Original Research

Mood and Psychological State in Patients with Obstructive Sleep Apnea (OSA) Referring to Sleep Laboratory

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Abstract

Background and Objective: Obstructive sleep apnea (OSA) is associated with increased sympathetic activity, sleepiness, mood, and psychological alterations. In this study, mood and psychological state of patients referring to sleep laboratory were assessed.

Materials and Methods: Fifty-eight consecutive individuals eligible for participation in the study were assigned to one of two groups of normal and mild (n = 19), or moderate to severe OSA (n = 39) with apnea-hypopnea index (AHI) of ≤ 15, or > 15 per hour, respectively, based on their initial polysomnography. The mood status was evaluated using the profile of mood states (POMS).

Results: Amongst the six POMS subscales, only power-energy was significantly different between the two groups (P = 0.03). The total score of POMS, however, did not differ across the groups (P = 0.58).

Conclusion: According to the obtained results, it may be concluded that mood status and OSA are not related when POMS is used for evaluation of mood status.

Keywords: Mood; Sleep apnea; Mental health

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Introduction

Respiratory sleep problems, such as snoring, are common symptoms (1, 2). Sleep disordered breathing (SDB) is partial or complete airway obstruction leading to hypoxia and sleep disruption (3, 4). Obstructive sleep apnea (OSA) is associated with increased sympathetic activity, perspiration, sleepiness, mood, and psychological alterations (5, 6). SDB is accompanied with numerous mood and psychological dysfunctions in adults due to hypoxia and sleep disruption (3).

The adults with sleep disruption usually show sleepiness and dysfunction (5). Agitation, anxiety, and depression are well-known presentations of diurnal sleepiness. Hypoxia has also an important role in mood and psychological dysfunction due to sleep disruption (7). Intermittent hypoxia would result in decreased neurocognitive function (8). Those with sleep apnea and hypoxia have decreased attention and cognition scores (8, 9).

Apnea-hypopnea index (AHI), the number of apnea or hypopnea events per hour of sleep, is the most common used scale for stroke and cognitive disorders in OSA (10). Polysomnography (PSG) is typically used to assess OSA, rather than history and physical examination (11, 12). Attainment of an instrument for evaluation of psychiatric outcomes in OSA would result in earlier diagnosis of the severity of the problems leading to higher quality of life and lower burden of the disease. In this study, we assessed the mood and psychologi-

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cal alterations in patients attending sleep laboratory for evaluation of OSA.

Materials and Methods

In this observational comparative study, 58 consecutive individuals attending sleep clinic of *Baharloo* hospital, a referral training hospital in Tehran City, Iran, during the year 2016, were enrolled. The subjects included two groups of normal and mild (n = 19), or moderate to severe (n = 39) OSA, with AHI of equal or less than, and more 15 per hour, respectively, based on their PSG. Participants with history of other major medical disorders such as head trauma, seizure, psychiatric disorder, and drug use were excluded from the study. Those who showed predominant central apneas (> 50% of total apneas) were also excluded.

The enrolled patients signed the informed consent form, while Helsinki Declaration was respected throughout the study. This study was also approved by the ethical committee affiliated to Tehran University of Medical Sciences, Tehran, Iran. All participants underwent PSG in our sleep laboratory. Apnea was defined as decrements in airflow of more than 90% from baseline for a period longer than 10 seconds (12). Hypopnea was defined as more than 30% decrease in airflow, but less than 90% from baseline for a period longer than 10 seconds (12).

The mood status of the participants was evaluated with the profile of mood states (POMS) (13, 14). Total mood disturbance (POMS-Total) was calculated by summing the six POMS subscale scores. It was validated by the authors in an unpublished data with Cronbach's alpha of internal consistency of 0.65 to 0.92. The POMS had 65 adjectives rated on a 0 to 4 score. Higher scores indicated greater distress levels. Data from this instrument consolidated into six dimensions of mood: tension-anxiety, depression-dejection, fatigue-inertia, confusion-bewilderment, vigor-activity, and anger-hostility. The total score of mood disturbance was computed by adding the five negative subscale scores (tension-anxiety, depression, anger-hostility, vigor, fatigue, and confusion), and subtracting the vigor score. Higher scores for the total mood disturbance score indicated a greater degree of mood disturbance. The scores on POMS were compared between the groups. Participants completed the questionnaire before PSG.

Data analysis was analyzed using SPSS software (version 21.0, IBM Corporation, Armonk, NY, USA). The utilized tests were chi-square for categorical variables, and independent-sample t for continuous variables. Multiple regression model was performed for assessment of association. Kolmogorov-Smirnov test was used for checking the normality of data. Some of the more important factors such as duration of sleep problems in each group was not considered here, because of the lack of access. The significance level was considered less than 0.05.

Results

According to standard PSG, out of 58 patients, 39 had moderate to severe OSA. Demographic variables are depicted in table 1. In mild and moderate to severe sleep apnea groups, there were 11 (57.9%) and 31 (79.5%) participants, respectively; which was not significantly different between the two groups (P = 0.05).

Among the six POMS subscales, only power-energy was significantly different between the two groups (Table 2). Furthermore, the total score of POMS was not different across the groups (P = 0.58).

A multiple regression analysis of each component of POMS with dependent variables including age, body mass index (BMI), smoking, rapid eye movement (REM) latency, sleep efficiency, total sleep time, sleep onset latency, AHI, and minimum O_2 saturation was performed.

Table 1. Demographic and polysomnographic variables across the groups

	AHI ≤ 15 (n = 19) (Mean ± SD)	**AHI > 15 (n = 39) (Mean ± SD)**	**P-value**
Age (year)	42.84 ± 11.23	47.23 ± 9.68	0.13
BMI (kg/m²)	29.79 ± 5.80	30.72 ± 5.82	0.57
REM latency (minute)	174 ± 98	154 ± 107	0.52
Sleep Efficiency (percent)	80.3 ± 14.3	74.3 ± 11.0	0.10
Total sleep time (minute)	393.9 ± 59.5	392.5 ± 70.5	0.94
Sleep onset latency (minute)	49.2 ± 36.4	37.3 ± 28.9	0.21
Min O_2sat (%)	85.6 ± 9.2	77.7 ± 12.9	0.03

SD: Standard deviation; AHI: Apnea hypopnea index; BMI: Body mass index; REM: Rapid eye movement; Min O_2sat: Minimum O_2 saturation

Table 2. POMS components and total score in normal and mild versus moderate to severe OSA

	AHI ≤ 15 Mean ± SD	AHI > 15 Mean ± SD	P-value
Tension-anxiety	6.84 ± 5.66	7.85 ± 6.14	0.55
Depression-dejection	11.30 ± 8.27	12.72 ± 9.79	0.59
Enmity-angry	11.16 ± 8.73	11.51 ± 8.29	0.88
Power-energy	21.42 ± 4.99	17.92 ± 5.97	0.03
Fatigue-exhaustion	7.53 ± 3.29	7.97 ± 5.28	0.74
Confusion-dizziness	4.00 ± 4.38	4.67 ± 4.46	0.59
Total scoring	19.21 ± 29.09	23.87 ± 30.55	0.58

POMS: Profile of mood states; OSA: Obstructive sleep apnea; AHJ: Apnea-hypopnea index

As presented in table 3, among these variables, only the age was statistically associated with the total score of POMS. Similar to univariate analysis, AHI was significantly related to vigor in this multiple regression model.

Discussion

In this study, the mood and psychological alterations in patients with OSA were assessed. POMS were similar, except for the power-energy subscale that was significantly lower in those with moderate to severe OSA. However, the demographic characteristics were similar between the two study groups. This matter showed that OSA would develop no significant effect on mood status. Other studies have shown variable results (15-18).

Quan et al. showed that there is no significant differences between the mild OSA and normal groups in terms of mood status (19). This finding is in congruence with our results. The importance of the matter was well-established by Bardwell et al., who declaimed that the treatment of mood symptoms might reduce the fatigue severity in patients with OSA (20). It is related to power-energy that was found to be higher in mild OSA group.

Jackson et al. reported that fatigue was the primary predictor of the level of depressive symptoms in patients who attended the sleep laboratory, regardless of the level of severity of SDB (21). This was in congruence with our study. Baran and Richert found that the depressive symptoms associated with OSA could be considered as a combination of a mood disorder secondary to an adjustment disorder with depressed mood and primary medical condition (22).

Harris et al. showed that treatment of depression in OSA might reduce sleepiness and fatigue and also improve quality of life (23). Lee et al. reported that men are more prone to the negative impact of insomnia and OSA on fatigue and quality of life (24). Haensel et al. reported no effect of treatment with continuous positive airway pressure (CPAP) on mood states in patients with OSA using POMS (25). Habukawa et al. believed that complete treatment of OSA is needed to improve emotional state and quality of life in patients with OSA (26).

Our main limitations were limited sample size, and lack of longitudinal design. The suggestions for future studies are larger sample size, and multi-center studies to attain more definite results. Since no confounders are described, and the study lacks a control group, projecting the results to the population of patients with sleep apnea should be performed with more caution.

Table 3. Multiple regression analysis of each component of POMS and its total score with dependent variables including age, BMI, smoking, REM latency, sleep efficiency, total sleep time, sleep onset latency, AHI, and minimum O_2 saturation

	Tension (POMS1)	Depression (POMS2)	Anger (POMS3)	Vigor (POMS4)	Fatigue (POMS5)	Confusion (POMS6)	POMS-Total
Age (year)	0.012*	0.097	0.204	0.459	0.636	0.010*	0.007*
BMI (kg/m^2)	0.509	0.277	0.378	0.885	0.385	0.108	0.365
Smoking (pack/year)	0.886	0.333	0.428	0.175	0.239	0.444	0.133
REM Latency	0.648	0.207	0.179	0.801	0.805	0.158	0.123
Sleep Efficiency	0.497	0.663	0.903	0.610	0.596	0.508	0.931
Total Sleep Time	0.152	0.475	0.153	0.399	0.458	0.067	0.120
Sleep Onset Latency	0.061	0.530	0.375	0.765	0.641	0.087	0.429
AHI	0.948	0.349	0.493	0.008*	0.824	0.942	0.797
Min O_2sat	0.225	0.165	0.373	0.479	0.811	0.144	0.249
R Square	0.307	0.246	0.178	0.247	0.136	0.316	0.319

*P-value less than 0.05

POMS: Profile of mood states; BMI: Body mass index, REM: Rapid eye movement, AHI: Apnea hypopnea index; Min O_2sat: Minimum O_2 saturation

Conclusion

It may be concluded that mood and psychological status and OSA are not related according to the POMS. Moreover, assessment of other psychological disorders in these patients would help better prognosis.

Conflict of Interests

Authors have no conflict of interests.

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