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Association of Snoring and Cardiovascular Symptoms - A Survey

Malavika Pradeep[1], Sridevi G[*2], Kavitha S[3]

[1]Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India
[2]Department of Physiology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India
[3]Department of Biochemistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

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ABSTRACT

Snoring is a loud sound that can be produced when air across the relaxed tissues of the throat. The causes of snoring include age, being overweight or out of shape, the way you are built, nasal and sinus problems, sleep posture, alcohol, smoking and medications. The present study was performed to find the association between the habit of snoring and health problems like hypertension, breathlessness, fatigue and chest pain among genders. A self-developed questionnaire to assess the snoring habits of the participants with their underlying health problems. The study was conducted on an online platform and the responses were collected. The datas were collected and analysed with the help of statistical software SPSS version 22 and chi-square test was used as a statistical analysis to find how snoring habit affects the participants based on the gender. The results revealed that male respondents who have the habit of snoring are more related to problems like breathlessness, hypertension, fatigue and chest pain compared to females. This result can be justified by the fact that females have strong hormonal support offered by estrogen that protects them from cardiovascular and respiratory disorders.

*Corresponding Author

Name: Sridevi G
Phone: 9840325676
Email: sridevig.sdc@saveethaa.com

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INTRODUCTION

Snoring is a loud sound that can be produced when air across the relaxed tissues of the throat. The causes of snoring include age, being overweight or out of shape, the way you are built, nasal and sinus problems, sleep posture, alcohol, smoking and medications. Sometimes snoring can also indicate serious health conditions. Sleep habits are greatly associated with increased risk of cardiovascular and systemic diseases. The sleep foundation reports that at least three nights per week Americans about 56% snore and 24% snore nearly every night. From the survey, 8% with symptoms are under the diagnosis of obstructive apnoea (Williams, 2007). Cardiovascular diseases have higher morbidity and mortality found in snorers with risk factors, compared to non-snorers (Zaninelli *et al.*, 1991). A statistically significant risk factor is associated with stroke and coronary heart disease. Habitual snoring appears to increase greater stroke risk among men than those in women (Li, 2014). Loud snoring with breath pauses in contrast with an increased health care utilisation (Dunai, 2008). Researchers found a significant association between sleep apnoea and

unstable blood pressure during sleep with increased risk of cardiovascular disease and mortality among older adults (Endeshaw, 2013; Swathy and Sethu, 2015). Lung function test can be eventually used for evaluating harshness of obstructive airway diseases (Timothy *et al.*, 2019). Snorers can also have a chance of cardiovascular diseases. We can find symptoms such as nasal airway obstruction, obstructed breathing during sleep, snoring, and open mouth breathing in children who have adenoid hypertrophy (Devi and Sethu, 2018). In the case of asthma, obstruction and hindrance in the respiratory tract are reversible (Dave and Preetha, 2016; David *et al.*, 2019).

Our body stature is also a cause of snoring. Obesity and overweight include excessive fat accumulation which has a negative effect on the health of our body and snoring habits (Baheerati and Devi, 2018; Abigail *et al.*, 2019). Consumption of alcohol and medications can also act as factors for snoring. Highly significant relations can be found between BMI and thyroid levels as well (Fathima and Preetha, 2016). Another research finding showed that there had been significant changes in the habit of snoring among males and females as well (Samuel and Devi, 2015).

Modern-day lifestyles have many ill effects on sleeping patterns (Ilankizhai and Devi, 2016). Oropharyngeal exercise helps in the reduction of snoring and its serious health problems such as Obstructive Sleep Apnoea (Shruthi and Preetha, 2018). Many mechanisms have been elucidated correlating snoring might with cardiovascular risk factors (Sands, 2013). Even cerebrovascular disorders are associated with habitual snoring (Smirne, 1993). In women, the risk associated with snoring and its complications are high irrespective of age, smoking, BMI and cardiovascular risk factors. Majority of snorers are not diagnosed with sleep apnoea. Snoring tendency increases the chances of developing hypertension and cardiovascular disease, but this is still under controversy (Hu, 2000).

Disordered and abnormal breathing during sleep is also associated with several health problems like excessive daytime sleepiness and poor sleep quality. Obstructive sleep apnoea is getting widely unrecognized among snorers (Ohayon *et al.*, 1997).

This study is quite necessary for spreading awareness and relation between snoring and cardiovascular diseases. Loud snoring with breath pauses is an indication of increased risk of cardiovascular diseases. Increased awareness makes people understand more about proper sleeping methods, good cardiac health and thus provides a more healthy life. The aim of the present study is to investigate the association linking snoring and related problems related to respiratory and cardiovascular disorders like breathlessness, fatigue, chest pain and hypertension.

MATERIALS AND METHODS

The type of population used for the study was the adult group within the age group between 30 - 40 years. The study population was 100. The inclusive criteria include - no previous history of any neck surgery, nasal obstructions or deviated nasal septum. The exclusive criteria include - Previously diagnosed with any cancer or head, neck, congenital disorders, etc. The sampling method used is random sampling. In a study conducted by Maurice M Ohayon et al., the number of participants is 4972 and sampling method used is random sampling (Ohayon *et al.*, 1997). In a study conducted by Thorarinn Gislason et al., the number of participants is 1524 and the sampling method used is random sampling (Gislason, 1993). In a study conducted by MF Fitzpatrick et al., the number of participants is 1478 and sampling method used is random sampling method (Fitzpatrick, 1993).

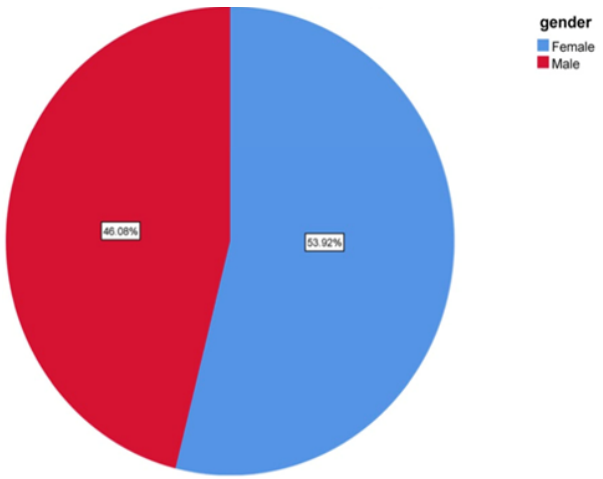

Figure 1: Pie chart represents the responses of the respondents regarding their gender

A self-developed modified questionnaire containing questions that assess the participants age, gender, snoring habits, and symptoms of respiratory and cardiovascular illness. This study was done by administering and circulating the questionnaire on an online platform. The questions are close-ended type mostly. The data collection software used is google forms. The statistical software used is SPSS software version 22 and the statistical test used was chi-square test analysis and the confidence level was $p<0.05$ and the correlation analysis was done between genders for their habit of snoring and

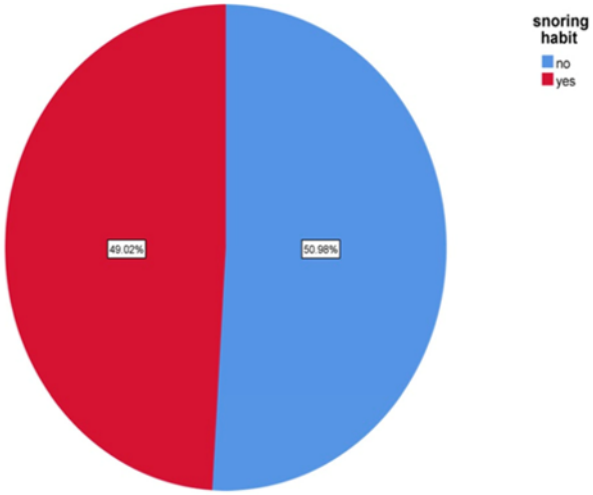

Figure 2: Pie chart represents the responses of the respondents regarding their snoring habit

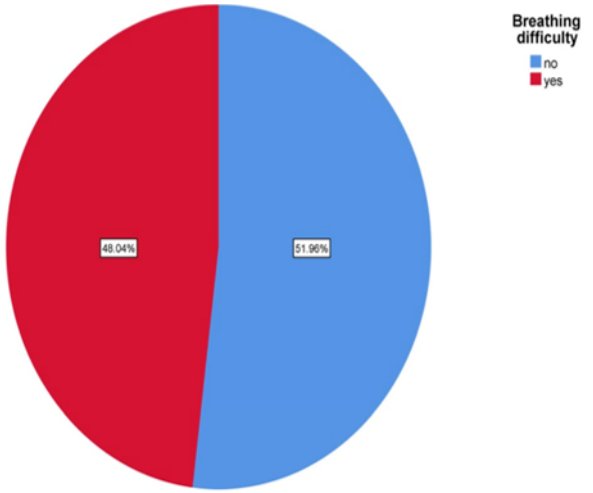

Figure 3: Pie chart represents the responses of the respondents regarding their breathing difficulty

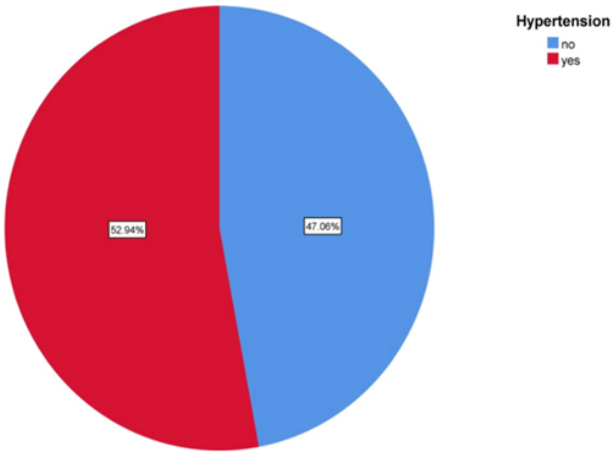

Figure 4: Pie chart represents the responses of the respondents regarding their hypertension

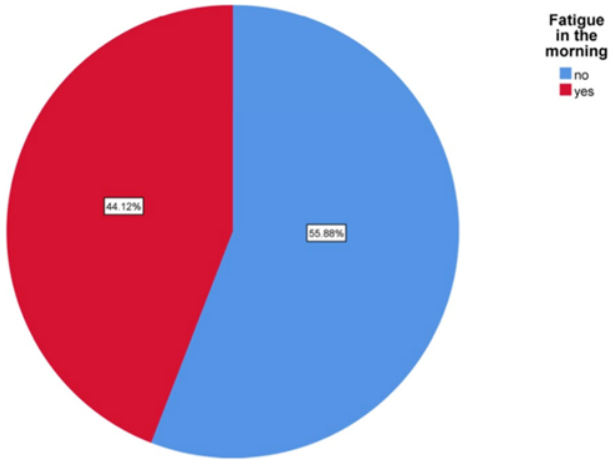

Figure 5: Pie chart represents the responses of the respondents regarding their fatigue in the morning

underlying health-related issues.

RESULTS AND DISCUSSION

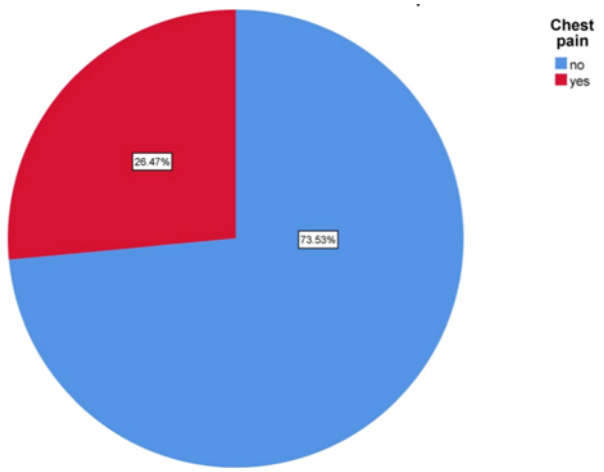

Figure 6: Pie chart represents the responses of the respondents regarding their chest pain

The data of percentage analysis were represented in the form of pie diagrams and Correlation analysis was depicted in the form of bar diagrams. The responses of the following data were then analyzed. 102 responses were received. The result summary is as follows,

As in Figure 1, about 46.08% of participants were female and 53.92% of participants were male.

As in Figure 2, about 49.02% of participants had the habit of snoring as indicated by their family members and 50.98% of participants did not have the habit of snoring. As per Figure 3, about 48.04 % of the participants had breathing difficulty and 51.96 % of participants did not have breathing difficulty.

As in Figure 4, 52.94% of participants had been suf-

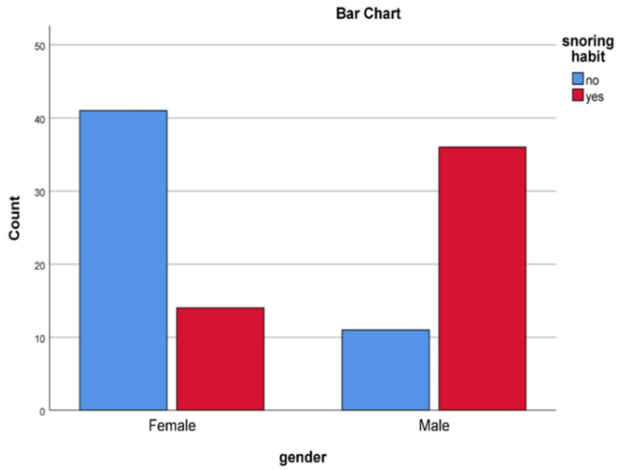

Figure 7: This graph represents the association between gender and the total count of responses on snoring habits

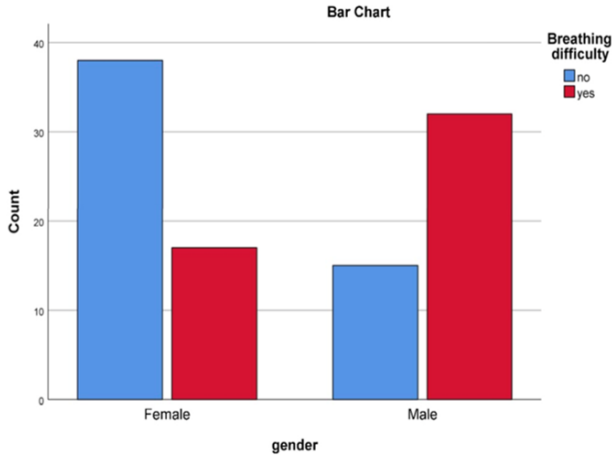

Figure 8: This graph represents the association between gender and the total count of responses on breathing difficulty

fering from hypertension and 47.06% did not suffer from hypertension. As in Figure 5, 44.12% of participants felt difficulty with fatigue ness on getting up from the bed and 55.88% did not have fatigue. As in Figure 6, 26.47% of participants had symptoms of chest pain and 73.53% did not have such symptoms of chest pain.

Correlation analysis between gender and snoring with its health-related issues were analysed. Results showed that the male participants had more habit of snoring compared to females and the result was significant at p= 0.000 (p < 0.001) as in Figure 7. X axis represents gender and Y value represents the number of participants. Out of 49 respondents who have responded yes, 17 of them constitute female and 32 of them constitute male. Hence, males have more snoring habits compared to females. Association between gender and snoring habit was done using Chi-square test, Pearson chi-square value is 26.523 ; p value= 0.000 (<0.05) was found to be statistically significant. Where blue color represents ”no” and red color represents ”yes”

As in Figure 8, most of the male participants suffered from breathlessness compared to female with p-value = 0.000 (p < 0.001).X axis represents gender and Y value represents the number of participants. Out of 50 respondents who have responded yes, 14 of them constitute female and 36 of them constitute male. Hence, males have more snoring habits compared to females. Association between gender and breathing difficulty was done using Chi-square test, Pearson chi-square value =14.032 ; p-value = 0.000: (<0.05) was found statistically significant. Where blue color represents ”no”and red color represents ”yes”

As in Figure 9, the majority of male participants

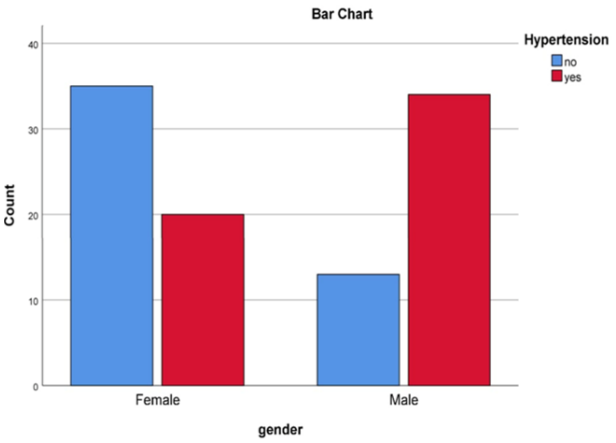

Figure 9: This graph represents the association between gender and the total count of responses on hypertension

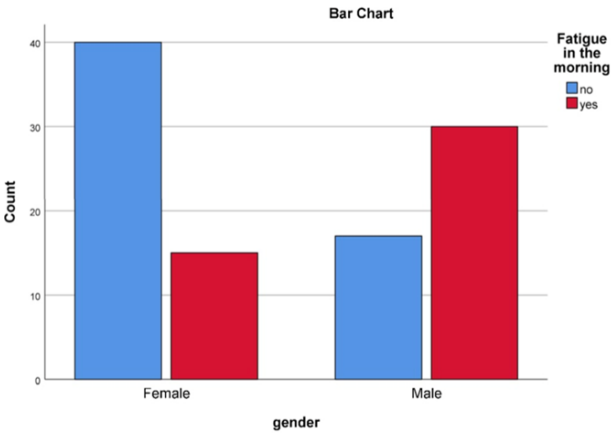

Figure 10: This graph represents the association between gender and the total count of responses on snoring habits

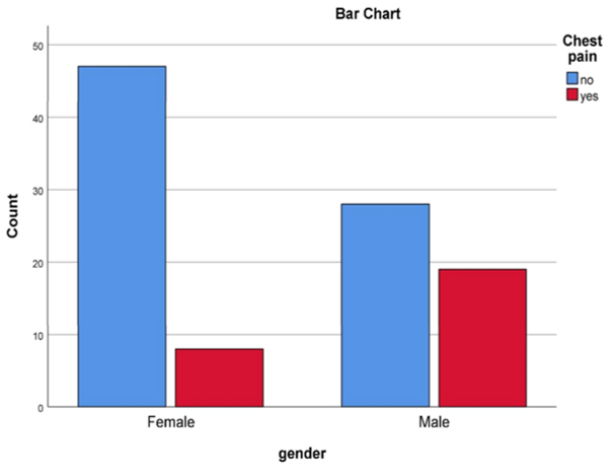

Figure 11: This graph represents the association between gender and the total count of responses on chest pain

were hypertensive compared to females and the result was significant at p=0.000 (p < 0.001). X axis represents gender and Y value represents the number of participants. Out of 54 respondents who have responded yes, 20 of them constitute female and 34 of them constitute male. Hence, males have more hypertension compared to females. Association between gender and hypertension was done using Chi-square test, Pearson chi-square value = 13.167 ; p-value = 0.000 (<0.05) was found to be statistically significant. Where blue color represents ”no” and red color represents ”yes”

As in Figure 10 majority of male participants felt fatigued getting up in the morning compared to females with significance p = 0.000 (p < 0.001). X axis represents gender and Y value represents the number of participants. Out of 45 respondents who have responded yes, 15 of them constitute female and 30 of them constitute male. Hence, males have more fatigue in the morning compared to females. Association between gender and fatigue in the morning was done using Chi-square test, Pearson chi-square value = 13.738;p-value = 0.000 (<0.05) was found to be statistically significant. Where blue color represents ”no” and red color represents ”yes”

As in Figure 11, more male participants suffered from chest pain compared to females with a p-value at 0.003 and the result was insignificant. X axis represents gender and Y value represents the number of participants. Out of 27 respondents who have responded yes, 8 of them constitute female and 19 of them constitute male. Hence, males have more snoring habits compared to females. Association between gender and chest pain was done using Chi-square test,Pearson chi-square value = 8.721; p-value = 0.000(<0.05) was found to be statistically significant. where blue color represents ”no” and red color represents ”yes”.

Noisy breathing is caused by a partial blockage or narrowing some point in airways. Snoring itself is a respiratory problem which is caused by partial closing of the upper respiratory tract. Snoring can also cause serious effects on respiratory health. Loud snoring frequently and waking up in the middle of the sleep due to breathlessness are signs of Obstructive Sleep Apnoea. In the present study, more male participants felt tired and fatigued after getting up from sleep. This is inconsistent with the previous findings by (Chapman, 2011).

Snoring can be caused due to bulky throat tissue, blocked nasal airways, poor muscle tone in throat and tongue, sleep deprivation, drug and alcohol intake, etc. It causes disturbances like somnambulism, impaired quality of sleep and poor night's sleep.

Tiredness after sleeping is caused due to less sleep at night. Less sleep may be due to sleep disturbances. Snoring leads to fragmented and unrefreshing sleep which causes poor daytime function, tiredness and sleepiness. Snoring also has its effects on cardiovascular diseases - Obstructive sleep apnoea increases the risk of stroke, recurrent heart attack and abnormal heartbeat such as atrial fibrillation (Lessov-Schlaggar, 2008).

A study by Zaninelli et al, 1991 showed an increase in morbidity and mortality in patients who are snorers and the risk of cardiovascular disease is more compared to non-snorers.Snoring also worsens the prognostic value of treatment in patients suffering from cardiovascular disorders. Snoring and Obstructive sleep apnoea may lead to impaired cardiac function in women compared to men (Westreich *et al.*, 2019). Sleep apnoea is at risk for developing hypertension. These findings are consistent with our present study.

CONCLUSION

The present study analysed the association between the habit of snoring and cardiovascular and respiratory parameters. The results of the study revealed that most male respondents had the habit of snoring and they experienced breathlessness, fatigue, chest pain and they were hypertensive compared to female respondents.

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

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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