

Review Article

Effects of sleep apnea on general health -A review

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ABSTRACT:

Obstructive sleep apnea (OSA) is a complex disorder characterized by collapse of the upper airway during sleep. Downstream effects involve the cardiovascular, pulmonary, and neurocognitive systems. OSA is more prevalent in men than women. Clinical symptoms suggest the diagnosis of OSA but none is pathognomonic of the condition. With rising awareness of OSA and the increasing prevalence of obesity, OSA is increasingly recognized as a major contributor to cardiovascular morbidity including systemic and pulmonary arterial hypertension, heart failure, acute coronary syndromes, atrial fibrillation, and other arrhythmias. Pulmonary manifestations include the development of chronic thromboembolic disease, which can then lead to chronic thromboembolic pulmonary hypertension (CTEPH). Neurocognitive morbidities include stroke and neurobehavioral disorders. Screening for OSA includes the use of symptom questionnaires and the diagnosis is confirmed by polysomnography. Management primarily includes the use of continuous positive airway pressure (CPAP) or bi-level positive airway pressure (BiPAP) devices during sleep. Alternate options such as mandibular devices and surgical procedures are considered for certain patient populations.

Keywords: Sleep Apnea; Obstructive; Airway Obstruction; Sleep Apnea Syndromes.

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INTRODUCTION

Obstructive sleep apnea (OSA) in the third edition of International Classification of Sleep Disorders (ICSD-3) is defined as a clinical syndrome characterized by repetitive episodes of partial or complete airway obstructions which during sleep, these obstructions result in desaturation of the blood's normal oxygen levels and are usually terminated by brief arousals from sleep.¹ These breathing gaps result in reductions in the oxygen supply to the brain and an accumulation of carbon dioxide², which briefly activates the brain's arousal system to reopen the airways. This process is frequently repeated, the consequence of which is to deprive patients of normal restorative sleep, the

resulting sequelae includes daytime sleepiness, headaches and cognitive deficits such as reduced ability to concentrate.³ Additionally, sympathetic overstimulation, systemic inflammation, and deoxygenation take place.⁴

PREVALENCE OF OBSTRUCTIVE SLEEP APNEA

OSA is considered as the second most common respiratory disorders following asthma, which leads scientists to perform many studies of OSA prevalence in various countries.⁵ For instance, in a study conducted in Pennsylvania, prevalence of OSA was found to be 17% in men and 5% in women, while the

overall prevalence in United State, based on The Wisconsin Cohort Study, is estimated at 9% in women and 24% in men.⁶ Across the globe, Europe's prevalence of OSA is 26% in men and 28% in women, such as in Spain. In addition, some Asian epidemiological studies have estimated the prevalence of OSA in Hong Kong as 8.8% in men and 3.7% in women, and some epidemiological researches from other Asian countries, including Korea and India, have shown similar findings.⁵ According to a recent epidemiological study in Saudi Arabia, it has been deduced that the prevalence of OSA is estimated at 8.8%, affecting 12.8% of men and 5.1% of women.⁸ In summary, 7%–26% in men and 3%–28% in women constitute the prevalence of OSA worldwide, and such disproportion in the percentages through these epidemiological studies may be attributed to a lot of geographical differences including the diversity of the population, age, and ethnic origin.^{7,8}

RISK FACTORS OF OBSTRUCTIVE SLEEP APNEA

OSA can affect anyone. However, there are several factors that increase one's risk of developing this sleeping disorder.

a) Obesity

OSA is quite prevalent in obese and overweight population. In fact, those with excess weight are four times more prone to having OSA than people with normal weight. The upper airway may be obstructed during one's breathing due to fat accumulation.⁶

b) Nasal Obstruction

Nasal passages are naturally the path in which air flows to our bodies. Any obstruction in these passages result in a limited airflow that is most recognized during sleep, producing apnea's and symptoms associated with OSA.

c) Gender

With a 2-4:1 ratio, men lead women when it comes to the chances of developing OSA. The reason males are more prone can be attributed to a variety of factors. Men have longer airways, which increase the chances of collapsing, whereas women have shorter airways that are more stable. Also, adipose tissue accumulation in men is centered on the upper body part, while women usually develop lower body fat.

d) Craniofacial Anatomy

Craniofacial characteristics are directly linked with the development of OSA. Enlarged tongue, soft palate, and inferiorly positioned hyoid bone cause narrowing of the upper airway, increasing its chances to collapse.

e) Smoking

Smoking increases the amount of inflammation and fluid retention in the upper airway, and it also results in daytime sleepiness. Higher risk of snoring and OSA is found in smokers than non-smokers or former smokers.⁷

CLINICAL SYMPTOMS

Clinical symptoms play a key role in identifying patients with OSA but none is pathognomonic of the disease. Patients usually complain of fatigue, excessive daytime sleepiness, snoring, drooling, nocturnal gasping or choking, headaches and/or falling asleep while driving. Patients with OSA are more likely to be involved in motor vehicle collisions.⁹

OSA PATHOPHYSIOLOGY

OSA pathogenesis is also multifactorial. There are "anatomical" and "non-anatomical" causes. Non-anatomical contributors include impaired pharyngeal dilator muscle function, premature awakening to mild airway narrowing (low respiratory arousal threshold), and unstable control of breathing. When combined with a pharyngeal airway that is susceptible to closure during sleep, impairment in one or more of these non-anatomical contributors can perpetuate OSA severity. Given that airway obstruction in OSA only occurs during sleep, the combination of an anatomical predisposition combined with state-dependent changes in non-anatomical contributors is crucial in driving this common disorder.¹⁰

DIAGNOSTIC TOOLS OF OBSTRUCTIVE SLEEP APNEA

The procedures followed in diagnosing a patient with OSA are few but precise. These methods include a polysomnography test and a home sleep apnea test. Both of which are sleep studies, the most effective and accurate diagnostic tools. A polysomnography is a test that records various body movements and functions while the patient is asleep in a hospital or sleep center. This testing method is deemed as the gold standard examination to diagnose OSA. The most important data from the polysomnography is the apnea-hypopnea index (AHI). It represents the severity of OSA by relating the values of apneas and hypopneas.¹¹

TREATMENT OF OBSTRUCTIVE SLEEP APNEA

OSA's treatments are considered as life-long treatments. These therapies are divided into non-invasive and invasive treatments. The non-invasive treatments such as continuous positive airway pressure (CPAP), which is considered the first therapy for mild to severe patients, do not require anesthesia. Invasive treatments, on the other hand, require surgical intervention such as Uvulopalatopharyngoplasty (UPPP). Surgeries are not the primary treatments for OSA. However, they are recommended for patients who reject or are unable to tolerate noninvasive medical treatments, such as CPAP and for patients who have mild OSA and specific anatomical abnormalities that can be corrected.¹²

PREVENTION OF OBSTRUCTIVE SLEEP APNEA

Some lifestyle habits can act as major contributors in reducing and preventing OSA severity. These habits include weight loss, physical exercises, and cutting down smoking and alcohol especially before sleep time. These lifestyle modifications have shown their efficacy by reducing the AHI and increasing oxygen consumption.¹³

COMPLICATIONS OF OBSTRUCTIVE SLEEP APNEA HEALTH

A growing number of studies indicate that the OSA-resulting intermittent episodes of hypoxia, the condition when the body is at low oxygen levels, induce metabolic mechanisms such as sympathetic activation, systemic inflammation, impaired glucose and lipid metabolisms, and endothelial dysfunction. Left untreated, these mechanisms lead to higher risks and susceptibility for metabolic disease, hypertension, cardiac disease, coronary heart disease, stroke, morbidity, and mortality.¹⁴

OSA AND QUALITY OF LIFE

Although OSA is a well-recognized disease that affects patients physically and psychologically, its negative impact on the different levels of society may be even higher. OSA leads to worsening patients' personal relationships especially with bed partners who are already under stress, and due to poor quality, in addition to the negative impact of the disorder on the marriage itself and decreased libido. Depression and OSA are inter-related and both disorders tend to exist in the same patient¹⁵; they also share the same symptoms and polysomnographic features, which lead to masking and missing of the diagnosis of OSA. OSA can lead to TRD. Additionally, OSA may result in decreasing work productivity mainly due to EDS, which is frequently misperceived by work authorities as laziness. More attention should be directed toward the risks associated with OSA not only in RTA but also train collisions and aircraft safety. At a higher level, more broadly, OSA results in an excessive increase in healthcare costs due to over-utilization of medical services by this patient group especially before the diagnosis and the treatment of the disease. Therefore, proper management of OSA will not only benefit the patient but also improve many aspects of society.

CONCLUSION

Due to OSA's multiple negative complications, more clinical studies and trials on OSA are recommended in order to better understand the nature of its effects. Furthermore, it is of complete importance to raise awareness of this disorder among community members and increase its recognition in health sectors

to help in the early diagnosis and intervention for OSA.

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