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Knowledge, Attitude and Practice of Pedodontists, Pediatrician And ENT Surgeons Towards Pediatric Obstructive Sleep Apnea: A Cross Sectional Study

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ABSTRACT

Introduction: Sleep disordered breathing encompasses a wide range of upper airway disorders from primary snoring (PS) to obstructive sleep apnea (OSA). Obstructive sleep apnea, which affects 1 to 3 percent of children,is characterized by periodic obstruction of the upper airway that interferes with normal respiratory gas exchange and disturbs sleep.

Aims: To assess Knowledge, Attitude and Practice of Pedodontists, Pediatricians and ENT specialists towards Pediatric Obstructive Sleep Apnea.

Method: A cross sectional semi structured self administered questionnaire was designed to collect the data. Time bound enumeration was used to recruit the participants and a total of 25 Pedodontists, 25 Pediatricians and 25 ENT specialists were included in study.

Result: Of the total 28% of Pedodontists came across cases of Pediatric Obstructive Sleep Apnea.92% of Pediatricians come across cases of Pediatric Obstructive Sleep Apnea.40% of Ear,Nose and Throat surgeons screen for Pediatric Obstructive Sleep Apnea.

Conclusion: Inspite of having 1-3 % of Pediatric obstructive sleep apnea patients in India, it is one of the neglected entity from Pedodontists.

Key words: Sleep apnea–Snoring–Polysomnography.

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1 INTRODUCTION

leep-disordered breathing is a spectrum of upper airway disorders ranging in severity from primary snoring to obstructive sleep apnea. Obstructive sleep apnea, which affects 1 to 3 percent of children,is characterized by periodic obstruction of the upper airway that interferes with normal respiratory gas exchange and disturbs sleep.Children with obstructive sleep apnea often present with a clinical picture of snoring and witnessed apneas. If not treated, obstructive sleep apnea can result in significant physiologic sequelae including cardiorespiratory impairment and growth retardation. The gold standard for diagnosis of pediatric obstructive sleep apnea is full-night polysomnography (PSG). Polysomnography, however, is expensive, time-consuming, and frequently unavailable at institutions that treat children with obstructive sleep apnea. Consequently, obstructive sleep apnea is most often diagnosed with clinical criteria, and adenotonsillectomy is performed with no further objective testing. Although polysomnography reliably measures the presence and severity of obstructive sleep apnea, it fails to quantify the impact of obstructive sleep apnea

on a child's general well-being, including emotional and behavioral health. Moreover, although adenotonsillectomy has been used with increasing frequency to treat children with obstructive sleep apnea,some controversy remains concerning the specific indications for this procedure [1] .

Obstructive sleep apnea is defined by the American Thoracic Society (ATS) 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."Obstructive hypoventilation during sleep is included in the above definition of obstructive sleep apnea by the American Thoracic Society, as it is in the definition given by the International Classification of Sleep Disorders [2].

Obesity in pregnancy is associated with an increased risk of adverse pregnancy outcomes, and it is therefore important to consider whether obstructive sleep apnea may be an important contributor [3] .

Patients with obstructive sleep apnea may suffer from repeated episodes of hypoxia and normoxia, which are in many ways reminiscent of ischemia reperfusion events, and are currently believed to promote the production of reactive oxygen species (ROS) and the promotion of oxidative stress, which in turn may adversely affect endothelial regulation through Nitrous Oxide-mediated pathways . In addition, obstructive sleep apnea has been implicated in the induction and propagation of inflammatory cascades that in turn can both promote and exacerbate atherogenesis and vascular dysfunction [4] .

Almost all children with obstructive sleep apnea snore, and the American Academy of Pediatrics (AAP) recommends that all children with habitual snoring and symptoms/signs of obstructive sleep apnea (i.e., overweight or hypertension) undergo polysomnography or be referred to a sleepspecialist or otolaryngologist for further evaluation of possible obstructive sleep apnea [5] .

The distinctive symptoms of obstructive sleep apnea in children are remarkably scarce and usually require a high level of suspicion or alternatively, require systematic implementation of explorative screening questions to enable their detection. Common nighttime symptoms include snoring, excessive sweating, restless sleep, mouth breathing, apneas, gasping, labored or paradoxical breathing, and hyperextension of the neck during sleep. Daytime symptoms most commonly include difficulty concentrating, behavioral and mood problems, morning headaches, excessive daytime sleepiness (EDS), and failure to thrive [6] .The upper airway above the level of the cartilaginous airway is a collapsible muscular tube that usually remains patent but has the potential to collapse to facilitate such functions as speech and swallowing [7] .

Episodes of upper airway obstruction often are associated with arousals, sleep fragmentation, intermittent hypoxemia and hypercapnia, and nocturnal hypertension [8] . Pediatric patients with micrognathia often experience upper airway compromise related to the retrodisplacement or posterior prolapse/glossoptosis of the tongue that is most prominent in the supine position. This is often manifested as episodic obstructive apneas and chronic hypoxia. Untreated airway obstruction is associated with failure to thrive, neurocognitive delay, and behavioral difficulties, along with cardiopulmonary complications including pulmonary hypertension and congestive heart failure [9] .

2 MATERIALS AND METHODS

A cross-sectional study was conducted among Pedodontists, Pediatrician and Ear,Nose and Throat surgeons of Nagpur with approval sought from Institutional Ethical Comittee. The study objective and questionnaire were briefly explained to participants. A questionnaire consisting of ten close ended questions were distributed to participants.There was an active participation from all the participants.

Data was obtained from the participants using a semi-structured self administered questionnaire which included details on knowledge,attitude and factors affecting consumption of fast food.

3 STASTICAL ANALYSIS

Statistical analysis was done by using descriptive and inferential statistics using chisquare test, student's paired and unpaired t test and software used in the analysis were SPSS 22.0 version and Graph Pad Prism 7.0 version and $p<0.05$ is considered as level of significance.Sample size was 25 for each group.

4 RESULTS

Of the total 28% of Pedodontists came across cases of Pediatric Obstructive Sleep Apnea.92% of Pediatricians come across cases of Pediatric Obstructive Sleep Apnea.40% of Ear,Nose and Throat surgeons screen for Pediatric Obstructive Sleep Apnea.68% of Ear,Nose and Throat surgeons found that Pediatric Obstructive Sleep Apnea ceses goes undiagnosed because of lack of Treatmentt management.64% of Pediatricians think that cases of Pediatric Obstructive Sleep Apnea goes undiagnosed because of lack of thorough clinical examination.92% Pediatricians think that Dentists should be trained for screening and management of Pediatric Obstructive Sleep Apnea.80% of Pedodontists consider mouth breathing is one of the common symptom for diagnosing Pediatric Obstructive Sleep Apnea.Most of the Pedodontists and Pediatricians are familiar with Polysomnography which is most commonly used diagnostic tool for diagnosis of Pediatric Obstructive Sleep Apnea.92% of Pediatricians uses Polysomnography as diagnostic tool for diagnosis of Pediatric Obstructive Sleep Apnea.84% of Ear,Nose and Throat surgeons treated cases of Pediatric Obstructive Sleep Apnea and 36% of Pedodontists treated cases of Pediatric Obstructive Sleep Apnea.96% of Ear,Nose and Throat surgeons uses Tonsillectomy and Adenoidectomy for treating cases of Pediatric Obstructive Sleep Apnea.84% of

(TABLE-1)

Sr.No.	Question	Choices	Pedodontist(25)	Pediatician(25)	ENT(25)
1	Have you came across cases of Pediatric Obstructive Sleep Apnea in your practice?	Yes	7 (28%)	6 (24%)	5 (20%)
		No	18 (72%)	19 (76%)	20 (80%)
2	Are you familiar with the screening of Pediatric Obstructive Sleep Apnea in your practice?	Yes	9 (36%)	23 (92%)	7 (28%)
		No	16 (64%)	2 (8%)	18 (72%)
3	How often do you screen for Pediatric Obstructive Sleep Apnea?	Commonly	7 (28%)	5 (20%)	10 (40%)
		Not commonly	18 (72%)	20 (80%)	15 (60%)
4	Why do you think sleep apnea cases go undiagnosed?	Lack of thorough clinical examination	15 (60%)	16 (64%)	8 (32%)
		Lack of T/t management of POSA	10 (40%)	9 (36%)	17 (68%)
5	Do you feel Dentists should be trained for the screening and management of POSA?	Yes	22 (88%)	23 (92%)	22 (88%)
		No	3(12%)	2(8%)	3(12%)
6	Which signs and symptoms do you use for screening of POSA?	Enlarged tonsils	5(20%)	20(80%)	10(40%)
		Mouth breathing	20(80%)	5(20%)	15(60%)
7	Have you heard about polysomnography ?	Yes	24(96%)	25(100%)	25(100%)
		No	1(4%)	0(0%)	0(0%)
8	Which diagnostic techniques are commonly used by you for diagnosing POSA?	Polysomnography	17(68%)	23(92%)	20(80%)
		Other technique	8(32%)	2(8%)	5(20%)
9	Have you provided any form of T/t to Pediatric patient diagnosed with POSA?	Yes	9(36%)	5(20%)	21(84%)
		No	16(64%)	20(80%)	4(16%)
10	If yes which T/t modality used by you for treating POSA ?	Tonsillectomy /Adenoidectomy	4(16%)	17(68%)	24(96%)
		Palatal expansion	21(84%)	8(32%)	1(4%)

*Pe*dodontists uses palatal expansion as treatment modality for treating Pediatric Obstructive Sleep Apnea.

5 DISCUSSION:

Most of the Pedodontists and Pediatricians come across cases of Pediatric Obstructive Sleep Apnea.Obstructive sleep apnea children demonstrated a skeletal Class II pattern,with a reduced mandibular length and increased overbite. The hyoid bone found to adopt more superior position. In, addition children with obstructive sleep apnea were found to have narrower mandibular inter-arch distances [10] . Pediatric obstructive sleep apnea is highly prevalent in children and is associated with numerous health-related complications. Of equal concern is the likelihood that Pediatric obstructive sleep apnea will remain undiagnosed or diagnosis will be delayed in many children, given the paucity of available pediatric polysomnography laboratories. If Pediatric obstructive sleep apnea is left untreated, there are several potential harmful consequences, including attention or behavioral problems, reduced academic performance, cardiovascular disease, and growth / nutritional concerns ranging from failure to thrive or to obesity [11] .

Pediatricians most frequently come across cases of Pediatric Obstructive Sleep Apnea. Ear, nose and throat surgeons think that Pediatric Obstructive Sleep Apnea cases goes undiagnosed because of lack of treatment management. Pediatricians think that cases of Pediatric Obstructive Sleep Apnea goes undiagnosed because of lack of thorough clinical examination. Obstructive sleep apnea is a complex disease entity that has far-reaching effects on health-related quality of life in children. The impact of obstructive sleep apnea extends beyond sleep parameters to affect children's behavior, daytime functioning, and family life. Great improvements in Quality of life are evident after surgical intervention, and these findings are maintained in the long-term [1] .

Pediatricians think that Dentists should be trained for screening and management of Pediatric Obstructive Sleep Apnea. Pedodontists consider mouth breathing is one of the common symptom for diagnosing Pediatric Obstructive Sleep Apnea. Most of the Pedodontists and Pediatricians are familiar with Polysomnography which is most commonly used diagnostic tool for diagnosis of Pediatric Obstructive Sleep Apnea.Children with craniofacial disorders such as micrognathia and cleft lip/palate have an increased risk of obstructive sleep apnea. Micrognathia increases the risk of obstructive sleep apnea secondary to upper airway obstruction because the tongue is large relative to the mandibular structures and tends to prolapse backwards [12] .

Pediatricians uses Polysomnography as diagnostic tool for diagnosis of Pediatric Obstructive Sleep Apnea. The potential interactions between gene polymorphisms (conferring individual susceptibility determinants), lifestyle components modulating overall end-organ vulnerability, and the phenotypic expression of obstructive sleep apnea and its consequences will have to be identified and incorporated into future prediction schemes of morbidity risks associated with obstructive sleep apnea [6] .

There is partial improvement of obstructive sleep apnea with inhaled nasal steroids and Rapid maxillary expansion in children [13] . Pediatric polysomnography is the diagnostic study of choice to evaluate for obstructive sleep apnea in children, and to evaluate cardiorespiratory function in infants and children with chronic lung disease or neuromuscular disease when indicated. It is helpful to investigate atypical cases of parasomnias. It is important to understand that children are not just small adults when being studied in a sleep lab; they require a child friendly atmosphere and approach, need smaller and specialized equipment, and due to developmental and physiological differences from adults, have age-adjusted rules for the scoring and interpretation of polysomnograms [7] .

The real benefit of polysomnography testing is the accurate diagnosis of obstructive sleep apnea in children compared with that based on clinical evidence alone, resulting in avoidance of unnecessary surgery if no other indications for Tonsillectomy & Adenoidectomy are present [14] . Ear,Nose and Throat surgeons uses Tonsillectomy and Adenoidectomy for treating cases of Pediatric Obstructive Sleep Apnea.It is possible to use nasal continous positive airway pressure in a wide range of ages, from young babies through to older children, either as a primary treatment or as a bridge therapy in patients at high risk for surgery. In order to improve the success rate for nasal continous positive airway pressure,there needs to be a focus on education and motivation of the parents to convince them of the efficacy and safety of nasal continous positive airway pressure in order to reduce the number of failures [15] .

Tongue-lip adhesion may be performed in micrognathic infants to alleviate airway obstruction. Polysomnographic evaluation before and after surgery suggests that Tongue-lip adhesion can improve Obstructive Sleep Apnea [9] . Children with Obstructive Sleep Apnea lack upper airway neuromotor responses to negative pressure and hypercapnia during sleep. We speculate that this is secondary to chronic respiratory abnormalities during sleep. Upper airway responses improved after Tongue-lip adhesion but did not reach normal levels, despite normalization of polysomnographic results [7] .

Pedodontists uses palatal expansion as treatment modality for treating Pediatric Obstructive Sleep Apnea. Mandibular advancement splint therapy for snoring and obstructive sleep apnea results in changes in craniofacial morphology that are predominantly dental in nature, particularly on a long-term basis. It is important to provide adequate information to the patients regarding these possible changes, especially to those in whom larger occlusal changes are to be expected or in whom they are unfavorable [16] . Treatment of obstructive sleep apnea with a personalized oral jaw-positioning appliance in children with malocclusion is effective and well tolerated. Essential matters to address are how long these benefits last and how long children can and must continue to wear the appliance [17] . The modified monobloc appliances may be an effective therapeutic alternative in children with mild to moderate obstructive sleep apnea [10] .

Habitual snoring and obstructive sleep apnea in children is associated with increased prevalence of a variety of morbidities spanning the Central Nervous System and the cardiovascular and endocrine systems. The coexistence of obesity and obstructive sleep apnea appears to yield not only increased morbidity rates and poorer responses to therapy, but is altogether associated with a distinct and overall recognizable clinical phenotype. Therapeutic options have somewhat expanded since the initial treatment approaches were conducted, to include not only surgical extraction of hypertrophic adenoids and tonsils, but also nonsurgical alternatives such as Continous Positive Airway Pressure, antiinflammatory agents, and oral appliances [18] .

The important role of obstructive sleep apnea in long-term health outcomes, such as traffic and occupational accidents, and the adverse effect on vascular risk is recognized [3] . Orthodontic therapy should be encouraged in pediatric obstructive sleep apnea and that an early approach may permanently modify nasal breathing and respiration, thereby preventing obstruction of the upper airway [17] .

6 CONCLUSION:

Inspite of having 1-3 % of Pediatric obstructive sleep apnea patients in India, it is one of the neglected entity from Pedodontists. As multi-therapies might act synergistically, a greaterdegree of collaboration between sleep medicine, ear, nose and throat specialists and Pedodontist is warranted to establish the contribution of each therapy to the outcome of pediatric obstructive sleep apnea. This issue needs to be addressed urgently so that physicians may establish whether a patient should undergo an adenotonsillectomy ormay be spared a surgical procedure and receive dental treatment on the basis of a skeletal evaluation.In conclusion, further studies are warranted todefine the characteristics of patients who may benefit mostfrom orthodontic treatment and to assess the long-term efficacy of such treatment.

Conflict of interest:

Authors declare that there is no conflict of interest.

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