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Research Article

Comparison of clinical dentistry students' knowledge and attitudes about obstructive sleep apnea syndrome before and after extra-curricular education

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Abstract

Background: Obstructive Sleep Apnea (OSA) is difficult to detect when dentists or dentistry students are not well-trained on this subject. Including this topic in the dental curriculum may help students with diagnosing patients who have OSA.

Objectives: This cross-sectional study was conducted to compare the changes in the knowledge and attitudes of clinical dentistry students at Atatürk University, Turkey about OSA before and after education about this topic.

Materials and methods: In this study, 227 participants were asked to reply OSAKA questionnaire consisting of 23 questions (18 knowledge questions and 5 attitude evaluation questions) before and after the lesson about OSA. Obtained data were analyzed with descriptive statistics, Chi-square, and Spearman analyses. The statistical significance level was set at $\alpha < 0.05$.

Results: The mean knowledge score was 4.91 before the lesson and 13.0 after the class. Overall, correct answer rates increased significantly ($p = 0.010$) as well.

Conclusion: Participants' knowledge about OSA increased and their attitudes became more positive after the lesson. Pre-graduate training may increase dentistry students' knowledge scores and improve their attitudes regarding OSA.

Introduction

Obstructive Sleep Apnea (OSA) is a sleep disorder characterized by apneas or hypopneas resulting from episodes of partial or total airway obstruction during sleep, affecting 17% - 22% of the population [1,2]. Patients with OSA have an increased risk of cardiovascular diseases, hypertension, stroke, heart failure, diabetes, and sudden death [3-5]. It has been proven that the sleep, mood, cognition, glycemic control, and blood pressure of patients have improved after treatment with OSA [6-9]. Therefore, if OSA is not diagnosed or treated, it can lead to many negative health issues [10].

Obstructive sleep apnea (OSA) as one of the most prevalent sleep disorders, is frequently underdiagnosed and mistreated [11]. Clinical examinations of the patients, running objective

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tests, and getting information about the individuals' clinical and comprehensive sleep history are necessary for diagnosis [12]. A comprehensive upper airway assessment is necessary to determine the locations of obstruction [13]. Easy accessibility to the upper airway during a routine dental examination gives dentists a very advantageous position to identify OSA [14]. Dentists are also essential in determining whether Oral Appliance Therapy (OAT) is appropriate for patients with OSA, choosing the best OAT appliance, adjusting the OAT appliance, and assessing the patient for side effects [15].

Although the knowledge and attitudes of dental students regarding OSA were evaluated in different countries, there is no study conducted in Turkey. In addition, previous studies did not investigate the effect of extracurricular education on knowledge scores and attitudes of clinical dentistry students. The purpose of this study was to investigate Turkish clinical dentistry students' knowledge levels and attitudes about OSA. The hypothesis of the present study was that pre-graduate education about OSA would not affect the knowledge of intern students.

Materials and methods

The protocol was approved by the Ataturk University research ethics committee (N-11/02/2021-15). The present study included fourth and fifth-grade students studying dentistry at Ataturk University who were willing to participate and had not attended any OSA-related courses or meetings. First-, second-, and third-year dental students at Ataturk University who wanted to avoid participating in the study or had previously attended any OSA-related courses or meetings were not included in the current study. The lectures consisted of three parts to enhance dentistry students' understanding of OSAS. The first part included theoretical knowledge; clinical cases comprised the second part; and the third part included practical treatment methods for OSAS.

Twenty dental students participated in a pilot study that was conducted prior to the main investigation. The pilot study's Cronbach alpha reliability value of 0.803 indicated good consistency among the items. In order to achieve 80% power and alpha 0.05 to identify a 20% difference in the responses, 108 samples were calculated for each grade (4^{th} and 5^{th}). In total, the study required the participation of at least 216 students.

A web questionnaire was applied to 227 clinical dentistry students at Ataturk University in January- March 2023 before and after the lectures about OSA. The questionnaire was sent along with a cover letter explaining the study, and consent was obtained from all participants. The OSAKA questionnaire consists of 3 sections. In the first part, demographic information of the participants including gender, chronic disease, and data on previous education history about OSA were collected. The second part consists of 18 questions with "true, false, don't know" answers measuring the knowledge level of the participants about OSA. The participants who answered these questions correctly got 1 point, while others got 0 points. The third part consisted of 5 questions that aimed to learn the participants' attitudes about OSA, including the answers "strongly disagree, disagree, undecided, agree, and strongly agree."

Statistical analyses were conducted by using a computer program (SPSS v 26, Chicago, IL, USA). Reliability analysis was conducted using Cronbach's alpha to assess the internal consistency of factor items. Descriptive statistics were used to investigate the answer rates of each question, and Chi-square analysis was used to compare the percentages of correct answer rates before and after the lesson. Spearman correlation analysis was used to determine relationships between the total knowledge score and attitudes. The statistical significance level was set at $\alpha < 0.05$.

Results

A total of 227 students participated in the study. Of all respondents, 37.9% (n = 86) were male and 62.1% (n = 141) were female. Most of the participants gave "no" answers to the demographic questions (Table 1).

Knowledge

The Cronbach α for the 18 knowledge items was 0.722 for the Turkish-language version of the OSAKA compared with α of 0.69 reported using binary data of the English-language version [16]. The average correct answer score of the students before the lesson was 4.91 and 13.0 after the lecture. After the lesson, correct answer proportions significantly increased in all knowledge questions (Table 2).

Attitudes

The internal consistency of the two-item factor regarding the importance of OSA as a clinical disorder and identifying patients with OSA was high, with a Cronbach α of 0.856. Also, the internal consistency of the three-item factor regarding physician confidence in identifying and managing patients with OSA and on CPAP was high, with a Cronbach α of 0.751. A factor analysis forcing all five attitude items on one factor was run, and Cronbach α for these five items was 0.704. The attitudes of participants improved (Table 3).

Before the lesson, the mean knowledge score positively correlated with the 5-item attitude scale and mean attitude score. The mean attitude score also positively correlated with each 5-item attitude scale. 3 confidence subscale items and 2 importance subscale items positively correlated with themselves (Table 4).

Table 1: The number and percentage (%) of answers that participants provided to demographic questions.

Questions	Yes	No
Do you have a chronic disease?	14 (6.2%)	213 (93.8%)
Has anyone in your family been diagnosed with OSAS?	20 (8.8%)	207 (91.2%)
Have you received any training about OSAS before?	51 (22.5%)	176 (77.5%)
Have you ever attended any course, conference, etc. related to OSAS?	24 (10.6%)	203 (89.4%)
Have you ever had a patient whom you suspected had OSAS?	18 (7.9%)	209 (92.1%)

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After the lesson, the mean knowledge score positively correlated with all attitude items and the mean attitude score. The mean attitude score also positively correlated with each 5-item attitude scale. 3 confidence subscale items and 2 importance subscale items positively correlated with themselves (Table 5).

Table 2: Correct answer rates of the participants and their comparison before and after the lecture.

OSAKA questions	Before Lecture	After Lecture	*p* -value
1. Women with OSA may present with fatigue alone	11.9%	45.8%	0.023*
2. Uvulopalatopharyngoplasty is curative for the majority of patients with OSA	5.7%	50.2%	0.009*
3. The estimated prevalence of OSA among adults is between 2% and 10%	21.6%	67.4%	0.002*
4. The majority of patients with OSA snore	34.8%	95.2%	0.000**
5. OSA is associated with hypertension	13.2%	58.1%	0.001*
6. An overnight sleep study is the gold standard for diagnosing OSA	41.9%	80.6%	0.012*
7. CPAP therapy may cause nasal congestion	22.9%	70.5%	0.000**
8. Laser-assisted uvuloplasty is an appropriate treatment for severe OSA	20.3%	73.6%	0.000**
9. The loss of upper airway muscle tone during sleep contributes to OSA	45.4%	90.3%	0.001*
10. The most common cause of OSA in children is the presence of large tonsils and adenoids	41%	83.7%	0.019*
11. A craniofacial and oropharyngeal examination is helpful in the assessment of patients with suspected OSA	41.9%	91.6%	0.000**
12. Alcohol at bedtime improves OSA	34.8%	91.2%	0.000**
13. Untreated OSA is associated with a higher incidence of automobile crashes	22%	89.9%	0.000**
14. In men, a collar size 17 inches or greater is associated with OSA	14.1%	83.3%	0.000**
15. OSA is more common in women than men	21.1%	78%	0.000**
16. CPAP is the first therapy for severe OSA	10.6%	64.3%	0.000**
17. Less than five apneas or hypopneas per hour is expected in adults	15.4%	65.6%	0.000**
18. Cardiac arrhythmias may be associated with untreated OSA	34.4%	80.2%	0.001*
Overall correct answer	25.1%	75.5%	0.010*

*$p < 0.05$, **$p < 0.001$

Table 3: Percentage (%) of answers that participants provided to attitude questions before and after the lecture.

Questions	Before Lecture		After Lecture		*p* - value
	Yes	No	Yes	No	
Is OSA an important clinical disorder?	83.7%	16.3%	98.5%	1.5%	0.017*
Is identifying patients with OSA essential?	85.2%	14.8%	97%	3%	0.035*
Do you feel confident in identifying patients at risk for OSA?	16.8%	83.2%	40.9%	59.1%	0.000**
Do you feel confident in managing patients with OSA?	14.1%	85.9%	40.5%	59.5%	0.000**
Do you feel confident in managing patients on CPAP?	12.8%	87.2%	33.1%	66.9%	0.000**

*$p < 0.05$, **$p < 0.001$

Table 4: Correlations among attitude items and between mean attitudes and knowledge before the lesson.

	1	2	3	4	5	6
Importance						
1. Importance of OSA as a clinical disorder	-					
2. Important to identify patients with OSA	0.777‡	-				
Confidence						
3. Confident in identifying at-risk patients	0.096	0.114	-			
4. Confident in managing patients with OSA	0.107	0.107	0.687‡	-		
5. Confident managing patients on CPAP	0.034	0.056	0.663‡	0.822‡	-	
Mean attitude and knowledge scores						
6. Mean attitude score	0.549‡	0.557‡	0.737‡	0.783‡	0.756‡	-
7. Mean knowledge score	0.175‡	0.253‡	0.328‡	0.203‡	0.167‡	0.319‡

*$p < 0.05$ †$p < 0.01$ ‡$p < 0.001$

Table 5: Correlations among attitude items and between mean attitudes and knowledge after lesson.

	1	2	3	4	5	6
Importance						
1. Importance of OSA as a clinical disorder	-					
2. Important to identify patients with OSA	0.842‡	-				
Confidence						
3. Confident in identifying at-risk patients	0.272‡	0.372‡	-			
4. Confident in managing patients with OSA	0.162*	0.224‡	0.666‡	-		
5. Confident in managing patients on CPAP	0.140*	0.190‡	0.500‡	0.720‡	-	
Mean attitude and knowledge scores						
6. Mean attitude score	0.706‡	0.758‡	0.736‡	0.709‡	0.645‡	-
7. Mean knowledge score	0.188‡	0.291‡	0.250‡	0.222‡	0.239‡	0.343‡

*$p < 0.05$ †$p < 0.01$ ‡$p < 0.001$

Discussion

OSA is a complex condition with multiple predisposing or risk factors as well as anatomical and/or physiological etiologies [17]. Studies have associated a number of craniofacial anatomical features including a retrognathic or micrognathic mandible, a retrognathic maxilla, a hyperdivergent growth pattern or dolichocephalic facial type, a high and narrow palate, an inferiorly positioned hyoid bone, an enlarged tongue, and a lengthy soft palate [18] and dentoalveolar anomalies to OSA [19]. Because of these predisposing factors, dentists are more likely than other practitioners to have first contact with OSA patients or to detect OSA and other sleep disorders in their patients [20]. For this reason, it is essential to know dentists' level of knowledge and attitudes about OSA [21]. The present study is the first research evaluating the knowledge and attitudes of dental students about OSA before and after the lecture about this issue. As the knowledge scores of the

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participants increased significantly, the hypothesis of the present study was rejected.

The mean knowledge score before the lecture (4.91) was below the threshold which was 12. However, after the lesson, the knowledge score (13.0) was above the threshold. In this study, similar to previous studies [22], although intern dentists had low-level knowledge about OSA before receiving training, most of them (93.7%) reported that it was essential to identify OSA patients. The lowest correct answer rates were obtained from the answers given to the 2nd and 16th knowledge questions before the lecture. Students did not evaluate themselves as qualified in the management of OSA before the lecture as they did not have sufficient knowledge about treatment. Following the lecture, there was a considerable improvement in the students' self-confidence in managing the process. In addition, the majority of the students did not know the relationship between OSA and hypertension and the place of CPAP in treatment, and this result is consistent with other studies [23]. Whereas, the following questions received the highest correct responses: The gold standard for diagnosing obstructive sleep apnea is a sleep study during the night; the most common cause of the condition in children is a large tonsil and adenoid; and a craniofacial and oropharyngeal examination is helpful in assessing patients with suspected OSA (Question 6,9,10,11) before the lecture. The correct answer rates to all these questions increased after the lecture.

The effectiveness of the applied training was revealed by the significant increase in the mean knowledge when the pre and post-tests were compared. This suggests that if lectures on sleep disorders can be added to the curriculum, it will increase the effectiveness of dentists in the diagnosis and treatment stages of patients.

Simmons, et al. [14] reported that US dental schools have expanded their curricula in sleep medicine and sleep-related topics in the dental curriculum lasting approximately 4 hours. No study reports how much time is allocated to OSA-related topics in the curricula of dental faculties in Turkey. In this study, students were given only 1 hour of lectures on OSA. Despite this, the increase in the number of correct answers is remarkable. Despite sleep disorders' negative impact on individuals' health and economic situations, physicians' awareness of these common sleep disorders is limited [24-26]. Considering the lack of knowledge of dentists and physicians about OSA, as reported in other literature [27-29], providing adequate undergraduate education would be a good starting point.

The aim of the study was to compare the changes in the knowledge and attitudes of clinical dentistry students about OSA before and after education about this topic. The improvement in these scores following the training session is not examined since certain general values, such as gender, having a chronic illness, and having a family member with OSA, did not alter before and after the one-hour OSA lecture.

This study has some limitations. This study was applied to students from a single university and does not provide information about the educational level of students from other universities. The other limitation is that since the study is a survey, the answers are based on the respondents' statements. Lastly, this study was only conducted among dentistry students; dentists were not included in the present study [21,30-32]. Studies carried out in various institutions may have produced varied findings because universities in Turkey and other countries have different curricula and teaching approaches. Future research evaluating the knowledge and attitudes of dentists and dentistry students regarding OSA should be carried out in other Turkish cities as well as other countries.

Conclusion

As pregraduate dentists, dental students in the present study had a low level of knowledge about OSA before the lecture. In the post-lecture questionnaire, the rate of correct answers to all questions increased significantly, and their attitudes improved. Education about sleep disorders and their treatments should be given during undergraduate training to increase the knowledge level of dentists about OSA. Given the close relationship between OSAS and dentistry, dentists should enhance their knowledge of OSAS. This study demonstrated a lack of sleep-related knowledge in dental education, which harms clinical practice. A significant increase in relevant information after training would help identify and diagnose OSAS.

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