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Knowledge and Attitudes About Obstructive Sleep Apnea Among Dental Students: A Cross-Sectional Study

Diş Hekimliği Öğrencileri Arasında Obstrüktif Uyku Apnesi Hakkında Bilgi ve Tutum: Kesitsel Bir Çalışma

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ABSTRACT

Objective: Dental sleep medicine is an increasingly recognized medical specialty, but obstructive sleep apnea (OSA) frequently progresses undetected. Dentists are often the first health-care professionals to assess signs and symptoms of OSA and therefore have a key role in OSA diagnosis. The purpose of the study was to assess the knowledge and attitudes about OSA among dental students.
Methods: The OSA knowledge and attitude questionnaire was completed by dental students between April 2023 and June 2023. The questionnaire includes 18 knowledge and 5 attitude items on OSA. Chi-square tests and Student's t-tests were used to compare the differences between individual items and mean scores of the participants. Differences were considered significant at $P < .05$.
Results: A total of 351 dental students participated in the study. The total knowledge scores of the students were poor with a mean knowledge score for all students of 51% (9.18 ± 2.89). While 67.6% of participants considered OSA to be of clinical importance, only 18.2% were confident in their ability to manage OSA.
Conclusion: There are some deficiencies in the OSA education provided to dental students. Additional courses on dental sleep medicine are needed, and relevant updates should be made to the dentistry curriculum.
Keywords: Knowledge, attitude, dental education, dental student, obstructive sleep apnea

ÖZ

Amaç: Dental uyku tıbbı, pek tanınmayan bir tıbbi uzmanlık alanıdır ve obstrüktif uyku apnesi (OUA) genellikle fark edilmeden ilerleyebilir. Diş hekimleri hastanın tıbbı öyküsünü ilk alan ve OUA'nın teşhisinde kritik role sahiptirler. Bu çalışmanın amacı, diş hekimliği öğrencilerinin obstrüktif uyku apnesi ile ilgili bilgi ve tutumlarını değerlendirmektir.
Yöntemler: Bu çalışma Ocak-Nisan 2023 tarih aralığında planlanmıştır. Katılımcıların bilgi ve tutum seviyelerinin değerlendirilmesi için OSA bilgi ve tutum (OSAKA) anketi kullanılmıştır. Katılımcıların bireysel maddeler ve ortalama puanları arasındaki farkları karşılaştırmak için sırasıyla Ki-Kare testi ve bağımsız örneklemler Student t-testi kullanıldı. İstatistiksel anlamlılık düzeyi $P <,05$ olarak kabul edilmiştir.
Bulgular: Araştırmaya toplam 351 diş hekimliği öğrencisi katılmıştır. Öğrencilerin toplam bilgi puanı her iki grupta da zayıf olup tüm öğrencilerin ortalama bilgi puanı (9,18 ± 2,89) olarak gözlenmiştir. Ankete katılanların çoğu, OSA hakkında güçlü olumlu tutumlar gösterdi. Ancak çoğunun OUA hastalarının yönetiminde kendilerine güvenleri düşük bulunmuştur.
Sonuç: Diş hekimliği öğrencilerinin eğitim sürecinde obstrüktif uyku apnesi ile ilgili bilgi ve tutumuna ilişkin bazı eksiklikler bulunmaktadır. Bu sebeple diş hekimliği eğitimine uyku diş hekimliği ile ilgili ek dersler konulmalı ve eğitim müfredatında güncellemeler yapılmalıdır.
Anahtar Kelimeler: Bilgi, tutum, diş hekimliği eğitimi, diş hekimliği öğrencisi, obstrüktif uyku apnesi

INTRODUCTION

Sleep disorders are a public health problem that has been noticed in recent years that causes serious problems in the short and long term. Obstructive sleep apnea syndrome (OSAS) is a very widespread cause of sleep disorders and is the most common type of sleep breathing disorders.[1] Obstructive sleep apnea (OSA) is a medical condition which frequent respiratory pauses due to sleep-related muscle tone changes leading to partial or complete upper airway collapse. The prevalence of obstructive sleep apnea has been reported to be approximately 15% in the general population.[2] It has been reported that women are less affected than men and the prevalence varies among 0.5%-9% and 1%-24%, respectively. OSA is not only related with daytime sleepiness and poor quality of life. [2,3] It has been found to be associated with 7% of motor vehicle accidents in individuals with untreated OSA.[4]

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The diagnosis of OSA is made by the presence of a total of 5 apneas and hypopneas per hour, accompanied by daytime sleepiness, sleep sighs, sleep interruptions, daytime fatigue, and concentration disorders.[5] Common risk factors for the development of OSA are considered to be obesity, male gender, old age, hormonal changes in menopause, increased fluid retention, presence of adenotonsillar hypertrophy and smoking.[6] Also hypertension has been found to be related with OSA. Various cardiovascular disorders and diabetes mellitus have been stated to can be associated with OSA, although it is not clear.[6] In a meta-analysis, the prevalence of OSAS ranged from 9-38%, and it was stated that this condition increased with age and was more common in male gender and obese.[7] In a previous study, the prevalence of OSA in Turkey was found to be among 0.9-1.9%.[8]

Dental sleep medicine is can be identifed as a branch of dentistry that deals with the study of the oral and maxillofacial reasons and results of sleep-related disorders, including sleep-related breathing disorders such as OSA.[9] Physicians working in this topic must have very specialized medical knowledge. Particularly, there are some OSA related findings such as high arched or narrow hard palate, maxillo-mandibular relationships, enlarged or elongated uvula, tonsil hypertrophy, and lateral peritonsillar narrowing that general dental practitioners can observe during routine intraoral examination.[10] In addition, sleep bruxism (SB), a behavior often suspected and reported to share widespread clinical features with OSA, may also occur in OSA patients.[11] Furthermore, it is also quite common to have OSA and craniofacial pain together.[12] Due to the insufficient information about sleep medicine in the dentistry curriculum, sometimes treatment can be planned incorrectly, and the situations in which OSA patients should be referred for further investigation may be overlooked.

The gold standard in the diagnosis of obstructive sleep apnea is nocturnal polysomnography (PSG) in the sleep laboratory. However, several alternative portable diagnostic devices have also been developed, which have various advantages such as shorter waiting time and lower price.[13,14]

The first treatment option and the gold standard method in the treatment of OSA is the continuous positive airway pressure (CPAP).[15] The use of the CPAP device is difficult for the patients, their compliance with the treatment is generally not very good. Mandibular advancement device (MAD) is a type of oral appliance used as an alternative treatment to CPAP in the treatment of OSA.[16] Studies have reported that these appliances increase oxygenation during the night and improve the negative health and social results of OSA and snoring.[16,17] Mandibular advancement devices are generally recommended for use in patients with mild or moderate OSA and snoring, as well as in patients who are not compliant with CPAP use.[17] Therefore, dentists have a critical role in the treatment of OSA patients by using intraoral appliances.

The most important part of the dental clinical routine is to record the medical history patients before deciding the treatment on the examination. At this point, with a well-done clinical examination, many systemic conditions can be diagnosed and necessary referrals can be made.[18] Thus, dentists have a critical role in the diagnosis and diagnostic procedures of OSA, referral for advanced surgical procedures, and treatment with mandibular advancement devices.[19]

Hence, the aim of this study was to investigate the knowledge and attitudes about obstructive sleep apnea among dental students and thus to identify the need for revision of the dental educational curriculum on this subject.

METHODS

This study was designed as a cross-sectional study between April 2023 and June 2023 and it was conducted in accordance with the Principles of the Declaration of Helsinki and was approved by the Human Research of Ethics Commitees of Istinye University (Date: 12.04.2023; Protocol Number: 22-118) A total of 351 dentistry students 53,3% female and 46,7% male, were included in the study and an informed consent form was obtained from all of them. All of the participants met all of the inclusion criteria: being a dentistry student in 4th and 5th year, being between the ages of 18-30, volunteering to participate in the study, and answering the questions completely. A questionnaire form was created as a result of the literature review, including demographic characteristics such as age, gender, class of education, presence of chronic disease, and having OSAS in the family. Moreover, The Obstructive Sleep Apnea Knowledge Attitude (OSAKA) questionnaire developed by Schotland and Jeffe[20)] was used to evaluate OSAS knowledge and attitude. The OSAKA questionnaire is 23-item questionnaire that takes less than 10 minutes to be complete and consists of 18 knowledge assessment and 5 attitude assessment questions. Knowledge questions of OSAKA consist of true-false format and “do not know” option was also included as a third-response to minimise the effect of guessing. This option scored as an incorrect response during response rate calculations. Correct options were set as 1 point, and 0 points were given to the incorrect answers and “I don’t know”, which was accepted as an incorrect answer. Therefore, the total score that can be obtained varies between 0 and 18.[20]

The second part is about the OSAS attitude and consists of five items: two items to evaluate the importance of this situation as a clinical disorder and identifying OSAS, and three items assessing self-confidence in the management of OSAS. The answers to the attitude questions were calculated with a five-point Likert scale ranging from 1 to 5. (1=strongly disagree; 2=disagree; 3=neither agree nor disagree; 4=agree; and 5=strongly agree).

Statistical Analysis

Statistics analysis was performed using IBM SPSS Statistics (Version 22.0. Armonk, NY: IBM Corp.) The categorical data were expressed as numbers and percentages. The chi-square test and independent sample t-test were used to compare differences between categorical variables. Pearson correlation analysis was used to examine the relationship between the total knowledge score, total attitude score and each attitude subscale score in OSAKA, ages and years of education of participants. The statistical significance level was considered as $P < .05$.

RESULTS

It was seen that hand-wrist radiographs exhibited sexual A total of 351 dental students participated in the study and the mean age of students was 23.4±1.9 years. 39% (n=137) of the participants were 4th year, 61% (n=214) were 5th year dental students. 5.1% of the students have a systemic disease and the rate of those who use drugs was 4.3%. Additionally, 6.8% of the participants have a family history of obstructive sleep apnea syndrome. Table 1 presented the demographic characteristics of the students.

The total knowledge score of students was calculated and the mean knowledge score of all students was 9.18±2.89. While there was no statistically significant difference between OSAKA knowledge score and gender of dental students, a significant relationship was observed between age, education year, presence of OSAS in the family members

and presence of systemic diseases. The knowledge scores of students aged ≥24 years (9.65±2.57), 5th year dental students (10.20±2.59), systemic disease (11.56±2.50) and patients with a family history of OSAS (11.42±2.45) were higher (*P*<.05). (Table 2).

Table 1. Demographic characteristics of the dental students

		n	%
Gender	Female	187	53.3
	Male	164	46.7
Age	<24 years	209	59.5
	≥24 years	142	40.5
Years of dentistry education	4th year	137	39.0
	5th year	214	61.0
Presence of systemic diseases	No	333	94.9
	Yes	18	5.1
If yes, drug use related to these systemic diseases	No	336	95.7
	Yes	15	4.3
Presence of Obstructive Sleep Apnea Syndrome in the family	No	327	93.2
	Yes	24	6.8

Table 2. The relationship between the demographic characteristics of dental students and the OSAKA questionnaire knowledge items

		Mean	SD	*P*
Gender	Female	9.32	3.08	.330
	Male	9.02	2.68	
Age	<24 years	8.86	3.07	.012*
	≥24 years	9.65	2.57	
Years of dentistry education	4th year	7.59	2.63	.001*
	5th year	10.20	2.59	
Presence of systemic diseases	No	9.05	2.86	.001*
	Yes	11.56	2.50	
If yes, drug use related to these systemic diseases	No	9.03	2.85	.001*
	Yes	12.53	1.73	
Presence of Obstructive Sleep Apnea Syndrome in the family	No	9.02	2.86	.001*
	Yes	11.42	2.45	

The correct answer rates to the knowledge questions of the OSAKA questionnaire were shown in Table 3. None of the questions were answered correctly by all the participants. The question with the highest correct answer rate was the 4th question (The majority of patients with OSA snore) with 88.6% (n=311) and with 81.2% (n=285) the 11th question (A craniofacial and oropharyngeal examination is useful in the assessment of patients suspected with OSA) took the second place. However, the question with the lowest correct answer rate was the 8th question (Laser-assisted uvuloplasty is an appropriate treatment for severe OSA) with 6.6% (n=23) and the second question (Uvulopalatopharyngoplasty is curative for the majority of patients with OSA) with 9.4% (n=33) (Figure 1). 5th year students gave more correct answers to the majority of OSAKA knowledge questions compared to 4th year students and statistical significance was found in these answers (*P*<.05) (Table3).

Two of the attitude questions were associated with awareness of the importance of OSA, and three were associated with self-confidence in identifying and managing OSA. Importance subscale score, confidence subscale score and total attitude scores of the participants were found as 3.95±0.90, 2.68±0.96 and 3.19±0.93, respectively. Overall, 67.6% (n=237) of students considered OSA very important or extremely important as a clinical disorder. Similarly, 64.4% (n=226) considered identifying patients with OSA as very important or extremely important.

A very small proportion of participants (20.8%, n=73) agree or strongly agreed that they were confident in identifying patients with OSA. Only 18.2% agreed or strongly agreed that they were confident in their ability to manage OSA and only 17.1% (n=60) agreed or strongly agreed that they were confident in their ability to manage patients with CPAP therapy.

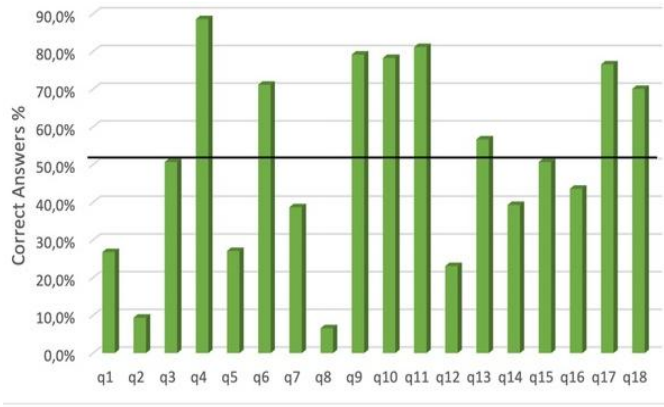

Figure 1. The rates of correct answers of obstructive sleep apnea knowledge and attitude knowledge questions

Table 3. Total and comparative scores of 4th and 5th year dental students knowledge items of OSAKA

Item on the knowledge section of OSAKA questionnaire (correct responses)	% Correct Answers			
	Total	**Years of dentistry education**		***P***
		4th year (n=137)	**5th year (n=214)**	
1. Women with OSA may present with fatigue alone (True)	94 (26.8%)	21 (15.3%)	73 (34.1%)	.001*
2. Uvulopalatopharyngoplasty is curative for the majority of patients with OSA (False)*	33 (9.4%)	4 (2.9%)	29 (13.6%)	.001*
3. The estimated prevalence of OSA amongst adults is between 2% and 10% (True)	178 (50.7%)	49 (35.8%)	129 (60.3%)	.001*
4. The majority of patients with OSA snore (True)*	311 (88.6%)	113 (82.5%)	198 (92.5%)	.004*
5. OSA is associated with hypertension (True)	95 (27.1%)	22 (16.1%)	73 (34.1%)	.001*
6. An overnight sleep study is the gold standard for diagnosing OSA (True)	250 (71.2%)	96 (70.1%)	154 (72.0%)	.703
7. Continuous positive airway pressure (CPAP) therapy may cause nasal congestion (True)	136 (38.7%)	49 (35.8%)	87 (40.7%)	.371
8. Laser-assisted uvuloplasty is an appropriate treatment for severe OSA (False)	23 (6.6%)	8 (5.8%)	15 (7.0%)	.666
9. The loss of upper airway muscle tone during sleep contributes to OSA (True)	278 (79.2%)	106 (77.4%)	172 (80.4%)	.499
10. The most common cause of OSA in children is the presence of large tonsils and adenoids (True)	275 (78.3%)	99 (72.3%)	176 (82.2%)	.027*
11. A craniofacial and oropharyngeal examination is useful in the assessment of patients suspected with OSA (True)	285 (81.2%)	93 (67.9%)	192 (89.7%)	.001*
12. Alcohol at bedtime improves OSA (False)	81 (23.1%)	30 (21.9%)	51 (23.8%)	.675
13. Untreated OSA is associated with a higher incidence of automobile crashes (True)	199 (56.7%)	50 (36.5%)	149 (69.6%)	.001*
14. In men, a collar size of 17 inches of greater is associated with OSA (True)	138 (39.3%)	16 (11.7%)	122 (57.0%)	.001*
15. OSA is more common in women than men (False)	178 (50.7%)	64 (46.7%)	114 (53.3%)	.231
16. CPAP is the first line therapy for severe OSA (True)	153 (43.6%)	31 (22.6%)	122 (57.0%)	.001*
17. Less than five apnoeas or hypopnoeas per hour is normal in adults (True)	269 (76.6%)	110 (80.3%)	159 (74.3%)	.196
18. Cardiac arrythmias may be associated with untreated OSA (True)	246 (70.1%)	79 (57.7%)	167 (78.0%)	.001*

There was a significant correlation between the total knowledge score, total attitude score (r=0.106, *P* <.001) and each attitude subscale score (r=0.382, *P* <.001), (r=0.291, *P* <.001). Moreover, the total knowledge score correlated significantly with the age of the participants (r=0.150, *P* <.001) and year of dentistry education (r=0.439, *P* <.001) (Table 4). The total attitude score correlated significantly with the year of dentistry education (r=0.106, *P* <.001), conversly no correlation was found between age of participants (r=0,083, *P* >.001). Importance subscale score shown no correlation neither age (r=0.005, *P* >.001) or year of dentistry education (r=0.086, *P* >.001). Additionally, while there was a positive relationship between the confidence subscale attitude score of the participants and their age (r=0.106, *P*<.001), no relationship was found between the years of dentistry education (r=0.080, *P* >.001,

Table 4. Pearson correlation coefficients between mean scores of total attitude questions, each attitude subscale, and total knowledge questions on the OSAKA

	a	b	c	d	e	f
Age (a)	1					
Years of dentistry education (b)	.278**	1				
Total knowledge score (c)	.150**	.439**	1			
Importance subscale score (d)	0.005	0.086	.382**	1		
Confidence subscale score (e)	.106*	0.080	.291**	.184**	1	
Total attitude score (f)	0.083	.106*	.421**	.661**	.859**	1

*P<.05, ** P <.001

DISCUSSION

This study represents the first attempt to evaluate the knowledge and attitudes among dental students regarding OSA. Dentists have a critical role in the initial detection and treatment of various clinical conditions. Such as, they are likely to be the first to be contacted to identify potential OSA or other sleep disorders, refer them to appropriate physicians, or treat them with oral appliance.[21] Therefore, dentists' knowledge, attitudes, and collaboration with other physicians regarding OSA and intraoral appliances are essential for managing OSA patients. This study provides data on the basic education of the dentistry, the competencies of future dentists on these issues and the requirements of curricular regulations.

Dental students' knowledge of OSA was limited with an average score of 51% in this study. It was determined that the average of the knowledge scores of the dentistry students in the study was lower than the study averages of Schotland and Jeffe[20] where OSAKA was developed, and the results of the studies that included many different groups (such as doctors, medical students, practitioners or dentists) in the literature.[22-24] This situation can be improved by factors such as increasing the diagnostic opportunities and training hours devoted to sleep medicine in dentistry faculties.

As for results, among dental students, the increased age and years of dental education were significantly associated with higher knowledge about OSA. Conversely no significant relationship between the knowledge scores of dental students and gender was found. There are studies in the literature reporting that there is a relationship between the age of physicians and their level of knowledge but in contrary to this study results older physicians have less knowledge about OSA.[20, 24] The reason for this is thought to be that young dentists receive a more up-to-date education and can access new information more easily by using technology.[24] Obtaining different results from the literature in this study may be due to the different study group. While general dental practitioners and specialist dentists took part in these studies, dental students participated in the present study. Moreover, it can be concluded that although the ages of the students are close to each other and their command of current information and technology is similar, the level of OSA knowledge is higher due to the fact that the 5th years students have more clinical experience.

The knowledge scores of students which presence systemic diseases (11.56±2.50) and patients with a family history of OSAS (11.42±2.45) were higher. Systemic hypertension, cardiovascular problems, type 2 diabetes, metabolic syndrome have been found to be associated with OSA.[6] Since the presence of OSAS in the individual or one of the family members will increase awareness about the subject, the high level of knowledge can be attributed to this.

In the study, the knowledge questions answered most correctly by the dental students were the 4th and 11th questions. These are the items regarding the role of sleep studies and craniofacial and oropharyngeal examination in the diagnosis of OSA, in which snoring is the most common symptom. This correct response rate indicates that dental students have a high level of awareness and knowledge of the diagnosis of OSA and associated symptoms. Conversely, the questions with the lowest knowledge scores of the students were the 2nd and 8th questions, and since these are questions related to the treatment approach and management, it shows that their awareness and knowledge of treatment is insufficient.

In accordance with previous studies, we concluded that the majority of the students had high awareness of the clinical definition of OSA and the importance of recognizing individuals at risk (79%).[24-27] However, it observed that students' self-confidence scores in managing OSA treatment were quite low (53.6%). At this point, educational deficiencies related to dental sleep medicine should also be taken into account in pre- and post-graduate education.[28] Similar to a previous studie, a positive significant correlation was found between knowledge scores and attitude scores in this study.[28] When the relationship between attitude scores and years of education and age was examined, no effect of age on attitude scores was observed, again related to the fact that the age distribution of students is very close to each other. However, it was observed that the average attitude scores increased as the years of education increased. In the education process, both the training received and the increase in the number of cases encountered positively affect the attitudes of the students. Considering all these, dental education and training curriculum should be supported with additional programs related to dental sleep medicine be more comprehensive studies should be carried out.

The limitations of this study are as follows; Firstly, this study was planned as a cross-sectional study and therefore causality cannot be inferred from any of the relationships we observed. furthermore, we cannot generalize the results of study to other countries where dental education on OSA may differ in significant ways.

In conclusion, the dental students in this study showed insufficient knowledge and attitudes towards the diagnosis, appropriate referral and treatment of OSA. The role of the dentist is very important in identifying OSA patients and directing them to medical care. It can be kept in mind as OSA may initially be suspected at a dentist visit. For this reason, the necessity of giving more place to dental sleep medicine in the dental education curriculum and increasing the level of OSA knowledge with postgraduate education should be taken into consideration.

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Hasta Onamı: Çalışmaya katılan tüm diş hekimliği öğrencilerinden yazılı onam alınmıştır.
Hakem Değerlendirmesi: Dış bağımsız.

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Peer-review: Externally peer-reviewed.
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