



Lifestyle Behaviour and Obstructive Sleep Apnea (OSA): An Association Study Among Young Adults

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ABSTRACT

Introduction: Lifestyle changes like low physical activity, smoking and consumption of alcohol have been reported to have an impact on Obstructive Sleep Apnea. Smoking was found to be associated with nocturnal hypoxemia and disturbed sleep. Apneic episodes are increased after alcohol consumption.

Objectives: To determine the risk of developing Obstructive Sleep Apnea among young adults.

Material and Methods: Participants were asked to fill in an online generated questionnaire on lifestyle habits in addition to the modified Berlin questionnaire and Epworth questionnaire. A total of 209 study participants were included in the study. A Chi-square test was applied.

Results: Among 209 participants, 47(22.5%) were females and 162 (77.5%) were males. Snoring was reported in 90 (43.1%) of study participants. Around thirty-three, percent of participants were at higher risk of developing Obstructive Sleep Apnea and Obstructive Sleep Apnea was predicted in 21.5%. No association was found between the lifestyle behavioural factors and Obstructive Sleep Apnea.

Conclusion: Though a significant association was not found between selected lifestyle factors and Obstructive Sleep Apnea risk, the role of lifestyle factors could not be undermined. A healthy lifestyle helps in preventing the occurrence of Obstructive Sleep Apnea.

Keywords: Lifestyle factors, Obstructive Sleep Apnea, Smoking, Alcoholism, Physical Activity

INTRODUCTION

Poor sleep is known to be susceptible to cardiovascular diseases and type -II diabetes mellitus.¹ Insulin sensitivity deteriorates on acute sleep restriction.²Lifestyle habits like physical inactivity, night shifts, smoking and alcoholism affect the quality and quantity of sleep. Stress is causing a higher incidence of Insomnia and other sleep-related disorders. Obesity is a risk factor for occurrence for Obstructive Sleep Apnea (OSA). Lifestyle change is the culprit of the present world with mushrooming sedentary professions and intake of high-calorie food. Studies suggest that 2% of women and 4% of men at middle age have OSA which is becoming increasingly common with the current obesity epidemic. ³ Studies

have shown that 58% of patients with obstructive sleep apnea have a body mass index (BMI) > 30 Kg/m² and more than 50% of all obese men have obstructive sleep apnea.⁴ Lifestyle changes like physical activity, smoking and consumption of alcohol have been reported in many to have an impact on the prevalence of OSA. Mechanisms that underlie are alterations in upper airway anatomy and function, the imbalance between ventilatory drive and load and obesity-induced hypoxemia. A major outcome of untreated OSA includes diabetes mellitus, hypertension, coronary artery diseases and road traffic accidents.

Moderate weight loss of 26 ± 18 kg can alleviate sleep apnea and this has been demonstrated to improve the oxygen saturation during sleep.⁵ Sedentary

How to cite this article: Jyothi RK, Mathangi DC, Chellaiyan VG. Lifestyle Behaviour and Obstructive Sleep Apnea (OSA): An Association Study Among Young Adults. Natl J Community Med 2022;13(6):400-403. DOI: 10.55489/njcm.13062022628

Financial Support: None declared

Conflict of Interest: None declared

Date of Submission: 17-03-2022

Date of Acceptance: 16-05-2022

Date of Publication: 30-06-2022

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lifestyle habits or almost no physical activity has been correlated with both obesity and OSA.

Smoking is another risk factor for OSA and is found to be associated with sleep-disordered breathing. Cigarette smokers are four times as likely as non-smokers to report feeling unrested after a night's sleep. Surveys suggest that the stimulating effects of nicotine could cause smokers to experience nicotine withdrawal each night, which may contribute to disturbances in sleep.⁶The coexistence of OSA and chronic smoking resulted in more pronounced cognitive deficits than either factor alone.⁷The suction collapse of the oropharyngeal airway is worsened by alcohol consumption.⁸ Studies have shown that nocturnal snoring and apnoeic episodes are invariably increased after alcohol consumption.^{9,10}The objectives of the study were to determine the risk of developing OSA among young adults and to identify the lifestyle factors influencing the development of OSA.

MATERIAL AND METHODS

This was a cross sectional study conducted at an urban area of Chengalpet district of Tamil Nadu. The study period was for twelve months during 2019-2020.

Study population: The study population was healthy young adults in the selected urban area of district. The site selected was Navalur. Both males and females in the age group of 25-40 years were selected. Participants with any congenital syndrome, significant craniofacial malformation, airway cancers, congestive cardiac failure, chronic renal failure, hypothyroidism and those who had undergone recent upper airway surgery or steroid therapy were excluded from the study.

Sample size determination: The formula for the cross-sectional study is used. $N=4pq/l^2$. Prevalence of OSAS in India ranges from 4% to 13%. For calculation of sample size, prevalence of 13% is reported by Sharma SK et al¹¹. $p=13\%$, $q=87\%$, $l=5\%$. Adding a non-response rate of 10%, the total sample size included was 209.

Sampling method: The area chosen was Navalur urban area which had 3500 total population with 870 household in the year 2011. There were 423 young adults in the area at the time of conduction of the study. Those who fulfil the inclusion criteria were enlisted and simple random sampling of study population of 209 were included.

Study tool: The questionnaire was translated to local language and was pretested and validated. The questionnaire had details to assess their smoking and drinking habits, physical activity as per STEPS¹² in addition to the modified Berlin questionnaire¹³ and Epworth sleepiness questionnaire.¹⁴

Berlin Questionnaire is a validated questionnaire with more than 85% sensitivity. The questionnaire

has ten questions categorised into three- snoring, daytime sleepiness and obesity/hypertension as three categories. High risk was defined in category one as persistent symptoms in two or more snoring-related questions. High risk in category two was defined as persistent daytime sleepiness, drowsy driving, or both. High risk in category three was defined as a history of hypertension or a BMI greater than 30 kg/m². Subjects classified as high risk for OSA were those who scored high in at least two of three categories.

Epworth sleepiness scale is a validated scale having an eight-item self-reported questionnaire that asks patients to rate their likelihood of dozing, or falling asleep, in eight different situations on a four-point scale ranging from 0 ("would never doze") to 3 ("high chance of dozing"). The ESS determines if a person has sleep apnea syndrome.

Conduction of study: Institutional ethical committee approval was obtained before starting the study. Informed written consent was obtained from the participants and the participants were asked to fill in a questionnaire. After filling up the completed questionnaire, weight and height were taken for BMI calculation. Also, in the study, for the smoking and alcohol habits, if the person is never smoker or never consumed alcohol were considered as non-smoker and non-alcoholic respectively.

Outcome variable: The outcome variable in the present study was presence of OSA.

Data entry and analysis: Data collected were entered in Microsoft Excel sheet and were analysed with IBM SPSS version 21. Means and Proportions were calculated. A Chi-square test was applied. P-value < 0.05 was significant.

RESULTS

Among 209 participants, 47(22.5%) were females and 162 (77.5%) were males. The mean (SD) age of the study participants in years was 28 (± 4.8). Among the participants, 23.9% were overweight and 49.3% were obese according to Asian BMI criteria (Table 1).

Table 1: Demographic profile of the study participants (N=209)

Variables	Participants (%)
Sex	
Male	162 (77.5)
Female	47 (22.5)
Age group	
18-22	18 (8.6)
23-26	58 (27.8)
27-32	91 (43.5)
>32	42 (20.1)
BMI criteria*	
<18.5	9 (4.3)
18.6-22.9	47(22.5)
23-24.9	50(23.9)
>25	103 (49.3)

*Asian -Indian classification for BMI²⁵

Table 2: Sleep parameters of the study participants (N=209)

Sleep parameters	Participant (%) / Mean (SD)
Snoring	
Yes	90 (43.1)
No	119 (56.9)
Berlin Questionnaire score	
High risk	70 (33.5)
No risk	139 (66.5)
Sleep apnea syndrome (According to ESS)	
Yes	45 (21.5)
No	164 (78.5)
Epworth sleepiness score	7.17 ± 3.91

Table 3: Distribution of study participants according to Physical activity (N=209)

Physical activity (in minutes)	Mean (SD)
Regular walking	140.72 ± 127.63
Moderate physical activity	59.29 ± 109.13
Heavy physical activity	85.57 ± 116.68
Vigorous physical activity	46.39 ± 96.8

Table 4 Distribution of the study participants according to personal habits (N=209)

Personal Habits	Participant (%) / Mean ± SD
Smoking history	
Smoker	59(28.2)
Non-smoker	150(71.8)
Alcohol consumption	
Yes	63 (30.1)
No	146 (69.9)
Alcohol consumed days per week	0.57 ± 1.19
Number of drinks per day	0.34 ± 0.52
Number of cigarettes/bidis smoked per day on a typical day	0.82 ± 2.4

Snoring was reported in 90 (43.1%) of study participants and the mean (SD) of Epworth sleepiness score was 7.17 (±) 3.91 with a range of 4 to 21. According to the Berlins scale, 33.5% of participants were at high risk for developing OSA. Epworth Sleepiness Scale assessment determines the possibility of sleep apnea in 21.5% among the participants and the mean ESS value was found out to be 7.17 (±) 3.91 (Table 2). Regular walking was found to be the common

physical activity (Table 3). In the study, 28.2% of participants had a smoking habit and 30.1% had alcohol regularly. In addition, exposure to smoke at the workplace was reported in 19(9.1%) and at home in 38(18.2%) of study participants. Chi-square test was applied to find an association between personal habits such as regular physical activity, smoking history and alcohol consumption concerning sleep apnea syndrome. No association was found between lifestyle behavioural factors and sleep apnea. (Table 5)

DISCUSSION

In this present study, even though 43.1% snored, only 33.5% were found out to be at high risk for developing OSA by Berlins score and 21.5% by ESS. Its slightly higher with the American prevalence of OSA 15% in men and 5% in women for people aged 30–70 years.^{15,16} In India, it is estimated to be a little lower with 2.1–4.9% in North Indian adults.¹⁷ In the present study, the majority of the participants did walk as their daily physical activity and next to it was found to be heavy physical activity. Decreased levels of physical activity have been shown to have been associated with a high incidence of OSA. Moreover, OSA patients have hemodynamic changes and decreased aerobic exercise capacity.^{18,19}

Many of the studies say that benefits of the exercise to OSA is independent of weight loss. The possible reasons for the merits of physical activity have been studied and found to be due to the respiratory muscles working at an increased rate which in turn leads to metabolic and structural adaptations that improve fatigue resistance. In addition to that, exercise increases respiratory muscle recruitment and endurance exercise might cause reduced fluid accumulation around the neck and prevent the collapse of airways during sleep.²⁰ But in the present study, the authors did not find any relation between physical activity and sleep.

Predisposing factors for OSA include obesity, lack of physical activity, smoking and alcoholism. But previous studies demonstrated the worsening of OSA with alcoholism and smoking. Alcohol reduces the genioglossal muscle tone during sleep and it also causes an increased intake of high-calorie food which has an indirect effect on OSA.

Table 5 Association between key lifestyle factors and Sleep Apnea Syndrome. (N=209)

Lifestyle habits	Sleep Apnea Syndrome		OR (95% CI)	P-value
	Yes (%)	No (%)		
Regular physical activity				
Yes	5 (11.1)	16 (9.8)	1.2 (0.8-3.2)	0.789
No	40 (88.9)	148 (90.2)		
Smoking history				
Yes	38 (84.4)	21 (12.8)	1.8 (0.6-3.1)	0.631
No	7 (15.6)	143 (87.2)		
Alcohol consumption				
Yes	33 (73.3)	3 (1.8)	1.1(0.5-1.9)	0.468
No	12 (26.7)	161 (98.2)		

Chi-square test applied, P-value of <0.05 is significant

Studies prove that there is an overall 25% increase in the development of OSA in alcoholics.²¹ In the present study, 30.1% consumed alcohol with an average of 0.57 (\pm) 1.19 days in a week. That is effectively low when compared to Western standards and that could be the reason why we couldn't find a significant association between alcohol consumption and OSA in this study group.

In the present study 28.2% of the participants smoked and in addition to that 27.3% are subjected to passive smoking at home and the workplace. On average each smoker from the present study smoked about 0.82 (\pm) 2.4 cigarettes per day. Habitual smoking was found to have a very strong association with ESS scores in one of the recent studies.²² But in another study, even adjusting for age, sex and BMI, they failed to develop an association between smoking and OSA.²³ It almost resonates with the present study, where the authors too couldn't find a relationship between smoking and OSA. Another study found that even though there was no connection between smoking and OSA, OSA patients with a history of smoking are at an increased risk for microvascular and macrovascular complications in the future. Smoking may play an important role in promoting inflammation within the upper airway and the formation of a vicious cycle of OSA.²⁴

CONCLUSION

OSA is a condition that affects multiple systems, with increased morbidity and mortality. Though a significant association was not found between selected lifestyle factors and OSA risk, the role of lifestyle factors could not be undermined. Though the present study could not find significant relation between poor lifestyle habits with OSA, the importance of lifestyle behaviour could not be ignored. Further studies are required to clarify a stronger association between OSA and lifestyle factors.

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