



AWARENESS ON OBSTRUCTIVE SLEEP APNEA AMONG UNDER GRADUATE DENTAL STUDENTS-AN OBSERVATIONAL STUDY.

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Abstract:

Background: Dentists play an important role in detection and management of patients with Obstructive Sleep Apnea (OSA) and referring them to general physicians or sleep specialists or even handle these patients through multidisciplinary approach. Recent studies have shown higher hesitancy of dental professionals towards diagnosis and treatment of OSA patients.

Aim: The present study was aimed to assess the level of awareness towards treating OSA patients among undergraduate dental students of Tamil Nadu, India.

Methodology: A cross sectional questionnaire-based online-survey was conducted through Google forms among the undergraduate dental students in and around Tamilnadu. Statistical Package for Social Sciences software (SPSS version 22.0) was used to analyze the statistical data. The $p < 0.05$ was considered statistically significant.

Result: A total of 142 respondents participated among which majority (60%) admitted unfamiliarity towards the role of all 3 disciplines (ENT, Dentistry and Neurology) in identifying and managing OSA patient. 65% of our participants were unaware of the investigatory methods nonetheless 2/3rd of undergraduate dental students are willing to intervene in the management of OSA patients if they are given required training.

Conclusion: Thus it is essential for the dental community including undergraduate dental students to incorporate sleep medicine in dental curriculum, participate in the continuing medical/dental education programs, interdisciplinary courses focusing on sleep medicine in association with sleep specialists, sleep pathologists, neurology and ENT departments, and assist handling this severe and inevitable health condition.

Keywords: Awareness, Continuous positive airway pressure therapy, Dental Students, Polysomnography, Obstructive Sleep Apnea, Oral Appliances.

Introduction:

Obstructive sleep apnea (OSA) is a chronic patho-physiological sleep disorder characterized by partial or complete obstruction and collapse of upper respiratory tract, predominantly pharynx resulting in repetitive episodes of apnea, hypercapnia, hypoxia, insomnia and multiple arousals during sleep [1, 2]. It is associated with several systemic conditions like hypertension, diabetes, cognitive deficiency, and depression [3]. Various predisposing factors were proposed for occurrence of OSA that includes obesity, old age, smoking, alcohol, and narrow airway anatomy, large neck circumference, and oro-facial anomalies such as micrognathia, macroglossia, enlarged palatine tonsils, distended uvula and periodontal diseases [4]. OSA can be broadly categorized into central, obstructive and mixed type based on involvement and graded as mild, moderate and severe based on the nature of illness [5]. The common clinical signs and symptoms includes tiredness, anxiety, hoarseness due to high resistance to air flow during sleep (Snoring), depression, daytime sleepiness, lethargy, inability to perform routine activities and decreased quality of life [6].

Epidemiological Studies in the United States and European countries reported OSA prevalence estimate risk of 6.5% to 31% using Berlin questionnaire [7, 8] whereas Indian studies reported prevalence estimate ranging from 7.5% to 19.5% with higher male predominance [9, 10]. Studies have shown complete clinical examination, polysomnography (PSG) with modern imaging techniques aid in detection and treatment depending on clinical symptoms, etiology and severity of the disease at an early phase. American Academy of Sleep Medicine (AAOSM) recommends the use of oral appliances (OA) such as Tongue positioning device, Mandibular advancement or repositioning splints (MAS/MRA) to treat mild to moderate cases of OSA and continuous positive airway pressure (CPAP) machine, Bi-level positive airway pressure (BiPAP) machine, or surgical management in severe to advanced disease state [11, 12]. Owing to close contact with the oro-facial region along with availability of questionnaire-based screening tools, in the recent years dental students and professionals were believed to play a significant role in screening OSA patients and referring them to specialists. Literature studies have also revealed that dentist play an important role in identifying and diagnosing cases of OSA as most of the patients are unaware of this conditions due to ignorance or lack of knowledge [2-6]. In accordance with this, few studies were carried to evaluate the knowledge and practice towards OSA among dental students, practitioners as well as academicians across the world [4-7]. However due to increase prevalence of OSA in Indian Population, awareness level among undergraduate students on various aspects of OSA needs further assessment. Thus the present study was aimed to assess the level of awareness and attitude towards treating OSA patients among undergraduate dental students in Tamil Nadu, India.

Methodology: A cross-sectional questionnaire survey was conducted amongst the undergraduate dental students across Tamil Nadu, India to assess their awareness and attitude towards various aspects of obstructive sleep apnea. The study was conducted following the Helsinki declaration as revised in 2013. The required information was collected through published scientific articles pertaining to the study and self-administered structured questionnaires, comprising of 19 questions prepared in English language was distributed among the selected population and responses were evaluated.

The questionnaire had both combination of selected response to the certain questions and also few close ended questions (Yes / No/ don't know).

A total of 142 randomly selected undergraduate dental students across Tamilnadu participated in this survey. Since this study was conducted during COVID-19 Pandemic lockdown period, online Google forms were generated and distributed through social media platforms. It was observed that internal consistency of the questionnaire was adequate (Cronbach's alpha = 0.849). All the participants were briefed about the purpose of the study and an informed consent was obtained before the survey through Google forms and assured that their participation was purely voluntary. Statistical analysis was performed using SPSS version 22 (SPSS Inc., Chicago, IL, USA). Descriptive data were analyzed using frequencies and percentages. Chi-square test was used to compare the awareness scores within the population group. All statistical tests were performed at 90% confidence interval. The level of significance was set at $p < 0.05$

Results:

On analysis of the given data the mean age of study population was observed as 22.126 ± 1.457 years (mean \pm S.D) with 0.241 at 95% confidence level comprising of 80 (56.3%) male and 62 (43.7%) female participants. Among the study participants 35.92% were interns students (51 out of 142) followed by 21.14% (30) were final years and least being 10.56% (15) first year students respectively. Chi-square test analysis to correlate interrelationship between the year-wise distribution of the study participant showed chi-square statistic 25.464 with p value .0004 significant at $p < .05$.

83.8% of the study participants are familiar with the condition called obstructive sleep apnoea (OSA) among which 61.97% were aware of central sleep apnoea. It was observed 63.38% were aware of Apnoea Hypopnea Index (AHI) a scale that determines sleep disorder and 41.55% correctly identified AHI of 10 per hour is considered as OSA that increases based on severity as mild OSA (32.29%), moderate OSA (53.52%), and severe OSA (14.08%).

On evaluation of awareness towards various factors associated with OSA, 30.28% opted for male prevalence whereas 26.76% feels it is more common among females. 40.85% considers Increase in upper airway muscle tone as a significant predisposing factors whereas 64.79% think snoring is directly related with OSA along with obesity (46.48%) and cardiovascular risk (36.62%). 40.85% assumes retrognathic mandible causes obstruction of airway and 20.42% selected increase in neck circumference, retrognathic maxilla as an important etiology.

On evaluation of awareness towards diagnosis and treatment options of OSA, 51.41% think obstructive sleep apnoea causes changes in periodontal health and 32.39% recommend Polysomnography, a gold standard test used for detection of OSA. However only 39.44% were aware that all the 3 disciplines ENT, Dentistry and Neurology are involved in management of OSA. 34.51% suggested maxilla-mandibular setback surgery, 58.45% suggested Uvulo-pharyngopalatoplasty while 33.1% preferred Mandibular advancement device and Tongue retracting device for treatment of OSA and only 28.87% were aware of continuous positive airway pressure therapy (CPAP) routinely performed in treatment of patients with OSA.

Discussion:

Dental professionals play an important role in detection and management of patients with OSA and referring these patients to general physicians or sleep specialists or even treat these patients through multidisciplinary approach owing to their close proximity and accessibility of the upper airway tract. Undergraduate dental students are anticipated to perform more patient screenings, initial diagnosis and referral of suspected cases in their early career than treatment. While very few studies focused at how frequently dentists were involved in diagnosing OSA, [3-6] and available data suggest that there is a lack in referral and management of these patients.

Nearly 84% of the study participants are familiar with the condition called obstructive sleep apnea among which 61.9% were aware of central sleep apnoea. Similar results were also obtained in studies by Swapna et al (80%) [1], Alharbi LN et al (54.6%) [4], Shafiei S et al (70.8%) [6], Ramesh et al (55.8%) [11], Ahmed S et al (84.3%) [12], and Talaat (76%) [13]. Variation in observations across these studies could be attributed to several factors such as study population, sample size, different designs of the used questionnaires, dental education system, sleep medicine courses and difference in dental curriculum followed across the countries. Most of the undergraduate dental students admitted lack of awareness towards the role of all 3 disciplines (ENT, Dentistry and Neurology) in identifying and managing OSA patient. In a similar study by Vuorjoki-Ranta et al [15], Bian and Smith [16] argued that the risk factors, signs and symptoms, and complications of OSA were overall well recognized among dental professionals and students regardless of the years of practice and dental curriculum methods.

Despite its high prevalence rate only 30.2% of the respondents opted for male predominance whereas 26% feels it is more common among females similar to study by Swapna et al (43%) [1], Ramesh et al (32.7%) [11] and Manohar et al (32%) [14] suggesting most of study participants did not have an idea towards gender prevalence. Patil et al [17] and Malhotra et al [18] argued that an obese male has a major risk factor for obstructive sleep apnoea due to the anatomy of the upper airway tract of men predisposing them to pharyngeal collapse more than women. Moreover, studies have shown certain associated risk factors such as narrow palate, long soft palate, edentulism, macroglossia and mandibular advancement procedures are directly linked to a dental practice, thus contributing to the clinical relevance of OSA [1-4]. Among many predisposing factors described in the previous literature studies 64.79% think snoring is directly associated as shown in similar studies by Swapna et al (62.5%) [1], Alansari and Kaki (37%) [2] followed by obesity (46.48%) and cardiovascular risk (36.62%) as significant predisposing factors of OSA. Thus, due to increase in the associated risk such as obesity, and vascular conditions (hypertension, cardiovascular diseases) more emphasis should be put on dental graduates and training dentists to appropriately identify OSA patients and actively participate in their referral or treatment.

In our study, majority of the study participants were aware of classical orofacial features in OSA patients that include a retrognathic mandible, increase in neck circumference and retrognathic maxilla in contrast to observations by Swapna et al (53%), Alansari and Kaki [2], Alharbi et al [4] and Bian H [19]. A polysomnography is the gold standard tool that records the physiological function of organ systems and the qualitative and quantitative abnormalities of sleep and wakefulness and the sleep-wake transition. However almost 65%- 68% of our participants were unfamiliar of the Polysomnography investigations that are indicated for a suspected OSA patient. Similar findings were reported by

Ahmed S et al (48.1%) [12], Alansari and Kaki [2], Khanagar et al [5], Senturk H et al (61.4%) [20] could be attributed to lack of training, misdiagnosis with lower level of confidence towards diagnosis strategies and mistreat sleep disorders as other medical conditions. It is also evident that OSA does not appear to be sufficiently covered during undergraduate dental education and general dentists often reported not being exposed sufficiently to educational experiences that would enable them, to gain more experience and knowledge over a period of time.

Treatment options of OSA depends on the severity of the disease process that ranges from behavior management, diet modification, medications, continuous positive airway pressure (CPAP), Oral appliance, to orthopedic or orthognathic surgeries. Less invasive techniques that includes behavior modifications like altered sleep position, refrain from alcohol and sedative medications before sleep along with adequate dietary habits, exercises, monitor body weight, weight loss therapy, regulating body mass index following diet counselling are often preferred complex surgical procedures in mild to moderate cases of OSA [21, 22]. In the present study 34.51% dental students suggested maxilla-mandibular setback surgery, 58.45% suggested Uvulo-pharyngo-palatoplasty in advanced cases of OSA rather than behavior and diet modification approaches. This finding is of particular importance as it can be concluded that undergraduate dental students are willing to intervene in the management of OSA patients if they are given required training.

Continuous Positive Airway Pressure (CPAP) is considered as the gold standard treatment for patients with moderate-to-severe OSA. It acts by nonstop pumping of air under pressure through a sealed face mask into upper airway which is connected to a device with electric power. Because this is very complex to carry and use, it has less patient compliance. In previous studies Swapna et al (36%) [1], Manohar et al (11%) [14] recognized low prevalence of knowledge towards continuous positive airway pressure therapy (CPAP) routinely performed in treatment of patients with OSA. Similar results were seen (28.87%) in our study indicating lack of awareness and insufficient knowledge in the modes of management of OSA like surgery, Intra-oral appliances and extra-oral machines, which needed to be addressed promptly and possible ways to incorporate sleep medicine and OSA in the dental practice as well as in the undergraduate curriculum should be carried out effectively.

Several studies briefly discussed the importance of oral appliances as an alternative treatment to CPAP like mandibular advancement or mandibular retaining devices such as snore guard, silencer tongue retaining device and Snor Ex soft palate Lifter in treatment of OSA [11, 23] nonetheless dental professionals were often overlooked while managing OSA. About 2/3rd of the respondents were conscious towards oral appliances such as Mandibular advancement device and Tongue retracting device used in mild to moderate OSA patients. It is necessary that dentists should obtain OSA screening questionnaires in the history-taking routine, regularly update their strategies, treatment plans and recommendations for the use of Oral appliances in the treatment of OSA.

Conclusion:

This finding is of particular importance as undergraduate dental students are willing to intervene in the management of OSA patients if they are given required training along with effective integration of sleep medicine and OSA in undergraduate curriculum. It is crucial for the dental community including undergraduate dental students to participate in the continuing medical/dental education programs, interdisciplinary courses focusing on sleep medicine in association with sleep specialists, sleep pathologists, neurology and ENT departments, research activities and assist

handling this severe and inevitable health problem. Essentially all practitioners in dentistry, regardless of their professional domain interest should be prepared to diagnose, investigate and manage potential OSA patients to improve their quality of life.

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