

Is the clinical presentation different between men and women admitting to the sleep laboratory?

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Abstract

Objectives Sleep and sleep disorders are different in several important ways between men and women. We aimed to investigate gender differences in initial symptoms and associating medical diseases of patients admitting to our sleep clinic. **Methods** Ninety-one patients, 20 women (22%) and 71 men (78%), admitting consecutively to the sleep clinic were studied. A detailed sleep and medical history of the patients was recorded. All patients were questioned for Epworth Sleepiness Scale (ESS) and underwent an entire night of diagnostic polysomnography. Apnea–hypopnea index (AHI) was identified as the total number of apnea and hypopnea per hour of sleep. Hypopnea was defined as a decrease of airflow by at least 50% and desaturations were defined as $\geq 4\%$ decrease in oxygen saturation.

Results The mean values for age, body mass index, blood pressures and ESS score did not significantly differ between men and women, but AHI (events/h) was significantly higher in men (29.1 ± 22.7) than women (17.9 ± 17.7 , $p < 0.05$). Snoring was the most common symptom in both men (95%) and women (90%). Among the main presenting complaints, only morning headache (12 of women 60%, 31 of men 43%, $p = 0.04$) and dry mouth on awakening (ten of women 50%, 57 of men 80%, $p = 0.02$) showed a significant difference between the two genders, while among the medical diseases only hypothyroidism (four of women 20% and three of men 4%, $p = 0.03$) and depression (nine of women 45% and 16 of men 22%, $p = 0.02$) were seen as statistically higher in women than in men.

Conclusions Primary care physicians should be aware of obstructive sleep apnea (OSA) in women and the importance of referring women for sleep studies when they complain of symptoms associated with OSA, even if other non-specific symptoms such as morning headaches are reported. Also, hypothyroidism and depression are accompanied with sleep disorders especially in women.

Keywords Obstructive sleep apnea · Symptoms · Gender · Sleep disorders

Introduction

Sleep and sleep disorders are different in several important ways between men and women. The gender factor is generally neglected in many countries and especially women are of minor importance within the health politics when compared to men [1]. Although the greater sleep apnea prevalence in men has raised the concern that a selection bias for referral and identification of the diagnosis may favor men, women also come to the clinical interview accompanied by their partner less frequently than men. Women with obstructive sleep apnea (OSA) may be underdiagnosed due to circumstances related to the family lifestyle and socio-cultural factors. Moreover, the clinical presentation of OSA in women is different. The Wisconsin Sleep Cohort Study estimated that sleep apnea was undiagnosed in more than 90% of women with moderate to severe sleep apnea [2]. Atypical symptoms such as fatigue, morning headaches, insomnia, depression, and use of sedatives were more frequent in women than in men rather than typical symptoms of OSA such as snoring, witnessed apneas, and excessive daytime sleepiness [3]. For instance, snoring—the most common symptom of OSA—

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and decreased libido are usually attributed to the male population. Women also usually feel ashamed while talking about these symptoms. The disparity in clinical prevalence can possibly be explained by the difference in clinical presentation, different tolerance of symptoms, differing amount of medical services, or bias by physicians expecting a higher male predominance [4].

OSA is a common cause of excessive daytime sleepiness and neuropsychological dysfunction resulting in poor work/school performance, difficulty in concentrating, memory impairment, headache, feeling sick in the morning, impotence, and decreased libido [5]. It has also been implicated as an independent risk factor for cardiovascular diseases such as myocardial infarction, hypertension, heart failure, arrhythmias, and stroke [6–11]. We showed that, especially in females with metabolic syndrome risk, evaluation of metabolic syndrome criteria may play an important role in predicting OSA severity with high sensitivity (86.6%) and high negative predictivity (85.7%) [12].

In the present study, we aimed to investigate gender differences in initial symptoms and associating medical diseases of consecutive patients admitting to our sleep clinic which is open to referrals from chest, cardiology, endocrine, and otolaryngology departments.

Materials and methods

Study population

Ninety-one consecutive patients, 20 women (22%) and 71 men (78%), admitting to the sleep clinic between October 2003 and October 2005 were included in the study. A detailed sleep and medical history of the patients was recorded face to face by the same person. Sleep cycle, nutritional status, medications, alcohol usage, and family anamnesis were also questioned. Epworth Sleepiness Scale (ESS) was questioned to all patients before the sleep studies [13]. Physical examination was performed on all subjects and systolic (SBP) and diastolic (DBP) blood pressure were measured consecutively in sitting position on the right arm using a sphygmomanometer (Erka, Germany), after at least 5 min of rest, using the ESH/ESC Hypertension Guidelines. Hypertension was identified as $BP \geq 140/90$ mmHg or using antihypertensive drugs. Heart rate per minute was measured in sitting position and the body mass index (BMI) of the patients was calculated as weight divided by height squared (kg/m^2).

Sleep study

All patients underwent an entire night of diagnostic polysomnography [14]. The portable, limited sleep study performed with the Embletta device [15] consisted of the

following: (1) nasal pressure detector using nasal cannulae/pressure transducer system, recording the square root of pressure as an index of flow, (2) thoraco-abdominal movement detection through two piezoelectric belts, (3) finger pulse oximeter, and (4) body position detection. A sleep technician hooked it up by same standard to every patient.

Apnea was defined as total obstruction of oronasal airflow ≥ 10 s, hypopnea was defined as decrease of airflow by at least 50%, and desaturations were defined as $\geq 4\%$ decrease in oxygen saturation [16]. Apnea–hypopnea index (AHI) was identified as the total number of apnea and hypopnea per hour of sleep. Desaturation index was identified as the number of oxygen desaturation events per hour of sleep. Subjects with $AHI \geq 5$ were diagnosed as OSA [17].

Results

The mean values for age (50.1 ± 9.3 for women vs 50.9 ± 11.3 for men; $p > 0.05$), body mass index (BMI kg/m^2) (31.6 ± 6.6 for women vs 30.2 ± 5.0 for men; $p > 0.05$), Epworth Sleepiness Scale score (7.8 ± 6.3 for women vs 8.9 ± 6.2 for men; $p > 0.05$), systolic blood pressure (131.8 ± 20.9 for women vs 133.2 ± 14.5 for men; $p > 0.05$), and diastolic blood pressure (80.9 ± 15.1 for women vs 84.3 ± 15.5 for men; $p > 0.05$) did not significantly differ between the two genders, but apnea–hypopnea index (events/h) was significantly different between women (17.9 ± 17.7) and men (29.1 ± 22.7 , $p < 0.05$) (Table 1).

Entrance complaints, symptoms, and medical diseases of women and men admitting to the sleep clinic are shown in Table 2. Among the main presenting complaints, only morning headache (12 of women, 60%; 31 of men, 43%; $p = 0.04$) and dry mouth on awakening (ten of women, 50%; 57 of men, 80%; $p = 0.02$) showed a statistically significant difference between men and women, while among the medical diseases only hypothyroidism (four of women, 20%, and three of men, 4%; $p = 0.03$) and depression (nine

Table 1 Study population demographics

	Women	Men	<i>p</i> value
<i>N</i> (%)	20 (22)	71 (78)	NS
Age, year	50.1 ± 9.3	50.9 ± 11.3	NS
BMI, kg/m^2	31.6 ± 6.6	30.2 ± 5.0	NS
SBP, mmHg	131.8 ± 20.9	133.2 ± 14.5	NS
DBP, mmHg	80.9 ± 15.1	84.3 ± 15.5	NS
ESS score	7.8 ± 6.3	8.9 ± 6.2	NS
AHI, events/h	17.9 ± 17.7	29.1 ± 22.7	0.02

NS non-significant, BMI body mass index, AHI apnea–hypopnea index, ESS Epworth Sleepiness Scale

of women, 45%, and 16 of men, 22%; $p=0.02$) were seen as statistically higher in women than in men (Table 2).

Statistical analysis

Statistics were performed by Statistical Package for Social Sciences version 10.0 (SPSS-10.0) for Windows statistical packet program. Measurements are expressed as mean±SD. Mann–Whitney U test was used in the comparison of the two groups. A p value of <0.05 was regarded as significant.

Discussion

In most previous studies, women and men with OSA had differing apnea severity (women having a lower AHI) and differing weights (with women having a greater BMI). In the present study, women also had lower AHI, but their BMIs were similar with men. In our study, snoring was the most common symptom in both men (95%) and women

(90%). However, with regard to OSA symptoms, the frequency of snoring, witnessed apneas, and daytime hypersomnolence was not significantly different in both genders. On the other hand, morning headache was more frequently experienced by women (60%), while dry mouth on awakening was frequently experienced by men (80%). Young et al. [4] similarly found that women presented with more “atypical symptoms” and this may divert the treating physician to concentrate on alternative diagnoses and ignore the possibility of sleep apnea in the differential diagnoses. Ambrogetti et al. [18] noted that women were less likely to be aware of witnessed apneic events, an explanation for this finding may be that women who are bedpartners of men with breathing problems during sleep may be more sensitive to the disruptive behavior and may relate their observations more readily, whereas men either sleep despite their female bedpartners’ breathing problems during sleep or do not view these problems as disruptive or problematic. However, in our study, witnessed apneas were not significantly different between men (67%) and women (65%).

Insomnia is not considered a common symptom of OSA, especially in men; however, women were much more likely to complain of insomnia than men. In our study, 10% of women and 7% of men complained of insomnia with no difference between the two groups. The retrospective study by Krakow et al. showed that problematic insomnia symptoms were seen in about 50% of patients with a sleep-related breathing disorder but most of their patients had a psychiatric condition [19]. Although decreased libido is usually attributed to the male population, we think that women usually feel ashamed while talking about these symptoms. In our study, 40% of females and 28% of males complained of decreased libido. Among the medical diseases, only hypothyroidism and depression were seen more frequent in women, while chronic obstructive pulmonary disease, asthma bronchiale, hypertension, coronary heart disease, and stroke were similar between the two groups. There is a strong link between depression and OSA and it is unclear whether the depression that is diagnosed is a manifestation of sleepiness or OSA causes a mood disorder [20]. In previous studies, it has been found that women had higher depression scores when compared with men [21]. At the time of OSA diagnosis, women with OSA are more likely to be treated for depression, to have insomnia, and to have hypothyroidism than are men with the same degree of OSA [22].

Sleep-disordered breathing has been assumed to be a condition associated predominantly with men. The typical profile of a patient with OSA, which is still to be considered at the present time, is an obese, middle-aged man with habitual snoring and daytime hypersomnolence. However, in well-designed population-based epidemiological studies with larger samples, it was observed that the

Table 2 Entrance complaints and symptoms of women and men admitting to the sleep clinic

Main presenting complaints	women (<i>n</i> , 20) <i>n</i> (%)	men (<i>n</i> , 71) <i>n</i> (%)	<i>p</i> value
Snoring	18 (90)	68 (95)	NS
Witnessed apneas	13 (65)	48 (67)	NS
Excessive daytime sleepiness	11 (50)	41 (58)	NS
Insomnia	2 (10)	5 (7)	NS
Sleep interruption	13 (60)	48 (67)	NS
Fatigue	15 (75)	53 (74)	NS
Nocturnal sweating	6 (30)	39 (54)	NS
Choking on awakening	13 (65)	48 (67)	NS
Morning headaches	12 (60)	31 (43)	0.04
Changes in mood	8 (40)	32 (45)	NS
Difficulty in concentration	9 (45)	32 (45)	NS
Dry mouth on awakening	10 (50)	57 (80)	0.02
Decreased libido	8 (40)	20 (28)	NS
Sleepiness on driving	0 (0)	7 (9)	0.07
Traffic accident due to napping	0 (0)	3 (4)	NS
Nocturia (>1/night)	7 (35)	24 (33)	NS
Heartburn or acid reflux	5 (25)	27 (38)	NS
Heart palpitations	5 (25)	8 (11)	NS
Medical diseases			
Chronic obstructive pulmonary disease	0 (0)	9 (12)	NS
Asthma bronchiale	3 (15)	4 (5)	NS
Depression	9 (45)	16 (22)	0.02
Hypertension	10 (50)	33 (46)	NS
Coronary heart disease	2 (10)	8 (11)	NS
Diabetes mellitus	1 (5)	5 (7)	NS
Hypothyroidism	4 (20)	3 (4)	0.03
Stroke	0 (0)	0 (0)	NS

NS not significant

male/female ratio for sleep-disordered breathing was around 2:1, 3:1 [23]. The reasons for the lower diagnosis of OSA in women than in men are not fully understood. A possible reason for this discrepancy between clinical and epidemiological studies is that the clinical significance and the potential of morbidity for having a high AHI in the general population is lower in females. Another reason, however, is that sociocultural factors or differences in clinical expression of this disorder would result in less and later consultations of women or, alternatively, their clinical picture could be less recognized by primary care physicians and therefore OSA may be underdiagnosed. Furthermore, the presentation of women with non-specific symptoms, in addition to the classic symptoms, could make physicians turn to other diagnostic possibilities. Several studies have tried to provide an explanation for the male predominance in the prevalence of OSA, including anatomic size of airway [24], greater collapsibility in upper airway [25], greater increase in upper airway resistance in men, or hormonal changes in women [26].

In conclusion, primary care physicians should be aware of sleep apnea in women and the importance of referring women for sleep studies when they complain of symptoms associated with OSA, even if other non-specific symptoms are reported.

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