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EDITORIAL COMMENT

India's Air Pollution: The Horrendous Situation

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India's capital Delhi, with nearly 19 million residents, was described as a "gas chamber" as it faced a major air quality crisis this year.[1] The notorious pollution led to a declaration of public health emergency in the city. It also led to traffic accidents, closed schools, flight cancellations and ignited protests.

Frequent unhealthy levels of pollution from sources ranging from vehicle emission, agricultural practices like burning crop stubble, burning of biomass like wood, dung for cooking and heating, burning of coal, dust storms, forest fires, poor waste management, affect most of the country. As most of these practices are more prevalent in rural areas, the particulate layer that blankets dozens of cities, mainly the metro regions originates in these locations.

The hilly and mountainous inland regions of the country also act as reservoirs that trap the unpleasant and toxic air over vast belts of the country, sometimes making the air too dangerous to breathe. In land-locked regions, pollution does not dissipate timely. The polluted air then gently moves over major cities where it commingles with traffic exhaust, factory emissions, and construction dust making it more hazardous.

The indoor pollution caused due to use of stoves is too toxic for children. According to a World Health Organisation report, for households in India that used wood and dung for cooking, the mothers are more likely to deliver underweight babies in and children are more prone to asthma and infections. In 2015, about 75 percent of deaths linked to air pollution in India, some 1.1 million people, occurred in rural areas.

A lot many cities from India have seen a sudden rise in the rankings on WHO's list of most polluted cities. The problem has been prevalent since decades but has been measured and reported lately. About 98% of cities in low- and middle-income countries with more than 100 thousand inhabitants do not meet norms set out in the World Health Organization's (WHO) air quality guidelines. In the year 2012, approximately 1.5 million people died from the effects of air pollution in India. As per the World health statistics 2016, nearly 7 million deaths in 2012 across the globe occurred due to air pollution making it the world's largest single environmental health risk.

As per a fact sheet by University of Chicago, Air quality in Delhi, is among the deadliest in the country with pollution concentrations reducing life expectancy by more than 10 years for the typical resident.[2]

Exposure to high levels of pollutants affects is a major risk factor for cardiac disorders, stroke, chronic obstructive pulmonary disease, emphysema and lung cancer, and increases the risks for acute respiratory infections and exacerbates asthma. The rise in the level of air pollution also worsens the underlying disease condition, making a direct increase in need for medication and emergency visits to hospital.

As per a research conducted by Reddy et al, the annual population-weighted mean exposure to ambient particulate matter in India was 89.9 μg/m3 in 2017 with around 76.8% of the population exposed to annual population-weighted mean PM2.5 greater than 40 μg/m3, a limit recommended by the National Ambient Air Quality Standards in India.[3] Also, 1.24 million deaths in India in 2017 were attributable to air pollution and in the same year, India contributed 18.1% of the global population but had 26.2% of the global air pollution DALYs (disability-adjusted life-years) in 2017. It was also estimated that if the air pollution level in India were less than the minimum causing health loss, the average life expectancy in 2017 would have been higher by 1.7 years.[3] Although, India has disproportionately high mortality and disease burden due to air pollution, the anti-pollution laws in India aren't enforced well.

There is a need to implement both short-term and

long-term comprehensive and effective multi-sectoral policies and mechanisms that are adequate to face the magnitude of air pollution in the country and are able to reduce the high levels of air pollution that pose a major threat to the development of India. This would help in reducing the substantial avoidable deaths and disease burden from this major environmental risk. Controlling air pollution will require coordination across cities and provincial boundaries. There is a need to propose measures that would provide the largest reduction in exposure to air pollution and result in improvements of people's health. These might include switching to pollution free energy sources, reducing road traffic, avoiding use of cook stoves, creating vehicle free zones and cycle paths, planting more trees, proper waste disposal, use of vehicles with BS-VI technology and curtailing other practices of particulate emissions. Since the sources of air pollution are diverse, a coordinated effort is required with the involvement of different ministries along with the involvement of

policy makers, stake holders, media and the public. Once the drive against air pollution gains a momentum, further reinforcement would be required to enhance the planning and implementation of air pollution control efforts across Indian states in a sustainable manner. The time is to bring in a revolution against air pollution, not only to benefit human health, but for also laying a wider beneficial impact on the entire ecosystem of this so called 'green planet'.

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A Systematic Review on Sleep Related Disorders and Periodontal Disease

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A B S T R A C T

BACKGROUND: Periodontitis has been implicated in many systemic diseases such as diabetes, cardiovascular diseases, hypertension, stroke, Obesity, Kidney disorders. Recent scientific evidence has revealed a relationship between sleep related breathing disorders (SRBDs) and periodontal diseases. There has been a recent scientific evidence on population based studies reflecting an association between periodontal diseases and OSA.

AIM: The tenet of the study was to find out interconnect between obstructive sleep apnea and periodontal disease.

METHODS: A systematic review of clinical trials assessing the relationship between OSA and periodontitis was carried out. An electronic search based on internet search sites (From 2000-2016) by PubMed, MEDLINE, SCOPUS, EMBASE, Google scholar, CINAHL, and Web of Science (WoS) were used. Studies which met the inclusion criteria were further analysed to find out the outcome of the study.

RESULTS: A total of 174 potentially qualifying studies were screened. Out of them 10 studies fulfilled the inclusion criteria which were further analysed. In our study 10 studies (2000-2016) from Jordan, Tokyo, Turkey, Saudi Arabia, India, USA, South Korea, Taiwan, Australia were shortlisted. Out of them 5 were cross sectional studies, 4 were case control, and 1 was meta-analysis. The sample size in the studies ranged from 66 to 30,120 adult falling in age range of 18 to 75. The indicators for OSA used were as positive Epsworth sleepiness scale (ESS), Berlin Questionnaire, STOP-bang questionnaire, Apnea-Hypopnea index, Polysomnography (PSG). And the indicators for periodontal disease were Plaque index (PI), Clinical attachment level (CAL), Pocket Probing Depth (PPD), Gingival Bleeding Index (GBI). Majority of studies showed positive correlation between OSA and periodontal disease.

CONCLUSION: Recent evidence and literature suggests that there exist a strong interconnect between OSA and periodontal disease. Dentist play a pivotal role in diagnosis and timely management of OSA cases so as to halt progression of sleep apnea and periodontitis.

KEYWORDS: Sleep Related Breathing Disorders (SRBDS), Obstructive Sleep Apnea(OSA), Epsworth Sleepiness Scale(ESS), Apnea-Hypopnea Index (AHI), Polysomnography (PSG)

INTRODUCTION

Periodontal disease is a multifactorial disease that affects only a limited number of people within a population. Periodontal disease is a chronic infection of the tooth supporting structures caused mainly by gram-negative anaerobes.[1] Periodontal infection can be modified by behavioural factors, hormonal imbalances, drugs, systemic conditions, immunological, factors and haematological disorders.[2] Recently periodontal disease has received increasing attention because it may have relationship to systemic disease like Obstructive Sleep Apnea (OSA), diabetes, coronary heart disease, osteoporosis, etc.[3,4]

OSA is an event in which there is sudden obstruction or decrease in airflow due to collapse of upper airway leading to transient hypoxia and disturbed sleep.

Symptoms of OSA include morning headache, daytime sleepiness, snoring, and breathing pauses during sleep.[5] Excessive Daytime Somnolence (EDS) is a key symptom of OSA characterized by persistent sleepiness and often a general lack of energy, even during the day after apparently adequate or even prolonged night-time sleep. It is estimated that nearly 80% of men and 93% of women with moderate to severe sleep apnea are undiagnosed.[6] There has been a recent scientific evidence of association between periodontal diseases and OSA.

Thus, periodontitis is a multifactorial disease has polymicrobial etiology modified by various systematic and environmental factors. The periodontal and systemic diseases has a two way connect.

Numerous researches have been published focusing relationship between diabetes, pregnancy, Cardiovascular diseases and periodontitis. Very few studies are carried out to indicate relationship between OSA and periodontitis. Thus, it is important to find out the link between OSA and periodontal disease in an attempt to establish it as a risk

factor.

METHODOLOGY

This systematic review was conducted based on PRISMA. The research questions were explored using the PICO method. The research question were: (1) Is there a relation between periodontal disease and obstructive sleep apnea? (2) What is the interconnect between chronic periodontitis and obstructive sleep apnea? (3) What are the factors which suggest the relationship between periodontal disease and obstructive sleep apnea?

Search strategy: An electronic search of SCOPUS, MEDLINE, PubMed, CINAHL, Google Scholar and Web of Science (WoS) was carried out considering articles published up to December 2016 in English language.

Inclusion criteria: To be included studies had to be epidemiological studies regarding the outcome of reflecting the relationship between OSA and periodontal disease patients. The studies had to display the diagnosis of periodontitis based on key parameters like PPD, CAL, PI, GBI. The evaluation of OSA based on screening questionnaire like ESS, Berlin questionnaire, STOP-bang questionnaire, Mallampatti score and polysomnography (PSG) was a prerequisite. Various longitudinal studies, cohort studies, case control studies, randomized controlled trails on humans with no restrictions on sample size and geographic location published between (2000-2016) were enrolled in this study.

Exclusion criteria: Case Reports, Systematic reviews, review articles, abstracts, animal studies, publications in languages other than English were excluded from this study. Studies which did not directly evaluate the relationship between OSA and periodontitis were also excluded from the study. (Figure 1)

ASSOCIATION BETWEEN OSA AND PERIODONTAL DISEASE

The relationship between periodontitis and obstructive sleep apnea (OSA) had not been investigated before the study by Gunaratnam et al. (2009).[7] Periodontitis and OSA both are associated with systemic inflammation and cardiovascular disease. There is plethora of evidence implicating chronic periodontitis as a synergistic cause of various diseases, adverse pregnancy outcomes, pulmonary and cardiovascular diseases due to potential inflammatory pathways. There has been a recent scientific evidence of association between periodontal diseases and OSA. (Figure 2) Kellar JJ et al.[8] (2013) carried out a population based study showing statistically significant difference in the prevalence of chronic periodontitis in patients suffering from OSA. Arora SA et al.[9] (2015) in their cross-sectional study analysed interconnection between periodontal disease & day time somnolence among 200 patients using Epsworth sleeping scale. Results revealed a strong relationship between severity of periodontal diseases and
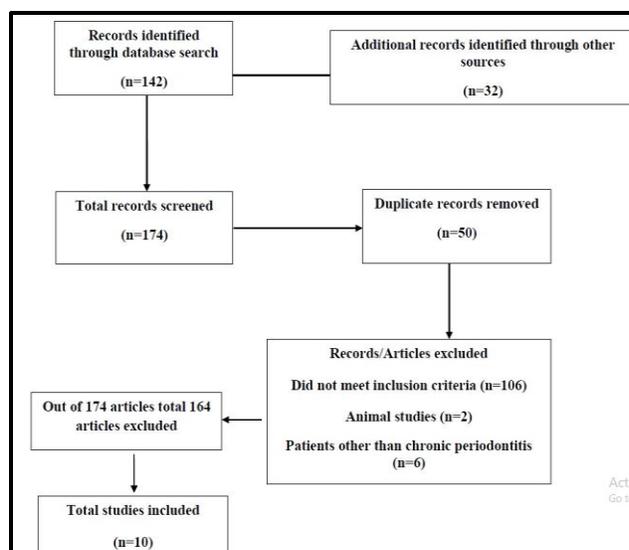

Figure 1. Study Design

daytime somnolence, although not statistically significant. Symptoms of OSA include morning headache, daytime sleepiness, snoring, and breathing pauses during sleep.[10] Excessive Daytime somnolence (EDS) is a key symptom of OSA characterized by persistent sleepiness and often a general lack of energy, even during the day after apparently adequate or even prolonged nighttime sleep.[11] The presence of obstructive sleep apnea is determined by the Apnea-Hypopnea Index (AHI). An $AHI \geq 5$ is indicative of the presence of obstructive sleep apnea.[12]

Various screening questionnaires are used to assess the screening of OSA, (i) Epsworth Sleepiness Scale(ESS)[13]:- Which is used as a tool to assess excessive day time sleepiness/Somnolence. The Epworth Sleepiness Scale is widely used in the field of sleep medicine as a subjective measure of a patient's sleepiness. The test is a list of eight situations in which the patient rates his/her tendency to become sleepy on a scale of 0(no chance of dozing) to 3(high chance of dozing). Upon completion of the test, the values for the responses are added and the total score is based on a scale of 0 to 24. The scale estimates whether a person is experiencing excessive sleepiness that possibly requires medical attention. Epsworth sleepiness scale is used as a validated, reproducible, and sensitive tool for the assessment and quantification of daytime sleepiness. (ii) Berlin questionnaire[14]: (Netzer NC et al.) Berlin questionnaire includes a set of questions concerning various known risk factors and symptoms of OSA. The Berlin questionnaire is simple and very easy for the screening of large populations. It does not require any extensive medical training to help patients to fill up as well as to analyze the questionnaire. Its sensitivity, specificity, and predictive values are sufficient for early diagnosis of OSA. (iii) Stop-bang questionnaire[15]: (STOP) S-Snore, T-Tired, O-Observed, P-Blood pressure. (BANG) B-Body mass
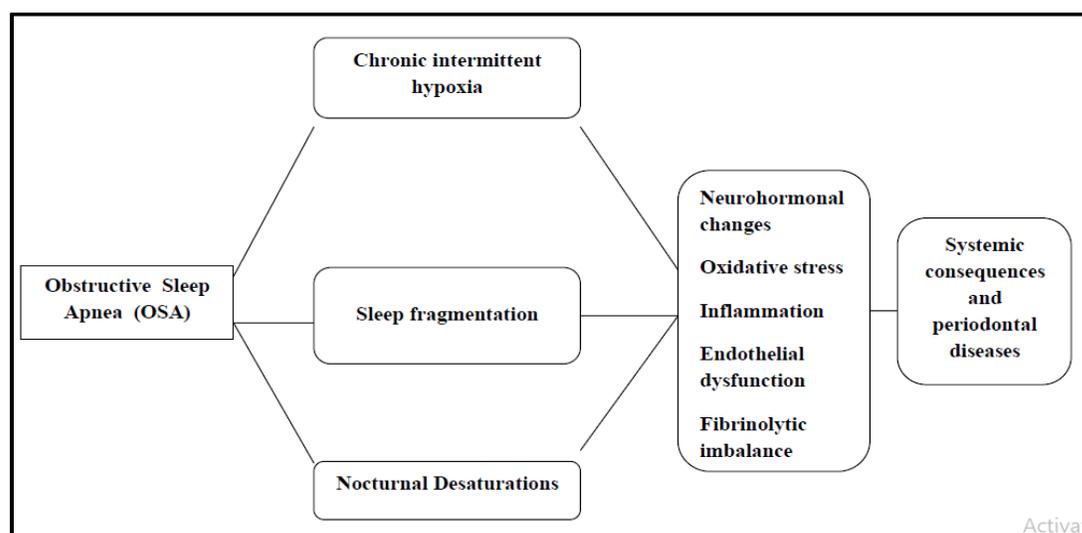
Figure 2. Mechanism leading to systemic consequences & periodontal disease of Obstructive Sleep Apnea (OSA).

index, A-Age, N-neck, G-Gender Yes to > 3 questions-High risk of obstructive sleep apnea. Yes to > 3 questions- Low risk of obstructive sleep apnea. These are used for screening of OSA. A confirmed diagnosis is made by Polysomnography (PSG) which is the gold standard. PSG includes electroencephalogram (ECG), electrooculogram (EOG), electromyogram (EMG).[16]

RESULTS

Selection of studies: A systematic review methodology was followed, and a thorough database search was done which yielded 142 records. Additional sources yielded 32 more records. A total number of 174 records from year 2000-2016 were taken into consideration; 50 duplicate records were removed from total of 174. 106 records which did not meet inclusion criteria, animal studies (n=2), patients other than chronic periodontitis (n=6) were also excluded to the study. Out of these records, a total number of 10 shortlisted studies were further evaluated on the basis of inclusion criteria and were included in the study. Statistical synthesis of the results of the included studies was not possible. Thus the paper was analysed on a qualitative way as meta-analysis was not possible. Out of 10 studies which were short listed for the systematic review 6 were cross sectional studies, 3 case control and 1 meta-analysis. 9 studies have reported a positive co-relation between OSA and periodontal disease whereas one study by Loke et al.[19] (2014 USA) reported that relation between OSA and Periodontitis is not significant.

Various cross-sectional studies are done till now to evaluate relationship between OSA and periodontitis (Table. 1) Habashneh RA et al.[17] (2016, Jordan) identified the cases of

OSA using the Berlin questionnaire and reported a positive association between periodontitis and OSA in a cross-sectional study on 296 patients. Their study showed a positive association between periodontitis and HR-OSA which was more generalized and more severe than in LR-OSA patients. Suzuki S et al.[18] (2016, Tokyo) did a cross sectional study by using Epsworth sleepiness scale (ESS) questionnaire and results revealed association between risk of OSA and poor oral health status. Theirs was an internet based survey involving 3053 respondents; the OSA group included 493 patients and control group consisted of 2560 patients. Epsworth sleepiness scale questionnaire was given to all the participants along with a consent form. Significant correlations were observed with the following parameters: difficulty in opening mouth, dry mouth, bad breath, gingival bleeding and gingival swelling. Gamsiz-Isik H et al.[19] (2016, Turkey) used polysomnography (PSG) for the diagnosis of OSA in periodontitis patients. Results of their cross sectional study demonstrated a higher prevalence of periodontitis and higher levels of levels of GCF IL-1β and serum hs-CRP in OSA patients with the prevalence of periodontitis in the OSA group (96.4%) being significantly higher than in the control group (75%), (p<0.001). Severe periodontitis prevalence was higher in the OSA group than in the control group. All periodontal clinical parameters were significantly higher in patients with OSA than in the controls (p=0.001).

Arora SA et al.[9] (2015, India) used the Epsworth Sleepiness Scale (ESS) as a diagnostic questionnaire and their results suggested a strong relationship between severity of periodontal disease and OSA and documented that as the mean CAL & PPD scores increased the ESS scores also

increased. It was found to be 7.6 + 1.97 for localized Periodontitis patients and 7.25 +1.30 for Generalized Chronic Periodontitis subjects. Loke et al.[20] (2014 USA) used polysomnography (PSG) for diagnosis of OSA. They reported that OSA was not significantly associated with the presence of moderate or severe periodontitis. In their study, 100 patients diagnosed with an overnight polysomnogram from sleep study centre underwent periodontal examination measuring periodontal probing depth (PD), clinical CAL, gingival recession, percentage of site with bleeding on probing. Multivariable logistic regression analysis predicting association between moderate/severe periodontitis with AHI score, age, smoking status indicated a significant association with age but no significant association with OSA.

A study conducted by Seo et al.[21] (2013, Korea) consisted of 687 subjects. They evaluated the association between OSA onset and progression of periodontal disease measuring periodontal parameters (CAL, periodontal probing depth). OSA was determined using polysomnography and apnea-hypopnea index (AHI). Their Results indicated that 17.5% of patients had periodontitis, 46.6% had OSA and 60% who were diagnosed with periodontitis had OSA proving a significant association between OSA and periodontal disease (Table 2).

Jewair AL et al.[22] (2015, Saudi Arabia) did a meta-analysis of 4 studies considered as randomized controlled trials, Preferred Reporting Items for Systematic reviews and meta Analyses followed by (PRISMA) guidelines. Results of the study showed a plausible association between periodontal disease and OSA. Evidence on the efficacy of periodontal disease interventions is insufficient. Various clinical and radiographical parameters were used for the periodontal assessment were CAL, PPD, oral hygiene indices, radiographic alveolar bone loss, and salivary cytokines. The (pooled odds ratio=1.65, 95 % confidence interval (CI)=1.11, 2.46, P=0.01) respectively.

Case control studies also determined the relationship between OSA and periodontitis. (Table.3) Moreover, Keller et al.[9] (2013, Taiwan) through their case-control study design determined that there is an association between OSA and chronic periodontitis using Polysomnography as the diagnostic test. Ahmad et al.[18] (2013, USA) through a case control study used a "STOP" OSA screening questionnaire to assess the
OSA and it was found that a significant association
between moderate or severe periodontitis and the risk of OSA in patients. Gunaratnam et al.[7] (2009, Australia) used the Apnea-hypopnea (AHI Index) in their case-control study design and their results revealed that there is significant association between periodontal disease and OSA.

DISCUSSION

Periodontal disease is a irreversible inflammatory disease of tooth supporting structure to halt the disease progression and treatment, patients need a specialist. This disease has multiple etiological factors as well as risk factors which include aging, gender, obesity, genetics, stress, pregnancy, nutrition, diabetes, smoking. Chronic periodontitis has been suggested to have an impact on the development of cardiovascular diseases, diabetes, obesity, kidney disorders and obstructive sleep apnea.[23,24] Few studies have claimed that periodontitis and OSA are associated with systemic inflammation and found that prevalence of periodontitis in OSA was higher. So, for a dentist the knowledge of OSA is mandatory to diagnose and manage cases of periodontitis.

Numerous studies have done till date which have hypothesized the relationship between OSA and periodontitis. With this review, we have attempted to find out the pathophysiology of OSA and periodontal disease.

In OSA, patients mouth breathing is a classical feature which leads dryness of mouth. It can be attributed to dryness of mouth in OSA patients. Snoring leads to mouth breathing which is seen in OSA patients, There are few studies which have suggested that dry mouth affects periodontal structures because saliva does not provide clearance action into the periodontal pocket which leads to bacterial colonization and binding of bacteria to the tissues which development of periodontal diseases like gingivitis and periodontitis occurs.[24] Apart from dryness of mouth while sleeping it also leads to halitosis. Stress is found to be higher in OSA patients, as we know stress plays a major role in periodontal disease occurrence and stress related periodontal disease. Some authors also evaluated that Plaque index (PI) was higher in OSA patients and daily brushing habits was also seen lower in OSA patients. A study reported in Japanese children with OSA and poor oral hygiene was also seen.[24]

Certain studies suggest the role of OSA with various inflammatory mediators TNF- ∝, IL-1β, IL-6, process through hypoxia and oxidative stress, hypoxia in OSA patients leads to stimulation which release of reactive oxygen species (ROS) that can lead to inflammation and endothelial dysfunction. OSA patients shown high levels of pro-inflammatory mediators and high levels of C-reactive protein such as seen in periodontitis patients.[25] There for, the exact mechanism to see impact on OSA and periodontitis on systemic health are unclear, their effect on pro-inflammatory cytokine have suggested.[26,27] During inflammatory response elevated levels of TNF- ∝, I L-1b and C-reactive level in gingival crevicular fluid have been seen in periodontal disease patients. In OSA patients there is repeated events of hypoxia and apnea which leads to an increase levels of TNF-∝, interleukin-6 and C-reactive

STUDY	STUDY DESIGN	DEMOGRAPHY	PERIODONTAL ASSESEMENT	DIAGNOSIS OR RISK FOR OSA	RESULTS	INFERENCE
Habashneh RA et al.[22] 2016, Jordan	Cross- sectional internet survey	n=296 subjects. Males with a mean (±SD) age 40 (8.5) years selected	CAL > 3mm, PPD > 4mm, GI*,PI#,CI* presence or absence, BOP#	Berlin-questionnaire	15% patients considered as (HR-OSA) with (LR-OSA) PPD- 2.35 ±0.±69 vs 1.97 ± 0.34 (p=0.000) and CAL 2.95±0.82 vs 2.12±0.55(p=0.000), patients with HR-OSA were more likely to have periodontitis (OR=2.3; 95% CI: 1.03-5.10) compared to patients with LR-OSA)	-The study showed a positive association between periodontitis and HR-OSA. Periodontitis in HR-OSA patients was more generalized and more severe than in LR-OSA patients.
Suzuki S et al.[23] 2016, Tokyo	Cross- sectional internet survey	Total 3053 respondents. OSA group- 493 patients and Control group- 2,560 patients.	Gingival index (GI) Gingival swelling (GI), dry mouth, bad breath, tooth mobility, Brinkman index (smokers)	Epsworth sleepiness scale	Significant correlation were observed with the following parameters: difficulty in opening mouth (odds ratio:2.66 95% confidence interval (CI): 1.647-4.311), dry mouth (OR:2.11; CI: 1.544-2.876), bad breath (OR: 1.69: CI: 1.309-2.186),gingival bleeding (OR: 1.48; CI: 1.134-1.932) and gingival swelling (OR: 1.44; CI: 1.046-1.981)	-This study revealed association between risk OSA and oral health status. -Some limitations-Survey was a self reported questionnaire. -Internet survey can be a source of selection bias. No questions were asked regarding other possible causes of mouth breathing, such as allergic rhinitis.
Gamsiz-Isik H et al.[24] Turkey	Cross sectional	163 individuals: 83 individuals with OSA (18 females; 65 males) and 80 non-OSA individuals (23 females; 57 males) as controls. The test group was classified according to OSA severity.	CAL*,PPD#,GI*,PI*, BOP#, GCF* IL-lβ	Polysomnography OSA diagnosed if AHI was >5events/hr.	The prevalence of periodontitis in the OSA group (96.4%) was significantly higher than in the control group (75%), (p<0.001). Severe periodontitis prevalence was higher in the OSA group than in the control group. All periodontal clinical parameters and GCF IL-lβ concentrations were significantly higher in patients with OSA than in the controls (p=0.001). No significant differences were found between mild OSA group and severe/moderate OSA group.	-This study demonstrated a higher prevalence of periodontitis and higher levels of GCF IL-1β and serum hs-CRP in OSA patients.

STUDY	STUDY DESIGN	DEMOGRAPHY	PERIODONTAL ASSESEMENT	DIAGNOSIS OR RISK FOR OSA	RESULTS	INFERENCE
Arora SA et al.[20] 2015, India	Cross-sectional	Sample size- 200 subjects 119 (59.5%) males, 79 (39.4%) females	CAL*,PD#,GI*,PI*, gingivitis, periodontitis according to AAP classification.	Epsworth sleepiness scale	-Prevalence of mild gingivitis to severe periodontitis: 15% had gingivitis, localized periodontitis 43%, generalized periodontitis 32%, diagnosed as chronic periodontitis. -Mean PI score with gingivitis 1.6±0.45, with mean gingival index scores 1.5±0.04, ESS score 5.3±1.6 with gingivitis Mean CAL& PPD scores for localized periodontitis 7.6±1.97, and for chronic periodontitis 7.25 ±1.30	A strong relationship between severity of periodontal diseases and day time somnolence, although not statistically significant. Some limitations: There was no confirmatory diagnosis of sleep apnea by polysomnography and other objective tools such EEG
Loke et al.[19] 2014, USA	Cross-sectional	n=100 subjects. F/M gender ratio: 9/91. Age range: 28–79 years. Mean ages: 52.6 year.	-PPD#, CAL*, REC*, BOP#, % of sites with plaque, % of sites with bleeding on probing, plaque PD ≥5 mm, % of sites with CAL ≥3 mm.	Polysomn-ography	-Prevalence of moderate to severe periodontitis 73 %. - Mean AHI in mild, moderate, and severe categories= 44.0 ± 12.9,55.4±13.4, 58.6±12.6, and 54.2±11.8 respectively	OSA was not significantly associated with the presence of moderate or severe periodontitis except for % of sites with plaque. Some limitations: -Weak study design. -Sample over represented by males.
Seo et al.[26] 2013, Korea	Cross-sectional	n=687 subjects. F/M gender ratio: 227/460. Age range: 47–77 years. Mean age: 55.85±6.63 years.	CAL > 6mm, PPD > 4mm, BOP#, REC#,PI*,GI*	Polysomnography and Apnea hypopnea index(AHI)	-Prevalence of periodontitis: 17.5 % (N=120). -Prevalence of OSA: 46.6 %. - 60 % of subjects with periodontitis had OSA. OSA was positively associated with periodontitis (OR= 2.51, 95% CI= 1.37-4.62) in subjects >55years of age, not in subjects <55 years of age.	There is a significant association between OSA and periodontal disease. Some limitations- -No sample size calculation. -Not all known confounders were controlled for.

Table 1. Cross-Sectional Studies Evaluating the Relationship Between OSA and Periodontitis and Included in the Present Study.

CAL- Clinical attachment level, PPD-Pocket probing depth, REC-Recession, GI- Gingival index, PI-Plaque index, CI-Calculus index, AHI-Apnea Hypopnea Index, BOP-Bleeding on Probing, HR-High risk, LR-Low risk ,OSA-Obstructive Sleep Apnea

STUDY	STUDY DESIGN	DEMOGRAPHY	PERIODONTAL ASSESEMENT	DIAGNOSIS OR RISK FOR OSA	RESULTS	INFERENCE
Jewair AL et al,.[25] 2015 SAUDI ARABIA	This meta-analysis Study considered as randomized controlled trials, longitudinal, cohort, case-control, and epidemiological studies on humans with no restrictions.	Meta-analysis of four studies	CAL*, PPD#, oral hygiene indices, radiographic alveolar bone loss, and salivary cytokines.	Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) guidelines	Meta-analysis of four studies revealed a statistically significant association between periodontal disease and OSA (pooled odds ratio=1.65, 95 % confidence interval (CI)=1.11, 2.46, P=0.01). There is insufficient evidence on the efficacy of periodontal disease interventions	There is some evidence to a plausible association between periodontal disease and OSA. Evidence on the efficacy of periodontal disease interventions is insufficient.

Table 2. Meta-Analysis Evaluating the Relationship Between OSA and Periodontitis and Included in the Present Study.

CAL- Clinical attachment level, PPD-Pocket probing depth, REC-Recession, GI- Gingival index, PI-Plaque index, CI-Calculus index, AHI-Apnea Hypopnea Index, BOP-Bleeding on Probing, HR-High risk, LR-Low risk ,OSA-Obstructive Sleep Apnea

STUDY	STUDY DESIGN	DEMOGRAPHY	PERIODONTAL ASSESEMENT	DIAGNOSIS OR RISK FOR OSA	RESULTS	INFERENCE
Keller et al[17]. 2013, Taiwan	They conducted study on longitudinal health insurance datatbase 2000. (Case-control study)	Cases=7673 with OSA as cases- Controls=21,963 without OSA. Mean ages=47.6 (±15.4 years). and over 62% were males	- PPD ≥3 mm, inspection of color and shape of gingival tissue, BOP#, tooth mobility. -Radiographic alveolar bone loss.	Polysomnography	-Prevalence of periodontitis between cases and control: (33.8 % of cases vs. 22.6 %, p<0.001) conditional logistic regression analysis revealed that the OR of prior CP for cases 1.75(95 % CI=1.68–1.88; P <0.001) OR for OSA among sampled patients with prior CP after excluding those who underwent periodontal treatment 1.78 (95 % CI=1.68–1.88; P<0.001).	-There was an association between OSA and a prior diagnosis of chronic periodontitis. Some limitations- -Risk of measurement bias. -No clear definition of chronic periodontitis. -Multiple examiners.
Ahmad et al[18] 2013, USA	Case-control	According to AAP classification Cases=50 with moderate or severe periodontitis was selected as; Case types III, IV With the Mean ages=61 years. Controls=104 with gingivitis Or early periodontitis with OSA were included Case types I, II	Plaque Index, Gingival Index and Bleeding Index, PD#, CAL*, gingival recession and case types	"STOP" OSA screening questionnaire	In all, 59 subjects (38.3%) screened at high risk for OSA by providing 2 or more affirmative response on the STOP questionnaire. 60% of periodontitis cases (n=30) screened high risk of OSA compared with only 28% of controls (n=29). Cases were 4.1 times more likely (95% CI: 1.9, 11.4) to at high risk of OSA than controls (p=0.007) after adjustment for potential confounders.	There is a significant association between moderate or severe periodontitis and the risk of OSA. Some limitations: -Risk of measurement bias (periodontal examinations were done by different operators, no calibration results). - OSA was subjectively ascertained. - No goodness of fit statistic.
Gunaratnam et al[29] 2009, Australia	Case-control	Cases-66 (54 males 12 females)	CAD#,CAL*,REC*,BoP# (Silness and Loe plaque index (PI), Lobene modified gingival index (GI)	AHI of more than five per hour	Prevalence of periodontitis was 77% and 79% depending on definitions used, Mean AHI=36.55±25.7 Mean CAL=2.15±1.20mm, CAL significantly associated with total sleep time (r=0.287, 0<0.5	-Study shows significant relation between OSA and periodontal disease. -Some limitations: -Small sample size.

Table 3. Case Control Studies Evaluating the Relationship Between OSA and Periodontitis and Included in the Present Study.

CAL- Clinical attachment level, PPD-Pocket probing depth, REC-Recession, GI- Gingival index, PI-Plaque index, CI-Calculus index, AHI-Apnea Hypopnea Index, BOP-Bleeding on Probing, HR-High risk, LR-Low risk ,OSA-Obstructive Sleep Apnea

protein in the serum of OSA patients.[28,29] One study assessed the concentrations of a number of salivary cytokines (IL-Iβ, IL-6, IL-21, IL-33 in OSA patients and non-OSA patients and reported significantly higher levels of IL-6 and IL-33 in the mild/moderate and the severe OSA patients groups compared to the controls, (p<0.05).[30] A statistically significant correlation was also identified between the IL-21 and both the CAL and the pocket depth r=–0.347 (p=0.017), and r= –0.287 (p=0.05), respectively, They concluded that the OSA patients may cause an increase in the salivary IL-6 and IL-33 levels independent of the OSA severity.

Numerous studies confound that various pathways include local and systemic inflammation leads to generation of pathogenesis of periodontal disease. OSA has been associated with an increased risk for development of metabolic disorders such as impaired glucose tolerance and insulin resistance. Gunaratnam et al.[7] did a pilot study they found prevalence of periodontitis among OSA patients and it was revealed that treatment of periodontitis has been shown to improve systemic inflammation, and metabolic control of glycemia which affects to periodontal health.

Nuha Ejaz et al.[18] extended the findings of Gunaratnam et al.[7] which diagnosed and classified periodontitis by same clinical parameter and suggested that the odds of moderate or severe periodontitis was elevated by a 4.1–fold margin among patients screening high risk relative to low risk for OSA after adjustment for potential confounders. Both studies suggested that the prevalence of periodontitis is greater in patients with OSA.

Day time somnolence, which a key indicator for OSA revealed a strong relationship with severity of periodontal disease as per Arora SA et al.,[19] who assessed OSA by measuring daytime sleepiness using the Epworth sleepiness Scale.[11] Studies revealed that a practicing dentist with fair knowledge of sleep related breathing disorders (SRBDs) are just as likely to identify a patient at risk of Sleep disorders as a physician, by careful dento-facial examination and using indices like ESS & STOP Bang questionnaires.[12]

Rola Al Habashneh et al.[20] (2016) justified association between periodontitis and high risk for OSA (HR –OSA) among patients who scored positive in two or more categories of the Berlin questionnaire[12] as HR-OSA showed a higher pocket depth and clinical attachment level compared to patients with LR-OSA.

In contrast, Loke W et al.[21] found no meaningful association between OSA and the prevalence of moderate/severe periodontitis.

CONCLUSION
Based on this review of literature, followed by systematic review of studies conducted in past years. Some studies extend the finding of Gunaratnam et al.[7] (2009) that the prevalence of periodontitis may be higher in patients with OSA. Studies conducted by various screening questionnaire like ESS, STOP-Bang, Berlin Questionnaire, Mallampati index/score and Polysomnography. The clinical consequences of these findings suggest that physician should be encouraged to send their OSA patients to dentists for periodontal examination and urge compliance with dental appointments. Dentist also need to be educated and trained to identify sleep related breathing disorders, evaluate and screen them during chair side examination of OSA patients and treat them with oral appliances such as Mandibular Repositioning Devices, Tongue Repositioning Devices, pharmacotherapy and surgical management.

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SYSTEMATIC REVIEW

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Obstructive Sleep Apnea: A Dental Perspective

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A B S T R A C T

PURPOSE: The present review was conducted to elaborate Obstructive Sleep Apnea (OSA) and the role of dentist in its diagnoses and management.

METHODS: A comprehensive literature search was performed in the electronic databases of PubMed, ScienceDirect and Google scholar. A total of 94 relevant peer reviewed articles were retrieved and 42 were included in the present review.

RESULTS: OSA can be fairly diagnosed by dentists while the patient has come for dental check-up. But insufficient knowledge and awareness among dentists about the diagnostic and treatment protocol of this under-diagnosed condition. It has also proven to be one of the underlying cause of many like diseases like cardiovascular problems, diabetes mellitus and hypertension. To the rescue, dental sleep medicine is gaining enormous attention. In the lieu of the above context 'American Dental Association (ADA)' has adopted a policy that focuses on outlines various diagnostic procedures and treatment modalities that can be carried out by dentist for management of OSA.

CONCLUSION: It can be concluded since there is no sufficient evidence for the prevalence of OSA in developing countries like India, it is needed to create awareness and implement appropriate diagnostic and preventive measures for the same.

KEYWORDS: Dental Sleep Medicine, Obstructive Sleep Apnea, Sleep Apnea, American Dental Association

INTRODUCTION

"It is a common experience that a problem difficult at night is resolved in the morning after the committee of sleep has worked on it."

- John Steinbeck

In relation to the above mentioned quote, however, if the quality of sleep is compromised it can have a negative impact on the general health, mental health and social life as well as day to day activities. The troubled sleep if prolongs over a period of time may lead to life threatening disease like diabetes, hypertension, stroke, depression and cardiovascular diseases.[1] Thus, quality and quantity of sleep is a basic need of humans and is of paramount importance for overall well-being of oneself just like breathing or eating.[2]

Although for an adult 7-9 hours of sleep is recommended,[3] yet there has been increasing evidence of downward trends in the average duration of sleep and increasingly higher prevalence of sleep disturbances, in western as well as Asia-African countries.[4-9] Sleep problems remains under represented in many developing countries due to lack of evidence or awareness about the burden of sleep problems.

The most common cause for sleep deprivation is insomnia. It is often associated with a medical or psychiatric problem environmental influence stress or can be idiopathic.[10] Next to Insomnia comes sleep disordered breathing (SDB) which includes a wide spectrum of sleep-related breathing abnormalities.

Sleep apnea syndrome (SAS) is among them which is characterized by recurring cessations or reduction of breathing while sleeping and thus leading to disruption of sleep. SAS is of 3 types[11], among which obstructive sleep apnea (OSA) is the most common form. It is characterized by repetitive collapse of the upper airway during sleep, which may be either partial or total resulting in hypopnea (reduction in breathing or airflow to at least 50%) or apnea (complete cessation of breathing or airflow for 10 seconds or longer) respectively and occurs more than five times per hour. Apnea-hyponea index (AHI) records number of apneas and hyponeas per hour of

sleep.[11] OSA along with daytime hypersomnolence which leads to snoring is known as Obstructive sleep apnea syndrome (OSAS) or Obstructive sleep apnea hypopnea syndrome (OSAHS).[12] It may occur throughout the entire lifespan, from neonates to the elderly, most frequently in middle age (4%) and increases with age.[13] The prevalence of OSAS is approximately 3 to 7% for adult men and 2 to 5% for adult women in the general population as per the data available from different countries across the world.[14-20] The impact of OSAS is expected to be huge in developing countries like India as a hike in risk factors like sedentary lifestyle and its potential contribution to the increased rates of cardiovascular diseases, diabetes mellitus and obesity are highly reported. The prevalence of OSAS has been estimated to be 3.6% in an Indian community based sample translating to over 36 million affected individuals. This result when extrapolated to the overall population counts to one billion in India which makes it a significant public health problem.[21]

Dentists are said to be very well positioned to identify patients at greater risk of OSA and can play an essential role in their multidisciplinary care. Therefore, the present review was carried out to elaborate the role of dentist in diagnosis and management of OSA and its importance in Indian scenario.

METHODS

A literature search was performed in the electronic databases of PubMed, ScienceDirect and Google scholar. In order to define the keywords for search in databases, few seminal articles were analysed. Data was retrieved by a member of the research team using keywords like "sleep disordered breathing, Obstructive sleep apnea, dental sleep medicine, sleep apnea in dentistry" in multiple combinations were entered into Medical Subject Headings (MeSH) controlled vocabulary. Along with these terms we found additional keywords like sleep apnea/hypoapnea syndrome", "sleep apnea/hyponea syndrome" , "sleep apnea/hypopnea", "sleep apnea/hypopnea episodes", "sleep apnea/hypopnea events", "sleep apnea/hypopnea index" , "sleep apnea/hypopnea patients" as MeSH terms. Relevant terms were combined with the MeSH terms by Boolean phrases like 'AND' or 'OR' and entered in PubMed, ScienceDirect and Google Scholar. We also made a manual search in the key journals available in

the library of the institution. Some data was also obtained by cross checking the reference lists of the articles accessed. Peer reviewed studies which were relevant to the topic and were in English language were selected for the present review. A total of 94 relevant articles were retrieved from which 42 articles were included for the main content of the present review.

PATHOPHYSIOLOGY OF OSA

Sleep apnea syndrome is of 3 types- central, obstructive and complex or mixed sleep apnea. Central sleep apnea is caused when respiratory control centres in brain temporarily pause the activation of respiratory muscles. Obstructive is characterized by repetitive episodes of complete (apnea) and partial (hyponea) upper airway obstruction during sleep. Combination of both results in complex or mixed sleep apnea.[11] Among them obstructive sleep apnea (OSA) is the most prevalent type. Central sleep apnea is differentiated from obstructive sleep apnea by a lack of respiratory effort in former and continued but ineffective respiratory effort in OSA.[12] Obstructive sleep apnea can occur during sleep in response to a number of possible physiologic traits or combinations of traits. There can be obstruction or collapse somewhere between the nasal turbinates down to the level of vocal cords or in oropharynx. Most of the time tongue falls back in region oropharynx causing obstruction. This subsequently leads to increased resistance to airflow in the upper respiratory area which can potentially impair the surrounding muscles if the additional pressures persist for longer duration.[22]

CONSEQUENCES OF UNTREATED OBSTRUCTIVE SLEEP APNEA

I. **Excessive day time sleepiness**: Automobile and industrial accidents, intellectual deterioration, Personality and behaviour changes, depression, psychosis, deficits in thinking, perception, memory and ability to learn.[23]

II. **Cardiovascular System:** OSAS is closely related to increase in blood pressure. A study published on 2015 reveals that untreated OSAS patients are in greater risk of having coronary artery disease, stroke and hypertension.[24]

III. **Central Nervous System:** A number of studies have shown patients with untreated cases of OSAS often report with loss of concentration, frustration and distress due to combination of excessive day

sleepiness and fragmented sleep during night.[25]

IV. Endocrine System: A sleep related disorder can lead to insulin resistance and result in diabetes mellitus.[26]

V. Periodontits: Studies has been conducted to assess the association between Periodontitis and OSA with different severity. Findings of these suggested positive influence of OSA on periodontal health, thus causing periodontitis majorly in moderate or severe OSA.[27]

SYMPTOMS OF OSA

• Cardinal symptoms include loud snoring along with Apnea happening events
• Apnea-hyponea events alone which is also called nocturnal choking
• Excessive daytime sleepiness (EDS) which is called hypersomnolence
• Fatigue, morning headaches lack of concentration, impaired memory, Insomnia and possibly anxiety and depression.[25]

DIAGNOSIS

Specific tests are required for the establishing the diagnosis of the OSA like polysomnography (PSG) or portable monitoring (PM). These tests are prescribed and interpreted by a medical doctor. PSG score yield AHI scores which divides the OSA into 3 categories depending upon the severity. Among adults, normal AHI normal is <5 while mild OSA is considered when AHI score is 5 to 15, moderate OSA is with 15-30 AHI score and severe OSA is with >30 AHI score.[28]

ORAL EXAMINATION[29]

• Hypotonic tongue
• Macroglossy,
• Retrognathic mandible/maxilla,
• Micrognathism,
• V-shaped palate,
• Narrow arches
• Crossbites
• Signs of mouth breathing

RADIOGRAPHIC FEATURES

Larger distance between the mandibular plane and hyoid bone, posterior displacement of the symphysis[14] and other disproportionate relationships between the tongue base, soft palate, cranial base, pterygoid processes, cervical spine, and others.

After identifying the potential subject with the

disorder, dentist can take a detailed history of the patient including details of snoring, excessive daytime sleepiness (EDS), disturbed sleep at night, difficulties in concentrating or frequently experiencing confusions etc.

Epworth sleepiness scale is a commonly used scale to assess ESS. This screening tool can be easily applied and can be incorporated while taking health of the suspected subjects. A score of 10 or more on this scale indicated presence of ESS.[30] At the time of presence of positive findings, one should refer the patient to general physician for further diagnosis.

Berlin questionnaire has been successfully used as a screening tool for primary care of the population.[31] In this survey questions address snoring behavior, EDS/fatigue, and history of obesity or hypertension. The sensitivity of the Berlin questionnaire with regards to high-risk patients having sleep apnea was 86%. Another screening tool called the STOP BANG questionnaire was developed to screen for the most common risk factors seen specifically in OSA.[32]

MANAGEMENT OF OSA

It can be treated effectively by surgical or non-surgical methods. An approach to OSAS depends on severity of condition of patient, records of apnea or hypopnea episodes per hour and relationship between OSAS and systemic complications.[33]
Non-surgical methods- they can be conservative or mechanical.

I. Conservative methods[33]

a) Behavioral changes: Weight loss accompanied by healthy diet will eradicate the problem completely. Also, abstaining from alcohol consumption 3-5 hours before sleep can help in reducing the resistance of upper airway. Nasal dilator strips or sprays can be used to reduce snoring to an extent.

b) Position therapy: Guiding the patient with mild OSA symptoms to sleep sidewise and positioning head at a higher level than the body.

II. Mechanical methods

Continuous Positive Airway Pressure (CPAP): CPAP is the most effective treatment for relieving symptoms of moderate to severe cases of OSAS. It is considered to be the gold standard treatment and usually the first line treatment specially in the case of severe OSA. It consists of a mask which the patient has to wear during sleep over the nose or/and mouth. It

provides steady and continuous air pressure which can be adjusted to prevent the soft tissue in the back of the neck to collapse and cause upper airway obstruction. As this has a bulky apparatus, its compliance among patients is low.[34,35]

III. Surgical methods: These methods include sugeries removing structures that obstruct the airway passage and they are Adenotonsillectomy, Somnoplasty, Uvulopalatopharyngoplasty (UPPP), Maxillomandibular advancement surgeryandNasal surgery.[36,37]

IV. Pharmacotherapy: FDA approved drug for OSA is Modafinil for use in patients with OSA having residual daytime sleepiness. Armodafinil, the R-enantiomer of modafinil, is also now a FDA approved for use. Drugs such as tri cyclic antidepressants (Desipramine), Zolpidem, which are serotonergic, noradrenergic and which acts on the potassium channels can improve muscle responsiveness during airway narrowing.[37]

ROLE OF DENTIST IN THE MANAGEMENT OF OSAS

As dental clinicians see most of their patients every 6 months to 1 year, they can be first line defence in screening and sometimes treating patients with OSA (mild to moderate OSA).[22] Therefore, dentist can bridge between the undiagnosed portion of population with OSA and field of medicine, thereby aiding in providing appropriate medical care to the subjects affected.

As a dentist one must examine the oropharynx region, tongue, uvula, soft palate and tonsils during clinical evaluation. The tongue volume is determined to indicate the air column obstruction with the help of Mallampatti index.[29] The shape and volume of uvula and soft palate and position of mandible should be observed vertically and horizontally. It can further be fortified by radiographic examination.[38]

Some of the signs of OSA identified by oral examinations and radiographic images taken in dental settings are listed as follows:-[39,40]

Taking in account the poor compliance with CPAP, Orthodontic correction with use of oral appliances therapy(OAT) is alternative but effective way of correcting OSAS by advancing the mandible and changing the tongue posture to improve the airflow in upper airway and reduce the incidence of supine apnea.[7,23,41]

Indications of Oral Appliance Therapy (OAT)
i. Mild to moderate symptoms of OSAS
ii. Low BMI rate
iii. 8mm or more mandible advancement
iv. Intolerance or failure of CPAP therapy
v. Patients unwilling for surgery.[1,6,7]

Contraindications of Oral Appliance Therapy:
i. TMJ disorders
ii. Limited mandibular movements
iii. Poor oral hygiene
iv. Presence of 6 to 10 teeth or less than in each arch.
v. For behavioral measures such as weight loss or sleep-position change.[37,42]

Type of OAT presently available in the market are-MAD (Mandibular advancement devices), TRD (Tongue retaining device), SPL (Soft Palate Lift).[33] These appliances are given depending upon the case severity and underlying etiology of the patients. Studies have compared different devices according to the severity of OSA.[43]

Thus, Dentists can and do play an essential role in the multidisciplinary care of patients with sleep related breathing disorders. In the lieu of the above context 'American Dental Association (ADA)'has adopted a policy that outlines the role of dentist as given in Table 1.

INDIAN SCENARIO
Still there is huge number of unmet medical needs concerned with sleep related breathing disorders. The rising awareness about the same has lead to increased rate of screening of the ailment. To the rescue, dental sleep medicine is gaining enormous attention. It is a rapidly growing field working in close approximation with general medicine and further enhancing the timely diagnoses along with appropriate treatment to the patients.[45]

Scenario in India is still grave. So far few prevalence studies in India have been conducted, findings from these suggests high prevalence of OSA.[20,21] Also ,it is expected that large portion of population is still undiagnosed that can be equivalent to submerged portion of an iceberg. It can be pertained to high cost of equipments, methodologic difficulties and high

ADA POLICY ON ROLE OF DENTIST IN TREATING SLEEP RELATED SLEEP DISORDERS[44]	
Screening	- Should be a part of comprehensive medical and dental history. - Signs and symptoms should be properly examined to assess the presence of OSA.
Referral	If the patient is suspected of OSA, referral should be made to appropriate physician for the final diagnosis.
Oral Appliance Therapy (OAT)	OAT should be given if- -Prescribed by a physician -Mild and moderate sleep apnea, and for severe sleep apnea when a CPAP is not - tolerated by the patient. Dentist should first assess the patient for the appropriateness for fabricating the appliance. Dentist should also take well-informed consent from the patient after telling the probable side-effects of OAT.
Surgical interventions	Though secondary, but surgical intervention can be given by dentist when CPAP or OAT is inadequate or not tolerated by the patient.
Follow – up	Once the appliance is given or patient is screened for OSA, dentist must follow-up according to the severity of the condition and also should be in regular communication with patient's physician for progress of the treatment or when the patients seems to develop recurring OSA relevant symptoms or comorbidities.
Continuing-education	A dentist should keep oneself upbreast with knowledge and training of dental sleep medicine with related continuing education.

Table 1. ADA Policy on Role of Dentist in Treating Sleep Related Sleep Disorders[44]

patient load in hospitals. Also, sleep medicine has been slow to develop in India, as there are only 40 sleep laboratories in the country with the population more than 1 billion.[46] Studies has shown lack of awareness among Indian dentists as well as physicians about prevalence, diagnosis and management of sleep apnea syndrome.[47,48] Since India is developing nation, change in lifestyles with urbanisation is affecting the health of the people. As we are having a huge proportion of people with obesity, diabetes and cardiovascular disorders, the impact of undetected OSA as a public health burden cannot be undermined. In the light of evidence available, there is need for implementation of appropriate diagnostic and preventive measures. Also, dental sleep medicine should be incorporated in the curriculum of dental education. This way we can nib this problem in the bud by training the budding dental clinicians. Subsidy on the diagnostic facilities as well as treatment modalities can be another measure to address this problem in under-served areas of India.

CONCLUSION

From the present review, it can be concluded that being in a position of screening patients more frequently, dentists can aid in much early diagnosis of OSA. This can further prevent the life-threatening

complications that may follow this condition. Therefore, dental sleep medicine should be incorporated in the curriculum or continuing dental education (CDE) programs must be organised to prepare dentists to combat this unseen but widely prevalent health problem.

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Flexible Denture: A Hope for Partial Edentulous Patient-A Case Report

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A B S T R A C T

The various treatment options for the aesthetic and functional rehabilitation of partially edentulous patients are conventional fixed partial dentures, implant supported fixed partial dentures and removable partial dentures. In some cases, removable partial dentures may be the only choice which is available other than implants and fixed partial denture. Removable cast partial dentures are used as definitive removable prostheses when indicated, but location of clasps is not aesthetically pleasant. So, when patient is concerned about aesthetics, flexible partial dentures which is aesthetically superior may be considered. But for the success of flexible removable partial denture, proper diagnosis, treatment planning, insertion, wearing and maintenance of this prosthesis is very important.

KEYWORDS: Flexible Denture, Valplast, Flexiplast, Nylon, Acrylic Clasps

INTRODUCTION

The introduction of acrylic polymers and chrome cobalt alloys type of removable partial dentures have gained popularity among dentists. Decade ago, removable partial denture were chosen by the patients for their low cost and good physiology. Modern era has led to the evolvement of the removable partial denture from traditional hard fitting denture bases to soft dentures by using nylon based thermoplastic material. So they have become an excellent alternative to traditional removable partial dentures which have many problems like loss of chewing efficiency, hard denture bases and less retention. These flexible dentures not only provide good function and esthetics but are also comfortable and strong. The flexible nylon resin has gaining popularity because of its simplified design and a built- in stress breaker which provide better stress distribution and a superior function. So flexible denture has become a good option not only for the dentists but also for the patients.[1-3]

CASE REPORT

A 51-year female patient reported to the Department of Prosthodontics with a chief complaint of bad aesthetics due to the front missing teeth (Figure 1). The patient presented with multiple missing anterior teeth (Kennedy's class IV) (Figure 2). She was very much apprehensive about the aesthetics and did not want any rigid or metal prosthesis in her mouth.

PROCEDURE
• Firstly, alginate impressions were made and

Figure 1. Preoperative view

Figure 2. Intraoral view

diagnostic casts were prepared (Figure 3).
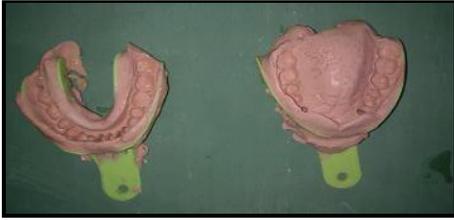
Figure 3. Impression of the arches

• Cast were mounted on surveyor and were analyzed for presence of any undercuts.
• After that using centric relation record and face bow transfer to evaluate inter-arch space the diagnostic casts were articulated on the articulator.
• Final impressions were made for both the arches using polyvinyl siloxane light body material and final casts were made with Type III dental stone.
• Maxillomandibular relationships were recorded with check bite method
• Then the definitive casts were mounted on the articulator.
• Shade selection was done and artificial acrylic resin teeth were arranged according to that.
• Denture try in was done in the patient's mouth and after the full satisfaction of patient denture was processed in the injection system.
• Then the final denture was finished, polished and inserted. Occlusion was evaluated and adjusted if needed (Figure 4 & 5).

Figure 4. Palatal view of the flexible prosthesis

Figure 5. Labial view of the flexible prosthesis

• Postoperative instructions were given to the patient on how to insert the prostheses and with the need to maintain oral hygiene (Figure 6,7 & 8).

DISCUSSION

Removable partial denture is commonly used for treating the patients who cannot be opted for conventional fixed partial dentures and implant supported prosthesis. Since decades the removable cast partial denture has been used for rehabilitation of partially edentulous patients and its fabrication involves the use of metal alloy, acrylic resin and/or thermoplastic resins. In the first kind, i.e. a metal alloy consists of a metal base with acrylic teeth attached to it and metal retentive clasp that aids to hold the cast partial denture in position. But these metal clasps give metallic appearance which is not acceptable by many patients, especially those concerned about their aesthetics. In few cases where the maxillary posterior teeth are missing and only the anterior teeth are present, the placement of metallic clasps on canines may not be acceptable to patients due to its unpleasing design.[4]

The second type of removable partial denture as discussed above are all acrylic resin prosthesis, also known as temporary or interim removable partial denture or a ''FLIPPER''. It functions as a space maintainer and is commonly used to restore the function of the tooth during the treatment until the definitive prosthesis is fabricated in the laboratory.

Flexible denture material is available in the form of granules packed in cartridges of varying sizes and first introduced by the name of valplast and flexiplast since 1956. They are superpolyamides belonging to the family of nylon, a resin derived from dicarboxylic acid, diamine, amino acid and lactams.[5] The Injection-molding technique is used for fabrication of flexible denture base prosthesis.[8] A prosthesis fabricated from these materials has many advantages from the others as it requires minimum or no mouth preparation, good retention, comfortable for patient as it is thin and lightweight, resistant to fractures and is aesthetically pleasant because it is translucent and pink shade which matches with the natural tissues. Acrylic resin teeth do not tend to bond chemically with a flexible denture base resin and are retained by making T shaped holes into which the resin flows to retain teeth mechanically.[7]

Figure 6. Intraoral palatal view of the flexible prosthesis in the patient's mouth

Figure 7. Intraoral frontal view of the flexible prosthesis in the patient's mouth

Figure 8. Postoperative view of the flexible prosthesis in patient's mouth

It hence, has been proven that flexible partial denture has several advantages over the other two types of partial dentures. Instead of using metal clasps, a flexible partial denture has a thin finger like extension extended into undercuts which act like a clasp. It is useful in patients having gingival recession as they appear elongated and for patients allergic to acrylic.[2] However, fabrication of flexible partial and complete dentures is contraindicated in cases with insufficient inter-arch space i.e., less than 4mm space, with prominent residual ridges where there is less space for labial placement of teeth because T–shape holes are necessary for mechanical retention of teeth to denture base, and with flat- flabby ridges with poor soft tissue support which require more rigid prosthesis.[3]

As every invention has a few drawbacks, the flexible prosthesis is difficult to repair, reline, rebase and is prone to staining from tea and/or coffee if it is not polished properly and cleaned by the patient on a regular basis. In order to maintain the aesthetics and cleanliness of the prosthesis, the patient should be advised to practice good oral hygiene practices and clean his/her prosthesis regularly after every meal and it should be removed during brushing of natural teeth to avoid scratching of the prosthesis.

CONCLUSION

Flexible partial dentures are a good option for the replacement of missing teeth especially when patient is concerned about aesthetics. It should be borne in mind that proper care of the prosthesis is required in order to reduce staining of the prosthesis, as it affects the aesthetics of the prosthesis as time passes by. The fabrication depends on the clinician's skill in selection of the type of the prosthesis required for the patient. Flexible dentures while previously were selected by only a handful of patients and the clinician has gained its ground to become an effective and often demanded treatment option.

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Enhanced Recovery after Caesarean Section, Madagascar

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A B S T R A C T

INTRODUCTION & AIM: Few hospitals practice enhanced recovery after caesarean section. Our aim was to evaluate the application of enhanced recovery after caesarean section after implementation in our service.
MATERIALS AND METHOD: An observational audit prospective was conducted, from November 2018 to January 2019, in the Complex Mother-Child Military Hospital, Antsiranana. Patients between 18 to 35 years, ASA 1 or 2 before surgery were included. Patients undergoing general anesthesia procedures were excluded from the study.
RESULTS: Thirty-one patients were identified. Each received antiotic prophylaxis and prevention of postoperative nausea/ vomiting and intratechal morphine. Fluid infusion was optimized in 18 patients. In post-interventional recovery room, multimodal analgesia were given orally after the intervention in 15 patients (48%), Sixteen (52%) cases drunk. Forty-four patients (45%) ate food four hour after intervention. Stop infusion performed in 13 cases (42%). The bladder catheter removed in 13 patients (42%). The median length of stay was 3.5 days.
CONCLUSION: Early food, removal of the bladder catheter and the infusion stop have low compliance to the protocol. An audit and formation were needed.

KEYWORDS: Caesarean Section, Enhanced Recovery, Audit, Assessment

INTRODUCTION

Enhanced recovery after caesarean is less widely practiced.[1,2] In Madagascar, Rafanomezantsoa et al. start this protocol in a public hospital.[3] Length of stay after caesarean section was 5 days before implementation. In our service, this method was effective for all patients who have undergone surgery since the 01st October 2018. Our aim was to evaluate the application of this enhanced recovery after Caesarean section in our service.

Material and Methods

A prospective observational study audit was performed, over a period of three months from November 2018 to January 2019, in the Complex Mother-Child, Hospital Military Antsiranana. We included women operated for Caesarean section, 18 to 35 years, emergencies or planned, with or without comorbidities stable before surgery. Under general anesthesia procedures were excluded. Preoperative fasting was respected, antibiotic prophylaxis (cefazolin® 2 g) were administered. Intraoperatively, prevention of nausea and postoperative vomiting with dexamethasone 8 mg was performed preoperatively, followed by ondansetron after surgery. Spinal anesthesia used isobaric bupivacaine and fentanyl and morphine. Crystalloid is limited to 500 ml. Ocytocin® was used to prevent postpartum hemorrhage after clamping cordon. The contact skin-to-skin is encouraged if the state of newborn permits. In post-interventional recovery room, multimodal analgesia (paracetamol 1 g * 4, ketoprofen LP 100 mg * 2) were given orally one hour after surgery. Patients drunk unlimited quantities at the first hour, and light meal before the fourth hour after the procedure. the bladder catheter and stopping infusion were removed. In the dining room, patient walked in the sixth hour. Venous thromboembolism is prevented using enoxaparin dose of 100 IU / kg. Every item were evaluated. The hospital length of stay of mother – newborn were registered. The results are expressed as mean ± standard deviation for quantitative variables, the number (percentage) for discrete variables.

RESULTS

Thirty-one cases (31) of caesarean sections were included in the study period. The average age was 31 ± 5 years (table 1). Preoperatively, all patients received prophylactic antibiotics (100%). Fasting preoperative was recorded in 27 cases (87%). Intraoperatively, each (100%) benefited from the prevention of postoperative nausea vomiting, oxytocin and spinal anesthesia. The optimization fluid were performed in 18 cases (47%).

271

Eight newborns (26%) were admitted to intensive care unit of neonatology. There was a skin-to-skin contact mother-newborn in 24 cases (74%). In recovery, the removal of the bladder catheter and the infusion stopped are carried out in 13 cases (42%). Multimodal analgesia orally was taken in 15 (48%) patients. Sixteen (52%) drunk and 14 (45%) ate before the fourth hour, and each at the sixth hour. All of them were mobilized before the sixth hour (100%). No patient presented urinary retention. Prevention of venous thromboembolism was systematic. The median Stay of the newborn & mother stay was 3.5 days (3-5.5) including 5 cases (16%) that were discharged from the hospital on the second day (table 2).

DISCUSSION

This prospective study showed the feasibility of intrathecal morphine, wherein oral analgesia, early feeding, stop infusion and removal of the bladder catheter post interventional treatment room were difficult to access. The median duration of mother-newborn stay was 3.5 days.

The addition of intrathecal morphine were systematically; a comparable study authors.[4-6] It was higher than Pujic et al 18%.[1] The perispinal morphine is the gold standard during a caesarean section. It covers the pain until the twenty-fourth postoperative hour.[7]

Multimodal analgesia is administered orally in 48%; against 7% Wyniecki et al.[2] Deniau B et al. had a higher compliance.[6] Early feeding was the barriers in our study.

Stop infusion was observed in 42%; this result was similar with some authors.[5,8] It was above for Pujic et al.[1] The administration of intravenous self-controlled infusion were the main barriers.[2]

The urinary catheter is removed within 42%; This result is superior to surveys conducted by some authors less than 5%.[1,2] Cattin et al. showed a proportion rate of 32%.[5] Laronche et al. have applied this protocol in 70%.[9] This discordance could be explained by the fear of urinary retention and the maintenance of intravenous infusion.

Fifty-two percent (52%) were found to be drunk in the postoperatory recovery room; this result was supported by Deniau et al.[6] But, it was superior to other studies around 10% to 38%.[1,2,9] But it was less than Cattin et al.[5] Deniau et al. showed a technical organization defect was the difficult barrier.[6]

Early feeding was 45%.[5,6] It was superior to surveys conducted by some authors.[1,2] Early feeding does not increase the risk of postoperative nausea, vomiting and abdominal distension.[10] The barriers are due to fears of the woman in labor and education of health workers. All patients were mobilized early; it was superior to literature results.[1,2,6] It is achievable through the removal of the bladder catheter, and training of paramedics. It authorizes an earlier physical skin-to-skin contact mother and newborn.[4]

The median length of stay was 3.5 days comparable to that study of literature.[4,5] Wrench et al. realized the exit of patients the day after surgery and 2 days in 25.1% and 50.9% respectively.[8] This results regarding the length of stay was one day shorter as compared to the mothers hospitalized in the present study.

This single-centre study did not show the satisfaction. But, this is the first audit conducted within the complex mother-child, Military Hospital, Antsiranana. Further study would be necessary for accession to the protocol to reduce hospitalization length of stay of 48 hours or 24 hours.[8]

CONCLUSION

The enhanced rehabilitation after Caesarean is feasable in our service. However, some points can be improved, especially in the postoperative period, such as analgesia orally, removal of the IV line and the urinary catheter in recovery and early feeding. Increasing adherence to the protocol reduces the duration of mother-newborn stay.

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CHARACTERISTIC	RÉSULTS (n,%)
Age	31 ± 5
Gestity	2 (2-3)
Classification ASA	
1	28 (90)
2	3 (10)
Caesarean section	
Elective	8 (26)
Emergency	23 (74)
Technical anesthesia	
Spinal anesthesia	
Epidural anesthesia	31 (100)
	0 (0)

Table 1. Characteristic of The Patients Undergoing Caesarean Sections

COMPONENTS	RESULTS (n,%)
Fasting preoperative	28 (87)
Antibiotic prophylaxis	31 (100)
Prevention of nausea vomiting postoperative	31 (100)
Restriction fluid infusion	18 (58)
Oxytocin	31 (100)
Skin-to-skin contact mother-newborn	24 (74)
Drinking at 1 hour	16 (52)
Eating at 4 hour	15 (48)
Oral multimodal analgesia	15 (48)
Bladder catheter removed	13 (42)
Stop infusion	13 (42)
Early mobilisation	31 (100)

Table 2. Protocol of Enhanced Recovery After Caesarean Section

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274

ORIGINAL RESEARCH

Role of Alexithymia in Predicting Self-Efficacy in Academic Students of a North Indian Institution: A Cross Sectional Study

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A B S T R A C T

INTRODUCTION: Alexithymia is a cognitive-affective style and a personality construct that is associated with various physical and psychological disorders. It refers to a personality trait associated with difficulties with identifying or describing feelings, mental imaging and fantasy, and external cognitive orientation

AIM: To access the problem of alexithymia among the Academic (Dental and Ayurvedic) students of an Institution in North India.

MATERIALS AND METHOD: A questionnaire based cross-sectional survey was carried out among the medical students of D.J. Group of Institutions, Modinagar, Ghaziabad district, Uttar Pradesh, India. Ethical approval was obtained from the Institutional Review Board, Modinagar and informed consent was obtained from all the study participants prior to the study.

RESULTS: The questionnaire based study was carried out among 252 medical students of D.J. Group of Institutions, Modinagar, Ghaziabad district, Uttar Pradesh, India. Out of which 113 students were of Ayurveda and 139 were dental students. The inter group comparison of respondents according to course of study in which majority of the Ayurveda students were having significant result for the alexithymia problem.

CONCLUSION: This study demonstrates that alexithymia plays significant role in decreasing self-efficacy in academic students. As alexithymia is high in college students and affects self-regulation, goal orientation, and academic function, we suggest that mental physicians routinely evaluate medical college students for alexithymia.

KEYWORDS: Alexithymia, Ayurveda, Dental, Student

INTRODUCTION

Now a day's people are facing difficulties in identifying, describing, and expressing their subjective feelings and cannot distinguish between feelings and the emotional arousal. Even they have difficulty in reflecting and regulating their emotions with constricted imagination capacities such as paucity of fantasies, and have an externally oriented cognitive thinking, which is popularly known as Alexithymia. Literally, alexithymia is a Greek word meaning "lack of words for emotions" or lack of the ability to find words that identify and describe feelings. Alexithymia is a cognitive-affective style and a personality construct that is associated with various physical and psychological disorders.[1] Also; it is difficult for people with alexithymia to verbally communicate their psychological distress, with failure to seek help from others. As a result, this could lead to a feeling of isolation and not being understood by others and potential of negative effect.[2] It is associated with a trait of human personality that has difficulties with identifying or describing feelings, mental imaging and fantasy, and external cognitive orientation.[1]

Researches have also documented that alexithymia is often found to be associated with certain psychiatric disorders, such as psychosomatic disorders[2-4], depression[5], and anxiety.[6] A few studies have reported a positive relationship between alexithymia and pain disorders in their study population.[7,8] It has the tendency to influence the academic achievement of college students, and that effect could also be moderate in nature.[9] A positive relationship between test anxiety and alexithymia among students was reported by and Sepahvand et al. (2015).[10]

The prevalence of different kinds of psychiatric disorders are more frequently observed among college students than in a matched non-student populations and this reason could be due to multiple stressors, which include, but are not limited to academic overload, inadequate time, final examinations and peer pressure.[11,12] The above statement can be supported as there is documented evidence that a marked increase in psychiatric disorders, including depression and anxiety in college students has been seen over the last decade.[13]

Authors across the world have reported a high degree of alexithymia in medical students[8,14] and subsequently, its influence on their mental well being.[15] Among students, low self-efficacy was associated with depression and anxiety.[16] However, there still are numerous gaps in the academic mental health literature and the questions among the scientific

community is that (i) whether low self-efficacy is associated with alexithymia, (ii)whether alexithymia is related to depression and anxiety in academic students, and (iii) which factors impact alexithymia in academic students and hence, this study was undertaken with an aim to provide the scientific community with important data regarding the problem of alexithymia among the medical students.

MATERIALS & METHOD

A questionnaire based cross-sectional survey was carried out among the medical students of D.J. Group of Institutions, Modinagar, Ghaziabad district, Uttar Pradesh, India. Ethical approval was obtained from the Institutional Review Board, Modinagar and informed consent was obtained from all the study participants prior to the study.

DATA COLLECTION

A total of 252 students were included in the study and those who were non-hostellers was excluded. These students were divided into 2 groups. One group having dental students whereas other one includes ayurveda students.

The questionnaire used in the study consisted of 20 Questions. Face validity and content validity was assessed. Reliability of the questionnaire was assessed using test-retest and internal consistency of the questionnaire was ascertained by Chronbachs-Alpha (α). Construct validity of the questionnaire was assessed using Spearman's correlation coefficient between individual parameter/construct and overall score of the construct. The data was entered and analyzed in SPSS version 16.0. and both descriptive and inferential tests were applied.

RESULTS

The questionnaire based study was carried out among 252 academic students of D.J. Group of Institutions, Modinagar, Ghaziabad district, Uttar Pradesh, India. Out of which 113 students were of Ayurveda and 139 were dental students. Table 1 shows the frequency distribution of respondent regarding alexithymia in which majority of the respondents were agreeing regarding the alexithymia problem whereas table 2 shows the inter group comparison of respondents according to course of study in which majority of the Ayurveda students were having significant result for the alexithymia problem.

DISCUSSION

The condition of alexithymia is referred to a personality trait associated with difficulties with identifying or describing feelings, mental imaging and fantasy, and external cognitive orientation in a person. This construct was first conceptualized by Nemiah and Sifneos (1970) as a difficulty in the communicative patterns of certain individuals who demonstrated an inability to verbally express or describe feelings, as well as had a marked diminution of fantasy and since then, many researchers have tried to test and expand this construct. As per Bagby, Taylor, Parker & Dickens, (2006), [7] alexithymia is a disorder of affect regulation resulting from developmental impairments in cognitive representations that process all emotional information.

The present questionnaire based study which consisted of questions regarding the perception of the study participants towards the alexithymia scale. The study was carried out among the academic students which consist of ayurveda students and dental students where it was clearly seen that majority of the participants did agree and some did strongly agree when they were asked wether the found it difficult to say how they felt inside or about expressing the exact feeling of anger, being scared and/or sad and it highlights a majority of the students academic students in the dental and ayurvedic filed are suffering from the problem of alexithymia. In agreement, few authors have also reported a positive relationship between alexithymia and pain disorders among students.[8-10]

CONCLUSION

This study demonstrates that alexithymia plays significant role in decreasing self-efficacy in academic students. As alexithymia is high in college students and affects self-regulation, goal orientation, and academic function it is suggested that they are regularly assessed and easy access to college counsellors and support groups is available, especially during examinations.

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QUESTION	STRONGLY AGREE n (%)	AGREE n (%)	NEITHER AGREE NOR DISAGREE n (%)	DISAGREE n (%)	STRONGLY DISAGREE n (%)	MEAN ± SD
1. I am often confused about the way I am feeling inside	0 (0%)	169(67.1%)	30(11.9%)	53(21.0%)	0(0%)	3.46± 0.820
2. I find it difficult to say how I feel inside	0 (0%)	169(67.1%)	30(11.9%)	53(21.0%)	0(0%)	3.46± 0.820
3. I feel things in my body that even doctors don't understand	3(1.2%)	145(57.5%)	36 (14.3%)	68 (27.0%)	0 (0%)	3.33± 0.887
4. I can easily say how I feel inside	16(6.3%)	169(67.1%)	34 (13.5%)	33 (13.1%)	0 (0%)	3.67± 0.783
5. When I have a problem, I want to know where it comes from and not just talk about it	30(11.9%)	147(58.3%)	44(17.5%)	26(10.3%)	5 (2.0%)	3.68± 0.886
6. When I am upset, I don't know if I am sad, scared or angry	17(6.7%)	157(62.3%)	41 (16.3%)	37(14.7%)	0 (0%)	3.61± 0.818
7. I am often puzzled by things that I feel in my body	9(3.6%)	144(57.1%)	17(6.7%)	79(31.3%)	3 (1.2%)	3.31± 0.993
8. I'd rather wait and see what happens, instead of thinking about why things happen	0(0%)	126(50.0%)	61(24.2%)	65 (25.8%)	0 (0%)	3.24± 0.838
9. Sometimes I can't find the words to say how I feel inside	37(14.7%)	150(59.5%)	45 (17.9%)	20(7.9%)	0 (0%)	3.81± 0.780
10. It is important to understand how you feel inside	53(21.0%)	142(56.3%)	31(12.3%)	26(10.3%)	0 (0%)	3.88± 0.857
11. I find it hard to say how I feel about other people	39(15.5%)	137(54.4%)	31(12.3%)	45(17.9%)	0 (0%)	3.67± 0.943
12. Other people tell me that I should talk more about how I feel inside	46(18.3%)	139(55.2%)	38(15.1%)	29 (11.5%)	0 (0%)	3.80± 0.870
13. I don't know what's going on inside me	15(6.0%)	185(73.4%)	32(12.7%)	20(7.9%)	0 (0%)	3.77± 0.674
14. I often don't know why I am angry	29(11.5%)	174(69.0%)	41 (16.3%)	8(3.2%)	0(0%)	3.89± 0.628

15. I prefer talking to people about everyday things, rather than about how they feel	41 (16.3%)	162(64.3%)	36(14.3%)	12 (4.8%)	1(4.0%)	3.91± 0.725
16. I prefer watching funny television programmes, rather than films that tell a story about other people's problems	93(36.9%)	116 (46.0%)	26(10.3%)	8 (3.2%)	0 (0%)	4.27 ± 0.818
17. It is difficult for me to say how I really feel inside, even to my best friend	55(21.8%)	160(63.5%)	36(14.3%)	1 (4.0%)	0 (0%)	4.07± 0.611
18. I can feel close to someone, even when we are sitting still and not saying anything	20(7.9%)	174(69.0%)	41 (16.3%)	17 (6.7%)	0 (0%)	3.78± 0.683
19. Thinking about how I feel, helps me when I want to do something about my problems	33(13.1%)	142(56.3%)	48(19.0%)	25 (9.9%)	4 (1.6%)	3.69± 0.878
20. When I have to concentrate on a film to understand the story, I enjoy the film much less	97 (38.5%)	129 (51.2%)	22 (8.7%)	4(1.6%)	0(0%)	4.27± 0.683

Table 1. Frequency Distribution of Respondent Regarding Alexithymia

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	GP	N	Mean	Std. Deviation	Std. Error Mean	Mean difference	P value
1 I am often confused about the way I am feeling inside	Ayurveda	113	3.45	.802	.075	-.016	0.5**
	Dental	139	3.47	.837	.071	-.016	
2 I find it difficult to say how I feel inside	Ayurveda	113	3.45	.802	.075	-.016	0.5**
	Dental	139	3.47	.837	.071	-.016	
3 I feel things in my body that even doctors don't understand	Ayurveda	113	3.33	.871	.082	-.004	0.4**
	Dental	139	3.33	.904	.077	-.004	
4 I can easily say how I feel inside	Ayurveda	113	3.70	.693	.065	.059	0.02*
	Dental	139	3.64	.851	.072	.059	
5 When I have a problem, I want to know where it comes from and not just talk about it	Ayurveda	113	3.62	.783	.074	-.107	0.1**
	Dental	139	3.73	.962	.082	-.107	
6 When I am upset, I don't know if I am sad, scared or angry	Ayurveda	113	3.69	.733	.069	.144	0.005*
	Dental	139	3.55	.878	.074	.144	
7 I am often puzzled by things that I feel in my body	Ayurveda	113	3.24	1.002	.094	-.121	0.6**
	Dental	139	3.36	.985	.084	-.121	
8 I'd rather wait and see what happens, instead of thinking about why things happen	Ayurveda	113	3.21	.796	.075	-.054	0.02*
	Dental	139	3.27	.873	.074	-.054	
9 Sometimes I can't find the words to say how I feel inside	Ayurveda	113	3.67	.700	.066	-.248	0.9**
	Dental	139	3.92	.826	.070	-.248	
10 It is important to understand how you feel inside	Ayurveda	113	3.95	.789	.074	.120	0.06**
	Dental	139	3.83	.908	.077	.120	
11 I find it hard to say how I feel about other people	Ayurveda	113	3.66	.951	.089	-.020	0.8**
	Dental	139	3.68	.941	.080	-.020	
12 Other people tell me that I should talk more about how I feel inside	Ayurveda	113	4.11	.783	.074	.552	0.1**
	Dental	139	3.55	.861	.073	.552	
13 I don't know what's going on inside me	Ayurveda	113	3.82	.671	.063	.089	0.5**
	Dental	139	3.73	.676	.057	.089	
14 I often don't know why I am angry	Ayurveda	113	3.97	.589	.055	.153	0.1**
	Dental	139	3.82	.651	.055	.153	
15 I prefer talking to people about everyday things, rather than about how they feel	Ayurveda	113	4.06	.631	.059	.271	0.01*
	Dental	139	3.79	.775	.066	.271	
16 I prefer watching funny television programmes, rather than films that tell a story about other people's problems	Ayurveda	113	4.17	.833	.078	-.192	0.2**
	Dental	139	4.36	.799	.068	-.192	

17 It is difficult for me to say how I really feel inside, even to my best friend	Ayurveda	113	3.96	.706	.066	-.186	0.01*
	Dental	139	4.15	.510	.043	-.186	
18 I can feel close to someone, even when we are sitting still and not saying anything	Ayurveda	113	3.78	.741	.070	-.005	0.006*
	Dental	139	3.78	.634	.054	-.005	
19 Thinking about how I feel, helps me when I want to do something about my problems	Ayurveda	113	3.80	.888	.084	.185	0.3**
	Dental	139	3.61	.864	.073	.185	
20 When I have to concentrate on a film to understand the story, I enjoy the film much less	Ayurveda	113	4.07	.678	.064	-.354	0.002*
	Dental	139	4.42	.648	.055	-.354	

Table 2. Inter Group Comparison of Respondents According to Course of Study

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