THE DIAGNOSTIC EFFECTIVENESS OF THREE CARDINAL SYMPTOMS IN SLEEP APNEA SYNDROME WHEN ASKED ROUTINELY IN OUT-PATIENT VISITS

Erol Aktunç[1], Remzi Altın[2], Nejat Demircan[1], Meltem Tor[2], Murat Unalacak[1], Levent Kart [2]

Zonguldak Karaelmas University, School of Medicine, Departments of Family Medicine[1] and Pulmonary Medicine[2]

Aim: In this study we investigated the increase in patient referral rates and diagnosis of obstructive sleep apnea syndrome (OSAS) by asking three cardinal symptoms.

Methods: Patients who applied with different complaints to the family practice out-patient clinic between 04.01.2003 and 10.31.2003 (n=413) consisted the study group and they, along with their spouses, were asked about three cardinal symptoms of OSAS. Control group consisted 451 age and sex matched out-patients who had applied before the initiation of the study. Symptom positive patients were referred to an ear-nose-throat specialist and a sleep disorders specialist. Polysomnography was performed if indicated. Student-t test and chi-square test were used as appropriate.

Results: There were no significant differences between groups about age, sex and body mass index (BMI) values. Patients diagnosed as OSAS were predominantly males. The mean BMI values for each group were classified as overweight. The rate of referral in control group was significantly lower than the study group. Out of the 413 patients three (%0.7) were diagnosed as OSAS, five (%1.2) were diagnosed as simple snoring. One of the three patients diagnosed as OSAS was female and the other two were male.

Conclusions: It is our conclusion that all patients in primary care settings should be screened for cardinal symptoms of OSAS in order to prevent further complications and improve their quality of life. We started routine screening of all patients for OSAS by using three cardinal symptoms in our primary care out-patient clinic.

Keywords: Sleep apnea, primary care, diagnosis, screening, referral

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INTRODUCTION

In this study we investigated the rate of increase in patient referral rate and diagnosis of obstructive sleep apnea syndrome (OSAS) by asking three cardinal symptoms; loud snoring, witnessed apneas and daytime sleepiness to patients and their spouses, applying with non-sleep related complaints to a family practice out-patient clinic.

OSAS is defined as the intermittent interruption of the air flow through oropharynx resulting in recurrent apnea periods during sleep (1). OSAS is a common and important clinical problem. This syndrome causes many complications in different organ systems, the major ones being in the cardivascular system (2, 3, 4, 5). For this reason OSAS converges an ever increasing attention.

Correspondence: *Yrd. Doç. Dr. Erol AKTUNÇ*
Zonguldak Karaelmas Üniversitesi
Tıp Fakültesi Aile Hekimliği A.D.
Esenköy mevkii, 67600 Kozlu/Zonguldak, Türkiye

The three cardinal symptoms defining OSAS are loud snoring, repetitive episodes of apneas with continued respiratory efforts during sleep and excessive daytime sleepiness. (6, 7, 8, 9) Sleep apnea patients are frequently habitual snorers, although some are not either aware of the problem or the severity of it at all. This makes an interview with the spouse or bed partner essential. (9) A pattern of intermittent loud snoring, interspersed with periods of silence lasting more than 10 seconds, is suggestive of the occurrence of sleep apnea. Another prominent presenting complaint is excessive daytime sleepiness, a subjective complaint hard to quantify. (8) Other symptoms may include dry mouth on waking, nocturnal arousals

Table 1. The demographic data for the study and control groups

Demographic data	Study group (n=413)	Control group(n=451)	P value *
Age			
Mean±SD**(Years)	46.7 ± 11.7	48.4 ± 12.5	p>0.05
Range	15 - 81	17 - 75	
Gender			
Male	129 (31.2%)	148 (32.8%)	p>0.05
Female	284 (68.8%)	303 (67.2%)	p>0.05
Mean BMI***	27.2 ± 4.9	27.3 ± 4.9	p>0.05
Range	15.2-42.9	15.4-42.7	p>0.05

** Chi-Square testing , ** Standard deviation, *** Body Mass Index*

with or without choking spells, nocturnal diaphoresis, abnormal motor activity during sleep, enuresis, gastroesophageal reflux, headaches, chest pain, diminished libido, impotence, loss of memory and concentration, personality changes, and depression. (8,9) OSAS patients are frequently overweight and hypertensive. The gold standard for diagnosis is polysomnography in the sleep laboratory. As the diagnostic sleep studies are both expensive and hard to perform, referred patients should be highly selected. (6,8) Many of the symptoms in OSAS occur in many diseases, so the combination of the cardinal symptoms make the selection more accurate (8).

MATERIAL AND METHODS

Patients who applied with different complaints to the Family Practice out-patient clinic of a university hospital between 04.01.2003 and 10.31.2003 (n=413) consisted the study group and they, along with their spouses, were asked about three cardinal symptoms of OSAS. Control group consisted age and sex matched 451 patients who applied to the same setting before the study started and to whom the three symptoms were not routinely asked. All of the patients in both of the groups were evaluated by the same physician.

Presence of loud snoring alone or in combination with one or all of the other two symptoms indicated a detailed research for OSAS in the patient. All of the referred patients were evaluated by an ear-nose-throat specialist and pulmonology department sleep disorders specialist. Polysomnography was performed as indicated above.

Table 2. The symptoms of the patients in the study group

Symptoms	Study group (n:413)	
	n	%
Snoring (Loud or not)	62	15.0
Witnessed apneas	8	1.9
Daytime sleepiness	6	1.5
Referred patients	12	2.9

Polysomnography

Polysomnography was performed by using a computerised system (Compumedics E-series, 44 channel, USA) according to the standards of American Thoracic Society (10). The following parameters were recorded during polysomnographic study: electroencephalography, right and left electrooculography, submental and tibial electromyography, ECG, oral or nasal airway flow rate using thermocouple, oxygen saturation rate, noise of snoring, the motion of the thoracic and abdominal wall by induction pletysmography. Sleep scoring was performed according to the published standards (11). The short term arousals were defined according to the criteria of American Sleep Disorders Society (12). Either the cessation of the airflow while thoracic and abdominal wall motion was present or an 80 % depletion in the airflow were accepted as apnea. The duration of apnea was determined by the time interval between two breaths. Obstructive hypopnea was defined as 20-50 % decrease in airflow or desaturation of oxyhemoglobin by ≥4 % or accompanying arousal while thoracic and abdominal wall motion was present. Apnea-Hypopnea index (AHI) was defined as the number of obstructive apnea or hypopnea periods per hour of sleep. Patients having symptoms (Loud snoring, witnessed cessation of breathing during sleep, etc.) with an AHI≥5 were classified as OSAS (13).

Statistical analysis

The statistical analysis was performed on SPSS 11.0 package program using student-t test and chi-square test where appropriate. Variables were presented as mean ± standard deviation. Results less than 0.05 were accepted as significant for p value.

Table 3. The demographic data for the referred patients (n:12)

Age	
Mean±SD(Years)	44.75±10.0
Range	19-58
Gender	
Male	7 (58.3%)
Female	5 (41.7%)
Mean BMI	25.3±3.4
Range	16.8-31.3

RESULTS

The demographic data for the study and control groups were depicted in the table 1. There were no significant differences between groups about age, sex and body mass index (BMI) values ($p>0.05$). The majority of our cases in both of the groups were women. The mean BMI values for each group were classified as overweight (14).

The symptoms of the patients in the study group were depicted in the table 2. Patients in the control group were not routinely asked about any one of the three cardinal symptoms of OSAS. They presented their snoring (Loud or not) as a complaint by themselves. The witnessed cessations of breathing and daytime sleepiness were only asked to the subjects of the study group. The only one patient referred in the control group was evaluated for his loud snoring and found to be OSAS.

The demographic data for the referred patients were depicted in the table 3. The majority of the referred and OSAS diagnosed patients were male whereas the majority of the cases in both of the groups were female.

The symptoms and diagnosis of the referred patients were depicted in the table 4. Patients who did not attend to the polysomnographic testing were high in this group (n=4, 33.3 %). Out of the 413 patients, three (%0.7) were diagnosed as OSAS, five (%1.2) were diagnosed as simple snoring. One of the three patients diagnosed as OSAS was female and the other two were male.

DISCUSSION

Being a significantly less recognized public health problem, 80-90 % of patients with OSAS are undiagnosed, despite having clear signs and symptoms, as physicians do not routinely look for them in the primary care (9,15,16,17,18). Studies have shown that when physicians are informed about the disorder, their index of suspicion is high and they routinely ask their patients about OSAS symptoms, causing a significant increase (Eight fold) in the diagnosed OSAS patients (6,9,15,19).

Successful treatment of OSAS is associated with a marked reduction in hospitalization and mortality rates (16,18,20). Also marked improvement in angina or symptoms of congestive heart failure have been shown (9,17,21,22). These patients consume a considerable amount of healthcare resources when left without treatment (23).

Potential confounding factors affecting our results; as our patient group was taken from the population who apply to a hospital, these findings can not be generalized to the whole Turkish population. The majority of our sample was of female patients. This may contribute for a gender bias in our results. A significant part of the referred patients (one third) did not want to have the polysomnographic testing. Some OSAS patients might have been missed for this reason.

Although our population was predominantly composed of females, the referred and OSAS diagnosed patients consisted primarily of male patients. This is consistent with the literature (24).

The OSAS patients are generally classified as overweight persons according to BMI. (8, 18) Our OSAS diagnosed patients were also overweight (mean BMI 25.3).

Referral for sleep testing was increased by twelve fold and diagnosis of OSAS increased by almost three fold (2.7) at our outpatient clinic, from 0.2 % (One case in 451) to 0.6 % (Three cases in 413) when we incorporated the three cardinal symptoms of OSAS into the standard complaint check list. This finding was concordant with the literature. Approximately one third (n=4) of the referred patients refused to have the polysomnography

Table 4. The symptoms and diagnosis of the referred patients

	Referred patients	
	n	%
Snoring (loud)	12	100
Witnessed apneas	8	66.7
Daytime sleepiness	6	50
Patients who refused sleep testing	4	33.3
Simple snoring	5	41.7
OSAS	3	25

testing because they did not want to stay in hospital without any serious illness. Also these patients mentioned that they had come for a formal check up but not for their snoring problem. They too were informed about the complications and simple therapeutic measures of OSAS as the remaining eight patients who accepted polysomnography. It seems an important issue in the public mind that a hospital stay just for some tests about snoring is repulsive. Although OSAS is somewhat prevalent, average people seem not to be as reactive and curious about it as he/she has been about diabetes, obesity and cardiovascular diseases. For this reason ambulatory or home based techniques for sleep studies may be more cost effective and less repulsive for some people. Also the public avareness should be an issue to be worked on (18).

For each patient diagnosed as OSAS three disease-free persons were exposed to, unnecessary polysomnographic testing and hospitalisation which is a disadvantage. This produces a challenge about cost-effectiveness that may be overcomed by a more detailed history or ambulatory testing equipments.

When OSAS is defined as an AHI of five or more, 2 percent of women and 4 percent of men between 30 and 60 years of age are diagnosed as OSAS (9,13,18). Our overall OSAS prevalence was 0.7% in this study, being 0.7 % in women and 1.5 % in men. If all of the referred patients were tested, this rate might be higher. As mentioned before it is not appropriate to generalize this result as the prevalence of OSAS in Turkish people. We have not encountered any prevalence rate in the literature about OSAS in Turkish population. Some Turkish authors estimated OSAS prevalence to be between 0.9-1.9 percent in general population when AHI≥5 had been accepted as an index (25, 26). Our results roughly correlate with this estimation but are still lower than the prevalence rates in western countries. As hypertension and obesity are more prevalent in Turkey, we may conclude that the real prevalence for OSAS may be higher (27,28).

We conclude that all patients in primary care settings should be screened for three cardinal symptoms of OSAS in order to diagnose the disease early and prevent further complications and improve their quality of life. We started the routine OSAS screening of patients by using three cardinal symptoms in our out-patient clinic.

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