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A Study to Assess the Knowledge of Obstructive Sleep Apnea Among Dental Graduates

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ABSTRACT

Introduction: Obstructive sleep apnea (OSA) is a prevalent but often undiagnosed respiratory disorder that can lead to significant health issues. Dental professionals play a crucial role in identifying and referring patients with OSA. Yet, insufficient training during dental education has led to a gap in their ability to recognize and manage the condition effectively.

Methodology: This cross-sectional study aimed to assess the knowledge and attitudes of dental graduates toward OSA. General dentists with at least 5 years of professional experience registered with the Dental Council of India (DCI) participated in the survey. A structured questionnaire was used to collect data on their knowledge, attitudes, and practices concerning OSA. The validity and reliability of the questionnaire were ensured through expert validation and a Cronbach's alpha of 0.70 or higher.

Results: The study included 249 dental professionals, with a majority being female (55%) and practicing in hospitals (52%). In terms of knowledge, five questions received over 50% correct answers, indicating good knowledge, while four questions scored poorly with less than 50% correct responses. Regarding attitudes, 50% of respondents showed a positive attitude toward OSA in some questions, while others exhibited a negative attitude, suggesting an insufficient understanding of the condition and its management.

Conclusion: The findings reveal a significant deficiency in the knowledge and attitude of dentists toward OSA, highlighting the need for enhanced education in dental curricula. By improving training on OSA, dental professionals could play a more effective role in identifying and managing the condition, ultimately improving patient health outcomes.

Keywords: *Obstructive sleep apnea, Dental education, Knowledge, Attitude, Screening*

1. INTRODUCTION

Obstructive sleep apnea (OSA) is a respiratory disorder that occurs during sleep and is characterized by a reduction or cessation of airflow despite continuous breathing efforts. It occurs when the muscles at the back of the throat relax during sleep, allowing soft tissue to collapse and obstruct the upper airway [1]. This may result in sharp drops in blood oxygen saturation, leading to a subsequent decline in oxygen levels. The body briefly awakens from sleep to resume regular breathing in response to the nervous system, signaling the body to respond to an oxygen shortage. In a single night, this sequence may recur numerous times. The end effect is a disturbed sleep pattern that frequently leads to increased daytime drowsiness [2].

OSA has been associated with many chronic diseases, including hypertension, two myocardial infarction [3,4], stroke [5,6], insulin resistance [7,8], diabetes [9], and nonalcoholic fatty liver disease. Sleep apnea and fatty liver are coupled via energy metabolism., and most recently, mild cognitive impairment (MCI)/dementia [10] and cancer [11].

Numerous chronic conditions have been linked to OSA, including diabetes [9], insulin resistance [7], myocardial infarction [3], [4], stroke [5,6], nonalcoholic fatty liver disease [9], moderate cognitive impairment, and cancer [11].

As OSA becomes increasingly common in the general population, it is emerging as a global health issue. Approximately 18 million individuals in the United States of America have OSA, accounting for 20% of the total adult population; nonetheless, 85% of cases go untreated.

To refer new OSA cases to sleep specialists for sleep investigations and therapy appropriately, dentists must first establish an adequate screening process. Therefore, dentists' inadequate training and expertise are the primary cause of the high frequency of undetected OSA [12, 13].

Very few OSA investigations have been conducted previously, and the majority have been conducted in medical fields other than dentistry by researchers in the field of dentistry [14-17].

The purpose of this cross-sectional study was to evaluate the attitudes and knowledge of dentists toward OSA.

2. MATERIAL AND METHODS

The inclusion criteria for this cross-sectional survey required participants to be general dentists holding a bachelor's degree and registered with the Dental Council of India (DCI). Additionally, participants were required to have a minimum of 5 years of experience in the dental field. The exclusion criteria involved excluding any participants who were not registered with the DCI. This survey aimed to assess the knowledge of OSA among dental graduates, focusing on those who meet the specified criteria for participation.

Methodology

The subjects were administered a structured questionnaire consisting of questions about their knowledge, practice, and awareness of the treatment of OSA to gather general information on their attitude towards it. Adapted from OSA's relevant literature and dental guidelines, a questionnaire was derived. The questionnaire was initiated with an invitation message, followed by a consent agreement for participation. The questionnaire included questions regarding respondents' demographic information, knowledge concerning OSA, and management of OSA. Demographic characteristics included sex (male or female), professional title (general dentist), and experience.

The first section began with a "yes, no, or don't know" self-assessment question: Have they ever heard of OSA? If yes, then, the following questions were asked regarding knowledge. Three options were given: 1- true, 2- false, and 3 – don't know. For the questions regarding attitude, the options are 1 - strongly agree, 2 - agree, 3 - neither agree nor disagree, 4 - disagree, 5- strongly disagree.

Validity and Reliability of the Questionnaires

The content validity was deemed satisfactory by the subject experts after the required changes were made to the questionnaire. The internal consistency was analyzed, which was adequate for the items in the form, with a Cronbach's standardized alpha of≥0.70 considered acceptable. The test-retest reliability involves administering the questionnaire with a group of respondents and repeating the same with the same group at a later point in time. We then compared the responses at the two-time points. (Cronbach's alpha = .85)

3. STATISTICAL ANALYSIS

The data obtained from the study will be tabulated and entered into a Microsoft Excel sheet. The level of significance will be 5% (0.05), and the power of the study will be 80%. Categorical and quantitative variables were presented as frequencies and percentages. The Shapiro-Wilk test of normality will be performed to assess the distribution of the data. All statistical analyses will be conducted using Statistical Package for the Social Sciences (SPSS) Statistics for Windows, Version 21.0. Armonk, NY: IBM Corporation. All statistical analyses will be conducted at a 95% Confidence interval and a p-value less than 0.05 will be considered statistically significant.

Result

Out of 249 participants, most are females (55%). 52% of the participants practice in hospitals, while 48% are private practitioners. All participants must have a minimum of 5 years of work experience after graduation [Figure 1].

Every correct answer received a score of 1, while any wrong answer or don't know option will score 0. For the knowledge and attitude sections, the proportion of correct answers was determined independently. The following are the results' interpretations: Good: ≥ 50% of dentists provided accurate answers; Poor: < 50% of dentists provided accurate answers [Figure 2].

A positive attitude is demonstrated when 50% of respondents said they agree or strongly agree. A negative attitude is shown by the fact that fewer than half of the dentists answered "neither agree nor disagree," "disagree," or "strongly disagree."

In the knowledge section, questions for which dentists score 50 or higher are questions 1, 2, 3, 8, and 9. For questions 4, 5, 6, and 7, the respondents' scores were poor, i.e., ≤ 50% [Figure 3].

In the attitude section, questions that indicate a positive attitude are questions 1 and 4. For questions 2 and 3, the results show a negative attitude [Figure 4].

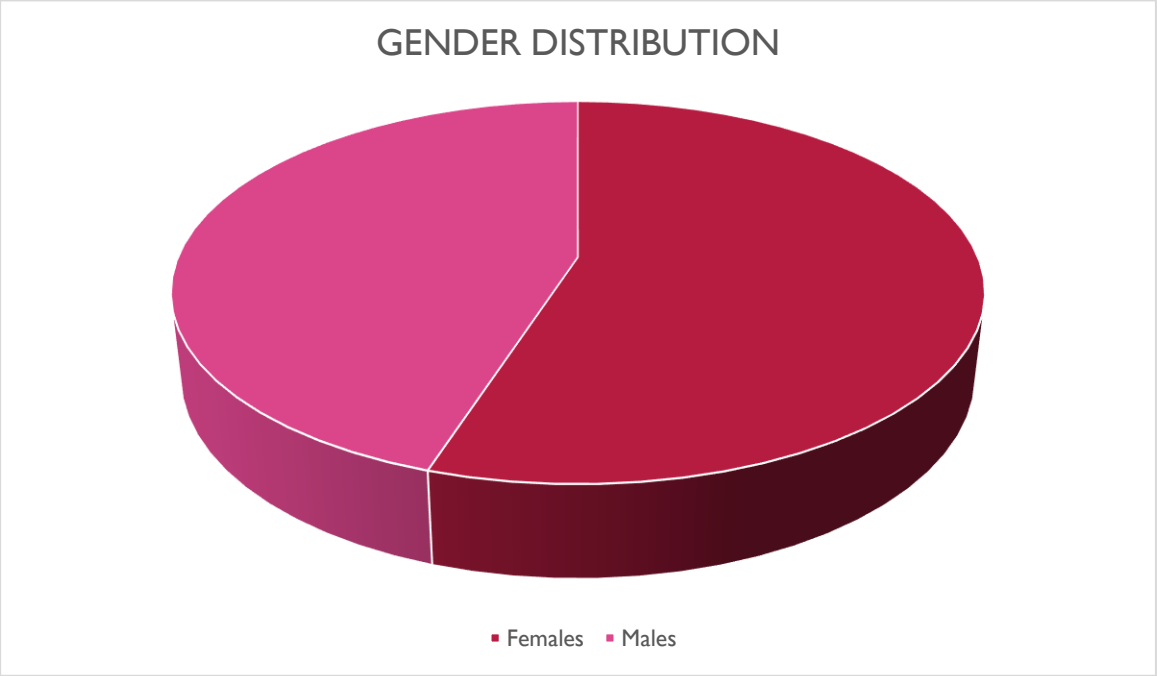

Figure 1: Gender Distribution

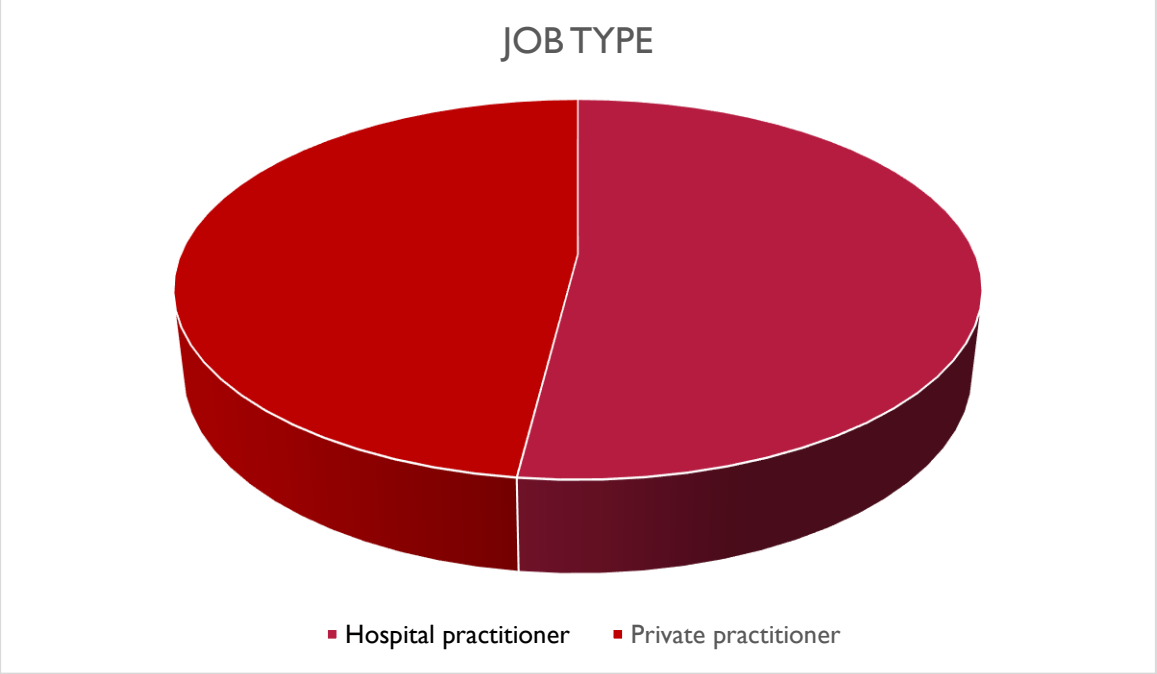

Figure 2: Job Type

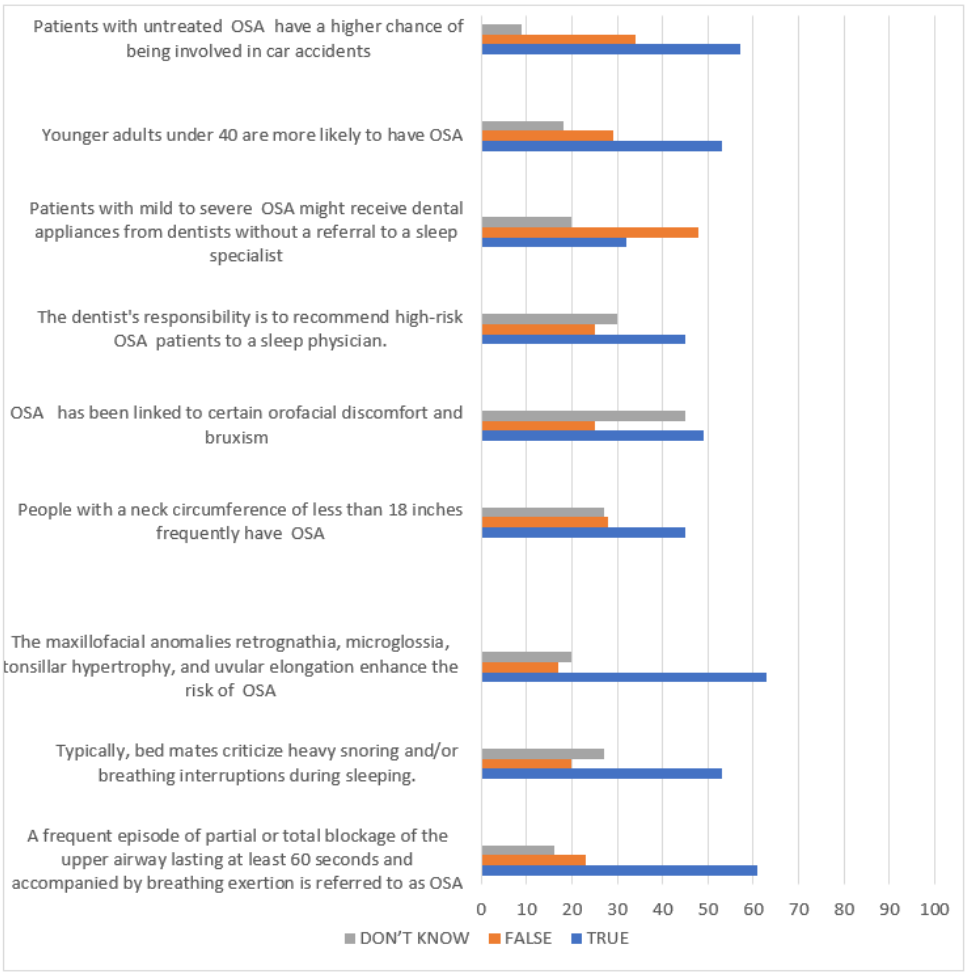

Figure 3: Percentage of respondents' knowledge of OSA

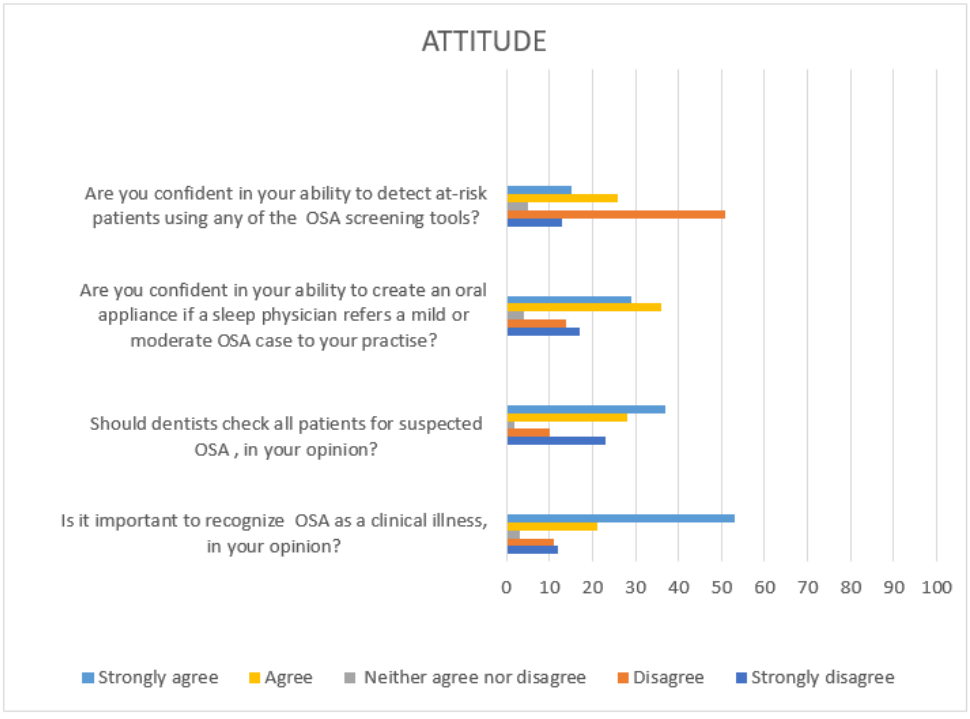

Figure 4: Percentage of respondents' attitude toward OSA

4. DISCUSSION

Many undiagnosed OSA cases are detected, referred, and managed by dentists, who are frequently the first healthcare professionals that patients see. Routine dental check-ups by dentists facilitate the easy evaluation of any abnormalities in the upper airway tract. Therefore, the higher incidence of undetected patients and related hazards may be attributed to dentists' inadequate training in OSA during dental school. This study establishes baseline data and clarifies the knowledge and attitude of dentists toward OSA.

In the knowledge section, dentists show good responses in 5 questions and poor performance in 4 questions. As for attitude, they exhibit a positive attitude in response to 2 questions and a negative attitude in response to another. This might be because the dentistry curriculum does not include learning objectives for OSA, which means that they would not be sufficiently knowledgeable about it.

The findings in this study reveal a deficiency in understanding screening methods, diagnostic tools, risk factors associated with OSA, appropriate treatment protocols, and the optimal timing and circumstances for referral to a sleep physician. Additionally, it highlights their inability to prescribe oral appliances directly to patients with OSA. A comparable outcome was documented in research wherein 60% of dentists were unaware of dental appliances for treating OSA, and 21.15% could not recognize the various diagnostic tests for OSA. Alansari et al. reported similar findings, indicating that Saudi dental interns lacked sufficient awareness of the connection between OSA and hypertension [17]. Conversely, Vuorjoki-Ranta et al. demonstrated that dental experts possess more excellent knowledge regarding OSA due to their superior educational background [18].

Enhancing the number of dental professionals capable of screening for and managing uncomplicated OSA while also referring more complex patients to sleep experts may improve the quality of life at the community level. Evidence suggests that working-age adults, children, and adolescents with lower socioeconomic status are more likely to develop OSA; additionally, older adults and patients with lower socioeconomic status are less likely to receive treatment for OSA. As more providers become capable of screening and managing OSA, costs and other barriers to care, such as geographic ones, are expected to decrease.

5. FUTURE AIMS AND SCOPE

The future aims of this study are focused on improving the recognition, diagnosis, and management of OSA within dental practices, with a particular emphasis on incorporating advanced technologies [19]. The integration of tools such as the Metaverse, Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR) offers significant potential for enhancing both education and practical applications [20]. The Metaverse can deliver immersive, interactive learning environments where dental professionals can engage in realistic simulations of OSA cases, thereby enhancing diagnostic skills and treatment planning [21-22]. AI can assist in analyzing patient data to identify risk factors for OSA and predict treatment outcomes. Meanwhile, VR and AR technologies can help dental professionals visualize and practice the use of diagnostic tools and therapeutic interventions in a more hands-on and interactive manner [23-26]. These technologies have the potential to revolutionize the way dentists learn about and manage OSA, ultimately leading to improved patient outcomes [27].

6. LIMITATIONS

Despite the valuable insights provided by this study, several limitations exist. First, the sample was limited to general dentists who were registered with the DCI and had a minimum of five years of professional experience. This restricted the scope of the study to a specific group of dental professionals, and the results may not be generalizable to newer dental graduates or those from other regions. Second, the cross-sectional design of the study captures only a snapshot of the knowledge and attitudes of dentists at a particular point in time. Longitudinal studies would be needed to track changes in knowledge and attitudes over time. Additionally, the reliance on self-reported data from the structured questionnaire may introduce response bias, as participants may overestimate their knowledge or attitudes toward OSA. The study also did not account for the influence of other factors, such as the level of exposure to OSA-related cases or continuing education in OSA management, which could impact the results. Furthermore, while the study highlighted knowledge gaps, it did not explore the specific barriers that dentists face in acquiring or applying this knowledge in clinical practice. Lastly, since this research was conducted within a particular region, the findings may not fully reflect the global perspective on dentists' knowledge and attitudes toward OSA, given the variations in dental education and healthcare systems across countries.

7. CONCLUSION

There is a pervasive deficiency in instruction regarding sleep and OSA provided to dentists during their doctoral studies. A coordinated initiative to enhance the minimal OSA education for dentistry students is essential to tackle and ameliorate OSA issues at the population level. Improving the involvement of dentists in identifying and treating OSA and increasing the number of dentists' healthcare facilities as access points for OSA care can yield sustained, positive effects on community

sleep health. Enhancing education and providing comprehensive support for dentists in this capacity will facilitate improvements in patient outcomes and mitigate the increased healthcare expenses associated with untreated OSA.

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Conflicts of interest There are no conflicts of interest

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