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Knowledge and Attitude of Iranian Dental Students and Specialists about Obstructive Sleep Apnea

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Objective Obstructive sleep apnea (OSA) is a relatively common sleep disorder, which leads to multiple sleep arousals and hypoxemia. We aimed to assess the knowledge and attitude of students and faculty members of Shahid Beheshti Dental School, Tehran, Iran about OSA.
Methods We conducted a cross-sectional study on undergraduate and postgraduate students and faculty members of oral and maxillofacial (OMF) surgery, orthodontics, and oral medicine departments of Shahid Beheshti Dental School. The Obstructive Sleep Apnea Knowledge and Attitude (OSAKA) questionnaire was used to obtain information. We used the Chi-square, Kruskal Wallis, and Mann-Whitney U tests for statistical analysis. The data were analyzed by SPSS 22.0 (α <0.05).
Results One hundred ninety-seven participants, including 43 dental students, 68 postgraduate students, and 64 faculty members filled out the questionnaire. The mean knowledge score among all participants was 10.69±3.133. Overall, OMF medicine and OMF surgery faculty members had significantly higher correct answer choices in the knowledge section than fifth and sixth-year dental students (P<0.001). There was no significant difference among other groups (P>0.05). About attitude, 91% of respondents reported that OSA is an important or extremely important disorder. However, only 10.2% and 16.9% felt confident about the ability to manage patients with OSA and identifying patients at risk of OSA, respectively. Overall, gender and educational level were correlated with the mean attitude score (P<0.05).
Conclusion All participants had poor knowledge but a positive attitude towards OSA. This shows the necessity of better education about OSA.
Keywords Sleep Apnea; Obstructive; Knowledge; Attitude; Dentistry

Introduction

Obstructive sleep apnea (OSA) is a relatively common sleep disorder affecting 17% to 22% of the population.[1] It is characterized by multiple airway obstruction episodes during sleep that lead to various arousals and hypoxemia.[2] OSA is associated with hypertension, traffic accidents, and decreased quality of life.[3] Besides, it has a significant economic impact on the society because of daytime sleepiness and work disability.[4] Notably, studies have shown that the risk of all-cause mortality increases in patients with moderate to severe sleep apnea.[2, 5] Five percent of the Iranians were deemed high risk based on the Berlin questionnaire criteria.[6] However, it is considered to be an underdiagnosed disease since identifying the patients is a challenge in public health.[7]

Dentists can be the first line of detecting and managing many diseases. Owing to frequent contact with people and the availability of simple questionnaire-based screening tools, dentists can play a significant role in screening of OSA patients and referring them to sleep specialists.[8] In addition, they may be involved in the treatment plan. The gold standard treatment for apnea is continuous positive airway pressure (CPAP).[9] However, it may have side effects and discomfort, and it may not be well tolerated. Dentists can contribute by preparing a mandibular advancement device for CPAP-noncompliant patients.[10] Moreover, a variety of oral surgeries, including uvulopalatepharyngoplasty, hyoid advancement, and mandibular advancement can be performed by the maxillofacial surgeons on eligible patients.[11]

Despite the importance of their role, dentists are reluctant to get involved in managing apnea patients probably because of fear of malpractice.[8] There is lack of adequate training in dental schools in both pre-doctoral and post-doctoral curricula.[12] The mean total pre-doctoral sleep curriculum time is 2.96 h in 49 dental schools in the United States[13] and 1.2 h in certain middle eastern countries.[14] There is no specific training in this regard in pre-doctoral and post-doctoral curricula in Iran, and it is only briefly explained.

Therefore, we aimed to assess the knowledge and attitude of undergraduate dental students and postgraduate students of orthodontics, oral and maxillofacial (OMF) surgery and OMF medicine as well as the faculty members of Shahid Beheshti Dental School about OSA to provide an overview in this respect.

Methods and Materials

We assessed Shahid Beheshti Dental School (Tehran, Iran) undergraduate and postgraduate students, and the attending faculty members of oral medicine, OMS, and orthodontics departments in April 2016. We used extra online forms to achieve the desirable sample size for postgraduate students

and the attending faculty members. We chose these specific departments because the faculty members and postgraduate students attending these departments may come into contact with OSA patients more than other departments. Also, students attending these departments have completed the basic science courses and are in their fifth or sixth year of dental education. The questions were selected from the Obstructive Sleep Apnea Knowledge and Attitude (OSAKA) questionnaire[15] which was designed and validated in the United States to measure the physicians' knowledge and attitude towards sleep apnea. To obtain the Persian version of the OSAKA questionnaire, we used the cross-cultural translation method. In brief, two authors translated the OSAKA questionnaire into Persian separately. A review committee consisting of orthodontists and English language experts evaluated these two versions and chose one as the provisional version. Then, two bilingual investigators back-translated this version to English. Neither of them had access to the original version of the questionnaire. A committee compared these versions with the original version and assessed its equivalency and consistency to produce a pre-final version. We distributed the questionnaires among 25 respondents and then interviewed them to determine the questionnaire's clarity and accessibility. The final version of the Persian translation was validated by the committee based on the assessment given by these 25 people.

The questionnaire consisted of two main sections of knowledge and attitude. The knowledge section had 18 questions with "true", "false", and "I do not know" choices and covered subjects including epidemiology, pathophysiology, symptoms, diagnosis, and treatment of OSA. "I do not know" answer was considered as false. The attitude section had five questions. The first two questions were about the OSA's importance in a five-point Likert scale from "not important" to "extremely important". The next three attitude questions were about the confidence of identifying and managing OSA patients in five-point Likert scale from "strongly disagree" to "strongly agree".

The researchers distributed the printed questionnaires among the targeted group in the dental school.

The data were analyzed using SPSS 12 (SPSS, Inc., Chicago, IL, USA). We used the Chi-square test to compare correct answers to each question among different educational levels. The total knowledge score was compared with the Kruskal Wallis and Mann-Whitney U tests. Then, the knowledge and attitude scores were compared using the Pearson's correlation coefficient. We used a two-tailed test and considered $\alpha < 0.05$.

Results

Characteristics:

Of 242 administered questionnaires, 177 were returned (response rate: 73.1%). Eighty-nine respondents were female (50.3%) and 88 were male with a mean age of 32.44±9 years (range 21 to 55 years). The majority of respondents were dental postgraduate students (34.5%). Table 1 summarizes the demographic information of the participants. None of the participants, not even OMF surgeons, had any history of apnea training in their subspecialty curriculum.

Table 1- Characteristics of participants

Characteristics	Value
Age (years)	32.44± 9.00
Gender	N (%)
Male	88 (49.7)
Female	89 (50.3)
Academic level	N (%)
Dental students	43 (24.3)
Postgraduate students	68 (38.4)
Oral and maxillofacial surgeons	22 (12.4)
Orthodontists	22 (12.4)
Oral and maxillofacial medicine specialists	24 (13.6)
Faculty members	66 (37.3)
Oral and maxillofacial surgeons	22 (12.4)
Orthodontists	21 (11.9)
Oral and maxillofacial medicine specialists	23 (13)

Knowledge:

The mean knowledge score of all participants was 10.69±3.133, ranging from 8.43 ±3.55 for fifth-year dental students to 12.39±1.75 for OMF medicine professors. Overall, the faculty members obtained a higher mean score than students. The internal consistency of the items in the knowledge domain was high, with a Cronbach alpha of 0.64. The detailed information about the knowledge questions is illustrated in Table 2.

Table 2- Knowledge questions by each type of respondents

N	OSAKA question	Total %	Dental Students		Residents			Professors			P-value
			Fifth year (n=21)	Sixth year (n=22)	Oral and maxillofacial surgeons (n=22)	Orthodontists (n=22)	Oral and maxillofacial medicine specialists (n=24)	Oral and maxillofacial surgeons (n=22)	Orthodontists (n=21)	Oral and maxillofacial medicine specialists (n=23)	
1	Women with OSA may present with fatigue alone	52	33.3	27.3	54.5	72.7	50.0	54.5	42.9	78.3	0.007
2	Uvulopalatopharyn goplasty is curative for the majority of patients with OSA	61	38.1	54.5	72.7	68.2	45.8	86.4	57.1	65.2	0.032
3	The estimated prevalence of OSA among adults is between 2% to10%	26.0	9.5	36.4	27.3	13.6	33.3	31.8	33.3	21.7	0.34

4	The majority of patients with OSA snore	79.7	81	81.8	72.7	81.8	79.2	68.2	90.5	82.6	0.646
5	OSA is associated with hypertension	49.7	61.9	31.8	63.6	77.3	54.2	59.1	52.4	60.9	0.133
6	An overnight sleep study is the gold standard for diagnosing OSA	76.3	71.4	77.3	72.7	77.3	66.7	95.5	81	69.6	0.432
7	CPAP therapy may cause nasal congestion	35	9.5	9.1	27.3	13.6	50	72.7	14.3	78.3	<0.001
8	Laser-assisted uvuloplasty is an appropriate treatment for severe OSA	45.8	42.9	27.3	45.5	45.5	58.3	54.5	47.6	43.5	0.612
9	The loss of upper airway muscle tone during sleep contributes to OSA	74.0	76.2	72.7	77.3	54.5	58.3	86.4	71.4	95.7	0.036
10	The most common cause of OSA in children is the presence of large tonsils and adenoids	77.4	66.7	72.7	90.9	95.5	70.8	86.4	61.9	73.9	0.08
11	A craniofacial and oropharyngeal examination is useful in the assessment of patients with suspected OSA	81.4	71.4	68.2	81.8	77.3	75	90.9	90.5	95.7	0.170
12	Alcohol at bedtime improves OSA	74	61.9	63.6	86.4	72.7	70.8	77.3	90.5	69.6	0.329
13	Untreated OSA is associated with a higher incidence of motor-vehicle accidents	59.9	33.3	40.9	59.1	68.2	75.0	68.2	57.1	73.9	0.037
14	In men, a collar size 17 inches or greater is associated with OSA	47.5	57.1	45.5	40.9	40.9	66.7	31.8	38.1	56.5	0.268
15	OSA is more common in women than men	31.1	4.8	36.4	27.3	27.3	37.5	27.3	42.9	43.5	0.139
16	CPAP is the first therapy for severe OSA	62.7	47.6	40.9	45.5	68.2	62.5	77.3	66.7	91.3	0.006
17	Less than 5 apneas or hypopneas per hour are normal in adults	54.2	33.3	36.4	50	68.2	62.5	63.6	61.9	56.5	0.167
18	Cardiac arrhythmias may be associated with untreated OSA	75.7	57.1	72.7	63.6	77.3	66.7	95.5	90.5	82.6	0.04
Mean total knowledge score		10.69 ± 3.13	8.43 ± 3.55	8.91 ± 3.27	10.64 ± 2.53	11 ± 3	10.83 ± 1.88	12.27 ± 2.99	10.9 ± 3.76	12.39 ± 1.75	<0.001

More than two-thirds of the respondents did not correctly answer the questions about the prevalence of OSA and whether OSA is more common in women than men (the highest frequency of correct answers was noted in dental students in the sixth year followed by OMF medicine faculty members). Less than 10% of dental students correctly answered the questions about whether CPAP therapy causes nasal congestion.

About 80% of respondents correctly answered the question about snoring in patients with OSA and the usefulness of a craniofacial and oropharyngeal examination (with the highest mean correct answer frequency of 90.5% and 95.7% among orthodontic faculty members and OMF medicine faculty members, respectively).

Seven knowledge items significantly differed among the respondents, which were questions 1, 2, 7, 9, 13, 16, and 18. Of these items, question 7 "whether CPAP therapy may cause nasal congestion" had the most significant difference (P<0.001). In this item, the mean correct answer frequency of OMF medicine faculty members was significantly higher than that of all other respondents (P<0.001). Overall, OMF medicine faculty members and OMF surgery faculty members had significantly higher correct answer frequency than fifth and sixth-year dental students (P<0.001).

Attitude:

Ninety-one percent of the respondents reported that OSA is an important or extremely important disorder, and 88.7% believed that identifying patients with possible OSA is important or extremely important. In questions about confidence, only 10.2% and 16.9% felt confident about the ability to manage patients with OSA and identifying patients at risk of OSA, respectively; whereas, 34.5% of the

respondents felt confident in their ability to manage patients with CPAP therapy.

Correlations:

There was a correlation between gender and all attitude questions (except for the question about the importance of OSA as a clinical disorder) and the mean attitude score. The educational level was correlated with the mean attitude score ($P<0.05$); while, it was not correlated with the mean knowledge score. The correlations between all attitude items, mean attitude score, and mean knowledge score were significant (Table 3).

Table 3- Correlations between attitude items

	1	2	3	4	5	Total attitude score	Total knowledge score
1	1.000						
2	0.603**	1.000					
3	0.328**	0.398**	1.000				
4	0.201*	0.346**	0.691**	1.000			
5	0.204*	0.320**	0.537**	0.605**	1.000		
Total attitude score	0.650**	0.728**	0.790**	0.744**	0.684**	1.000	
Total knowledge score	0.359**	0.277**	0.392**	0.474**	0.411**	0.471**	1.000

Discussion

OSA is highly underdiagnosed, causing several health problems.[7, 16] Despite noticeable prevalence shown in numerous studies in Iran, this disorder still remains under-recognized by different specialties, among them dentists.[6, 17] As dental professionals are determined to treat patients comprehensively, they ought to be concerned about OSA, with high blood pressure, depression, impaired quality of life, and increased mortality among its consequences.[18] Moreover, certain associated risk factors like edentulism and possible treatments such as mandibular advancement are directly linked to a dental practice; thus the clinical relevance of OSA.[19, 20] While no studies checked out the frequency of dentists' involvement in diagnosing OSA, the available data suggest that referral and management of these patients are poor. Therefore, in this study, we sought to evaluate the knowledge and attitude of Iranian dental students, postgraduate students, and attendees towards OSA to reveal the possible reasons behind its underdiagnosis.

The obtained results showed that the mean total knowledge score was not optimal. Our results fell below those of the study by Talaat et al, that evaluated fifth-year dental students' knowledge about sleep medicine in the second Sharjah International Dental Student Conference in April 2014. Nearly 29% of the respondents scored high; whereas 70.8% scored low in the knowledge about sleep-related breathing disorders.[14] In another study, 40% of the participants, who were general dentists in the United States, reported that they knew little or nothing about oral appliance therapy for OSA patients.[12] In another study in Finland, Vuorjoki-Ranta et al. argued that the risk factors, signs and symptoms, and consequences of OSA were overall well-recognized by dental professionals regardless of their years of practice. For instance, 41.8% of the participants, including general practitioners and specialists identified hypertension as a consequence of OSA by choosing "totally agree", while in our study, 49.7% admitted there was a correlation.[21] However, the results cannot be compared because of the different designs of the used questionnaires. Similar to the first OSAKA survey, no correlation between gender and knowledge was found in this study.[15] The respondents scored minimum on epidemiological questions such as the prevalence of OSA or its gender predilection. However, nearly 80% of them considered a craniofacial and oropharyngeal examination to be useful in assessing patients suspected for OSA. Although a trend of increased knowledge was observed with increased years of education, no significant difference was observed except that OMF medicine faculty members and OMF surgery faculty members had significantly higher correct answer frequency than fifth and sixth-year dental students.

Despite an insufficient level of knowledge, 91% of the respondents reported that OSA is an important or extremely important disorder. The majority considered that identifying patients with possible OSA is important or extremely important. This finding is of particular importance as it can be concluded that dentists are willing to intervene in OSA patients' management if they are given the required training. It has been argued that the reluctance of dental professionals to get involved in the diagnosis and treatment of OSA patients may well be attributed to their low level of confidence.[22] Only about a quarter of participants felt confident about their ability to manage patients with OSA and identifying patients at risk of OSA, according to our results. A significant correlation was also observed between all attitude items, mean attitude score, and mean knowledge score. In other words, the more dentists realize the condition and its risk factors and consequences, the more willing they are to help. This finding is supported by many similar surveys using the questionnaire.[15, 22-24] Despite knowledge, gender affected the mean attitude score with women comprising 50.3% of the participants scoring significantly higher. Although clinicians with different educational levels had similar knowledge scores about OSA, they differed in their attitude score significantly. A recent study by Calero et al, also found a similar elevation

of attitude among practicing physicians compared with graduate students.[25]

The low level of knowledge regarding OSA as demonstrated in this study is alarming especially considering the complications of OSA. Due to an increase in the associated risk factors such as obesity, training of dentists who will appropriately identify OSA patients and actively participate in their referral or treatment should be emphasized.[26] The average educational time of sleep medicine in the United States dental schools is reportedly 3.92 h for pre-doctoral dental program and 1.55 h for dental hygienist program.[13, 27] Similarly, Japanese pre-doctoral dental curriculum consists of 3.8 h of training on sleep medicine.[28] A lower educational time is dedicated to the topic in the middle east dental schools, averaging about 1.2 h.[14] This unsatisfying instruction time drops to null in dental curricula of the Iranian dental schools' undergraduate and graduate programs, although there is not yet a national survey conducted in this respect. The under-representation of the importance of sleep medicine and OSA is a plausible reason for this insufficient emphasis of the curricula on the topic. Our study sheds light on the lack of knowledge of dental graduates and the importance of integrating sleep medicine into the dental curricula. Studies have explored various interventions to enhance the dentists' knowledge and encourage them to treat OSA patients. For example, Tsuiki et al. proposed an oral appliance therapy as an educational activity at the University of British Columbia.[29] Simultaneously, Yamamoto et al. designed a novel seminar consisting of a 60-min didactic lecture and a 2-h instructional practical training for postgraduate student education at the Nagasaki University.[30] Another suggestion is to update the medical history form to consist of items useful for screening of sleep disorders by dental students to help identify OSA patients.[31] There should be courses available for dental graduates to continue education on sleep medicine and OSA, as suggested by the Canadian dental sleep medicine professionals.[32] The authors also suggest the inclusion of information on OSA in the national dental textbooks. Teodorescu et al. found that sleep medicine coverage in medical textbooks was less than 2% and had not increased since the 1990s.[33] A similar study on dental textbooks is also recommended.

Conclusion

In conclusion, senior dental students, postgraduate students and the faculty members of OMF medicine, OMF surgery, and orthodontics departments showed poor knowledge but a positive attitude towards OSA. This finding points to the need for better education in sleep medicine in the Iranian dental schools. With a response rate of 81.4%, this study conducted in one of the most prominent dental schools in Iran could help clarify the overall condition. However, the results obtained here cannot be generalized and should better be verified by other studies. Further studies should also focus on evaluating the knowledge of different dental professionals involved in treating of OSA patients, looking at specific interventions to improve knowledge.

Conflict of Interest

No Conflict of Interest Declared■

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