills in EBD among dentists and dental students. A study conducted in six European countries showed that only one third of dentists were aware of EBD and used it in their daily practice [4]. Finnish dental students revealed inadequate knowledge and ability to use EBD, and the most common scientific sources they used were; colleagues, personal lecture notes and health gate portal [2]. Final year undergraduate dental students in the UK also felt lack of confidence in

research skills such as using evidence-informed research in their clinical practice and interpreting the results of research [5].

In Iran, over a third of available treatment guidelines, and information from books and different sources were found to be unsuitable (not evidence-based) and misleading [6]. Nevertheless, dental and medical students as well as specialist students have shown positive attitudes toward evidence-based knowledge, even though it was inadequate [7–10].

To achieve evidence-based oral health care, dental students need lifelong learning skills and practices as a skilful user of scientific evidences from valid databases for diagnosis, prevention, and management of oral health problems [1]. Medical Universities in Iran have devoted huge budget to provide available scientific and valid international data bases for students despite financial sanctions.

However, inadequate data are available on how often and which scientific information sources are used by dental students, as well as their information retrieval skills, and their knowledge of EBD. Thus, our study aimed to determine the most common scientific information sources of Iranian dental students in the university and at home, as well as their knowledge of EBD and their information retrieval skills.

## **Methods:**

In this cross-sectional study, Iranian undergraduate dental students from two dental universities (Babol University of Medical Sciences and Mashhad University of Medical Sciences) participated. The sample size was 179 dental students. Students were in the last year of their studies in academic year 2018–2019 (dental curriculum in Iran is 6 years). An introductory workshop about EBD, research design and data retrieval courses on 4th year of the education were included in their curricula. The Ethics Committee of Babol University of Medical Sciences approved the study (nr. IR.MUBABOL.HRI.REC.1398.271). Before being invited to take part in the study, participants received information about the scientific goal of the research i.e. their participation was voluntary and could withdraw at any time.

The study questionnaire was self-administered and was earlier validated among the Finnish dental students [2]. The same questionnaire was translated using standard "forward-backward" method. Two independent oral health experts translated the items and response categories from English to Persian, and modified some information sources based on available sources in Iran to provide a provisional version. Subsequently, a language expert back-translated the questions to English and following a careful adaption to the main questionnaire, the final version were provided.

The final version contains two main sections: EBD and information retrieval in dental profession/studies. The first four questions assessed the students' EBD knowledge. The Patient-Intervention-Comparison-Outcome (PICO) and meta-analysis questions had one correct answer and each scored one point. The level of evidence question comprised four and the scientific article question comprised five answers options, and correct answers to each, scored one. Therefore, these two items scored maximally four and five, respectively. The overall EBD score ranged between 0 and 11; those scoring 8 or more (i.e. answered

correctly to more than 70% of the items) was considered as Good knowledge of EBD, based on the Finnish study [2].

In the information retrieval section, the students were asked to respond "Appraise your personal skills in searching for scientific information?" Their answers to this question were categorized into "poor", "good, and "fair". To assess the use of information sources, we asked students "How often have you applied the following information sources in the university and at home for the past 6 months?" In Iran, since dental students are not allowed to work outside the dental faculty before graduation, field of "work" was deleted from the main questionnaire. Table 3 shows the response alternatives. Compact Dentistry References (CDR) and national dental journals were added as local sources to the response alternatives.

To assess students' use of internet and their network skills, we asked them "How often do you search for dental scientific information in the Internet?" The responses were "Daily, Weekly, Monthly, once in semester, and never" and if they easily find the needed scientific information from the Internet or not.

Finally, the students were asked to select three topics (dental specialties) which they are most frequently searched for scientific information. The response alternatives are shown in Table 2. We added non-clinical specialties as well as Oral Pathology, Oral Medicine, and Dental Public Health to response alternatives.

In addition to descriptive statistics, we used t-test and one way ANOVA to assess the association of knowledge of EBD with demographic variables and subjective evaluation of information retrieval skills. We used chi-square test to test the relationship of students' information retrieval skills and use of information sources.. Level of significance was set at  $p < 0.05$ . We analysed all data with SPSS software, version 22 for Windows (SPSS Inc., Chicago, IL, USA).

## Results:

Totally, 179 (64% females) final year dental students in Mashhad and Babol dental faculties participated in this study (Table 1). The response rate was 98%. The mean knowledge of EBD was 7.18 (SD 2.6, range: 0–11). Altogether 53.6% of the dental students had good knowledge of EBD (i.e. answered correctly to at least 70% of the EBD questions) and 8% of them answered correctly to all EBD questions. Dental students who sensed to possess weaker information retrieval skills showed lower EBD scores ( $p = 0.01$ ) (Table 1).

Dental students of Mashhad University had higher EBD scores ( $p = 0.01$ ). The most frequent dental specialty fields that dental students searched for scientific information were endodontic (49.7%), oral and maxillofacial surgery (42.6%), and restorative dentistry (34.1%), respectively (Table 2). Less than 20% of dental students reported searching for information in non-clinical dental fields.

Personal lecture notes were the most frequently used source of information in the university 67.6% and at home 61.5% (Table 3). Dental students also frequently asked their fellow dental students (64.8%) as a

second source of information when working in the university. Using CDR (compact dental references) books were also common among dental students in the university 45.3% and at home 39.1%.

The question “How often do you search for dental scientific information in the Internet?” revealed that 60% of the students searched for dental scientific information on weekly basis in the internet and 70 % of them perceived to find information easily. However, Table 3 shows that 20% of dental students searched scientific information in Medline, 10% in international journals websites, and about 6% in national journals’ websites.

Figure 1 shows frequency of students’ information retrieval skills based on weekly use of at least one information source in each category of EB information sources (Cochrane, PubMed/Medline, scientific journal websites), textbooks (national and other text books, and CDR books), and invalid information sources (personal lecture notes, fellow dental students, advertisements brochures) in the University and at home. Students who used at least one evidence-based information source weekly possessed better information retrieval skills than those who used at least one text book or one invalid information source.

## Discussion

The most common sources used by the graduating students to obtain scientific information were; personal lecture notes, fellow students and CDR (Compact Dentistry References) books. About half of the students had good basic knowledge of EBD. A minority of the students referred to valid scientific websites or journal websites to obtain information. Dental students who sensed to possess weaker information retrieval skills showed lower EBD scores and used invalid information sources more frequently.

Taking care of the patient’s oral health and providing the best available treatment is the responsibility of dentists and dental students [11]. Dentists and dental students make clinical decisions daily and in these decisions, they should combine the best scientific evidence available to improve the chances of providing a successful patient care [1].

However, contrary to EB oral health care approach the graduating dental students in the present study preferred to use sources which were easily available, summarized, and easy to read such as personal lecture notes, fellow students and CDR books, but not the evidence-based scientific information. These sources are useful for students at the time of their education and for their exams, however, after graduation these sources have several limitations for appropriate decision making and treatment planning; these sources may not be accurately evidence-based, not updated, and may be based on personal experience or expert opinion.

Similarly, colleagues, the commercial health gate portal for dental practitioners, and personal lecture notes were the most frequently used sources of information among last year dental students at Universities in Finland [2]. Unfortunately, this might be the case among dental instructors too. Iranian faculty members also preferred original textbooks and colleagues when seeking scientific information

and rarely used Cochrane library [12]. Dental practitioners also rely more on their own judgment or their colleagues' consultations in their clinical decisions instead of evidence-based databases [13–16].

To overcome uncertainty and variation in clinical decision making, dental students and clinicians should use EB health care method [1]. Firstly, they must know how to articulate answerable questions using problem (P), intervention or exposure (I/E), comparison (C), and outcome (O) method [17]. Secondly, they must know how to search for the best evidence in different electronic databases efficiently. Finally, once the best evidence has been identified, they should know how to critically appraise the evidence [18].

In this study, nearly half of dental students had poor or moderate knowledge of EBD. This finding is in accordance with the results of previous studies among dental students in Tehran [10], Mashhad [7], and dental residents in Kerman [8], illustrated that most Iranian dental students have insufficient basic understanding and knowledge about EBD, however, they do have positive attitude and believe that using EBD is helpful for patient care.

In the present study dental students of Mashhad dental school showed higher EBD scores than dental students of Babol dental school. Although these schools follow the same educational curriculum, there are some notable differences in terms of their educational and research profiles that might explain this finding. However the mean EBD knowledge for both student groups was lower than the good level.

In the same way, previous studies have highlighted that dental and medical students are unfamiliar with EBD or Evidence-Based Medicine and a small minority of them rated their EB related skills as advanced [2–5]. These results indicate that topics such as EBD, critical appraisal of different treatment methods and the important recent scientific information have not been sufficiently enough included in dental curriculums or not implemented adequately [2, 11]. Over the past two decades several valid scientific databases and associations such as Cochrane Oral Health Group, International Association of Dental Research, and Evidence-based Dentistry Network have been developed to assist clinicians in best decision making of oral health care procedures [1].

In Iran, internet has become more accessible and easier to use during the recent years, thus scientific information retrieval and finding of answers are faster and possible among Iranian students and dentists. Also, medical faculties and the Ministry of Health annually invest to provide useful scientific and valid international data bases for students despite their financial limitations. Even though only a smaller proportion of dental students in the present study used Medline or websites of scientific journals to search scientific information, more used those at home compared to the university.

In addition to our students' lack of fluency in English to search scientific information in international websites, students are mostly busy with clinical practice in the universities, and they are not required to search this information in scientific journals or Medline. Furthermore, this clinical approach in treatment and education disclosed why the least common specialty fields students searched for scientific information were non-clinical fields such as oral pathology and dental public health.

In the present study, two-thirds of the students used internet to search and obtain scientific information, however most of them used invalid websites for information retrieval. Our findings revealed that students who used at least one invalid information source (personal lecture notes, fellow dental students, advertisements brochures) possessed weaker information retrieval skills. In addition, the students with weaker information retrieval skills revealed lower EBD knowledge scores. These findings highlighted the importance and responsibility of dental curriculum planning in improving the students' information retrieval skills as well as their knowledge, attitude, and practice of EBD.

Theoretical education in the field should start in the first years of study and continue to practical courses in later years of study so that the students learn to apply EBD practically in their decision making. In line, medical students who received EBM training and senior students who participated in research activities revealed higher EBM-related knowledge [3]. These findings highlight the importance of adapting health sciences educational curricula with evidence-based concept [1, 3, 19].

## **Conclusions:**

The dental students used personal lecture notes, fellow students and CDR (Compact Dentistry References) books frequently in the university and at home for obtaining scientific information. About half of the dental students had good basic knowledge of EBD. Those students with better information retrieval skill showed higher EBD knowledge score and used evidence-based information sources more frequently. Therefore, more efforts should be put to basic skill of information retrieval and EBD in Iranian dental curricula while, future researches need to find evidence-based practice barriers as well as its solution methods in dental curricula.

## **Abbreviations:**

EBD: Evidence-based dentistry, EB: Evidence-based, PICO: Patient-Intervention-Comparison-Outcome, CDR: Compact Dentistry References

## **Declarations:**

### **Acknowledgment**

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### **Author contributions**

MMNS designed the study, collected the data, and drafted the manuscript. MMNS analyzed and interpreted the data. MMNS validated the questionnaire. JIV conceptualized the questionnaire and the study, and critically revised the manuscript. AK collected the data, validated the questionnaire, and revised the draft.

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## Availability of data and materials

The datasets supporting the findings of this article are available from the corresponding author, MM Naghibi Sitani, upon reasonable request.

## Ethics approval and consent to participate

The Ethics Committee of Babol University of Medical Sciences approved the study (nr. IR.MUBABOL.HRI.REC.1398.271) and confirmed that all methods were performed in accordance with the relevant guidelines and regulations. Participants received information about objectives of the study and signed a written consent before take part to the study.

## Consent for publication

Not applicable.

## Competing interests

The authors declare that they have no competing interests.

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## Tables:

Table 1

Mean EBD knowledge scores (SD) among the Iranian dental students by gender, dental faculty, and subjective evaluation of their own information retrieval skills (n = 179)

	N (%)	Mean EBD knowledge (SD)	P
<b>Gender</b>			
Male	63 (35.2)	7.11 (2.7)	
Female	116 (64.8)	7.21 (2.6)	0.8*
<b>Dental faculty</b>			
Babol	52 (30)	6.40 (2.2)	
Mashhad	127 (70)	7.50 (2.7)	0.01*
<b>Information retrieval skills</b>			
Good	34 (19)	7.91 (2.5)	
Fair	122 (68.2)	7.22 (2.6)	
Poor	23 (12.8)	5.87 (2.5)	0.01**
* By T-test			
** By ANOVA			

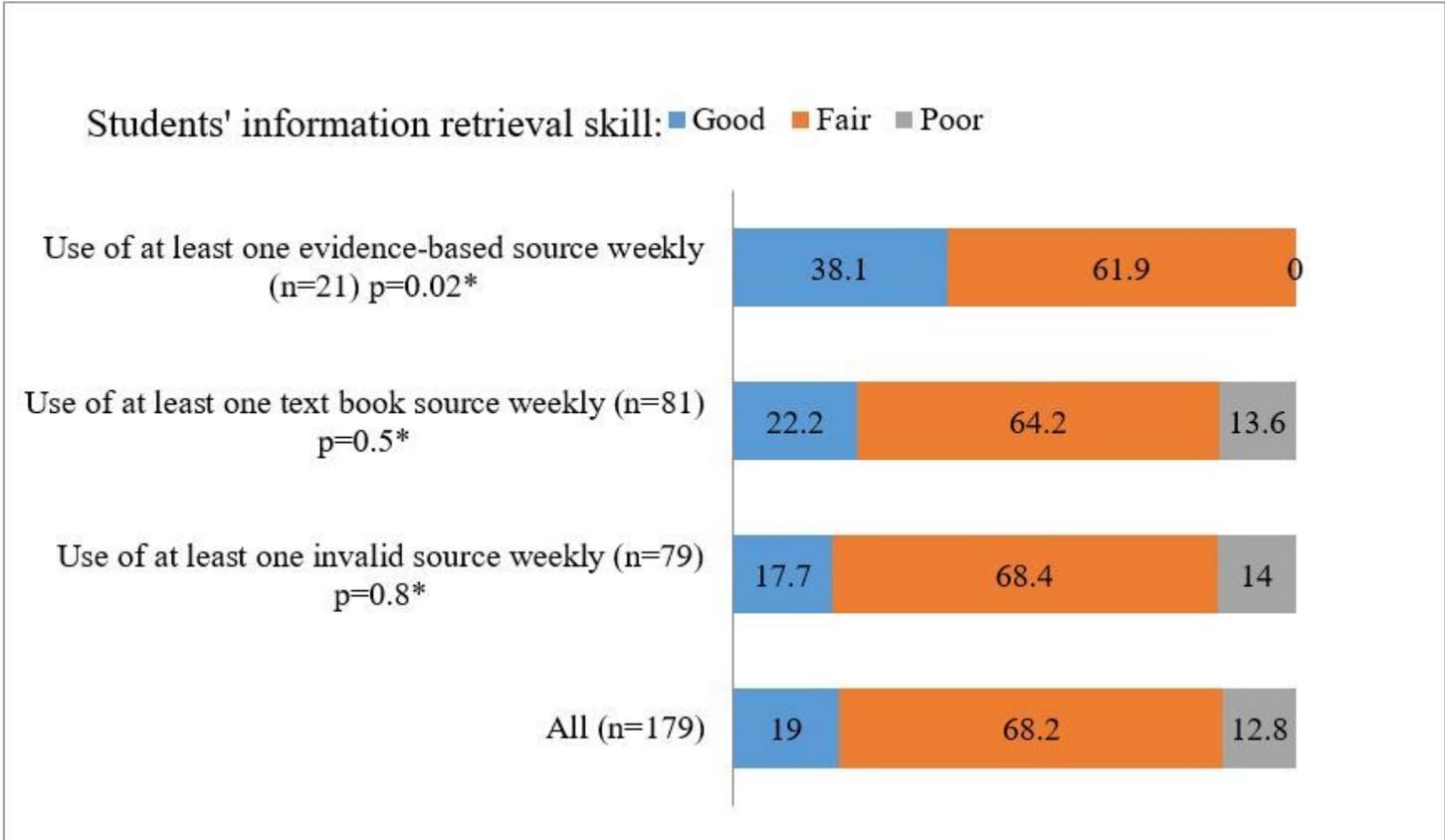
Table 2  
 Percentage of Iranian dental students (n = 179)  
 searching the most frequent dental specialties  
 for scientific information

<b>Search information fields</b>		
	<b>%</b>	<b>Rank</b>
<b>Endodontics</b>	49.7	1
<b>Oral &amp; maxillofacial surgery</b>	42.6	2
<b>Restorative dentistry</b>	34.1	3
<b>Orthodontics</b>	28.5	4
<b>Prosthodontics</b>	22.3	5
<b>Paediatric dentistry</b>	20.1	6
<b>Periodontics</b>	19.6	7
<b>Oral medicine</b>	19.6	7
<b>Radiology</b>	16.8	8
<b>Oral pathology</b>	10.6	9
<b>Dental public health</b>	5	10

Table 3  
Iranian dental students (n = 179) use of information sources at least weekly in the University and at home

	University		Home	
	%	Rank	%	Rank
Personal lecture notes	67.6	1	61.5	1
Fellow dental students	64.8	2	32.4	3
CDR*books	45.3	3	39.1	2
Other Text books	35.2	4	32.4	3
National Text Books	23.5	5	21.8	5
Medline/Pubmed article database	20.1	6	23.5	4
Website of international dental journals	10.1	7	19.6	6
Advertisement Brochures	8.4	8	7.3	8
Website of national dental journals	6.1	9	7.8	7
Other sources	6.1	9	7.3	8
Cochrane library	1.1	10	3.4	9
*Compact Dentistry References				

## Figures



**Figure 1**

Percentage distribution of the dental students' information retrieval skills based on weekly use of at least one information source in each category of evidence-based sources (Cochrane, PubMed/Medline, scientific journal websites), textbooks (national and other text books, and CDR books), and invalid sources (personal lecture notes, fellow dental students, advertisements brochures) in the University and at home (n=179) \* By Chi-square test