DOI: 10.7860/JCDR/2023/59353.17849

Research Protocol

Dentistry Section

Evaluation of Stress Level in Patient with Moderate Obstructive Sleep Apnoea Using PSS Questionnaire- A Research Protocol

BHAWNA SHYAMSUKHA[1], SHARAYU NIMONKAR[2], VIKRAM BELKHODE[3], SUREKHA GODBOLE[4]

ABSTRACT

Introduction: Obstructive Sleep Apnoea (OSA) is a sleep condition in which the upper airway becomes partially or entirely blocked during sleep, leading to reduced sleep arousals and arterial oxygen saturation. According to the epidemiological survey, OSA is relatively common among people. Hence, there is need to analyse emotional stress in patients suffering from OSA.

Need of the study: OSA and emotional stress are inter-connected hence, a diagnosis of OSA is necessary to determine the patient's level of emotional stress.

Aim: The research protocol aims to determine the stress level among patients suffering from moderate OSA and to compare the effect of gender on stress among such patients.

Materials and Methods: A cross-sectional study will be conducted over a period of six months from May 2022 to October 2022 at Respiratory ward of Datta Meghe Institute of Medical Sciences, Maharashtra, India. This study is planned to assess emotional stress among patients suffering from moderate OSA with sample size of 20 subjects (10 male, 10 female) without any other demographic criteria. Polysomnography (PSG) will be used to record the patients' data. The patients will be charged for the PSG procedure. An overnight PSG will be performed in Department of Sleep Medicine at the chosen study institute. An online questionnaire consisting of 14 statements will be used to gather and analyse information. The questionnaire will assess stress levels using the previously validated questionnaire, Perceived Stress Scale (PSS) questionnaire, provided by the American Sociological Association (ASA). Participants will be asked to rate their stress according to a PSS score. Descriptive analysis will be used for statistical analysis.

Keywords: Apnoea/Hypopnoea index, Blockage, Perceived stress scale, Polysomnography, Upper airway

INTRODUCTION

OSA is a sleep disorder in which there are partial or complete obstructions of respiratory system during sleep, leading to arterial oxygen desaturation and awakenings. Many signs and symptoms are correlated with the disease, including excessive daytime sleepiness, cognitive difficulties, type 2 diabetes mellitus, hypertension, coughing during sleep, choking during sleep, morning headache, etc., [1]. Acute myocardial infarction, atherosclerosis, and overall mortality have all been associated with severe OSA [2]. According to scientific literature, OSA is an unconventional hazard for mortality, cardiac disease, and transient ischemic stroke. According to surveys, OSA patients have a shorter life span and much higher work-related and traffic accident rates [3].

Polysomnography (PSG) is a diagnostic tool for OSA. The severity of OSA is assessed using Apnoea/Hypopnoea Index (AHI). OSA is categorised as mild (AHI 5-15), moderate (AHI 15-30), or severe (AHI >30) [4] based on AHI. Treatment options for OSA include positional therapy, medication, surgical procedures, the Mandibular Advancement Device (MAD), and Continuous Positive Airway Pressure (CPAP). In addition to considerable daytime tiredness, OSA patients frequently have psychological side-effects such as worry and sadness. Many people consult healthcare specialists and request a sleep study to determine if OSA is the underlying cause of these confusing symptoms are frequently the initial cause [5].

Stress refers to an emotional or mental state of pressure/tension. Stress-reduction interventions could be an alternative in managing the psychological symptoms of OSA. Stress is associated with depression and anxiety. Parameters linked to increased depression and anxiety are frequently identified alongside measures of multiplied psychological stress. Even while stress management therapies differ from those that target depressed or anxious symptoms, they should nevertheless aid in treatment of anxiety and depression associated with OSA [6].

Stress alleviation regimens are no longer considered for patients with OSA due to the unknown incidence of psychological stress. This study aims to investigate the prevalence of emotional stress and its relationships with symptoms of anxiety and depression in OSA. The hypothesis of the study is that patients suffering from moderate OSA have a definite relation with emotional stress levels. Examining emotional stress in people with OSA is the rationale for this study since OSA and emotional stress are connected. Therefore, a diagnosis of OSA is necessary to determine the patient's level of emotional stress.

The goal is to determine whether individuals with OSA experience emotional stress more frequently and whether there are any gender-related preferences.

Primary objective: The primary objective is to evaluate the stress level among patients suffering from moderate OSA.

Secondary objective: The secondary objective is to compare the effect of gender on stress among patients suffering from moderate OSA.

REVIEW OF LITERATURE

During sleep, frequent cessations of breathing occur due to a closed airway in case of OSA. Hypercapnia, nocturnal hypoxia, and sleep fragmentation are all symptoms of airway blockage [7]. OSA has been proven in numerous studies to exacerbate serious main organ illnesses such as metabolic syndrome, cardiovascular

disease, and cognitive loss. Lipp ME and Tanganelli M contributed that exacerbation of bronchial asthma, open-angle glaucoma, and erectile dysfunction have all been linked to OSA [8]. It was also reported excessive daytime drowsiness, snoring, and breathing pauses as the most prevalent signs of OSA. Other symptoms encompass gasping and choking. Morning headaches, sore throats, fatigue, memory loss, and sleep disturbances.

Grunstein R et al., concluded that OSA might also adversely impact working during daylight hours, increase the likelihood of motor vehicle traffic accidents and reduce work productivity [9]. The psychological component of OSA, which includes depressive sickness and anxiety disorder, has not yet been thoroughly studied. Spiegel K et al., in several meta-analyses and systematic reviews, have shown that anxiety and depression are associated with OSA. Patients with OSA were observed to have a higher rate of psychiatric co-morbidities, such as anxiety and mood disorders, than those without OSA [10].

Stress is linked to bad health outcomes, with 2/3 of Americans indicating that it has an impact on their health [11]. A recent study suggests that addressing stress in people with OSA may have adorn effects when they already have chronic health conditions, implying that managing stress may improve outcomes [12]. The distinct incidence and characteristics of OSA in men and women demonstrate the gender-specific effects of stress. According to research [13], OSA may be linked to injury in brain regions that are altered by chronic psychological stress.

Tomfohr LM et al., in cohort research, found a connection between OSA and depressive symptoms within a year of initiation [14]. Patients with OSA may experience detrimental effects from psychiatric co-morbidities on their quality of life and adherence to CPAP therapy, according to Tanganelli MS and Novaes ME [15]. Despite this, it is still unclear how OSA and emotional disorders are related. Stress is described by Lipp MEN as “a common tearing and wearing of the body induced by psycho-physiological changes that occur when someone is obliged to perform a task that causes powerful, appropriate and fearful emotions”. Stress is connected with tachycardia, profuse sweating, muscle tension, and alertness [16]. Patients with OSA have oxygen desaturation during sleep, which has been shown to alter the presentation of psychiatric symptoms in this population [17].

Calais SL et al., found that patients with OSA have a higher prevalence of psychological symptoms like despondency and anxiety, despite the fact that there is no direct connection between psychological symptoms and OSA [18]. The AHI, as described by American Academy of Sleep Medicine [19], is commonly used to assess OSA. The extent and frequency of hypoxic events are just one factor that may affect how well affective disorders like sadness and anxiety are treated in OSA patients. The Epworth Sleepiness Scale (ESS) results showed that women with OSA had more noticeable sleepiness than men with OSA, which was consistent with another research that showed women with OSA had more impairment in daytime performance and had more noticeable sleepiness [20]. Genetic, hormonal, behavioural, and environmental factors are only a few potential contributing causes [11]. Furthermore, gender-specific differences in symptoms may be linked to health behaviours like the propensity to utilise preventative measures, usage of prescription medications, and acceptance of therapy, however, finding cannot be applied universally due to the small number of female participants [21].

Calais SL et al., have indicated that female patients have a higher frequency of depressive illnesses than male patients [18]. Although the age-specific self-belief intervals for depression and anxiety disorders were substantial, additional study is required to support these results [22]. The authors will also study anxiety and depression in relation to gender because, according to some previous studies, OSA is assumed to be more common in women [23].

PSS was given by Dos Santos MA et al., to assess stress level for patient with OSA. Numerous documented established questionnaires are reliable and verified for usage with the general population and are used as a tool to analyse stress levels [5].

OSA is a life-threatening medical disorder affecting the quality of life. Stress is actively associated with depression and anxiety [24]. Not only is assessing the condition necessary but also the management of stress levels of such people is needed by providing primary care in the form of psychological counselling and formulating a treatment plan to reduce psychological symptoms before the disease worsens [25,26]. National research shows many patients with OSA, must be considered to improve their quality of life [24].

To better understand OSA patients’ emotional responses, this study is planned to assess the stress level in patients suffering from moderate to severe OSA, which will help formulate a proper treatment regime for such patients. Such patients must be encouraged to engage in hobbies, exercise, and other forms of recreation and interaction. As a treatment, cognitive, behavioural, or psychotherapies, and many times medications can also be used depending on the severity of the stress. A Standard Counselling Protocol has to be formulated to address the stress in OSA, and this protocol has to be implemented at the National level to control stress [26].

Future implications of this study include the fact that it can be diagnosed in big populations. The results of pre- and post-treatment patients with OSA can be compared.

MATERIALS AND METHODS

A descriptive cross-sectional study will be conducted over a period of six months, from May 2022 to October 2022, at Sharad Pawar Dental College, Maharashtra, after obtaining approval from the Institutional Ethical Clearance (IEC) with reference no. {DMIMS (DU)/IEC/2022/1171}. Before the investigation begins, the subjects will be informed about the study, and signed consent will be obtained from them.

This study design is planned to assess emotional stress among 20 participants which will be included in sample who had moderate OSA. A conventional sampling method will be applied as per the respondent from online questionnaire survey.

Sample size calculation [24]: The sample size was calculated by using the following formula:

n=(Z 1-α/2+ Z1-β) 2p1 (1-p 1)+p2 (1-p2)

(p1-p2) 2

where Proportion of outcome (p1)=0.80, Proportion of outcome (p2)=0.65, Level of significance (a)=0.05, Power (1-ß)=0.80, Z alpha value=1.96, Z beta value=0.84=(1.96+0.84) 2 0.80 (1-0.80)+0.65 (1-0.65) (0.80-0.65) 2. Thus keeping all values, the sample size came to be 19 and total sample size came to be 20.

Both gender groups (male and female) consist of 10 samples each.

Inclusion criteria: Inclusion criteria will be co-operative patients aged between 30-60 years of both genders diagnosed with moderate OSA.

Exclusion criteria: Any patients suffering from severe systemic diseases like cardiovascular disease, respiratory and neural diseases as well as bedridden and uncooperative patients and patients with treated case of OSA with oral appliances will be excluded from the study.

Planned Procedure

The selected participants will undergo relevant investigations for sleep apnoea as Polysomnography (PSG) and will be distributed PSS questionnaire for assessment of stress levels.

Polysomnography (PSG): An overnight PSG will be performed in the Department of sleep medicine, PSG recordings will be assessed

using the American Academy of Sleep Medicine's criteria [25]. Each hour's apnoea's and hypopnoea's will be calculated.

In this study, participants will be asked to rate their level of perceived stress using the PSS scale, where a score of 0 to 13 indicates low stress, a score of 14 to 26 indicates moderate stress, and a score of 27 to 40 indicates severe perceived stress [Table/Fig-1].

Questionnaire [Table/Fig-1]: The questionnaire will be consisting of 14 statements in English language. Study participants will be evaluated for stress level with a previously validated survey [26], PSS questionnaire given by ASA to assess the stress level. The seven positive items' scores are reversed, e.g., 0=4, 1=3, 2=2, etc., and then added together to provide the PSS scores [9]. Participants will be asked to rate their level of perceived stress using the PSS scale, where a score of 0 to 13 indicates low stress, a score of 14 to 26 indicates moderate stress, and a score of 27 to 40 indicates severe perceived stress.

S. No.	Questions	Never (0)	Almost never (1)	Sometimes (2)	Fairly often (3)	Very often (4)
1	In the last month, how often have you been upset because of something that happened unexpectedly?					
2.	In the last month, how often have you felt that you were unable to control the important things in your life?					
3.	In the last month, how often have you felt nervous and "stressed"?					
4.	In the last month, how often have you dealt successfully with irritating life hassles?					
5.	In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?					
6.	In the last month, how often have you felt confident about your ability to handle your personal problems?					
7.	In the last month, how often have you felt that things were going your way?					
8.	In the last month, how often have you found that you could not cope with all the things that you had to do?					
9.	In the last month, how often have you been able to control irritations in your life?					
10.	In the last month, how often have you felt that you were on top of things?					
11.	In the last month, how often have you been angered because of things that happened that were outside of your control?					
12.	In the last month, how often have you found yourself thinking about things that you have to accomplish?					
13.	In the last month, how often have you been able to control the way you spend your time					
14.	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?					

[Table/Fig-1]: Perceived Stress Scale (PSS) Questionnaire.

STATISTICAL METHODS

An analysis of analytical and descriptive statistics will be performed. Standard deviations and the mean will be used to present the data. Pearson's coefficient test will be used for determining the correlation between OSA and Emotional stress. Results will be evaluated through descriptive statistics for the assessment of mean value of emotional stress in OSA patients with frequency and percentage distribution.

REFERENCES

[1] Witmans MB, Keens TG, Ward SL, Marcus CL. Obstructive hypopneas in children and adolescents: Normal values. American Journal of Respiratory and Critical Care Medicine. 2003;168(12):1540.

[2] Tufik S, Santos-Silva R, Taddei JA, Bittencourt LR. Obstructive sleep apnea syndrome in the Sao Paulo epidemiologic sleep study. Sleep Medicine. 2010;11(5):441-46.

[3] Young T, Palta M, Dempsey J, Skatrud J, Weber S, Badr S. The occurrence of sleep-disordered breathing among middle-aged adults. New England Journal of Medicine. 1993;328(17):1230-35.

[4] Noal RB, Menezes A, Canani SF, Siqueira FV. Habitual snoring and obstructive sleep apnea in adults: Population-based study in Southern Brazil. Revista de Saude Publica. 2008;42(2):224-33.

[5] Dos Santos MA, de Cássia Nakano T, Mendes FA, Duarte BB, Marone SA. Emotional stress evaluation of patients with moderate and severe sleep apnea syndrome. International Archives of Otorhinolaryngology. 2017;21(01):28-32.

[6] Späth-Schwalbe E, Gofferje M, Kern W, Born J, Fehm HL. Sleep disruption alters nocturnal ACTH and cortisol secretory patterns. Biological Psychiatry. 1991;29(6):575-84.

[7] Buckley TM, Schatzberg AF. On the interactions of the hypothalamic-pituitary-adrenal (HPA) axis and sleep: Normal HPA axis activity and circadian rhythm, exemplary sleep disorders. The Journal of Clinical Endocrinology & Metabolism. 2005;90(5):3106-14.

[8] Lipp ME, Tanganelli M. Stress e qualidade de vida em magistrados da justiça do trabalho: Diferenças entre homens e mulheres. Psicologia: Reflexão E Crítica. 2002;15(3):537-48.

[9] Grunstein RR, Stewart DA, Lloyd H, Akinci M, Cheng N, Sullivan CE. Acute withdrawal of nasal CPAP in obstructive sleep apnea does not cause a rise in stress hormones. Sleep. 1996;19(10):774-82.

[10] Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on metabolic and endocrine function. The lancet. 1999;354(9188):1435-39.

[11] Landrine H, Klonoff EA. The schedule of racist events: A measure of racial discrimination and a study of its negative physical and mental health consequences. Journal of Black Psychology. 1996;22(2):144-68.

[12] Jackson ML, Tolson J, Bartlett D, Berlowitz DJ, Varma P, Barnes M. Clinical depression in untreated obstructive sleep apnea: examining predictors and a meta-analysis of prevalence rates. Sleep medicine. 2019;62:22-28. Doi: 10.1016/j.sleep.2019.03.011. Epub 2019 Mar 27.

[13] Hrubos-Strøm H, Einvik G, Nordhus IH, Randby A, Pallesen S, Moum T, et al. Sleep apnoea, anxiety, depression and somatoform pain: A community-based high-risk sample. European Respiratory Journal. 2012;40(2):400-07.

[14] Tomfohr LM, Edwards KM, Dimsdale JE. Is obstructive sleep apnea associated with cortisol levels? A systematic review of the research evidence. Sleep Medicine Reviews. 2012;16(3):243-49.

[15] Tanganelli MS, Novaes ME. Stress and quality of life in judges who deal with labor relations: Differences in gender. Psicologia: Reflexão e Crítica. 2002;15(3):537-48.

[16] Lipp MEN. O Stress: Conhecer e Enfrentar. 5th Ed. São Paulo, Brazil: Ed. Contexto; 2003.

[17] Cahali MB, Formigoni GG, Gebrim EM, Miziara ID. Lateral pharyngoplasty versus uvulopalatopharyngoplasty: A clinical, polysomnographic and computed tomography measurement comparison. Sleep. 2004;27(5):942-50.

[18] Calais SL, de Andrade LM, Lipp ME. Gender and schooling differences in stress symptoms in young adults. Psicologia, Reflexão e Crítica. 2003;16(2):257.

[19] Bardwell WA, Norman D, Ancoli-Israel S, Loredo JS, Lowery A, Lim W, et al. Effects of 2-week nocturnal oxygen supplementation and continuous positive airway pressure treatment on psychological symptoms in patients with obstructive sleep apnea: A randomized placebo-controlled study. Behavioral Sleep Medicine. 2007;5(1):21-38.

[20] Chaplin TM, Hong K, Bergquist K, Sinha R. Gender differences in response to emotional stress: an assessment across subjective, behavioral, and physiological domains and relations to alcohol craving. Alcoholism: Clinical and Experimental Research. 2008;32(7):1242-50.

[21] Sher AE, Schechtman KB, Piccirillo JF. The efficacy of surgical modifications of the upper airway in adults with obstructive sleep apnea syndrome. Sleep. 1996;19(2):156-77.
[22] Calais SL. Diferenças entre homens e mulheres na vulnerabilidades ao stress. In: M.E.N. Lipp(Org.). Mecanismos Neuropsicofisiológicos do Stress: Teoria e Aplicações Clínicas. São Paulo, Brazil: Casa do Psicólogo. 2003:87-89.
[23] Wong JL, Martinez F, Aguila AP, Pal A, Aysola RS, Henderson LA, et al. Stress in obstructive sleep apnea. Scientific Reports. 2021;11(1):01-09.
[24] Asghari A, Mohammadi F, Kamrava SK, Tavakoli S, Farhadi M. Severity of depression and anxiety in obstructive sleep apnea syndrome. European Archives of Oto-Rhino-Laryngology. 2012;269(12):2549-53.
[25] Whitney CW, Gottlieb DJ, Redline S, Norman RG, Dodge RR, Shahar E, et al. Reliability of scoring respiratory disturbance indices and sleep staging. Sleep. 1998;21(7):749-57.
[26] Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. Journal de Salud Y Conducta Social. 1983;24:385-96.

PARTICULARS OF CONTRIBUTORS:
1. Intern, Sharad Pawar Dental College and Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe), Wardha, Maharashtra, India.
2. Associate Professor, Department of Prosthodontics, Sharad Pawar Dental College and Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe), Wardha, Maharashtra, India.
3. Professor, Department of Prosthodontics, Sharad Pawar Dental College and Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe), Wardha, Maharashtra, India.
4. Professor, Department of Prosthodontics, Sharad Pawar Dental College and Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe), Wardha, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Bhawna Shyamsukha,
Intern, Sharad Pawar Dental College and Hospital, Datta Meghe Institute of Medical Sciences (Deemed to be University), Sawangi (Meghe),
Wardha-442001, Maharashtra, India.
E-mail: bhawna.26jain@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Aug 08, 2022
- Manual Googling: Oct 20, 2022
- iThenticate Software: Dec 20, 2022 (6%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jul 30, 2022**
Date of Peer Review: **Sep 28, 2022**
Date of Acceptance: **Dec 31, 2022**
Date of Publishing: **May 01, 2023**