Undiagnosed Obstructive Sleep Apnea in the Population of Saudi Arabia

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Abstract

Introduction: Obstructive sleep apnea (OSA) is a potentially life-threatening disorder that is poorly defined and underreported. OSA is characterized by recurrent episodes of upper airway obstruction, resulting in breathing difficulty during sleep, disruptive snoring, and nocturnal hypoxemia. Despite increased knowledge of this disease, OSA remains undiagnosed in many patients. Objective: The aim of the study was to assess excessive daytime sleepiness, which is a common symptom of undiagnosed OSA in Saudi Arabia. Methodology: A cross-sectional study design composed of an online survey that was distributed through social media from April 10, 2016 to August 10, 2016. The participants were first asked if they were Saudi. The survey included questions about demographic data, Epworth Sleepiness Scale (ESS), awareness of the sleep disorder, diagnosis status, snoring, chronic disease, obesity, and nocturnal polyuria. The sum of eight situations was calculated, and the risk of OSA was correlated with the above-mentioned variables. Descriptive statistical analysis was performed using SPSS.20 software. Results: total of 1,925 Saudis participated in our survey. The average age was 32.7 years. The majority were men (57.9%, n=1,115) and 42.1% (n=810) were women. Seven hundred and thirty-seven participants were found to have a risk of sleep apnea (>8) as per ESS were. Of these 737 participants, 44% felt that they had sleep problems. However, only 5.5% (n=41) were diagnosed with OSA. Of the male participants, 19% admitted to sleeping while driving; of these participants, 3.7% indicated a very high chance of sleeping while driving. Conclusion: The Saudi population may have an increased potential risk of OSA, with an increased obesity rate playing a role in its etiology. OSA would increase the tragedy of road traffic accidents in Saudi Arabia. A national project of implementing OSA screening programs, with the help of dentists and primary health-care providers, is paramount.

Key Words: Obstructive sleep apnea, Epworth sleepiness scale, Obesity, RTA

Introduction

Obstructive sleep apnea (OSA) is a potentially life-threatening disorder that is poorly diagnosed and underreported. OSA is characterized by recurrent episodes of upper airway obstruction, resulting in impaired sleep quality, disruptive snoring, and nocturnal hypoxemia [1-4]. OSA has been historically described as the "Pickwickian Syndrome," referring to the Charles Dickens's novel, The Posthumous Paper of the Pickwick Club, with a character of an obese boy who constantly falls asleep in any situation and any time of the day. Later, this condition was called the "obesity hypoventilation syndrome" [5]. Nowadays, our understanding of this disorder became much better. Many research studies have focused on OSA and its association with multiple chronic diseases such as hypertension, diabetes, depression, and cardiac diseases [6, 7]. Although there is an increased knowledge of this disease, many OSA patients remain undiagnosed. The difficulty of detecting OSA patients in the population is because most of them are not aware of the problem and rarely relate their "falling asleep sometimes" to a real disease with significant comorbidities.

EDS is the most common complaint of OSA patients. It is involuntarily falling asleep during the daytime. Apart from the potentially lethal diseases associated with OSA, EDS has been reported to be associated with severe road traffic accidents (RTA) [8]. The gold standard for diagnosis of OSA is the polysomnography or sleep study. However, it is expensive, time consuming, not widely available in all medical institutions, and not practical for public screening. As an alternative, the Epworth Sleepiness Scale (ESS) is a simple method to screen patients with EDS [9]. This study aimed to assess the prevalence of EDS in Saudi Arabia using the ESS.

Table 1. Epworth Sleepiness Scale.

S.No	Likelihood to fall asleep in the following situations
1	Sitting and reading
2	Watching TV
3	Sitting inactive in a public place
4	As a passenger in a car for an hour without break
5	Lying down to rest in the afternoon when circumstances permit
6	Sitting and talking to someone
7	Sitting quietly after eating lunch
8	In a car, while stopped for a few minutes in traffic
Score	**Chances of dozing**
0	Would never doze
1	Slight chance of dozing
2	Moderate chance of dozing
3	High chance of dozing

Material and Methods

A cross-sectional study design composed of an online questionnaire that was distributed through social media from April 10, 2016 to August 10, 2016. The Institutional Review Board (IRB) of the Riyadh Elm University Previously called Riyadh Colleges of Dentistry and Pharmacy obtained ethical

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approval. The participants were asked are Saudi or not. The survey included demographic data and the Epworth Sleepiness Scale, which consists of ranking eight possible situations in which the participant may fall asleep (*Table1*).

In addition, the participants were asked about their awareness of sleep issues, diagnosis status, snoring, chronic disease and obesity, nocturnal polyuria, and the possibility of dozing during a critical situation such as driving a car for men and cooking for women. Exclusion criteria: Non Saudis

The sum of scores for the eight situations was calculated, and the risk of OSA was correlated with the above-mentioned variables. The participants with an ESS score >8 were considered the at-risk group. Descriptive statistical analysis was performed using SPSS.20 software.

Results

There were 1,925 Saudi participants in our survey. The average age was 32.7 years. More than half of the participants were men (men, 57.9% [n=1,115]; women, 42.1% [n=810]. According to ESS score (>8), 38.2% (n=737) of the participants were found to be at risk for sleep apnea *(Figure 1)*. Of these 737 participants, 44% felt that they had a sleeping problem; however, only 5.5% (n=41) were diagnosed with a sleep disorder. Obesity was the most common condition associated with a high ESS score (>8) *(Figure 2)*, whereas snoring and nocturnal polyuria were not associated with a high ESS scores. Of the male participants, 19% admitted to sleeping while driving and 3.7% of them indicated a very high chance of sleeping while driving.

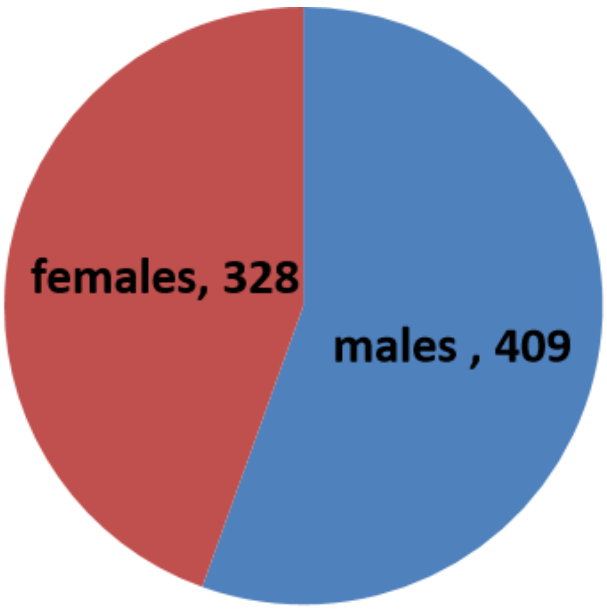

Figure 1. *Participants at risk of OSA in relation to gender.*

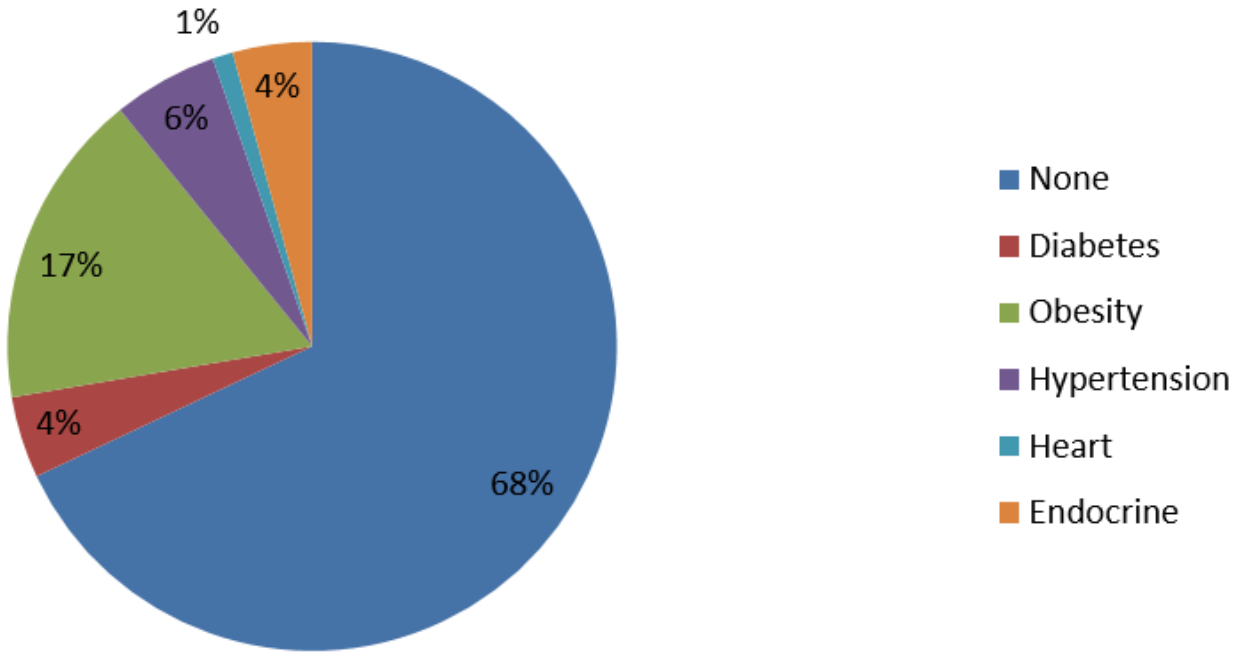

Figure 2. *ESS score more than 8 in relation to systemic.*

Discussion

OSA is a silent disease that may underline common chronic diseases like hypertension, depression, and cardiac diseases. The early detection and management of OSA would prevent these diseases and save the society of health and economic burden. Furthermore, EDS could affect students' academic achievement or cause several occupational injuries [10-12]. It may also be the cause of RTA, especially for truck drivers who spend long periods of time on the roads [8].

The patients might not notice this disease, and it is overlooked by primary health care providers. Bahammam et al. reported that four of ten women and one of three men who attended primary health care clinics were at risk for sleep apnea [13, 14]. In our sample, only 44% of the at-risk group

felt that they had a sleep disorder. Craniofacial abnormalities are commonly associated with OSA such as displacement of the hyoid bone inferiorly in relation to mandibular plane, and mandibular deficiency [15]. Dentists who often see more patients than primary physicians may be the first to suspect OSA, especially in patients with mandibular deficiency. Primary health care providers should also suspect OSA in obese or young patients suffering from chronic diseases associated with OSA, unexplained depression, or impotence. Due to the difficulty of using polysomnography as a screening tool, a quick and simple alternative is required. This screening tool should be practical for public screening as a pre-appointment questionnaire by primary health care provider or dentists. The ESS, although it is subjective, has the advantage of being fast, sensitive, and practical for screening a large number of people [9].

In our sample, 38.2% of the participants were found to be at risk for OSA according to the ESS score, and of these participants, only 5.5% had been diagnosed with OSA. In addition, more than one-third of the at-risk groups were diagnosed with one or more of the chronic diseases that could be associated with undiagnosed OSA. Obesity was the most common condition associated with the at-risk group. It has been reported that a 10% increase in body weight predicts a six-fold increase in the risk of developing OSA [16]. The progressive rise of obesity in Saudi Arabia, ranked the 15th most obese country with an overall obesity rate of 33.7% [17, 18], will predispose and potentiate OSA in the society.

The morbidity and mortality of OSA could happen as a late consequence of chronic diseases or EDS-related injuries. One would expect that the most common cause of death is cardiac-related events while the mortality of RTAs in OSA patients might be underestimated. There have been reports that untreated OSA drivers have an almost 5-times higher risk of a car crash than controls [19-21]. The severity of these accidents is unexpected. However, Parson's reported that these crashes accounted for 83% of all car accidents fatalities [22]. According to a 2015 report of the Ministry of Health of Saudi Arabia, RTAs are the cause of 17.8% of deaths in our hospitals, 81% of emergency room deaths, and 20% of beds are occupied by RTAs victims [23-25]. In our sample population, 19% of men admitted to sometimes sleeping while driving. Although there are many other causes of high RTAs in Saudi Arabia, some of these could be prevented by diagnosing and treating OSA.

The role of dentists in OSA screening is very important. They are familiar with jaw deformities, such as mandibular retrognathia, which is considered the most significant risk factor for OSA [26, 27]. Furthermore, people visit dentists more frequent and in younger age than any other health care providers [28]. Implementation of a screening tool such as the ESS as part of a pre-appointment medical questionnaire and referring suspected patients with jaw deformities to a sleep specialist would greatly help in the detection and treatment of OSA.

Conclusion

Considering our findings, we can say that the potential risk of OSA has increased in the Saudi population. Increased obesity rate could have a role in its etiology. Increased incidence of OSA would result in increased RTA in Saudi Arabia. A national project of implementing OSA screening programs with the help of dentists and primary health care providers is paramount to preventing this tragic scenario.

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