



The Egyptian Society of Chest Diseases and Tuberculosis
Egyptian Journal of Chest Diseases and Tuberculosis

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ORIGINAL ARTICLE

Gender differences in polysomnographic findings in Egyptian patients with obstructive sleep apnea syndrome



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Received 6 March 2016; accepted 20 March 2016

Available online 31 March 2016

KEYWORDS

Gender;
Polysomnography;
AHI;
BMI

Abstract *Aim:* Aim of the present study was to examine the influence of gender on degree of severity of obstructive sleep apnea.

Patients and methods: This retrospective study included 97 patients diagnosed with OSA by overnight polysomnography, who were referred to the Chest Department, Kasr Al Aini Hospital sleep laboratory during the study period from January 2013 to December 2015.

Results: There were 60 males (61.9%) and 37 females (38.1%) with a male to female ratio of 1.6:1. BMI was greater in females than males (44.62 ± 9.23 versus 39.74 ± 7.92 ; $p = 0.007$). AHI was greater in males than females (27.29 ± 20.85 versus 14.28 ± 8.76 ; $p < 0.001$). Desaturation index was also greater in males than females (42.24 ± 26.95 versus 29.46 ± 23 ; $p = 0.012$). Desaturation index increased with increasing BMI with a statistical significant difference ($p = 0.011$).

Conclusion: In Egyptian patients with OSA, although females had higher BMI as compared to males, males had more severe disease as indexed by AHI.

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Introduction

Obstructive sleep apnea (OSA) is a common condition that affects at least 4% of males and 2% of female. The OSA hallmark feature is the recurrent episode of partial (hypopnea) or

complete (apnea) upper airway collapse during sleep, which is associated with hypoxia-reoxygenation and microarousal [1].

Excess body weight is a major risk factor for snoring and sleep apnea, 70% of patients with OSA are overweight [2]. Obesity is believed to predispose to OSA because of mass loading to the upper airway of the neck [3].

There is evidence that there are both gender- and age-related differences in OSAS manifestation [4–6].

Epidemiologic studies of obstructive sleep apnea (OSA) have consistently found a very strong male predominance of this disorder [7].

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Peer review under responsibility of The Egyptian Society of Chest Diseases and Tuberculosis.

Women have consistently been reported to have a lower prevalence of this sleep disorder than men, with a male/female ratio of 2:1–5:1 [8–11].

Different studies had compared the degree of severity of OSA between males and females. OSA was found to be more severe in males [12–15].

The reason for this sex difference is unknown, since women and men with OSA are reported to have similar symptoms [16].

The clear sex difference raises the question of whether women manifest OSA differently from men, or whether they may be protected by a distinct pathophysiology [7].

Aim of the work

To study the influence of gender on degree of severity of obstructive sleep apnea in a cohort of Egyptian patients.

Subject and methods

We retrospectively reviewed the polysomnography (PSG) reports for all patients who had undergone overnight polysomnography (PSG) at the Chest Department of Kasr Alaini Hospital from January 2013 to December 2015.

Patients were eligible for the study if a diagnosis of OSA had been made on their initial polysomnogram. OSA was defined as an apnea – hypopnea index (AHI) of 5 or more events per hour. Only the patient's initial polysomnogram was included in the study.

All patients were subjected to full history taking, thorough clinical examination, measurements of body weight, height and body mass index (BMI in kg/m²).

Polysomnographic study was done (8 h per night) with a detailed analysis of the recorded data. Before the study, patients were advised to avoid tea and coffee intake or any other drugs that may have an influence on the quality of sleep as sedatives, hypnotics and tranquilizers.

Patients were connected to SOMNOscreen™ plus (Cardio-Respiratory Screening) which is computer based high technology polysomnography.

It included:

- Pulse oximetry applied to the index finger to detect arterial oxygen saturation (SaO₂).
- A microphone applied on the neck beside the larynx to detect snoring.
- Heart rhythm is monitored with a single lead ECG: to detect arrhythmia index which is number of cardiac arrhythmias per hour of sleep.
- Oronasal airflow using a thermal sensors and nasal pressure transducer.
- Chest and abdominal movements recording using 2 separate belts to detect the effort.
- Leg movements are recorded via anterior tibialis electromyogram.

From recording of sleep study we detect:

Apnea: defined by the cessation of airflow for a minimum of 10 s, with the oral thermistor providing the most accurate detection of an apnea. An apnea is further classified as obstructive, central or mixed based on the assessment of respiratory effort during the event [17].

Hypopneas: are generally classified only as obstructive events. Hypopneas can be scored using various definitions although most commonly they are characterized by at least a 30% reduction in airflow in association with a 3% or 4% oxygen desaturation [17].

A desaturation is scored when the following two parameters are met:

- Minimum drop required is 4% (The minimum decrease in oxygen level to score a desaturation).
- Minimum duration required is 10 s.

AHI: refers to the number of apneas and hypopneas per hour of sleep.

O₂ desaturation index: number of O₂ desaturations per hour of sleep.

SpO₂ time < 90%: Time in which oxygen saturation is less than 90% (as a percent from total sleep time).

Snoring index: the number of snoring events per hour of sleep.

The severity of sleep-related obstructive breathing events was rated as follows: mild: 5–15 events/h; moderate: 15–30 events/h; and severe > 30 events/h [18].

The following data were recorded and analyzed: age, sex, BMI, AHI, O₂ desaturation index, SpO₂ time < 90%, lowest O₂ saturation and snoring index.

Statistical methods

Data were coded and entered using the statistical package SPSS version 15. The data were summarized using number and percentage for qualitative values, mean and standard deviation for normally distributed quantitative variables, median and interquartile range for quantitative variables which are not normally distributed.

Statistical differences between groups were tested using Chi Square test for qualitative variables.

Independent sample *t*-test and analysis of variance (ANOVA) for quantitative variables which are normally distributed. While non parametrical Kruskal Wallis test and Mann Witney test were used for quantitative variables which are not normally distributed.

Correlations were done to test for linear relations between quantitative variables. *p*-values less than or equal to 0.05 were considered statistically significant.

Results

A total of 145 patients underwent overnight PSG at the Chest Department, Kasr Al Aini Hospital sleep laboratory during the study period. A diagnosis of OSA was made in 97 patients that were eligible for the present study. There were 60 males (61.9%) and 37 females (38.1%) with male to female ratio of 1.6:1. Regarding the age distribution, 9 patients (9.3%) aged from 31 to 40 years, 13 patients (13.4%) from 4 to 50 years, 28 patients (28.9%) from 51 to 60 years, 36 patients (37.1%) from 61 to 70 years, 11 patients (11.3%) above 71 years.

Females were slightly older than males but with no statistical significance.

By applying Mann–Whitney test the BMI was greater in females (*p* = 0.007). AHI was greater in males (*p* < 0.001),

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