Tripolitana Medical Journal; 2016, Vol. 5, No. 2, pp. 71 - 75

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Short Communication

ISSN 2077-5628

# Sleep Study of Patients with Snoring, Tripoli, Libya

**Ali Tuati[@1,2], Najla Shtwi[1], Njia Barg Elil[1], Saja Auzi[3] and Hager Abourema[1]**

[1]Department of Medicine, Abu Setta Chest Hospital; [2]Faculty of Medicine, University of Tripoli, Libya

Received 15 August 2016/Accepted 12 November 2016

## ABSTRACT

Snoring is a respiratory sound occurs during sleep and is caused by vibration of soft tissue of pharynx, soft plate and sometimes even uvula. The aim of this study is to look for how common is sleep apnea in patients with snoring. Among patients presented with snoring and sent for sleep study, the primary snoring with normal apnea hypoapnea index (AHI) was 17.5% of cases, while patients with Sleep Apnea was 82.5% of all cases. Sleep disordered breathing in patients with sleep apnea mainly due to obstructive sleep apnea was 78% of patients, while obesity hypoventilation syndrome was 12%, and Cheyne Stokes respiration /central sleep apnea, 10% of patients. Female patients with obstructive sleep apnea, 65%, while males, 35%, with female to male ratio of 1.9 : 1.0. Female mean age is 66 years and male mean age is 56 years.

In patients with obstructive Sleep Apnea and co-morbidities, obesity was present in 82%, hypertension in 62%, diabetes mellitus in 47%, while both DM and hypertension were present in 39%, and asthma or COPD i.e. overlap syndrome present in about 14% of the patients.

It is highly recommended that sleep disorders breathing especially obstructive sleep apnea preferred to be one of topics should be included in the Faculty of Medicine Curriculum.

***Key words-*** *Snoring; Obstructive sleep apnea; Sleep disordered breathing.*

## INTRODUCTION

Snoring is a respiratory sound occurs during sleep and is caused by vibration of soft tissue of pharynx, soft plate and sometimes even uvula. It usually occurs during inspiration and expiration.[1] The prevalence of snoring ranges from 5% to 86% with mean of 32%, in men and form 2% to 57%, with a mean of 21%, in women.[2] The term "sleep-disordered breathing" refers to conditions where apneas and hypopneas are present during sleep. The most common form of sleep-disordered breathing (SDB) is obstructive sleep apnea (OSA).[3] By using apnea hypoapnea index [AHI] (normal <5/hour) of 5/hour or more we diagnose obstructive sleep apnea (OSA). Obstructive sleep apnea syndrome (OSAS) If the patient is symptomatic e.g. excessive daytime sleepiness with AHI >5/hour or more are 2% for females and 4% for males.[2]

OSA severity as defined by the American academy of sleep medicine (AASM)[4]: **1**. mild OSA when AHI is 5-14/hour, **2**. moderate OSA when AHI is 15-30/hour, **3**. severe OSA when AHI is >30/hour. The other types of sleep apnea is a). Central sleep apnea (CSA) occurs when both airflow and respiratory effort cease. This cessation of breathing results from a loss of the autonomic drive to breathe and patient's upper airway remains patent.[6,7] b). Obesity Hypoventilation Syndrome (OHS) part of obstructive sleep apnea diagnostic criteria: 1. Obesity (BMI > 30% ), 2. respiratory failure type II ($PaO_2$ <60 mmHg + $PaCO^2$ >50 mmHg) during wakefulness, 3. symptomatic e.g. excessive daytime sleepiness, early morning headache, fatigability, in the absence of other causes of hypoventilation.[8]

The aim of this study is to look for how common is sleep apnea in patients with snoring, what are the types of sleep disordered breathing among these patients, age distribution, mean age, sex, how common is sleep apnea is known among doctors through referring patients for sleep study, and comorbidities associated with obstructive sleep apnea.

## MATERIALS AND METHODS

A retrospective study of 120 patients sent for sleep study suffering from snoring from 20.12.2013 to 30.6.2015, included 79 (66%) females and 41 (34%) males. All patients had sleep study using Apnea-link machine manufactured by Res Med company and recorded only respiratory events (did not include sleep stages study) including pulse oximeter to record oxygen saturation and pulse rate, nasal flow record by nasal cannula, chest wall movement by chest belt, and snore recording. The results were analyzed by machine software and then reviewed manually.

*@ Author to whom correspondence should be addressed*: Dr. Ali Tuati; *Tel*: 00218912119699. *E-mail:* alituati@yahoo.com;

## RESULTS

A 120 patients with a symptoms of snoring sent for sleep study the results shown in the following figures:***The referring doctors for sleep study result*** (Figure 1).

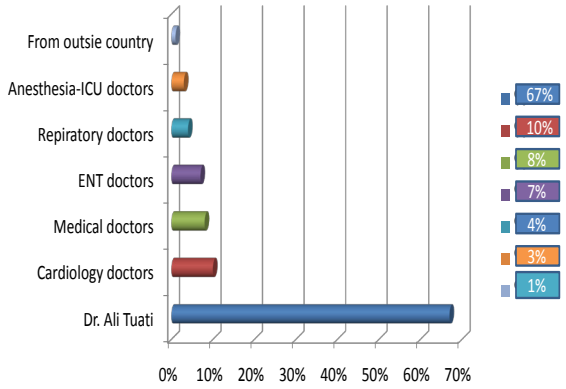


**Figure 1**: The referring doctors for sleep study

***The result of patients with snoring who came for sleep study*** **(Figure 2):**

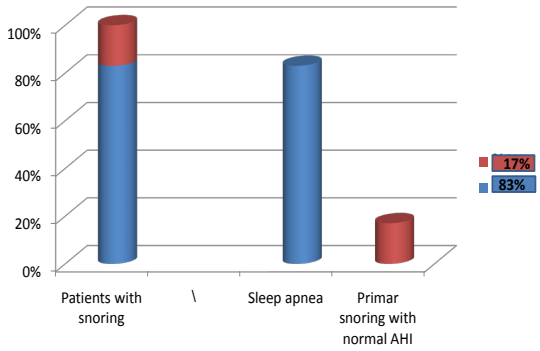


**Figure 2**: Patients with snoring came for sleep study

***The results of patients with sleep apnea with different of apneas*** (Figure 3):

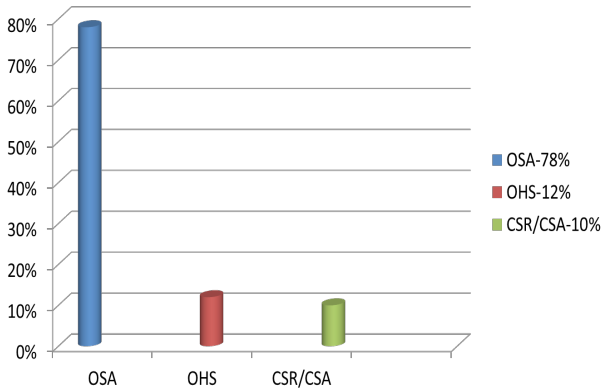


Figure 3: patients with sleep apnea

***Obstructive Ssleep apnea according to severity*** (Figure 4)**:**

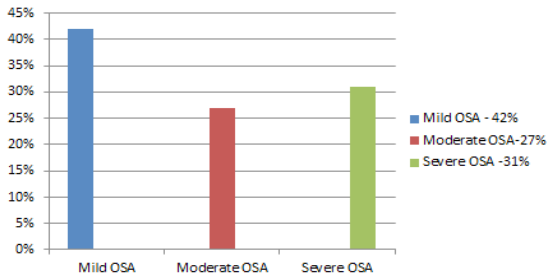


Figure 4: Obstructive Sleep Apnea according to severity.

***OSA gender distribution*** (Figure 5) OSA mean age: Female mean age: 66 years (35-85 years), male mean age: 56years (27-90 years)

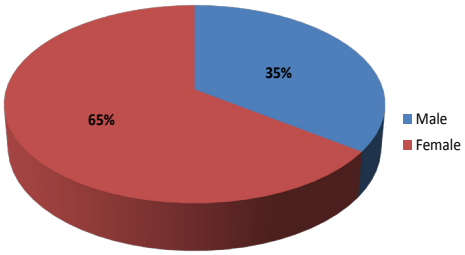


**Figure 5**: OSA gender distribution

***Obstructive sleep apnea distribution according to BMI***[9] (Table 1):

**Table 1**: Obstructive sleep apnea distribution according to BMI.

| BMI | 15-20 | >20-25 | <25-30 | >30-40 | >40 |
|---|---|---|---|---|---|
| Number of patients (total No.77) | 1 | 2 | 11 | 25 | 38 |
| Percentage according to BMI | 1.5% | 2.5% | 14% | 32.5% | 49.5% |

***Obstructive Sleep Apnea and co-morbidities*** (Figure 6):

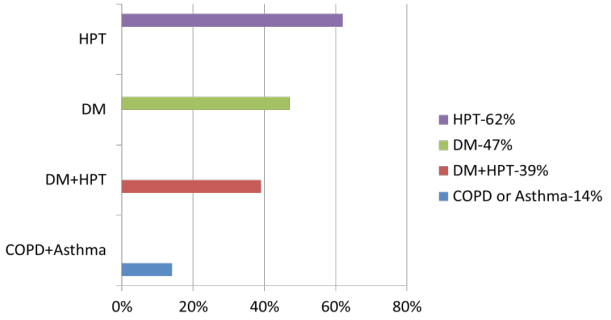


**Figure 6**: Obstructive sleep apnea and co-morbidities.

***Hypertension distribution according to OSA severity (Figure 7)*:**

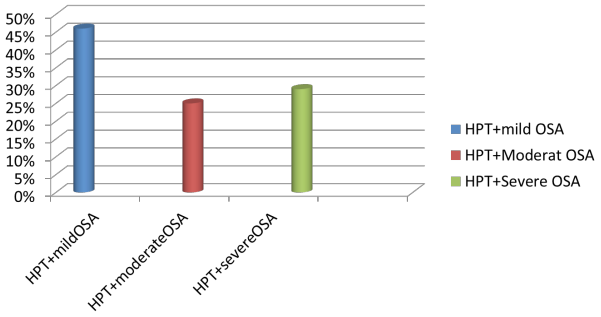


**Figure 7**: Hypertension distribution according to OSA severity.

***DM distribution according to OSA severity (Figure 8)*:**

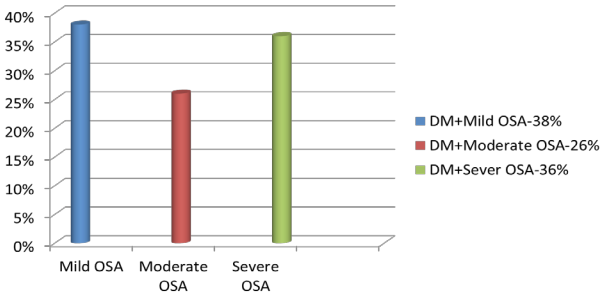


**Figure 8**: DM distribution according to OSA severity.

***DM and HPT distribution according to OSA severity (Figure 9):***

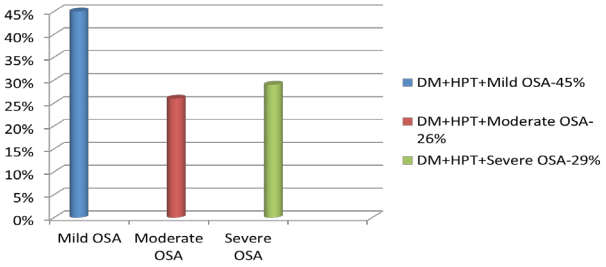


**Figure 9**: DM and HPT distribution according to OSA severity**.**

***Obstructive airway disease (asthma or COPD) among patients with OSA (Figure 10)*:**

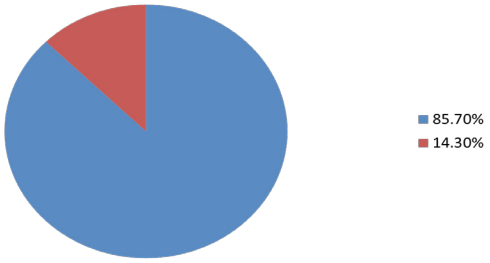


**Figure 10**: Obstructive airway disease (asthma or COPD) among patients with OSA

***Asthma or COPD (overlap syndrome) distribution according to OSA severity (Figure 11)*:**

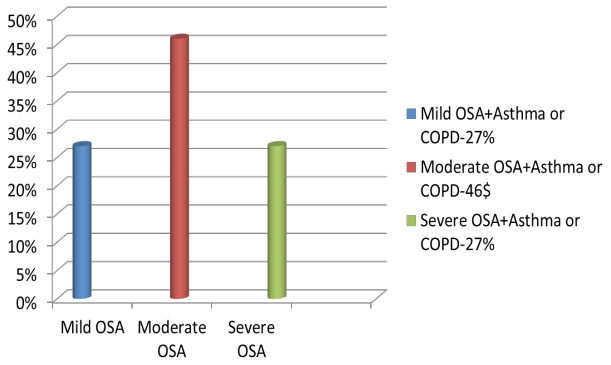


**Figure 11**: Asthma or COPD (overlap syndrome) distribution according to OSA severity.

## DISCUSSION

The referring doctors for patient sleep study: Sleep apneas unfortunately are not well known among doctors as we can see from referred patients for sleep study suspected to have sleep apnea, was only 33% (Figure 1). The rest of patients (67%) were referred by the author for sleep study. Patients with snoring (figure-6): Among patients presented for snoring who came for sleep study, minority of them had primary snoring with normal AHI and they form 17.5% of all cases, while majority of patients had sleep apnea and they form 82.5% of all cases.

Patients with snoring and sleep apnea (Figure 3): Sleep disordered breathing in patients with sleep apnea mainly due to obstructive sleep apnea (OSA) was 78% of patients, while obesity hypoventilation syndrome (OHS) was 12% of patients, and Cheyne Stokes respiration /central sleep apnea (CSR/CSA) was10% of patients. syndrome (OHS) forming 12% of patients and Cheyne Stokes respiration / central sleep apnea (CSR/CSA) forming 10% of patients. Obstructive Sleep Apnea according to severity: Mild OSA is seen in 42% of patients, moderate OSA is seen in 27%, and severe OSA is seen in 31% of cases (Figure 4). Gender distribution: 65% were females, and 35% males. Female to Male ratio is 1.9:1.0 (Figure 5).

This result is opposite to the prevalence in USA population males affect more females.[12] This may be due to obesity which is seen more in females than in males in our country as about 64% of Libyan adults are either overweight or obese, obesity progressively increasing with age, and two times more common among Libyan women than men.[10] Female mean age is 66 years, and male mean age is 56 years. OSA distribution according to BMI (Table 1): as the weight of the patient increase there is more chance to have OSA. Patients with low body weight with BMI: 15-20, to have OSA is 1.5%, and patients with morbid obesity with BMI: > 40, to have OSA is 49.5%, in general obesity is seen in 82% of patients with BMI > 30.

OSA and co-morbidities (Figure 6): Hypertension is present in 62%, while diabetes mellitus present in 47%, both DM and hypertension both present in 39%, and

asthma or COPD i.e. overlap syndrome present in about 14% of the patients.

Hypertension distribution according to OSA severity (Figure 7): is not showing a linear relationship between AHI and incidence of hypertension as patients with hypertension with mild OSA- form 46%, hypertension with moderate OSA- form 25%, and hypertension with severe OSA- form 29%, this is different from other studies which showed linear relationship between them.[11] Hypertension is strongly associated with OSA even when with mild severity of OSA[12,13], as seen in this study. Treatment of hypertensive patients with OSA with CPAP may result in a clinically significant drop in blood pressure. This drop is sufficient to reduce risk of a coronary heart disease event by 37% and stroke risk by 56% [14-16], therefore, it is advised to assess all patients with hypertension if they need sleep study to exclude OSA and they can benefit from CPAP therapy if they have OSA.

DM distribution according to OSA severity (Figure 8): DM with mild OSA-15 was 38%, DM with moderate OSA- form 26%, and DM with severe OSA-was 36%, is not in linear distribution. The repetitive effects of cortical arousal and hypoxia can worsen insulin sensitivity and glucose tolerance and the development of type 2 DM in patients with OSA.[17,18] This result showed that patients with OSA even with mild to moderate AHI there is increased prevalence of diabetes mellitus among these patients with OSA. DM and hypertension (HPT) distribution according to OSA severity (Figure 9): DM and PHT with mild OSA-form 45%, DM and HPT with moderate OSA-form 26%, and DM and HPT with severe OSA- form 29%. From this result even in patients with mild OSA there is increased prevalence of DM, HPT or both among these patients.

OSA and obstructive airway disease: Among patients with OSA about 14% have obstructive airway disease, either asthma or COPD (i.e. overlap syndrome) (Figure 10). Distribution according to OSA severity (Figure 11): Asthma or COPD with mild OSA-form 27%, with moderate OSA-form 46%, and with severe OSA-form 27%. Overlap syndrome patients develop more pronounced nocturnal oxygen desaturation than COPD or OSA alone, which predisposes to pulmonary hypertension and more severe cardiovascular disease.[20]The prevalence of OSA in COPD patients approximates its prevalence in the general population.[20-22] It is reported that overlap syndrome occurs in 10-20% of patients with OSA.[24] A recent comprehensive review indicates that the two disorders coexist in approximately 1% of adults. Subclinical form of overlap syndrome could be speculated as 4% in men based on a reported prevalence of 16.8% for GOLD 1 and 24% among men for an apnea/hypopnea index (AHI) of at least 5/h.[20] Overlap syndrome patients have a greater degree of hypoxemia and hypercapnia than COPD patients matched for GOLD stage. They also have more severe pulmonary hypertension and right heart failure, and suffer higher morbidity.[20-21] OSA can worsen asthma and vice versa. Several studies have shown an improvement in asthma symptoms after the initiation of continuous positive airway pressure (CPAP).[24-26] Therefore it is recommended to look for this overlap syndrome in patients with OSA to relieve their symptoms by CPAP therapy.

## CONCLUSION

From this study of patients referred for limited respiratory sleep study, patients presented withsnoring commonly associated with sleep apnea was (82.5%), and OSA (78%) was the most common type of sleep disordered breathing, followed by OHS (12%) and then CSR/CSA (10%). Patients with OSA is usually associated with comorbidities like obesity82%( ), hypertension (62%), DM (47%), and obstructive airway disease like COPD or asthma (14%).

## RECOMENDATIONS

Sleep apnea unfortunately is not well known among doctors as seen from the small number of patients referred for diagnostic sleep study among different specialties of medicine, and at the same time, diagnostic sleep study centers in our country are very limited in number either in the government hospitals or private sector. Therefore our advice is to open more sleep study centers either of limited sleep study or full polysomnography type. Also there are no lectures on sleep apnea disorders given to students in Faculty of Medicine. It is highly recommended that sleep disorders breathing especially obstructive sleep apnea be one of topics in medicine curriculum.

## ACKNOWLEDGMENTS

Author would like to thank the sisters Amal and Dora for helping me in doing sleep study.

## REFERENCES

1. Lugaresi E, Cirignota F, Montagna P and Sforza E (1994) Snoring: pathogenic, clinical, and therapeutic aspects. In: Principles and Practice of Sleep Medicine, Kryger MH, Roth T, Dement WC (Eds), WB Saunders, Philadelphia. p.621.

2. Damien Stevens (2004) Sleep apnea hypoapnea syndrome and primary snoring, *Sleep Medicine Secrete* 73-82.

3. Barnes L (editor) (2009) Surgical pathology of the head and neck, 3rd ed. New York: Informa healthcare.

4. Westchester and Illinois (2010) The international classification of sleep disorders. "Obstructive Sleep Apnea Syndrome. The International Classification of Sleep Disorders. American Academy of Sleep Medicine, *Retrieved*. pp. 52-58.

5. Westchester IL (2010) Author American Academy of sleep Medicine. International classification of sleep disorders: Diagnostic and coding manual, 2nd ed., p,51.

6. Franklin K, Erikson P, Sahlin C, and Lundgren R (1997) Reversal of central sleep apnea with oxygen, *Chest* **111**,163-169.

7. Eckert DJ, Jordan AS, Merchia P, and Malhotra A (2007) Central sleep apnea: Pathophysiology and treatment, *Chest***13**(2), 595-607.

8. Olson AL and Zwillich C (2005) The obesity hypoventilation syndrome, *Am J Med*. **118** (9), 948-956.

9. Global Database on Body Mass Index (2006) BMI Classification. World Health Organization, *Retrieved* **27**, 2012.

10. Rafik R. Elmehdawi and Abdulwahab M. Albarsha (2012) Obesity in Libya, *Libyan J Med*. **7**(10), 3402.

11. Nieto FJ, Young TB, Lind BK, et al. (2000) Association of sleep disordered breathing, sleep apnea, and hypertension in large community-based study, *The Journal of the American Association* **283**, 1829-1836.

12. Young T, Palta M, Dempsey J, Skatrud J, Weber S, and Badr S (1993) The occurrence of sleep-related breathing among middle-aged adults, *New England Journal of Medicine* **328**, 1230-1235.

13. Hla KM, Young TB, Bidwell T, Palta M, Skatrud JB, and Dempsey J (1994) Sleep apnea and hypertension. A population based study, *Annals of Internal Medicine* **120**, 382-388.

14. 15-Logan AG, Tkacova R, Perlikowski SM, Leung RS, Tisler A, Floras JS and Bradley TD (2003) Refractory hypertension and sleep apnoea: effect of CPAP on blood pressure and baroreflex, *Eur Respir J*. **21**, 241-247.

15. Becker HF, Jerrentrup A, Ploch T, Grote L, Penzel T, Sullivan CE and Peter JH (2003) Effect of nasal continuous positive airway pressure treatment on blood pressure in patients with obstructive sleep apnea, *Circulation* **107**, 68-73.

16. Pepperell JC, Ramdassingh-Dow S, Crosthwaite N, Mullins R, Jenkinson C, Stradling JR and Davies RJ (2002) Ambulatory blood pressure after therapeutic and subtherapeutic nasal continuous positive airway pressure for obstructive sleep apnoea: a randomised parallel trial, *Lancet* **359**. 204-210.

17. Punjabi NM, Ahmed MM, Polotsky VY, Beamer BA and O'Donnell CP (2003) Sleep disordered breathing, glucose intolerance, and insulin resistance, *Respiratory physiology and Neurology* **136**, 167-178.

18. Tasali E, Mokhlesi B, and Van CE (2008) Obstructive sleep apnea and type 2 diabetes: Interacting epidemics, *Chest* **133**,496-506.

19. Chaouat A, Weitzenbum E, Krieger J, et al (1995) Association of chronic obstructive pulmonary disease and sleep apnea syndrome, *Am J Respir Crit Care Med*. **151**, 82-86.

20. McNicholas WT (2009) COPD-OSA: overlaps in pathophysiology, systemic inflammation, and cardiovascular disease, *Am J Respir Crit Care Med*. **180**, 692-700.

21. Shteinberg M, Weiler-Ravel D and Adir Y (2009) The overlap syndrome: obstructive sleep apnea and chronic obstructive pulmonary disease, *Harefuah.* **148**, 333-336.

22. Sanders MH, Newman AB, Haggerty CL, et al, (2003) Sleep and sleep-disordered breathing in adults with predominantly mild obstructive airway disease, *Am J Respir Crit Care Med*. **167**, 7-14.

23. López-Acevedo M, Torres-Palacios A, Elena Ocasio-Tascón M, et al (2009) Overlap syndrome: an indication for sleep studies? *Sleep Breath* **13**, 409-413.

24. Chan CS, Woolock AJ and Sullivan CE (1988) Nocturnal asthma tole of snoring and obstructive sleep apnea, *Am Rev Respir Dis*. **137**, 1502-1504.

25. Lafond C, Series F and Lemiere C (2007) Impact of CPAP on asthma patients with obstructive sleep apnea. *Eur Respir*. **29**, 307-311.

26. Cifitci TU, Ciftci B, Guven SF, et al (2005) Effect of nasal continuous positive airway pressure in uncontrolled nocturnal asthmatic patients with obstructive sleep apnea syndrome, *Respir Med* 99.