SLEEP DISTURBANCE AMONG BED PARTNERS OF OBSTRUCUTIVE SLEEP APNEA PATIENTS

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ABSTRACT

***Introduction*: Obstructive sleep apnea is an increasingly prevalent chronic disorder which significantly affects the sleep pattern and quality of life of the bed partners. Snoring, apnea and arousal are commonly observed during sleep in patients with obstructive sleep apnea (OSA) and these nocturnal symptoms frequently disturb their bed partners. This study aims to assess the degree of sleep disturbance among the bed partners of patients with obstructive sleep apnea.**

***Methodology:* A cross-sectional study was conducted in a tertiary care center in Tamil Nadu from April- June 2022. 50 subjects were selected and self-administered with a questionnaire which assessed the degree of sleep disturbance.**

***Results:* The study showed that the majority of the participants were female. Most of them reported that the snoring of their bed partners was sufficiently loud to wake them up at night and caused a disturbance from their regular sleep pattern. The participants also reported symptoms such as anxiety, depression and tiredness due to the impact of sleep disturbance.**

***Conclusion:* Snoring in obstructive sleep apnea patients is found to negatively impact the bed partner's sleep. Treatment of OSA with CPAP therapy or surgery may have health benefits not just for the patients, but also for the partners.**

Key words: Obstructive sleep apnea, sleep disturbance among bed partners ,negative impact on sleep pattern.

INTRODUCTION

Obstructive sleep apnea is an increasingly common chronic disorder which is characterized by repetitive episodes of nocturnal cessation of breathing [(1)]. This occurs due to the collapse of the airway which can be either complete or partial, which leads to reduction in the airflow [(2)]. The obstructive events lead to asphyxia ,decreased blood oxygen saturation and the patient has continued breathing efforts which results in awakening of the patient [(3)]. Obstructive sleep apnea is mostly influenced by obesity, male gender, smoking, alcoholism, advancing age and multiple other risk factors .Untreated OSA may result in multiple systemic disorders like cardiovascular disorders, stroke, metabolic syndromes, cognitive problems and increased risk of accidents[(4,5)].In addition, OSA also affects the physical and mental health of the family members.

The clinical course of obstructive sleep apnea usually follows 3 stages. During the stage of susceptibility, the patient is usually asymptomatic and there may be presence of mild snoring. In the pre-symptomatic stage, snoring worsens and nocturnal apneas occur[(6)].The most common presentations in the clinical stage of the disease are severe snoring, excessive daytime sleepiness, fatigue, irritability, and morning headache. Prevalence of OSA in rural India has been estimated to be 3.73% [(7)].

The severity of Obstructive sleep apnea can be determined by the Apnea Hypopnea Index (AHI). AHI is defined as the number of apneas and hypopneas that occur during the total sleep time. AHI <5/ hour is considered normal for adults, mild OSA= 5-14.9/ hour, moderate OSA is 15-29.9/hour and severe OSA can be diagnosed when AHI exceeds more than 30/hour [8].
Adequate therapy of OSA can relieve the symptoms and reduce the sequelae associated with the disease. First line therapy includes Continuous Positive Airway Pressure (CPAP), however adherence to therapy among patients remains exceedingly low [9]. Alternative therapies include oral appliance therapy and surgery of the upper airway. These procedures have been beneficial for some patients; however, their efficacy is unreliable. Recent therapies have been developed which target treatable traits. This allows a more personalized management regimen for each of the patients [10].
Most people with OSA remain undiagnosed and consequently, untreated. This can occur due to lack of awareness about the disease and reluctance to seek treatment due to stigma associated with clinical presentations such as snoring.
Research has shown that OSA negatively affects sleep pattern and quality of life in bed partners of the patients. Studies have shown the increased prevalence of sleep disturbance and disturbed interpersonal relationships between bed partners due to snoring. All the findings support that OSA has a massive impact on mental health of bed partners.
This study was conducted to evaluate the degree of sleep disturbance among the bed partners of patients of Obstructive Sleep Apnea.

METHODOLOGY

PARTCIPANTS

A group of 50 people who were the bed partners of Obstructive Sleep Apnea were included in this study from the hospital between April to June 2022. All the subjects who fit into the criteria were self-administered with a questionnaire. The study was approved by the Institutional Review Board of the College. Informed consent was obtained from all the participants. Patient confidentiality was maintained throughout this study.

INCLUSION CRITERIA

-Patients with AHI>5
-Subjects who were bed partners of the OSA patients for atleast 3 days/week for a minimum period of 1 month.

EXCLUSION CRITERIA

-Patients with AHI<5
-Subjects who were <18 years of age
-The patient or partner was doing regular overnight shift work.
-Medication use or co-existing disorder likely to disturb the patient's or partner's sleep quality, including sleep disorders such as narcolepsy or insomnia, neurological disorders, and severe chronic respiratory diseases.
-The partner had been diagnosed with deafness or regularly used earplugs at night.
-The patient or partner consuming excessive amounts of alcohol daily.

QUESTIONNAIRE

Each of the participants were self-administered with a questionnaire that inquired into their age, sex and occupation and relationship with the patient (parent/spouse). Sleep disturbance of the participants and their effects were inquired by the following questions

1. Does your partner snore loudly in their sleep?
2. How long does it take for you to fall asleep?
3. How often do you have trouble getting off to sleep?
4. Do you get out of bed when you cannot sleep?
5. Do you get angry/ annoyed when you cannot sleep?
6. Is snoring sufficiently loud to wake you up at night?
7. How often do you wake up at night?
8. If usually wake up at night, how many times?
9. Does the snoring cause a disturbance from your continuous sleep?
10. How long does it take to fall asleep again?
11. Has the noise been so bad that you have had to sleep in another room?
12. Have you ever felt the need to wake up your partner to see if they're alright?
13. Does a poor night's sleep make you- depressed/anxious/irritable/tired?
14. Does a poor night's sleep affect your- concentration/ ability to work?
15. How long would you like to sleep each night?

STATISTICAL ANALYSIS

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS). The characteristics of the participants are presented as mean +- standard deviation for continuous variables and as frequency for categorical variables. Statistical significance was assessed using the Chi- Square test. A p-value of <0.05 was found to be statistically significant.

RESULT

PARTICIPANT CHARACTERISTICS

A total of 50 participants were included in this study. The following characteristics of the patients were collected: age, sex, occupation and relationship with the patient.

The ages of the participants included ranged from 21-64. The mean age was 41.90. 74% of the participants were female and 26% of the participants were male. Among them 29.4% were working, and 23.5% were students. The majority of participants were spouses of the patients (68%).

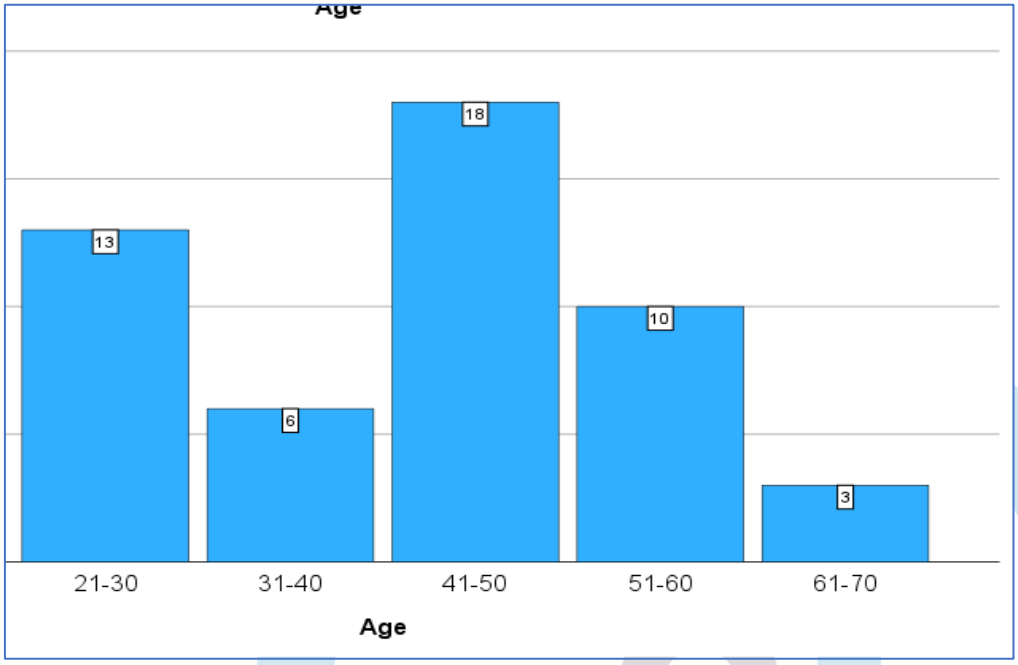

Fig. 1 shows the age distribution among the participants

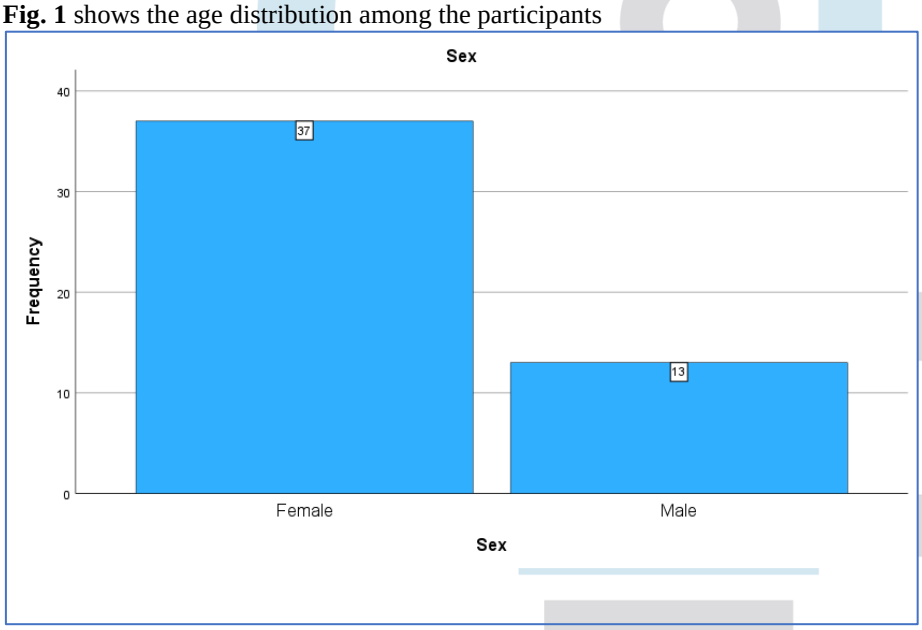

Fig. 2 shows the sex distribution among the participants

SLEEP DISTURBANCE AMONG THE PARTICIPANTS

All participants included in the study reported the presence of snoring among their bed partners.

35% of the participants reported that it took them thirty minutes to fall asleep. Most of the participants were in the 41-50 age group. We found a positive correlation between the age of the participants and the time it took for them to fall asleep (p value=0.015)

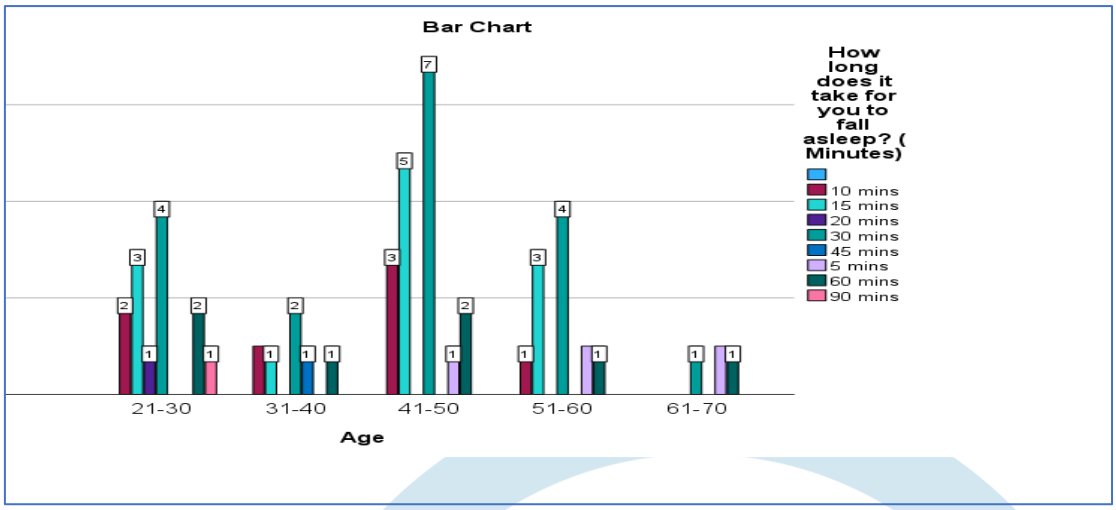

Fig. 3 shows the correlation between the ages of the participants and the time it takes them to fall asleep

37% of the participants reported that they had trouble getting off to sleep 2-4 times in a month, and 39% reported the same many times a week or daily.

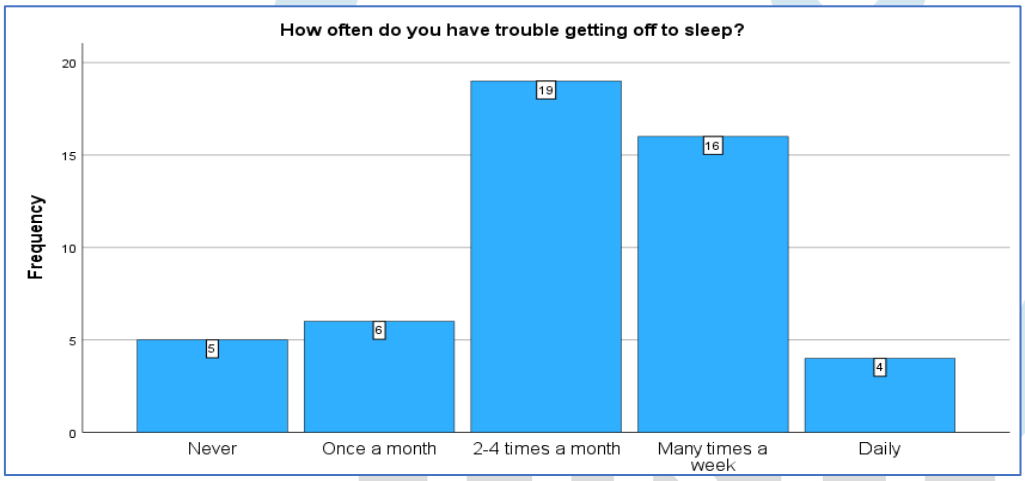

Fig. 4 shows the frequencies of the participants who have trouble getting off to sleep.

68% of the participants reported that snoring of their bed partners was sufficiently loud to wake them up at night and was mostly seen in female participants.

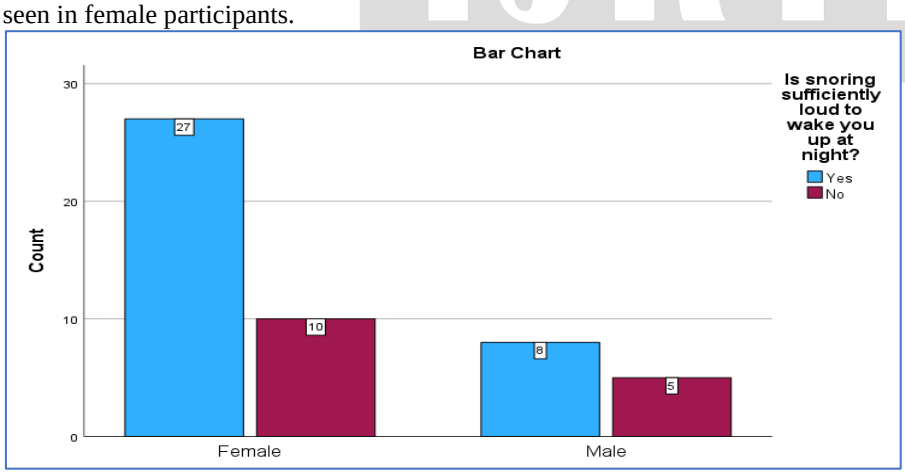

Fig. 5 shows the correlation between the sex of the participants and waking up at night due to the snoring
69% of the participants also reported that the snoring caused a disturbance from continuous sleep.

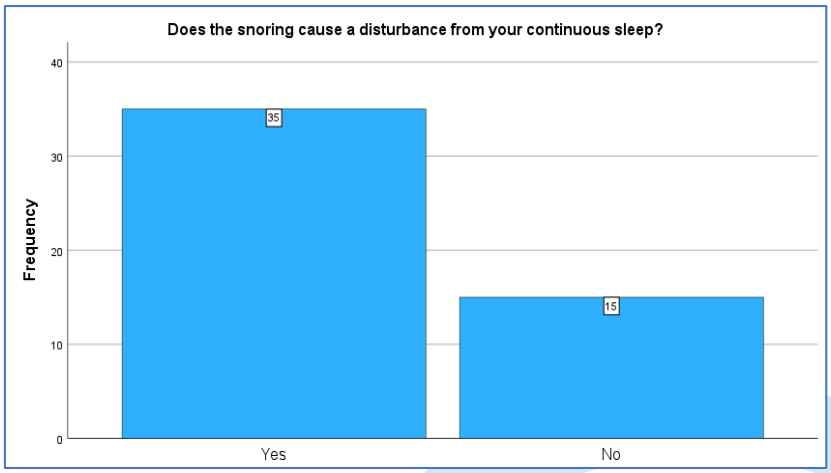

Fig 6. Shows the frequencies of participants in whom snoring causes a disturbance from continuous sleep.

Among those who woke up, 48% reported that they woke up 2-4 times a month and 37% reported that they woke up many times a week. It was found to be highest in the 41-50 age group. We found a statistical significance between the age of the participant and the frequency of them waking up at night (p value <0.001)

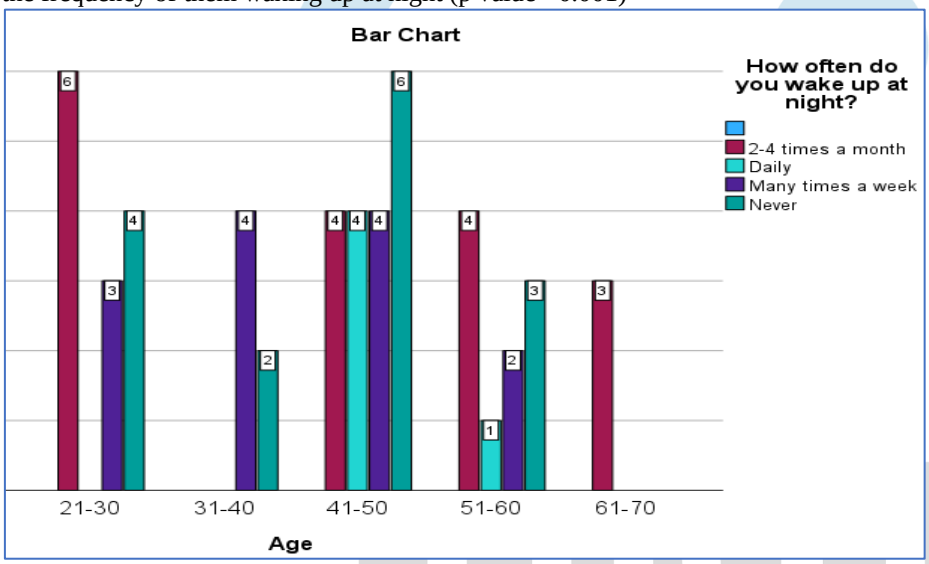

Fig. 7 shows the correlation between the age of the participants and how often they woke up at night

Most of the participants reported waking up only once in the night. Among the participants who woke up at night, 40% took half an hour to fall asleep again and 28% of them took an hour or more to fall asleep. Most participants who took half an hour or more to fall asleep were homemakers. We found a statistically significant association between occupation of the participants and time it took for them to fall asleep again (p value <0.001)

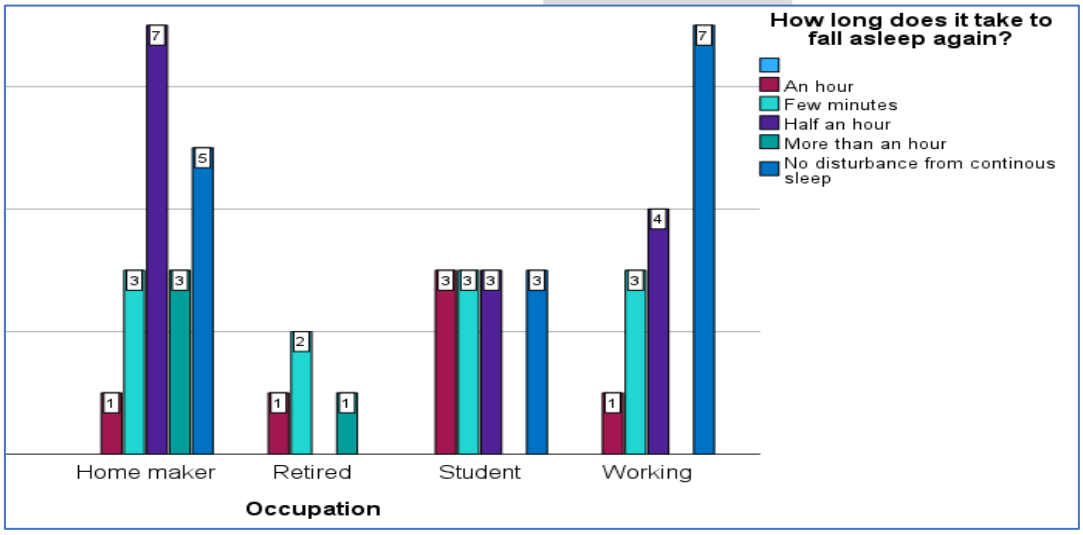

Fig 8. Shows the correlation between the occupation of the participants and the time it took them to fall asleep again.

61% reported that they did not get out of bed when they couldn't sleep. 43% of female participants reported that the noise has been so bad that they had to sleep in another room (p value= 0.020)

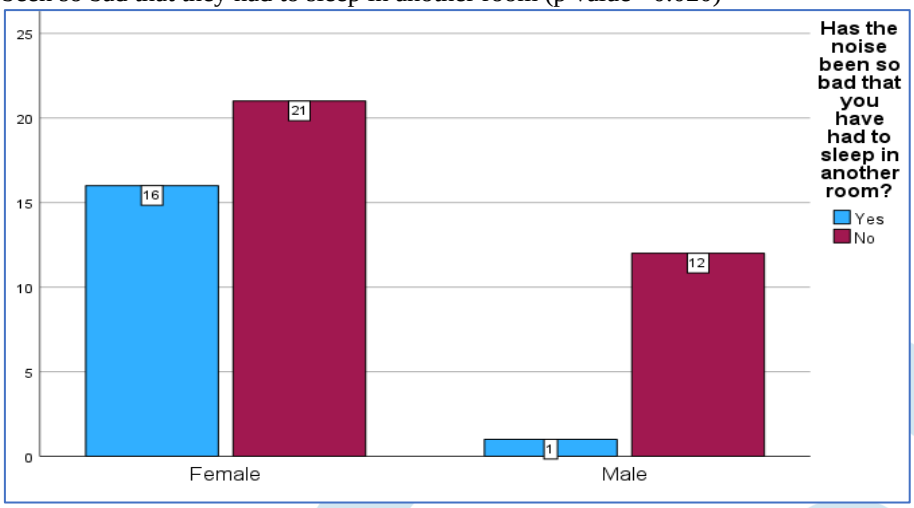

Fig. 9 shows the correlation between the sex of the participants and frequency of sleeping in another room due to the snoring

57% of the participants reported that they would get annoyed if the patient's snoring impacted their sleep. It was reported by 85% of the male participants and found to be statistically significant (p value= 0.024)

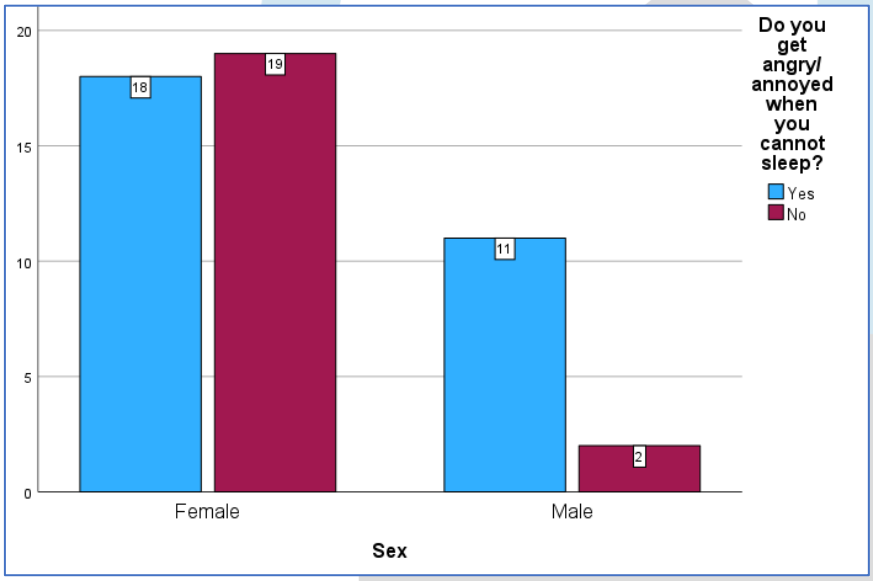

Fig. 10 shows the correlation between sex of the participants and frequency of feeling annoyed when they couldn't sleep

47% of the participants reported that they felt the need to wake up their partner to check if they are alright. It was more commonly associated with female participants and found to be statistically significant (p value= 0.037)

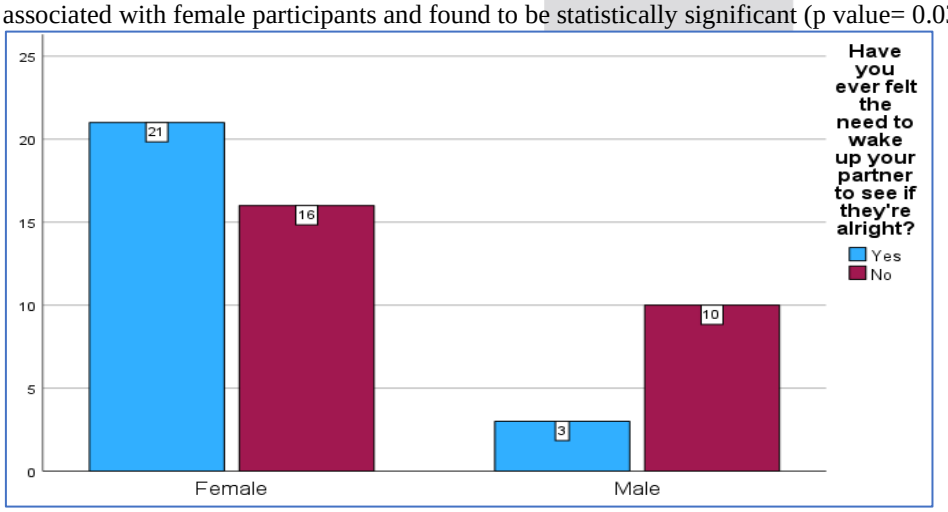

Fig. 11 shows the correlation between the sex of the participants and frequency of waking up to check if their partner was alright

IMPACT OF SLEEP DISTURBANCE AMONG THE PARTICIPANTS

51% of the participants responded that a poor night's sleep made them tired, 27.5% responded that it made them irritable. 12% and 8% felt that a poor night's sleep made them anxious and depressed respectively. All symptoms were commonly seen in homemakers and found to be statistically significant (p value <0.001)

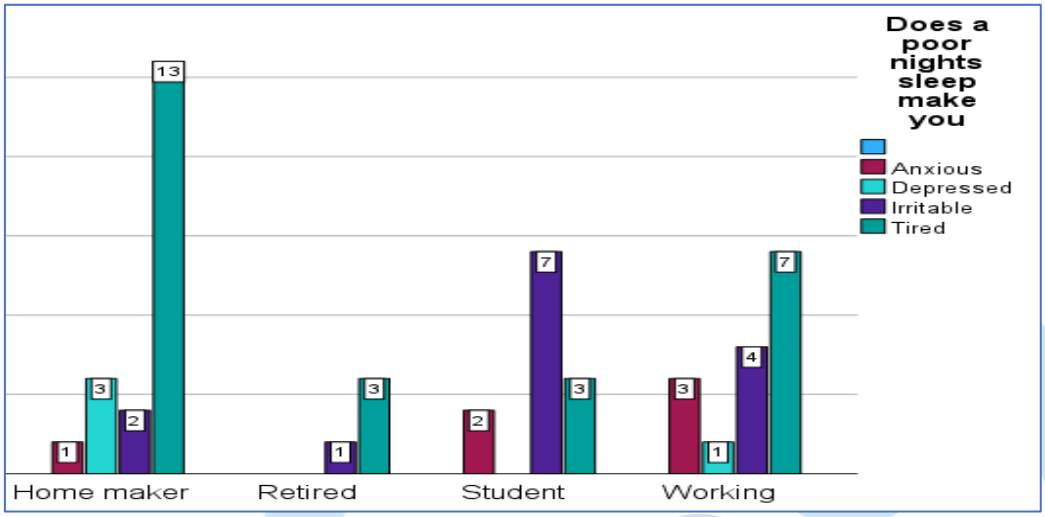

Fig. 12 shows the correlation between occupation of the participants and incidence of psychological symptoms

Also, 35% of the participants reported that inadequate sleep disturbed their concentration, 31% felt that it impaired their ability to work and 31% reported that it affected both.

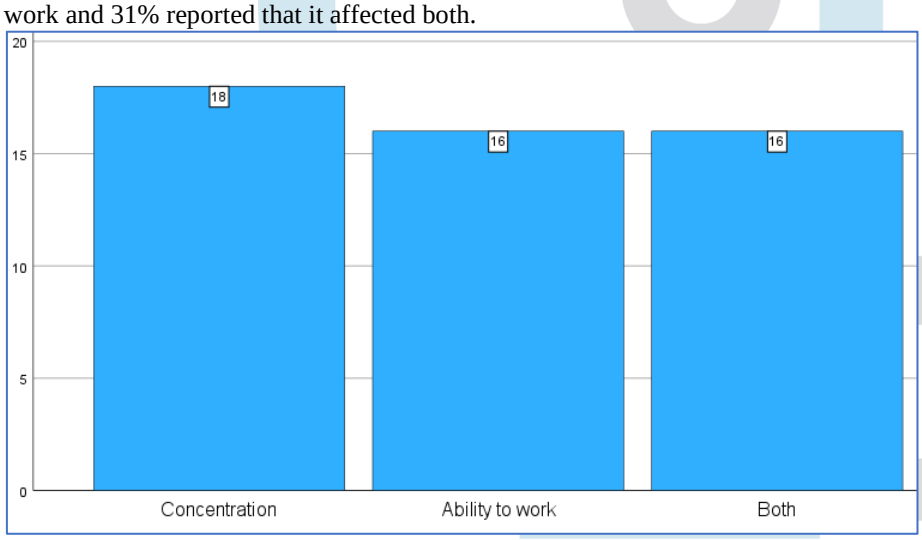

Fig. 13 shows incidence of symptoms such as disturbance in concentration and impairment of ability to work

DISCUSSION

Obstructive sleep apnea is an increasingly common chronic illness which can significantly impair the bed partners' quality of life [(11)]. Snoring in the patients contributes to the partners' objective and subjective sleep disturbance. Studies have shown that over a long time, untreated OSA can lead to insomnia in the partners. The partners' own sleep problems were associated with poor mental and physical health, general well-being and social interactions [(12)].

Our study had a sample of 50 bed partners of patients with obstructive sleep apnea. The participants in this study were more likely to report sleep disturbance. Additionally, the bed partners reported impairment in their concentration and ability to work due to the sleep disturbance.

A study which involved 136 bed partners of patients with OSA reported that 63.2% of the participants reported poor sleep quality [(13)]. The McArdle study which has a sample size of 46 bed partners reported that 66% of the participants in their study reported poor sleep quality [(14)]. In another study, Virkkula et al. It was reported that 55% of the bed partners reported sleep problems as a result of snoring in patients with mild OSA [(15)]. In a case-control study conducted by Anna Smith, it was found that OSA wives exhibited lower sleep quality and distress than controls [(16)]. Consistently our findings indicated that 68% of the participants reported poor sleep quality.

An early study in Monroe detected that female bed partners of the OSA patients has a greater total sleep time and lesser awakenings than the male participants when sleeping alone [17]. Consistently, in our study majority of the female participants reported the snoring to be so bad that they had to sleep in another room.

Few studies have also examined the occurrence of psychological symptoms due to sleep disturbance in bed partners. In a study it was reported that 37.5% of bed partners reported symptoms of depression. In our study, less than 28% of the patient's reported depression as a consequence of sleep disturbance.

Partners of patients with OSA represent a large number of the middle aged population who have very poor sleep quality (apparently due to patients' nocturnal symptoms) and poor self-reported health status. Although CPAP treatment is beneficial for most patients with OSA, the benefit to their partners is less clear. Certain studies shows that proper use of CPAP in OSA patients showed improvements in subjective sleep quality and decreased sleep disturbance in their bed partners. Some partners report moderate to severe sleep disturbance from CPAP machines, 125emphasizing the need for machines that are quieter and less obtrusive.

Our study had some limitations. First, the data was self-reported which may be affected by recall bias. This may have led to overestimation and influence of the results. Second, our study did not take into account the occurrence of chronic diseases as a result of inadequate sleep. Third, our study did not apply polysomnography to any of the participants which may have altered the results.

CONCLUSION

In conclusion, sleep disturbance is often a shared experience for the bed partners of patients with OSA. However, the night symptoms from OSA may not affect partner-assessed sleep. Depression and chronic disease are associated with the sleep disturbance of bed partners, but their causal relationship is unknown. This has been found to have long-term effects such as impaired concentration and impairment in the ability to work. Since this is a rising issue, additional studies are warranted to recognize the causes of poor sleep quality and the effects of OSA on bed partners.

REFERENCES

1. Osman AM, Carter SG, Carberry JC, Eckert DJ. Obstructive sleep apnea: current perspectives. Nat Sci Sleep. 2018 Jan 23;10:21-34. Doi: 10.2147/NSS.S124657. PMID: 29416383; PMCID: PMC5789079.
2. Spicuzza L, Caruso D, Di Maria G. Obstructive sleep apnoea syndrome and its management. Ther Adv Chronic Dis. 2015 Sep;6(5):273-85. Doi: 10.1177/2040622315590318. PMID: 26336596; PMCID: PMC4549693.
3. Sateia, M. J. International classification of sleep disorders-third edition: highlights and modifications., 146, 1387–1394 (2014).
4. Malhotra, A. & White, D. P. Obstructive sleep apnoea., 360, 237–245 (2002).
5. Morsy, N. E. et al. Obstructive sleep apnea: personal, societal, public health, and legal implications. Rev Environ Health, 34, 153–169 (2019).
6. Marin-Oto, M., Vicente, E.E. & Marin, J.M. Long term management of obstructive sleep apnea and its comorbidities. *Multidiscip Respir Med* 14, 21 (2019). https://doi.org/10.1186/s40248-019-0186-3
7. Pinto AM, Devaraj U, Ramachandran P, Joseph B, D'Souza GA. Obstructive Sleep Apnea in a rural population in South India: Feasibility of health care workers to administer level III sleep study. Lung India. 2018 Jul-Aug;35(4):301-306. doi: 10.4103/lungindia.lungindia_433_17. PMID: 29970768; PMCID: PMC6034385.
8. Goyal M, Johnson J. Obstructive Sleep Apnea Diagnosis and Management. Mo Med. 2017 Mar-Apr;114(2):120-124. PMID: 30228558; PMCID: PMC6140019.
9. Weaver TE, Grunstein RRAdherence to continuous positive airway pressure therapy: the challenge to effective treatment. Proc Am Thorac Soc; 2008;52:173-178, 18250209.
10. Jayne C. Carberry, Jason Amatoury, Danny J. Eckert,Personalized Management Approach for OSA,Chest,Volume 153, Issue 3,2018,Pages 744-755,ISSN 0012-3692,https://doi.org/10.1016/j.chest.2017.06.011.
11. Impact of Obstructive Sleep Apnea and Its Treatments on Partners: A Literature Review, Journal Article,DP – 2017 Journal of Clinical Sleep Medicine,PG - 467-477,VI – 13,IP – 03,AID - 10.5664/jcsm.6504 https://jcsm.aasm.org/doi/abs/10.5664/jcsm.6504
12. Strawbridge WJ, Shema SJ, Roberts REImpact of spouses' sleep problems on partners. Sleep; 2004;273:527-535, 15164910.
13. Chu, Chien-Ming & Wu, Shao-Yun & Yu, Chung-Chieh & Yu-Chih, Huang. (2021). Sleep Disturbance and Depressive Tendency in Bed Partners of Patients With Obstructive Sleep Apnea. 10.21203/rs.3.rs-800437/v1.
14. McArdle N, Kingshott R, Engleman HM, Mackay TW, Douglas NJ. Partners of patients with sleep apnoea/hypopnoea syndrome: effect of CPAP treatment on sleep quality and quality of life. Thorax. 2001 Jul;56(7):513-8. doi: 10.1136/thorax.56.7.513. PMID: 11413348; PMCID: PMC1746105.
15. Virkkula P, Bachour A, Hytönen M, Malmberg H, Salmi T, Maasilta P. Patient- and bed partner-reported symptoms, smoking, and nasal resistance in sleep-disordered breathing. Chest. 2005 Oct;128(4):2176-82. doi: 10.1378/chest.128.4.2176. PMID: 16236871.
16. Anna Karla A. Smith, Sonia Maria G. Togeiro, Sergio Tufik, Suely Roizenblatt,Disturbed sleep and musculoskeletal pain in the bed partner of patients with obstructive sleep apnea,Sleep Medicine,Volume 10, Issue 8,2009,Pages 904-912,ISSN 1389-9457,https://doi.org/10.1016/j.sleep.2008.08.013.
17. Monroe LJ Transient changes in EEG sleep patterns of married good sleepers: the effects of altering sleeping arrangement. Psychophysiology; 1969;63:330-337, 4311056.