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**Patients' symptoms as a reason to consult for diagnosing  
obstructive sleep apnea**

Симптоми због којих се пацијенти обраћају за дијагностиковање  
опструктивне ноћне апнеје

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## Patients' symptoms as a reason to consult for diagnosing obstructive sleep apnea

Симптоми због којих се пацијенти обраћају за дијагностиковање опструктивне ноћне апнеје

### SUMMARY

**Introduction/Objective** Obstructive sleep apnea (OSA) is characterized by a number of symptoms that sometimes the patient is not aware of them.

The aim of this study was to determine the symptoms due to which the patients came to our sleep department, and to examine to which extent patients self-awareness plays a role in diagnosing OSA.

**Methods** The study included 388 patients who came to sleep department of Clinic of Pulmonology from 2012 to 2016, with suspicion of OSA. Medical history was taken to all patients and polysomnography was performed in order to diagnose OSA. All patients with symptoms of OSA and apnea-hypopnea index (AHI) over 5 were diagnosed as OSA.

**Results** We identified list of 23 symptoms that lead the patients to visit doctor. The most common symptom was snoring which occurs in 86% of patients. Followed by a feeling of under sleeping 68% and witnessed apnea with 63%. 258 patients were diagnosed as OSA. The most important primary symptoms that led positive OSA patients to our clinic were snoring, witnessed apnea and daytime sleepiness. The percentage of snoring was decreasing with disease severity. Percentage of witnessed apnea and daytime sleepiness were increasing with disease severity. Self-awareness of symptoms led a majority of the patients to come at sleep department.

**Conclusion** Patients who have symptoms such as snoring, witnessed apnea and daytime sleepiness, are likely to suffer from the OSA. Most of the patients are aware of their symptoms and seek help from a doctor.

**Keywords:** sleep apnea; snoring; primary symptom.

### САЖЕТАК

**Увод/Циљ** Опструктивна апнеја се јавља у току сна (ОСА) и карактеришује је бројни симптоми којих понекад ни сам пацијент није свестан.

Циљ ове студије је да одреди симптоме због којих се пацијент јавља и да се испита до ког степена самосвесност пацијента има улогу у дијагностиковању ОСА.

**Метод** У студију је било укључено 388 пацијената који су се јавили на Одељење за медицину спавања на Клиници са пулмологију у периоду од 2012 до 2016 године, а код којих се посумњало на ОСА. Пацијентима је узета анамнеза за ОСА и урађена је полисомнографија. Свима са симптомима ОСА и код којих је апнеја-хипопнеја индекс (АХИ) био изнад 5 дијагностикована је ОСА.

**Резултати** Идентификована су 23 симптома због којих су се пацијенти јавили лекару. Најчешћи симптом је хркање (86% случајева). Затим следе осећај ненаспаваности (68%) и апнеја регистрована од сведока (63%). Код 258 пацијената је дијагностикована ОСА. Најчешћи примарни симптоми били су: хркање, апнеја регистрована од сведока и дневна поспаност. Процент хркања се смањивао са тежином болести. Процент апнеје регистроване од сведока и дневна поспаност су се повећавали са тежином болести. Највећи број пацијената се јављао јер су свесни својих симптома.

**Закључак** Код пацијената који имају симптоме као што су: хркање, апнеја регистрована од сведока и дневна поспаност, постоји велика вероватноћа да болују од ОСА. Велики део пацијената је свестан својих симптома и тражи помоћ лекара.

**Кључне речи:** апнеја у спавању; хркање; примарни симптом

### INTRODUCTION

Obstructive sleep apnea (OSA) is defined as an intermittent cessation of breathing during sleep [1]. Sleep apnea is characterized by the cessation of the flow of air over 10 seconds up to two minutes or longer [2]. The prevalence of OSA in the world is from 2 to 5 % of general population [3]. A growing number of authors point out that its prevalence is 5 % and greater among men and 2 % and greater among women [4]. According to this statistic we can assume that in Macedonia there are between 40,000 and 100,000 citizens suffering from OSA.

Obstructive sleep apnea is characterized by a number of symptoms that sometimes the patient is not aware of them [5]. The most common are snoring, witnessed apnea, daytime sleepiness, and feeling under sleeping upon waking, the weakening of intellectual abilities, dry mouth or throat in the

morning [6-8]. Most of the patients had never heard of obstructive sleep apnea and there are not aware of having symptoms that may indicate this disease. Unfortunately, doctors rarely think of OSA and symptoms that patients are complaining of, often are considered as symptoms of other diseases. Population-based epidemiology studies and observations of OSA patients have consistently shown the prevalence of hypertension, type II diabetes, cardiovascular disease, and stroke to be higher in people with OSA [9]. The prevalence of hypertension is significantly higher in patients with OSA than the general population. OSA prevalence is especially high in patients with hypertension and what is resistant to drugs. OSA was diagnosed in 83% of patients with uncontrolled hypertension (three or more antihypertensive drugs) [10]. The risk of myocardial infarction (MI) in patients with OSA is 5 times higher than the general population. Chances to survive MI in patients with OSA are much smaller than in patients with no OSA. 75% of patients with angiographically proven coronary artery disease has OSA [11]. Sleep disordered breathing is significantly more common in patients who have had a stroke or transient ischemic attack (TIA) than in the general community, occurring in between 32-63% of stroke patients, and is associated with increased mortality and worse functional outcomes in these patients. [10]

The aim of this study was to determine most common symptoms for which the patients with suspicious of OSA came to our Department, to identify the primary symptom for which they underwent polysomnography and to see if there is difference in symptoms in polysomnography positive patients in comparison to negative patients. Furthermore we wanted to examine to which extend patients self-awareness plays a role in diagnosing.

## METHODS

The study was prospective and performed at the Clinic of Pulmology from 2012 to 2016. The study included 388 patients who came to sleep department with suspicion of OSA. Medical history was taken from all the patients, after which on all patients polysomnography was performed. When taking patient anamnesis, data was grouped into four sets. The first set of information included standard data for age and gender. The second set of collected data included information about all OSA symptoms such as snoring, witnessed apnea, daytime sleepiness, morning dry mouth or throat, feeling under sleeping morning and others. The third set of collected data included information about primary symptom and was classified as a distinct category of data information. Primary symptom was defined as a single primary issue that led patients to the hospital. Fourth set of information included data of patient's self-awareness of symptoms. Obstructive sleep apnea was diagnosed by polysomnography and it represents golden standard for diagnosis [12-13]. In this study we used polysomnograph Respironix, model Alice 5. All results from polysomnography were scored manually according to standard criteria. Apnea, hypopnea and arousals were also identified according to the standard criteria [14]. All results were summarized in apnea hypopnea index (AHI). All patients with symptoms of OSA and AHI over 5 were diagnosed as OSA [13].

## RESULTS

The study included 388 patients, who came to sleep department with suspicion of OSA. The average age was  $44.8 \pm 13.7$  years, and 301 were males and 78 females. Medical history was taken to all patients with suspicion of OSA, and polysomnography (PSG) was performed to all of them in order to diagnose OSA. All patients with symptoms of OSA and apnea-hypopnea index (AHI) over 5 were diagnosed as OSA. 258 patients were diagnosed with OSA with  $AHI > 5$  / hour, 107 patients had negative  $AHI < 5$ /hour, 18 patients were diagnosed with respiratory effort related arousals (RERA), obesity-hypoventilation syndrome was found in 4 patients and 1 patient had central sleep apnea (CSA). Patients with RERA, CSA and obesity-hypoventilation syndrome were not taken in statistical analysis.

We identified 23 symptoms that led the patients to the sleep department. Twelve most common symptoms are listed in Table 1. The most common symptom was snoring which occurred in 86 % of patients, followed by a feeling of under sleeping 68 % and witnessed apnea with 63 %. The remaining 10 symptoms not listed in a Table 1 occurred below 1 % and they are headache, dizziness, bruxism, stuffy (block) nose, nose bleeds, restless legs, numbness in hands and feet, excessive dreaming,

**Table 1. Percentage of 13 the most common symptoms for all patients with clinical suspicion of OSA who presented at sleep laboratory before they underwent overnight PSG.**

|  |     |
|--|-----|
| Snoring  | 86% |
| Feeling under sleeping in the morning          | 68% |
| Witnessed apnea                                | 63% |
| Daytime sleepiness                             | 55% |
| Abrupt awakening from sleep because of choking | 38% |
| Abrupt awakening not associated with choking   | 29% |
| Cannot fall asleep                             | 21% |
| Dry mouth or/and throat in the morning         | 20% |
| Fatigue  | 19% |
| Short sleep                                    | 18% |
| Anxiety  | 15% |
| Chest pain                                     | 9%  |
| Fear of falling asleep                         | 5%  |

OSA – obstructive sleep apnea, PSG – polysomnography

**Table 2. List of most common symptoms in patients with and without OSA**

| OSA negative, AHI < 5                        | OSA positive, AHI > 5                          |
|--|--|
| Snoring                                      | Snoring  |
| Abrupt awakening not associated with choking | Daytime sleepiness                             |
| Feeling under sleeping in the morning        | Witnessed apnea                                |
| Cannot fall asleep                           | Feeling under sleeping in the morning          |
| Anxiety                                      | Abrupt awakening from sleep because of choking |
| Daytime sleepiness                           | Dry mouth or/and throat in the morning         |
| Others                                       | Others   |

OSA – obstructive sleep apnea, AHI – apnea-hypopnea index.

regurgitation of food, and nightmares.

After the PSG, the patients were divided into two groups. The first group included patients with negative PSG with  $AHI < 5$ , and the second group included patients with positive PSG with  $AHI > 5$  who we diagnosed as OSA. In Table 2 are listed 6 most common symptoms that we found out in both groups.

We identified a primary symptom for all patients and we attempted to classify the primary symptoms as a distinct category. Primary symptom was defined as a single primary issue that led patients to the hospital. In fact, most patients could clearly identify their primary symptom. A smaller number of patients had two or more symptoms. In these patients we had to identify only one major symptom that we considered as primary symptom. For example, if the patient had snoring,

witnessed apnea, daytime sleepiness, feeling under sleeping in the morning but his wife told him that he is suffocated while sleeping and that's why he is visiting a doctor, then as a primary symptom was registered as witnessed apnea. Or, if we had a patient who is complaining of abruptly awakening from sleep, cannot fall asleep and anxiety, and the main reason for visiting a doctor was abrupt awakening from sleep then we took that symptom as primary. The most common primary symptom for all patients was snoring with 31 %, followed by witnessed apnea 25 %, abrupt awakening from sleep

**Table 3. Percentage of primary symptoms for all patients with clinic suspicion of OSA who presented at sleep laboratory before they underwent overnight PSG.**

|  |     |
|--|-----|
| Snoring  | 31% |
| Witnessed apnea                                | 25% |
| Daytime sleepiness                             | 19% |
| Abrupt awakening from sleep because of choking | 18% |
| Abrupt awakening not associated with choking   | 9%  |
| Cannot fall asleep                             | 6%  |

OSA – obstructive sleep apnea, PSG – polysomnography

because of choking 19%, etc. (Table 3)

After PSG, we divided patients in 2 major groups. One with  $AHI < 5$  (negative PSG in 107 patients) and the second group with  $AHI > 5$  (positive PSG in 258 patients). Patients who were diagnosed with OSA according to the severity of AHI were divided into three groups. In the first group with mild OSA ( $AHI > 5 < 15$ ) were 41 patients (15.9 %). In the group with moderate OSA ( $AHI > 15 < 30$ ) were 23 patients (8.9 %), and in group with severe OSA ( $AHI > 30$ ) were 194 patients (75.2 %).

**Table 4. The primary symptom that occurs in different groups according severity of OSA**

|             | Snoring | Witnessed apnea | Daytime sleepiness | Other |
|-------------|---------|-----------------|--------------------|-------|
| AHI (5–15)  | 65.8%   | 12.2%           | 7.3%               | 14.7% |
| AHI (15–30) | 60.1%   | 17.7%           | 13.5%              | 8.7%  |
| AHI (>30)   | 29.2%   | 34.8%           | 27.8%              | 8.2%  |

OSA – obstructive sleep apnea, AHI – apnea-hypopnea index

Table 4 presents the percentage of primary symptoms in different groups of patients divided according to severity of OSA. We found out that snoring as the primary symptom is highest in mild OSA, and is decreasing as severity of OSA increases. Results are opposite with witnessed apnea and daytime sleepiness as a primary symptoms. With increase of OSA severity, parallel increase witnessed apnea and daytime sleepiness.

Results from 107 patients with  $AHI < 5$  are shown in Table 5. The most common primary symptom in this group of patients was snoring with 43.9%, followed abrupt awakening not associated with choking 23.4% and feeling under sleeping in the morning with 13.1%.

**Table 5. The primary symptom that occurs in patients with  $AHI < 5$**

|           | Snoring | Abrupt awakening not associated with choking | Feeling under sleeping in the morning | Cannot fall asleep | Other |
|-----------|---------|--|---------------------------------------|--------------------|-------|
| $AHI < 5$ | 43.9%   | 23.4%  | 13.1%                                 | 10.3%              | 9.3%  |

AHI – apnea-hypopnea index

The results that we collected from all 388 patients which referred to the question if they were aware of their symptoms are shown in Table 6. The majority of patients (72%) were aware of their

**Table 6. What was the motivation for patients to seek help from a doctor?**

|  |     |
|--|-----|
| Patients who were aware of their symptoms seeking help   | 72% |
| Patients who were not aware of their symptoms and they were pointed by their partner                       | 22% |
| Patients who were not aware of their symptoms but alerted by the media and come to our department          | 4%  |
| Patients who were not aware of their symptoms but were discovered by the doctor and sent to our department | 2%  |

symptoms, while patients who were “forced” to go to the doctor by their partners and were not aware of their symptoms were 22%. 4% of patients

were not aware of their symptoms but alerted by the media and come to our department. 2% of patients were not aware of their symptoms but were discovered by the doctors and sent to our department.

## DISCUSSION

Most of the patients had never heard of OSA and do not know that they have symptoms that may indicate this disease. Unfortunately, doctors rarely think of OSA and symptoms that patients are complaining of, often are considered as symptoms of other diseases [15]. Franklin et al pointed that OSA is primarily regarded as a male disorder [3], which is comparable with results of our study. Almost 80% of patients that we included in this study were male. OSA is characterized with a number of symptoms. From the study we can see that we identify 23 different symptoms. The most common symptoms are snoring, feeling of under sleeping in the morning, witnessed apnea and daytime sleepiness. Once we separated positive and negative patients with OSA, we found out that snoring is the most common symptom in both groups. Myers et al. pointed that snoring is the most common symptom in sleep apnea patients but is not useful for establishing the diagnosis [12].

But after snoring we have difference in order of appearance of symptoms in both groups. In the negative OSA group, symptoms that followed snoring were abrupt awakening from sleep not associated with choking and feeling under sleeping in the morning. In the positive OSA group next following symptoms were witnessed apnea, daytime sleepiness. We have similar results with primary symptoms. Most common primary symptoms in all patients were snoring, witnessed apnea, daytime sleepiness, abrupt awakening from sleep because of choking, abrupt awakening not associated with choking and cannot fall asleep. Most common primary symptoms in patients with OSA were snoring, witness apnea and daytime sleepiness. The percentage of snoring as the primary symptom reduced, as severity of the OSA increased. While the percentage witnessed apnea and daytime sleepiness was increasing, as severity of the OSA was increasing. In the study of Lietal the most common primary symptom is witnessed apnea with 32.9% and then snoring followed by 28.9%. In the same study, patients with  $AHI > 30$  have daytime sleepiness as most common primary symptom, followed by witnessed apnea and snoring [16]. Myers et al. pointed that the most useful observation for identifying patients with obstructive sleep apnea was witnessed apnea [12]. Most common primary symptoms in patients with  $AHI < 5$ , were snoring, abrupt awakening from sleep not associated with choking, feeling under sleeping in the morning and cannot fall asleep. In these patients, the symptoms are likely due to other diseases and we should make trials in the other directions. The differences in the primary symptoms are obvious, and they might lead the doctor to suspect which patient will be positive or negative for OSA. From the results we got from a medical history in which patients were asked what was motivation to seek help from a doctor, we can conclude that 72% of patients were aware of their symptoms. Arnardottir et al reported that in a middle-aged general population, approximately 20% of subjects had moderate-to-severe OSA, but the majority of them were neither

symptomatic nor sleepy and did not have impaired vigilance [17]. We can also conclude that doctors only in a minority of patients (only 2%), had suspicion that the symptoms of a patients who are complain are due to OSA. Although this percentage is very low, Rosen at al. published that the prevalence and recognition of sleep disorders in a community-based outpatient health setting was 0.1% [18]. Patients lose a lot of time for a doctor to recognize the disease and refer them to the sleep department [19]. We had 4% of patients who were not aware of their symptoms but were alerted by media and came to our department. With presentation in the TV and printed media, public awareness will rise about this widespread disease, and many patients will come to the right place on time. The majority of papers like this one stressed the need for more education of general physicians and clinical physicians. In these way they will recognize the disease early enough to diagnose OSA and just to obtain proper treatment for OSA patients [20].

## CONCLUSION

In the group with confirmed OSA most common symptoms were snoring, apnea confirmed by witness and daytime sleepiness. In the negative group on OSA, in addition to snoring, the most common symptoms were suddenly waking up from a sleep that is not associated with suffocation, a feeling of lack of sleep in the morning and cannot fall asleep. Many of the patients are aware of their symptoms and seek help from a doctor. Greater education of hospital doctors and doctors from primary health care to recognize the symptoms of the OSA are needed for promptly refer patients for diagnosis and treatment.

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