Original Research Article

DENTIST'S KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS OBSTRUCTIVE SLEEP APNEA IN CENTRAL INDIA: A QUESTIONNAIRE BASED SURVEY

Running title: Survey on Obstructive sleep apnea in dentistry

ABSTRACT

Context: Obstructive sleep apnea is a very usual sleep disorder that frequently goes undetected. In dental training enough significance aren't inclined to the various sleep disorders existing. Dentists take a crucial role in assessing, diagnosing, management and referring of OSA patients.

Aim: To evaluate the knowledge, attitude and practice about obstructive sleep apnea among dentists in Central India.

Study design: This cross-sectional study was carried out in Central India from January 2021 to June 2021 for duration of six months at Nagpur.

Methodology: 185 dentists participated in the survey. A questionnaire consisting of 23 items, evaluating the knowledge, attitude, and practice with respect to nine distinct domains concerning obstructive sleep apnea and circulated through a web designed program. Good/poor remarks were given to knowledge and practice questions and favorable/unfavorable for attitude questions. Study data was analyzed using descriptive and inferential statistics using chi square test.

Results: Overall dentists were observed to have good knowledge for domains of awareness, general findings and risk factors. Good knowledge was found in MDS for domains of screening and diagnosis (64.65% and 50.51%) and treatment and referral (65.66% and 57.58%) in comparison to the BDS group. Favorable attitude for all the domains was reported while poor practice in all domains.

Conclusion: Dentists had favorable attitude towards OSA but poor knowledge in certain domains about OSA which may be linked to lacked clinical experience and hurdle in their practice. They were passionate about further education on OSA.

Keywords: (Knowledge, Attitude, Practice Management, Obstructive sleep apnea, Dentist's, Questionnaires)

INTRODUCTION

One of the sleep-related breathing disorder is obstructive sleep apnea (OSA) which denotes repetitive incident of collapse of upper airway during sleep that can be partial or complete, proceeding to diminished (hypopnea) or absolute absence (apnea) of breathing for ten or more seconds and frequently related with either cortical arousal or a fall of saturated oxygen in blood.[1,2] Prevalence of OSA according to community-based studies from various portion of India have been estimated as 2.4% - 4.9% in men and 1%–2% in women.[3]

Various symptoms include noticed apnoea, snoring, depression, daytime sleepiness, and risk of cardiovascular diseases.[4] Male gender prediliction, menopause, middle age, sedentary lifestyles, obesity, large neck circumference, nasal obstruction, retro- or micrognathia, macroglossia, enlarged tonsils/ adenoids and low-lying soft palate are common risk factors.[5-7]

Overnight polysomnography (PSG) is a benchmark method of diagnosing OSA.[8,9] Various methods includes BANG questionnaire Body mass index, Age, Neck circumference, and Gender, STOP-BANG questionnaire Snoring, Tiredness, Observed apnea, high blood Pressure, Body mass index, Age, Neck circumference, and Gender, STOP questionnaire for adults, Berlin, Epworth Sleepiness Scale and Apnea Risk Evaluation System

(ARES). By this methods practitioners can directly screen the patients and can refer patients only with positive screening for PSG to obtain final diagnosis [2,10]

Currently the benchmark method for management of moderate to severe OSA is continuous positive airway pressure (CPAP). It is also an optional treatment for mild OSA.[11-14] Flemons et al found that deep palatal vault, enlarge tongue and Class 3 and 4 scores of uvula according to Mallampati classification are the features of high risk OSA patients.[16] Now Dentist's role is becoming gradually notable in evaluating, diagnosing, referring of OSA patients to another physician for assessing and assisting in the treatment.[15]

Hence the purpose of the study was to evaluate the knowledge, attitude and practice about obstructive sleep apnea (OSA) among dentists including Bachelor of Dental Surgery (BDS) and Master of Dental Surgery (MDS) in Central India.

METHODOLOGY:

This study was conducted from January 2021 to June 2021 for duration of 6 months at Nagpur in Central India.

Sample size calculation- The sample size for the study was calculated from the formula and qualitative data of similar type of study conducted in India.[2]

$$n = \frac{4Pq}{L^2}$$

Where p= 68.9% dentists correctly responded the correlation between gender and OSA

L = Allowable error

$= 10\% \text{ of } P = \frac{10 \times 68.9}{100}$

$= 6.89$

$q = 100 - P = 100 - 68.9 = 31.1$

$n = \frac{4 \times 68.9 \times 31.1}{6.89^2}$

$= 180.55$

n = 185 subjects needed in the study

Inclusion criteria – The survey takes in a total of 185 dentists including BDS and MDS across Central India. Irrespective of gender, graduation year and curriculum graduated dentists were included in the study.
Exclusion criteria – Undergraduates and Sleep physicians were eliminated from the study.

Data collection: In Google forms web based survey was specially created, spread to the dentists, and the replies were documented. This questionnaire survey included 23 questions. The questionnaire was put together by taking into consideration study carried out by Kale SS, 2020.[2]

- Demographic data consisted of: Gender, Qualification and Speciality.
- Twelve knowledge based questions involves five domains: Awareness, Screening and Diagnosis, Treatment and Referral, General findings, Risk factors of OSA.
- Seven attitude based questions involves three domains: Screening and Diagnosis, Dental curriculum, Interdisciplinary approach.
- Four practice based questions involve one domain: Screening, diagnosis and treatment.

Questionnaire was used to gather data on knowledge, attitude and practice of dentists toward OSA are compiled in Table 1. (Correct answers are mark bold)

Table 1: Questionnaire

Knowledge related questions		
Question Number	Question	Answer
1	Are you aware of Obstructive Sleep Apnea (OSA)?	**a) Yes** b) No
Screening and Diagnosis		

2	Which is the gold standard method used for diagnosis of OSA?	a) STOP questionnaire **b) Polysomnography** c) Case history d) Don't know
3	Can final diagnosis of OSA be made by a dentist?	a) Yes **b) No** c) Don't know
Treatment and Referral		
4	Which is not the correct choice of treatment for OSA?	**a) Mild OSA does not require treatment** b) Mild OSA treated with Oral appliance c) Moderate to severe OSA treated with CPAP and Orthognathic surgeries d) Severe OSA treated with oral Orthognathic surgeries e) Don't know
5	Disadvantages of CPAP (continuous positive airway pressure) is that, it causes,	a) Proclination of maxillary incisors **b) Retroclination of maxillary incisors** c) Proclination of mandibular incisors d) Retroclination of mandibular incisors
6	Who can prescribe oral appliances for OSA patients	a) Dentist **b) Sleep physician** c) Don't know
General findings		
7	OSA is more common among?	**a) Males** b) Females c) Both d) Don't know
8	Is snoring a symptom seen amongst OSA patient?	**a) Yes** b) No c) Don't know
9	Does the prevalence of OSA increases with age?	**a) Yes** b) No c) Don't know
Risk factors		
10	Factors which contribute to OSA are	**a) Obesity** b) Hypertension c) Obesity and/or hypertension d) Don't know
11	Do you think abnormal maxilla and mandibular development can be a risk factor for OSA?	**a) Yes** b) No c) Don't know
12	Enlarged adenoids are risk factors for OSA.	**a) Yes** b) No c) Don't know
Attitude related questions		
Screening and Diagnosis		
13	Dentist plays a role in diagnosing and providing treatment for OSA.	**a) Strongly agree** **b) Agree** c) Neutral d) Disagree e) Strongly disagree
14	When dentist identifies bruxism habit in his patient it is his role to enquire about snoring and OSA.	**a) Strongly agree** **b) Agree** c) Neutral d) Disagree e) Strongly disagree
15	Is it important for the dentist to enquire about sleep pattern of his	**a) Strongly agree**

	patient during history taking?	**b) Agree** c) Neutral d) Disagree e) Strongly disagree
Dental curriculum		
16	Do you think during under graduation the dental curriculum should include information about OSA and role of dentist?	**a) Strongly agree** **b) Agree** c) Neutral d) Disagree e) Strongly disagree
17	Should OSA screening of patient be a mandatory part of clinical examination for the dentists?	**a) Strongly agree** **b) Agree** c) Neutral d) Disagree e) Strongly disagree
Interdisciplinary approach		
18	Dentist and sleep physicians should deal together with OSA patients	**a) Strongly agree** **b) Agree** c) Neutral d) Disagree e) Strongly disagree
19	If the dentist encounters abnormal anatomical oral structures then he should further investigate for OSA and refer the patient to sleep physician.	**a) Strongly agree** **b) Agree** c) Neutral d) Disagree e) Strongly disagree
Practice related questions		
Screening, diagnosis and treatment		
20	Have you ever asked your patient about sleep history after observing attrition of teeth in his mouth?	**a) Yes** b) No
21	Have you ever screened patient for OSA who has given history of snoring?	**a) Yes** b) No
I)	If Yes, How have you screened the patient for OSA?	
II)	Have you referred your patient to physician for sleep disordered diagnosis after noticing oral findings related to OSA?	**a) Yes** b) No
III)	Have you ever fabricated any oral appliance for treating your patient with OSA?	**a) Yes** b) No
22	Have you ever attended any course on management of OSA patients?	**a) Yes** b) No
23	Would you be interested in attending course on dental management of sleep related oral diseases?	**a) Yes** b) No

Knowledge and practice questions were graded question wise as Good for ≥50% correct responses; poor for ≤ 50% correct responses, while attitude questions were graded as favorable for 50% dentists answering to agree and strongly agree; unfavorable for 50% dentists answering to neutral, disagree and strongly disagree.

Statistics: Data was analyzed descriptively and with inferential statistics using chisquare test and presented in the form of graphs and the analysis software used was SPSS 27.0 version with (P = 0.05) considered as level of significance.

RESULTS:

Total 185 dentists completed and returned questionnaire. Of these 86 (46.49%) were BDS and 99 (53.51%) were MDS. The distribution of dentist's percentage based on the correct knowledge for each question was illustrated in Table 2. Dentists including BDS and MDS answered for question regarding awareness (Q.No.1),

gender predilection (Q.No.7), symptoms of OSA (Q.No.8), prevalence of OSA with age (Q.No.9), risk factors for OSA (Q.No.11,12) were correct for more than 50%. MDS correctly answered for methods of diagnosing OSA (Q.No.2,3), treatment modalities (Q.No.4) and disadvantages of CPAP (Q.No.5) and were also more than 50%. BDS knowledge was poor for; methods of diagnosing OSA (Q.No.2,3), treatment modalities (Q.No.4,5,6) and risk/contributing factors for OSA (Q10) .

Altogether knowledge was good for domains like awareness, general findings and risk factors. BDS had poor knowledge for domains on screening, diagnosis, treatment and referral of OSA.

Table 2: Percentage distribution of dentists consistent with their knowledge towards obstructive sleep apnea (OSA).

Question number	Knowledge (Correct responses)		Interpretation	
	BDS (%)	MDS (%)	BDS	MDS
1	88.37	100	Good	Good
2	17.44	64.65	Poor	Good
3	20.93	50.51	Poor	Good
4	40.70	65.66	Poor	Good
5	34.88	57.58	Poor	Good
6	8.14	47.47	Poor	Poor
7	56.98	69.70	Good	Good
8	81.40	90.91	Good	Good
9	80.23	90.91	Good	Good
10	24.42	47.47	Poor	Poor
11	80.23	86.87	Good	Good
12	79.07	88.89	Good	Good

Dentists presented favorable attitude with respect to role of dentist in treatment of OSA (Q.No.13), in referral of the patients after identifying relevant oral findings (Q.No.14,19), enquiring about patient's sleep pattern (Q.No.15), incorporating OSA related knowledge in dental curriculum to undergraduates (Q.No.16), screening of patients coming to clinics (Q.No.17), and interdisciplinary approach (Q.NO.18) (Table 3). Altogether, dentists including BDS and MDS reported favorable attitude for all the domains regarding, screening and diagnosis, dental curriculum and interdisciplinary approach.

Table 3: Percentage distribution of the dentists consistent with their attitude regarding obstructive sleep apnea (OSA).

Question number	Attitude (Correct responses)		Interpretation	
	BDS (%)	MDS (%)	BDS	MDS
13	81.39	96.97	Favorable	Favorable
14	75.58	93.94	Favorable	Favorable
15	76.75	95.95	Favorable	Favorable
16	82.55	91.91	Favorable	Favorable
17	80.23	91.91	Favorable	Favorable
18	80.23	91.92	Favorable	Favorable
19	80.23	89.89	Favorable	Favorable

Practice related questions were responded good by dentists regarding dentists contribution in asking the patients about sleep history after noticing attrited teeth (Q.No.20) of MDS (54.55%) and their interest in attending OSA management courses (Q.No.23) of BDS (88.37%) and of MDS (93.94%) in comparison with the other two questions centered on screening the patients with snoring history (Q.No.21) (Figure 1) and their

record on attending OSA management sessions in past (Q.No.22) (Figure 2) which were responded poorly by both BDS and MDS.

Figure 1: Have you ever screened patient for OSA who has given history of snoring?

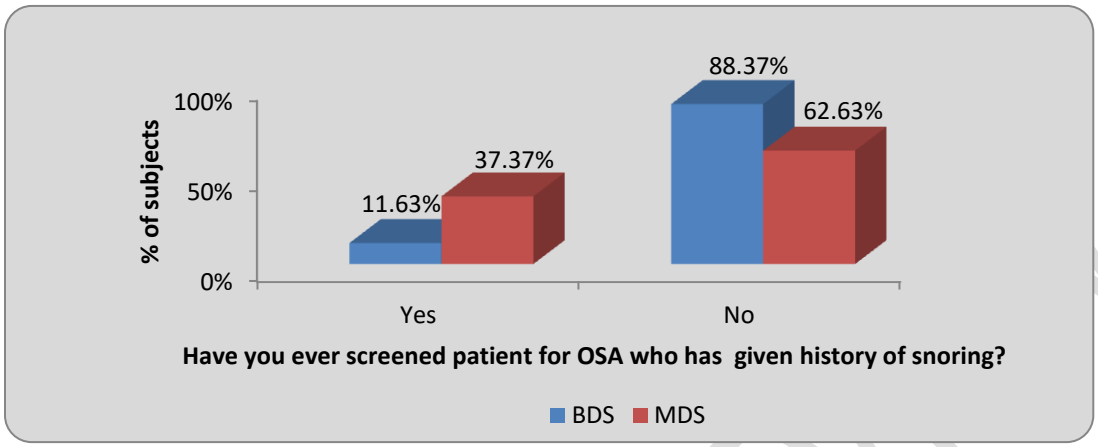
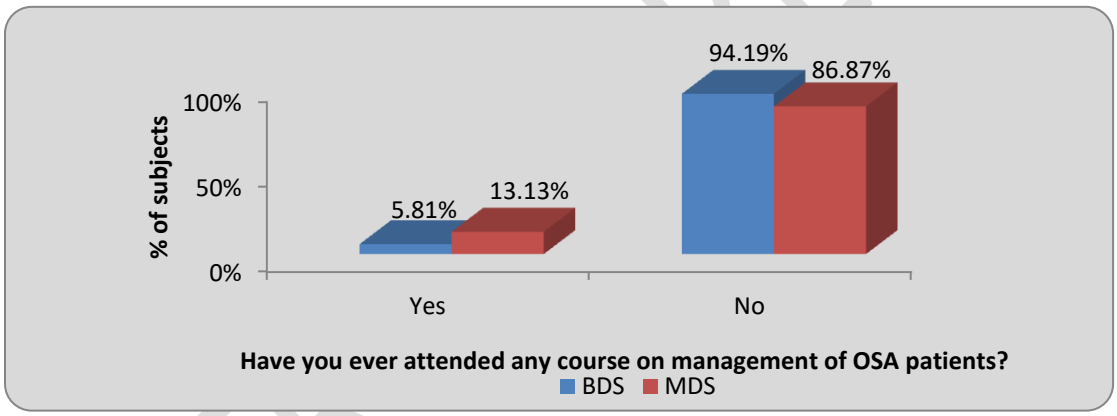


Figure 2: Have you ever attended any course on management of OSA patients?



Screening of OSA patients was not done by ≥50% of dentists both BDS and MDS. These dentists performed the screening by taking detail history, by dentition face profile, by polysomnography, malocclusion of teeth (Q No. 21 i). Further, 12.79% of BDS and 35.35% of MDS referred the screened patients (Q.No.21 ii), while only 10.47% of BDS and 27.27% of MDS fabricated oral appliances for the screened OSA patients (Q.No.21 iii). Mostly ≥50% dentists had poor practice in the categories concerning screening, diagnosis, treatment and continuing dental education.

DISCUSSION:

Out of the five domains in the knowledge related questions, for 2 domains including screening and diagnosis and treatment and referral, dentists have poor knowledge. As the dental syllabus does not include learning objective for OSA so this could be the cause for this and therefore the dentists have poor knowledge for the same. Dentists including 88.37% of BDS and 100% of MDS were aware of OSA. Bian found that 75% of the GDPs were aware of OSA as a disease.[17]

In general findings domain, OSA and gender predilection, 56.98% of BDS and 69.70% of MDS were acquainted about its correlation and this was in agreement with Jokubauskas et al.[12] They found that around 68.9% dentists correctly responded the relation between gender and OSA. 43.02% of BDS and 30.3% of MDS were not aware of gender predilection of OSA; this was in agreement with Manohar et al.[11]

The results of the present study shows that among both BDS and MDS, knowledge for screening, diagnostic aids, risk factors such as obesity, proper treatment along with the correct time and condition for referral to the sleep physician; regarding their role in final diagnosis and about prescribing the oral appliances to OSA patients directly was insufficient. Similarly in a study wherein, about 60% of the dentists were not aware about the oral appliances to treat OSA and 21.15% could not identify different tests for diagnosing OSA.[10]

Jokubauskas et al.[12] found that 78.8% dentists answered that they and medical practitioner can together deal with OSA similar findings found in Bian study.[17] The results of this study were also in accordance with the present study. About 41% dentist admit for their duty for suspecting OSA cases and 70.9% gave a positive view on participating in OSA treatment.[14] In this study favorable attitude of dentists for learning about OSA during graduation it is strongly suggested that the dental courses should include topics on OSA. This is in accordance with the study of Kale SS at al.[2]

In the present study, practices of the dentists towards domains directed towards screening, diagnosing and treating the OSA patients in their routine dental practice and continuing dental education was poor. Bian[17] found that 46% of the dentists after suspecting for OSA refer their patients to sleep physician while Manohar et al.[11] found that only 4% dentist correctly diagnosed the OSA patients. 85% dentist never consulted sleep physicians for the suspected OSA cases in their clinics and 89.8% dentists never fabricated any oral appliances for their OSA patients which is similar to the present study. In the present study, only 5.81% of BDS and 13.13% of MDS attended learning course regarding OSA management and 88.37% of BDS and 93.94% of MDS expressed their will to attend courses on OSA management. The results are consistent with Barnes et al.[18], wherein 90% of the dentists shows their interest in learning more about OSA while they are contrast with Jokubauskas et al.[12], who conveyed that 47.3% dentists attended continuing dental education courses for OSA learning.

CONCLUSION:

OSA led to multiple health problems since it is a highly underdiagnosed condition. In spite of its prevalence shown in different studies, this disorder still remains underacknowledged by different specialties, among them includes dentists. In the present study dentists had favorable attitude towards OSA but poor knowledge in certain domains about OSA which may be linked to lacked clinical experience and hurdle in their practice. Thus dentists make a crucial contribution in the reduction of serious medical symptoms associated with OSA. Furthermore, there is a need to far improve the knowledge among the future dentist, by introducing overall knowledge of OSA in undergraduate and postgraduate dental education. In addition, dentists should direct themselves towards continuing dental education programs regarding OSA.

ETHICAL APPROVAL:

The ethical approval was acquired from Institutional Ethics Committee before beginning the study with ethical clearance number – SDKS/PG/STRG/Pros2.

Consent

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

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