Association between sleep-related breathing disorder and depression in young adults and aged population - A survey

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ABSTRACT

The aim of the study was to create awareness about depression caused by improper sleep due to breathing disorder. It also aims in creating awareness about the necessity of treatment of obstructive sleep apnea. Sleep related breathing disorders refers to abnormal respiration during sleep. Obstructive sleep apnea refers to recurrent episodes of partial or complete closure of the upper airway resulting in disturbed breathing while sleeping. It reduces the quality of life. Untreated OSA leads to cardiovascular diseases including coronary artery disease, stroke and atrial fibrillation. It is a survey based study conducted in an online setting, done among the Chennai population. The sample size is 100 people. Sampling method used is simple random sampling. Randomisation was done to minimise bias. Internal validity was a pre tested questionnaire. External validity was Homogenisation, replication of experiment and cross verification with existing studies. Data analysis was done in SPSS software. Statistical test used was the chi-square test. Dependent variables were demographics such as age, gender. Independent variables were sleep related breathing problems and depression. From this online based survey, it was found that 97% people were aware of OSA and 99% of people were aware that untreated OSA could lead to many complications. This survey aims in creating awareness among people about sleep related breathing disorder and depression in young adults and aged population.

INTRODUCTION

Sleep is defined as a naturally occurring state of the body within inhibited sensory activity, reduced metabolic rate and decreased interaction with the surrounding (Jochebed and Priya, 2015). Sleep is an important aspect for a successful academic and economically prosperous career. Sleep disorders can be described as the disruption of the quality or quantity of sleep due to certain disturbances and habits (Aravindh et al., 2018).

Sleep related breathing disorders refers to abnormal respiration during sleep. Sleep related breathing disorders result in improper sleep during night.
which results in depression. There was much research done on the effects of depression in accidents (Chung and Park, 2011). Improper sleep during night and driving to work in morning may lead to various accidents. Orthopnea and paroxysmal nocturnal dyspnea are some and most important sleep related breathing problems.

Orthopnea refers to shortness of breath while lying down. PND awakens the person from sleep due to reverse shortness of breath and is quite frightening. OSA refers to recurrent episodes of partial or complete closure of the upper airway resulting in disturbed breathing while sleeping. This clearly shows OSA results in decreased quality of life. The presence of risk factors such as age, gender and obesity increases the incidence of OSA (Viswanath et al., 2015).

Untreated obstructive sleep apnea leads to various complications. The complications include stroke, coronary artery disease and atrial fibrillation. Many researchers have done research about association between sleep related breathing problems and depression. According to the study, out of 182 patients, 47 suffered from depression with a mean age significantly more than that of the other population and out of 47 depressed patients, 44 had abnormal PSG (a type of sleep study) (Shoib et al., 2017).

Obstructive sleep apnea (OSA) is characterized by repeated airway collapse during sleep (Bowsiya and Kumar, 2020). Nocturnal attended polysomnography is the standard diagnostic modality in determining if a patient has OSA (Padma et al., 2007). The severity of the OSA can also be assessed using apnea-hypopnea index and respiratory distress index (Sunitha and Aravindkumar, 2009). A proper diet and physical activity is very essential for the prevention of many chronic diseases (Uma et al., 2018). Exercise has been proven to improve sleep and helps to overcome depression.

Depression is a serious, chronic disease that can be managed with the chronic care model in primary care settings (Munuswamy et al., 2018). Dental students showed considerable stress symptoms and also showed higher levels of depression (Soh et al., 2017). Most of the physicians would encourage staying physically active to fight disease and doing a physical activity which acts as a stress reliever (Shahroom et al., 2019). Yoga elevates brain neurotransmitter levels like gamma-aminobutyric acid that may help to treat depression and anxiety (Varshini et al., 2018).

OSA is associated with an increased likelihood of hypertension, cardiovascular disease, and diminished quality of life. Hence, it becomes a prime concern for health-care personnel to diagnose it at earliest. Alcohol, sedatives and tranquilizers may also promote sleep apnea by relaxing throat muscles (Gokul, 2016). Sleep deprivation leads to slower brain waves, shortened attention span, higher anxiety, impaired memory, and a bad mood (Ranasinghe et al., 2018). Too little sleep can lead to an increase in body weight by changing levels of the hormones that control satiety and hunger, resulting in overeating, overweight, and obesity (Labh et al., 2018). Previously our team has conducted numerous original studies (Keerthana and Thenmozhi, 2016; Choudhari and Thenmozhi, 2016; Sri ram et al., 2015; Thejeswar and Thenmozhi, 2015) and lab animal studies (Seppan et al., 2018) over the past 5 years (Nandhini et al., 2018; Krishna and Babu, 2016; Subashri and Thenmozhi, 2016; Samuel and Thenmozhi, 2015; Hafeez and Thenmozhi, 2016). Now we are focussing on epidemiological surveys. The idea for this survey stemmed from the current interest in our community (Johnson et al., 2020; Sekar et al., 2019; Pratha and Thenmozhi, 2016; Menon and Thenmozhi, 2016; Kannan and Thenmozhi, 2016).

The aim of the study is to create awareness about depression caused by improper sleep due to breathing disorder. It also aims in creating awareness about the necessity of treatment of obstructive sleep apnea.

MATERIALS AND METHODS

Study setting

This is an online survey based study, conducted among the Chennai population. A Questionnaire was prepared and distributed among people through an online link from the survey planet. This study was approved by the International Review Board.

Sampling

The sample size was 100 people. Sampling method used was simple random sampling. In order to minimise bias randomisation (i.e all variables were included) was done. Internal validity was the pre tested questionnaire. External validity was homogenisation, replication of experiment and cross verification with existing studies.

Data collection

The questionnaire contained 20 questions. Independent variables were demographics such as age, gender. Dependent variables were sleep related breathing problems and depression. The collected results were entered in Microsoft excel.
Data analysis

Data analysis was done using SPSS software. Statistics used for analysis was Descriptive statistics. The Statistical test used for comparison between age and other variables was chi-square test, P<0.05 statistically significant. Graphs were drawn according to the results obtained.

RESULTS AND DISCUSSION

From this online based survey, it was found that 97% people were aware of OSA and 99% of people were aware that untreated OSA could lead to many complications. Individuals with obstructive sleep-disordered breathing (OSDB) commonly report symptoms of depression (Deldin et al., 2006). It is very necessary to study about sleep related breathing problems and depression.

About 59% male and 48% females participated in the survey (Figure 1). Age groups participated in the survey were 25-45 years: 63%; 46-65 years: 37%

Figure 1: Bar graph showing the gender distribution among participants. About 59% male and 48% females participated in the survey

Figure 2: Bar graph showing age distribution among participants. Age groups participated in the survey were 25-45 years: 63%; 46-65 years: 37%

Figure 3: Bar graph showing frequency distribution of breathing difficulties during sleep. 66% of the people experience breathing difficulties and 8% do not experience any breathing difficulties

Figure 4: Bar graph showing frequency distribution of sleep deprivation leading to depression. About 99% of people are aware that sleep deprivation leads to depression

Figure 5: Bar graph showing frequency distribution of people taking antidepressants. 74% people have taken antidepressants and 26% people have not taken antidepressants
Figure 6: Bar graph showing frequency distribution of risk taking leads to accidents. 98% are aware that poor sleep leads to accidents and an increased mortality rate.

Figure 7: Bar graph showing frequency distribution of sleep problems of people. 58% of people have sleep problems and 39% of people rarely have sleep problems.

Figure 8: Bar graph showing frequency distribution of depressed individuals are affected by breathing related sleep problems. About 95% people are aware that depressed individuals are affected by breathing related sleep disorders.

Figure 9: Bar graph showing frequency distribution of awareness of OSA. About 97% of people are aware of OSA.

Figure 10: Bar graph showing frequency distribution of risk factors of OSA. 87% of people are aware that obesity, being older, being male are risk factors of OSA.

Figure 11: Bar graph showing frequency distribution of frustration, sadness among the people. About 57% felt sad or frustrated rarely which are the signs of depression.

Survey were 25-45 years: 63%; 46-65 years: 37% (Figure 2).

66% of the people experience breathing difficulties and 8% do not experience any breathing difficulties (Figure 3). According to a study, 22.7% of men, 15.4% of women had breathing difficulties at least one night per week (Wheaton et al., 2005). About 99% of people are aware that sleep deprivation leads to depression (Figure 4).
Figure 12: Bar graph showing frequency distribution of sleeping pill being the reason for depression. 94% of people are aware that sleeping pills result in depression.

Figure 13: Bar graph showing frequency distribution of alcoholism causing sleep problems and depression. 98% of people are aware that alcoholism makes depression and sleep apnea worse.

Figure 14: Bar graph showing frequency distribution of symptoms of sleep apnea. About 93% people are aware that symptoms of OSA are attention problems, loud snoring and excessive tiredness.

Figure 15: Bar graph showing frequency distribution of untreated OSA leading to stroke and other complications. 99% of people agree that untreated OSA leads to many complications.

Figure 16: Bar graph showing frequency distribution of age groups more affected by depression. 96% of people agree to the fact that exercise treats sleep apnea and depression.

Figure 17: Bar graph showing frequency distribution of exercise helps in relieving depression and sleep deprivation. 69% of people agree that old aged people are more prone to depression and OSA.
Figure 18: Bar graph showing frequency distribution of untreated depression leads to brain damage. About 99% of people are aware that untreated OSA leads to brain damage.

Figure 19: Bar graph depicts the comparison of age and awareness of people on exercise as away to manage sleep apnea and depression.

Figure 20: Bar graph depicts the comparison of age and participants who had taken antidepressants.

Figure 21: Bar graph depicts the comparison of age and awareness of obstructive sleep apnea.

About 99% of people are aware that untreated OSA leads to many complications (Figure 15). According to a study, comparison between treated OSA and untreated OSA was done and they found that untreated OSA leads to cardiopulmonary complications (Abdelsattar et al., 2015). 96% of people agree to the fact that exercise treats sleep apnea and depression (Figure 16). A similar evidence is seen in a study done by Franz SI, according to whom moderate intensity exercise leads to happier mood and is beneficial for overcoming depression (Craft and 2016).
69% of people agree that old aged people are more prone to depression and OSA (Figure 17). Similar evidence is seen in a study by Duckworth et al. (2005). About 99% of people are aware that untreated OSA leads to brain damage (Figure 18).

The limitation of this study was limited sample size. Other research in similar topics were done in larger sample sizes, for example 788 men aged 40 to 88 years were assessed for sleep apnea and depression (Lang et al., 2017).

In Figure 19, blue colour depicts the participants who agree that exercise as a way to manage sleep apnea and depression and green colour depicts the participants who disagree that exercise as a way to manage sleep apnea and depression. X-axis denotes age and Y-axis denotes the frequency distribution for the response of the question 'Do you know exercise helps in sleep apnea as well as depression'. 59.0% participants aged 25-45 years accept exercise as a way to manage sleep apnea and depression. Using Chi-Square analysis, p=0.118, statistically not significant (p<0.05 considered statistically significant). In Figure 20, blue colour depicts the participants who have taken antidepressants and green colour depicts the participants who have not taken antidepressants. X-axis denotes age and Y-axis denotes the frequency distribution for the response of the question ‘Have you ever taken antidepressants’. 51.0% participants aged 25-45 years have taken antidepressants. Using Chi-Square analysis, p=0.039, statistically significant (p<0.05 considered statistically significant). In Figure 21, blue colour depicts the participants who were aware of obstructive sleep apnea and green colour depicts the participants who were not aware of obstructive sleep apnea. X-axis denotes age and Y-axis denotes the frequency distribution for the response of the question ‘Are you aware of obstructive sleep apnea’. 60.0% participants aged 25-45 years have taken antidepressants. Using Chi-Square analysis, p=0.178, statistically not significant (p<0.05 considered statistically significant).

CONCLUSION

This survey aims in creating awareness among people about sleep related breathing disorder and depression in young adults and aged population. The future scope of this study is to help in diagnosis of sleep related breathing problems and depression.

Conflict of Interest

The authors declare that there is no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

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