



**A QUESTIONNAIRE SURVEY OF PEDIATRIC OBSTRUCTIVE SLEEP APNOEA: KNOWLEDGE, ATTITUDE, AND PRACTICES AMONG PEDIATRIC AND PREVENTIVE DENTISTRY POSTGRADUATE STUDENTS IN INDIA**

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**ABSTRACT**

**Background** Scientific literature reveals that early identification and prompt management of pediatric obstructive sleep apnea (POSA) provides favourable results and pedodontists could play an important role. This study aims to assess knowledge, attitude and practice for POSA among pediatric and preventive dentistry postgraduate students in India.

**Methodology** One hundred and fifty four participants who consented and filled the online survey form were included in this study. A self-administered questionnaire, which had two parts - first part on demographical data of participants and the second part with 20 questions (12 on knowledge, 2 on attitude and 6 on practices), designed on Google forms was used. The scores were recorded for each domain and responses were tabulated and subjected to statistical analysis.

**Result** Majority of the participants had good or fair level of knowledge on POSA while almost half (47.4%) showed poor knowledge on the same. Most of the respondents reported to have neither attended any workshops, symposiums, or CDE programs nor were trained or appraised of screening POSA. Majority of the study participants strongly agreed on pedodontist's role in early diagnosis and referral of POSA and 90% showed favourable attitude on inclusion of more dental lectures and need for updation of postgraduate dental curriculum on POSA.

**Conclusion** The study findings indicate the need for workshops and training programs on POSA for postgraduate students of pediatric dentistry and also its inclusion in the dental curriculum.

**Keywords** Pediatric obstructive sleep apnoea; Knowledge; Attitude; Pediatric dentist.

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**INTRODUCTION**

American Academy of Pediatrics (AAP) guidelines defines Obstructive Sleep Apnea Syndrome in children as a "disorder of breathing during sleep characterized by prolonged partial upper airway obstruction and/or intermittent complete obstruction (obstructive apnea) that disrupts normal ventilation during sleep and normal sleep patterns<sup>1</sup> and the prevalence of Pediatric Obstructive Sleep Apnea (POSA) is estimated to be 1.2 – 5.7%. Based on an Indian school based survey on 5 to 10 years old children, the prevalence of POSA was estimated to be 9.6%<sup>2</sup>. According to American Academy of Pediatric Dentistry (AAPD), POSA can occur at any age in children but it's most common among 2-7 years old children<sup>3</sup>.

POSA differs significantly from adult OSA (obstructive sleep apnea) due to its clinical presentation, diagnostic criteria and complications related to the developmental, physiological and maturational factors associated with the overall growth of the child<sup>4,5</sup>. POSA occurs due to anatomic anomalies (adenotonsillar hypertrophy, respiratory tissue thickening, childhood obesity), neuromuscular diseases (cerebral palsy, myotonic dystrophy), craniofacial morphologies (midfacial hypoplasia, micrognathia, cleft lip and palate, hypotonic lips)<sup>6</sup> and syndromes (Pierre Robison syndrome, achondroplasia, craniosynostotic syndromes)<sup>4</sup>. Among these, the major determinant of POSA is adenotonsillar hypertrophy<sup>4,7</sup>. According to a meta analysis in 2018, around 42% to 70% of children were diagnosed with adenotonsillar hypertrophy<sup>8</sup>. An obstruction in the upper airway either partial or complete affects normal ventilation during sleep leading to multiple hypopneas or apneas during sleep which results in hypoxia. These events are terminated by a brief arousal from sleep with a gasp that restores normal breathing<sup>3</sup>.

According to American Family Physician foundation, POSA differs from adult OSA as children shows it in the form of behavioral issues, attention deficit hyperactive disorder (ADHD), poor concentration, depressed mood, learning difficulties, day time sleepiness and fatigue<sup>9</sup> and it is also associated with developmental co-morbidities of cardiovascular system, endocrine system and central nervous system in children. Infants with POSA can

present with breast feeding difficulties and feeding regression. Toddlers and school going children present with speech problems, failure to thrive, frequent allergies, chewing and swallowing difficulties with thumb sucking activities<sup>10</sup>. These children also present specific dentofacial and orthopedic features such as high and narrow arch palate, elongated soft palate, long facial profile with retrognathic mandible, greater overjet and openbite, which are classic feature of long face syndrome or adenoid facies as these children develop chronic mouth breathing habit<sup>11</sup>.

The adverse consequences of POSA could affect the long term health of a child through adulthood<sup>10</sup>. Hence, accurate and early diagnosis of POSA is cardinal to prevent morbidity and its sequelae. Scientific evidence shows that for the successful management of POSA, a multidisciplinary approach is imperative; and a pedodontist could play an important role<sup>12</sup>. For, a child visits a pedodontist from the age of 6 months till their adulthood for their routine checkup through dental well baby visits every six months<sup>13</sup>. Adenotonsillar hypertrophy being the major causative factor of POSA; children suffering from POSA are more likely to be identified by a paedodontist<sup>6</sup> as they are educated and trained in the anatomy and physiology of oropharyngeal region in children<sup>14</sup>. Literature has mentioned the unique role of pedodontist in early diagnosis and management of POSA<sup>15,16</sup>. But whether the lack of evidences on knowledge, attitude and practice regarding POSA among pedodontists is due to their lack of confidence to play a role in early diagnosis and referral needs to be ascertained<sup>17</sup>.

The role of dentists in POSA diagnosis had been addressed in several studies<sup>10</sup>, but the knowledge, attitude and practice regarding POSA among general dentist is still uncertain. A survey<sup>18</sup> conducted among general dentists have reported poor knowledge in diagnosis, screening and referral modalities of OSA in India. This lacunae in education on OSA<sup>15</sup> and POSA<sup>19</sup> during their training period have proposed for more focused educational programs on the topic among dental professionals. Yet, it is uncertain whether the upcoming postgraduates have enough knowledge and awareness regarding the importance of accurate and prompt early diagnosis of POSA in children. Hence, this study aims to assess knowledge, attitude and practice for POSA of pediatric and preventive dentistry postgraduate students, in India.

## METHODOLOGY

This cross-sectional questionnaire study was conducted from June to October 2021 among paediatric and preventive dentistry postgraduates in India, after obtaining approval from the Institutional ethical committee of AJ Institute of Dental Sciences, Mangalore. Through a pilot study, the sample size was determined to be 154.

A total of 764 postgraduate students were invited to participate in the study through various postgraduate Whatsapp groups. During the study period reminders by direct calling or messaging were carried out a maximum of three times for each participant. Those consenting to participate were briefed about the study and their informed consent was sought online. The first 154 respondents with completely filled survey form were included in the study.

The tool used in this study was a self-administered questionnaire developed by a group of three pediatric dentists in academia after referring to the scientific literature. It was validated by the subject experts. The questionnaire had two parts. The first part contained questions on demographical data of the participants and the second part included a total of 20 questions (12 knowledge based close ended questions, two on attitude using 5 item Likert grade scale and 6 practice based close ended questions) designed on Google forms.

The overall knowledge of the study participants were scored with each correct answer being given a value of one. Score 12 was the maximum and 0 the minimum score that could be obtained. An individual with total knowledge score > 11 was considered good, 9-10 as fair and 8 and below was considered as poor. Questionnaire responses were tabulated using Microsoft excel. Statistical analysis was done for each of the 20 survey items and for each of the three assessment domains (Knowledge, Attitude and Practice), a frequency distribution was determined and presented in the form of tables, diagrams and graphs. Overall mean of the knowledge was determined.

## RESULT

Study participants belonged to 11 states of India; and majority (80%) were third year post graduate students, also the most of them (85.7%) were from the private institutions and belonging to urban region (Table 1). Mean knowledge score of the study participants was  $8.17 \pm 2.54$ , with maximum score being 12 and minimum was 1. Almost half of the study population (47.4%) had poor knowledge score (Figure 1). Table 2 depicts the distribution of the study participants' response for each of the question in knowledge domain. More than 50% of the study participants responded correctly for most of the knowledge questions, except for two questions on most prevalent age group which manifest POSA and the extra oral features suggestive of POSA. Majority of the study participants strongly agreed on pedodontist's role in early diagnosis and referral of POSA, and also agreed in the need of updating the post graduate dental curriculum on POSA (Figure 2). Table 3 depicts the study participants' practice on POSA. All the study participants have reported to have diagnosed cases with mouth breathing habit during their practice, however only 47.4% of the study participants reported to have screened

and referred for POSA. And 39% reported to have never screened using any diagnostic tools for POSA. Only 34.5% of the study participants reported to have attended workshops, symposiums, or/ and CDE programs on POSA (Figure 3) and the status of training and appraisal of screening for POSA received by the participants is presented in Figure 4.

## DISCUSSION

For pedodontist is a medical practitioner who is in regular contact with a child from year one to adolescence; and is very likely to identify the causative factor of POSA, thus, they can play a unique role as a part of the multidisciplinary team for early diagnosis and prompt management of POSA to improve the overall performance and well being of a child. Diagnosis of POSA on a patient undergoing dental treatment under sedation is imperative, to reduce the risk of upper airway obstruction and pharyngeal collapse. Hence, adequate knowledge on diagnosis and management is essential for prompt referral and its management. However, scientific literature on pedodontists' knowledge on POSA is lacking. As today's postgraduates are tomorrow's practitioners, the present study was conducted to assess the knowledge, attitude, and practices of POSA among these budding pedodontists.

The present study findings revealed that almost half (47.4%) of the study participants had poor knowledge on POSA, where the majority of the respondents were from third year of post graduation. In line with this, studies have shown lack of awareness among Indian dentists as well as physicians about prevalence, diagnosis and management of sleep apnea syndrome. The probable reason could be the lack of knowledge on POSA available in the current post graduate dental curriculum in India. There is evidence that the Indian dental curriculum doesn't involve learning objective for OSA among general dentists.<sup>20,21</sup> Similar findings were reported in studies from other countries like Saudi Arabia and Jordan, in which dentists had limited knowledge about POSA and sleep medicine.<sup>22,23</sup>

Around 90% of the study participants showed a favourable attitude towards inclusion of more dental lectures on POSA and the role of paedodontist in POSA, in the post graduate dental curriculum. This result is consistent with findings of Guneri P et al. in 2017<sup>24</sup>, who reported that more lectures, dental education programs and workshops on POSA must be included in their dental curriculum. Simmons MS et al. in 2012,<sup>25</sup> stated that in US few dental schools have started including more topics on dental sleep medicine in their dental curriculum and didactic teaching method was used for the same. Jacy Stauffer et al<sup>19</sup> in his review of literature in 2018 has proposed that the education provided for dentist must include information on epidemiology, pathogenesis and treatment consideration of children with POSA.

For a pedodontist, besides knowledge on POSA; early diagnosis and referral of potential POSA patient to the physician is important for appropriate management of POSA. In 2017, ADA policy stated the dentists' role in screening and referring patients with OSA, as well as treatment provision with oral appliance therapy.<sup>26</sup> AAPD<sup>3</sup> has made it mandatory to use Pediatric sleep questionnaire (PSQ) to ask patients and their parents regarding the sleeping habits such as snoring, mouth breathing, bed wetting and breathing troubles during sleep. Further the oropharyngeal examination has to be done to detect adenoid hyperplasia and nasal deviations. Once the patient is suspected for POSA, immediate referral to physician has to be done for the formal sleep study. The golden standard for sleep study is polysomnography, which can give a detailed report on sleep which can be done by a sleep medicine specialist. In this study, 90% of the study population had diagnosed mouth breathing habit in children, in their practice. It has been well established that most of the children with mouth breathing habit have adenotonsillar hypertrophy, indicating suspected POSA in these children<sup>27</sup>. Yet, only 5.2% of the study population referred these children to a sleep medicine specialist and remaining 66.3% referred them to physicians. This is in accordance with a pilot study<sup>28</sup> conducted in US among AAPD members, in which 93.9% of respondents referred suspected POSA cases to a physician instead of sleep medicine specialist and 41.2% of the respondents were uncomfortable or very uncomfortable screening for POSA.

Around 90.2% of the study participants showed a favourable attitude towards their role in screening and referral of the POSA patient to a sleep medicine specialist in this study but 52.6% of post graduates were not sure about the screening and referral protocols and 39% never screened for suspected POSA using standard diagnostic tools. This is in accordance with the pilot study conducted among AAPD members, which concluded the routine screening for POSA is not standard.<sup>28</sup> Previous studies have reported that regardless of limited knowledge on OSA, majority of the dentists showed strong positive attitude towards attaining knowledge on OSA screening and referral.<sup>28,18</sup>

According to American Academy of Dental Sleep Medicine (AADSM), knowledge and training on dental sleep medicine must be updated regularly by the dentists who deal with POSA cases.<sup>29</sup> While in this study, 65.6% of the post graduates never attended any training programs on POSA during their post graduate training period which is similar to an earlier study, which reported that 61.4% of the respondents agreed not to have received formal training on POSA during their residency.<sup>28</sup> In this study, 52.6% of the postgraduates agreed that they were not adequately appraised or trained to screen for POSA. Yet only 13.6% of the study participants have agreed to have adequate appraisal, training and confidence in screening suspected POSA in children during their training period. Similarly the participants who attended the workshop SLEEPCON held by Indian Sleep

Disorders Association at annual conference agreed that it is essential to learn more about sleep medicine in the dental practice and also attend workshops on the same to have knowledge on this. They also expressed their concern about lack of knowledge on sleep dentistry in the dental curricula.<sup>30</sup>

There are certain limitations to this study. The study covered only few participants from 11 states of India; hence, the result of this study cannot be generalized since the knowledge level might not be the same. A larger sample size with different demographic information and extended focus on the practicing dentists may be conducted in future. Nevertheless, the findings of present study may be utilized as baseline data for further research. Since the questionnaire study was done on online platform, the authors of this study cannot assure that the participants were properly answering the questions without simply guessing the answers.

The postgraduates of Pediatric dentistry department should have at least 1-week posting in both Otorhinolaryngology as well as Pulmonology and Sleep Medicine departments each, to learn more about the working of polysomnography, spirometry, and CPAP titration and also know how to examine adenoids, tonsils, turbinate hypertrophy and septal deviations correctly. The medical fraternity should also be made aware of the dentists' role in sleep medicine since pulmonologists and otolaryngologists are more likely to encounter patients with SDB. It is probable that dental textbooks do not cover the POSA topic sufficiently; thus, the dental curriculum for postgraduates needs to be updated on POSA and dental sleep medicine. Postgraduate students may be motivated in doing dissertations on upper airway disorders and these cases may be exhibited during the MDS practical examinations.<sup>30</sup>

## **CONCLUSION**

While the role of pedodontist on POSA is well known, there is lacunae of knowledge on epidemiology, pathogenesis and treatment consideration of children with POSA among pedodontists. The attitude shown by study participants towards the management and referral of suspected POSA cases was favourable. The educational opportunities available in dental curriculum for postgraduates are limited and the screening protocols for POSA are not standard. Hence, to further improve the knowledge among future pedodontists, it is essential to include it in the dental curriculum and conduct more training programs like CDE and workshops on POSA.

## **ABBREVIATIONS**

AAP – American Academy of Pediatrics; AADSM - American Academy of Dental Sleep Medicine; AAPD - American Academy of Pediatric Dentistry; ADA – American Dental Association; CPAP – Continuous Positive Airway Pressure; MDS – Master in Dental Surgery; OSA – Obstructive Sleep Apnea; POSA – Pediatric Obstructive Sleep Apnea; PSQ - Pediatric Sleep Questionnaire.

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The Authors declare that there is no conflict of interest.

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## **CONSENT TO PARTICIPATE**

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