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Research Article

Snoring among Postgraduate Students in a Tertiary Institution, Southwest Nigeria

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ABSTRACT

Snoring, a symptom of disordered breathing during sleep, is increasingly becoming a major public health concern. A significant correlation has been found between snoring and cardiovascular diseases; unfortunately, it remains under-diagnosed in general population. This study sought to determine the prevalence of snoring, knowledge and perception of health risks associated with it among postgraduate students of a tertiary institution in Southwestern Nigeria. Using multi stage sampling technique, 300 postgraduate students of the University of Ibadan were selected. A self-administered questionnaire, was used to collected data on their socio-demographic characteristics, knowledge and perception of snoring, its health risks and snoring patterns. A 21-point, 12-point, 15-point and 12-point scales was used to measure knowledge of snoring, knowledge of its health risks, perception related to snoring and perception of its health risks respectively. Scores ≥15, ≥9, ≥9 and >6 were cut-offs for good knowledge of snoring, knowledge of its health risks, perception related to snoring and perception of its health risks, respectively. Descriptive and inferential statistics were used to analyse the data at $\alpha_{0.05}$. Respondents age was 27.2±4.3 years and 53.3% were males. Knowledge of snoring was good among 53.3% of respondents, 13.3% had a good knowledge of health risks associated with snoring, 71% had good perception of snoring while 43% had good perception of health risks associated with snoring. Prevalence of snoring was 31.3% and was significantly higher among males (36.9%) than females (25.2%). The level of knowledge of health risks associated with snoring is inadequate indicating a need for increased awareness on health risks associated with snoring among adults in Nigeria.

Keywords: *Snoring, adults, health risks, knowledge, perception*

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INTRODUCTION

Snoring is a loud and jarring noise produced by the joint vibration of tongue and soft palate as a result of the obstructed breathing while sleeping is a under diagnosed and under reported condition in the general population (Zhang et al, 2016; Blunden et al, 2004). It is a common sleep problem associated with significant morbidity and mortality risk factors making it a major public health concern (Akintunde et al, 2014).

Lots of studies in recent years showed that habitual snoring is significantly associated with many cardiovascular disorders including atherosclerosis, hypertension, coronary heart disease, congestive heart failure, stroke, erectile dysfunction and impaired glucose tolerance/diabetes mellitus (Zhang et al 2016, Akintunde 2013, Qiu et al, 2009, Li et al 2012; Nagayoshi et al, 2012; Yaggi et al, 2005, Hu et al, 2000).

Snoring may occur as a result of the presence of other cardiovascular risk factors e.g obesity, smoking and alcohol intake (Adewole et al, 2008; Sogebi et al, 2011, Adebusoye et al, 2014). Other factors associated with snoring include male sex, increasing age, family history of snoring (Sogebi et al, 2011; Adebusoye et al, 2014, Khoo et al, 2004). Increase in obesity in Sub-Saharan Africa and developing countries has being directly correlated with increased sleep disordered breathing especially among adults (GBD Obesity Collaboration, 2013).

Globally, the prevalence of snoring ranged between 16 to 89% (males 24 - 50% and females 14 – 30%) (Davey, 2014). The prevalence of snoring among adults in Nigeria ranges from 30% to about 45% and was higher among men than women (Akintunde et al, 2014; Adewole et al, 2008).

Increased knowledge is said to help individuals make healthy choices regarding habits which will lead to behaviour change (Cai et al, 2013). It is important to create awareness of health risks associated with snoring so that it will be seen as more than a mere disturbance.

Despite the increased studies on health implications of snoring, there is scarcity of data on studies that have evaluated the knowledge and perception of the health implications of snoring among postgraduate students in Nigeria. Hence the need for this study which determined the knowledge of snoring, knowledge of health risks associated with snoring, perception of the health implications of snoring and the prevalence of snoring among postgraduate students in Nigeria.

MATERIALS AND METHODS

Study Design, Sampling and Data Collection Procedure

This was a cross-sectional study conducted between September and November 2017 among postgraduate students of the University of Ibadan, Nigeria. Using multi-stage sampling technique, participants for this study were recruited from one department randomly selected from each of all the thirteen faculties in the institution.

The minimum sample size of 300 required for the study was obtained using the Kish-Leslie formula (Kasiulevicius et al, 2006) for estimating sample size for a single proportion; using a prevalence of snoring according to Desalu *et al*., (2016), among adults in Nigeria who were aware that snoring is a medical problem of 22.7%. Post graduate students who were present in the lecture room at the time of the study and consented to participate in the study were recruited.

Data was collected using a pretested semi-structured questionnaire containing questions on respondents' demographics, knowledge and perception related to snoring. The Berlin questionnaire for sleep apnea (Netzzer et al, 1999) was adapted to determine the prevalence of snoring, while scales of measurements were developed to measure knowledge and perception ratings.

Data Analysis

Statistical analysis was carried out using descriptive and inferential statistics and summarized as means ± standard deviation, frequencies and percentages; Chi square test was carried out to assess the relationship between the dependent and independent variables and $p < 0.05$ was considered to be statistically significant.

Ethical Approval

Ethical approval was obtained from the University of Ibadan/ University College Hospital Ethics Review Committee. Participants were given full details of all information related to the research and Informed consent was obtained from each participant.

RESULTS

The socio-demographic characteristics of the respondents is shown in Table 1; mean age was 27.3 ± 4.4 years. Age-wise distribution of the respondents showed the highest proportion, 77.3% was within the 20-29 years age group. Many (52.3%) of the respondents were male and 90.7% of them were not married.

Majority of the respondents 295 (98.3%) had heard of snoring and 240 (80%) had heard of sleep disorder. The overall mean knowledge score was 14.3 ±3.7 and 53.3% of the respondents had a good knowledge of snoring. Specifically, 73.3% had a good knowledge on causes of snoring while 64.3% had good knowledge of the types of sleep disorder. These are shown in Tables 2a and 2b below respectively.

Table 1:
Socio-Demographic Characteristics of the Respondents (N=300)

Socio-demographic variables	Frequency	(%)
Sex:		
Male	157	52.3
Female	143	47.7
Age*(in years)		
20-29	246	77.3
30-39	44	14.3
40-49	10	3.3
Marital status:		
Single	271	90.3
Married	29	9.7
Religion:		
Christianity	274	91.3
Islam	26	8.7
Ethnic group:		
Yoruba	240	80
Igbo	20	6.7
Hausa	8	2.7
**Others	32	10.6
Programme:		
PhD	6	2.0
MPH	23	7.7
M.Sc	189	63.0
MA	40	13.3
MLIS	42	14.0
Department		
Animal science	36	12.0
Biochemistry	14	4.7
Computer Science	44	14.7
Human Nutrition	25	8.3
Industrial & Production Engineering	30	10.0
Law	8	2.7
Dental Science	1	0.3
Library archival & information studies	49	16.3
Nursing	4	1.3
Pharmacognosy	5	1.7
Psychology	39	13.0
Religious studies	40	13.3
Theriogenology	5	1.7
Presently working		
Yes	71	23.7
No	229	76.3

*****Mean age = 27.3 ± 4.3 years **Others include Anang (0.7%), Bini (0.7%), Delta (0.3%), Edo (2%), Efik (0.7%), Esan (0.3%), Ibibio (1.7%), Igala (1.7%), Ikwerre (0.3%),Kanuri (0.3%), Tiv (0.3%), Urhobo (0.7%), Ukroani (0.7%).

Table 2a: Respondents' knowledge of snoring (N=300)

Knowledge of snoring	Frequency	Percent
Have you ever heard of snoring		
Yes	295	98.3
No	5	1.7
What do you understand by snoring?		
Poor	72	24.0
Fair	58	19.3
Good	170	56.7
Ever heard of sleep disorder		
Yes	240	80.0
No	60	20
Knowledge of sleep disorder		
Poor	127	42.3
Fair	102	34.0
Good	71	23.7
CAUSES OF SNORING:		
Inconvenient sleeping condition		
Yes	273	91.0
No	27	9.0
Use of sleeping pills		
Yes	124	41.3
No	176	58.7
Inadequate sleep		
Yes	192	64.0
No	108	36.0
Overweight		
Yes	274	91.3
No	26	8.7
Nasal Congestion		
Yes	283	94.3
No	17	5.7
Stressful activities during the day		
Yes	272	90.7
No	28	9.3
Alcohol consumption		
Yes	187	62.3
No	113	37.7
Consumption of fatty foods		
Yes	150	50.0
No	150	50.0
The cause of snoring varies		
Yes	269	89.7
No	31	10.3
The cause of snoring can't be known		
Yes	217	72.3
No	83	27.7

Table 2b:
Respondents' knowledge of types of sleep disorder (N=300)

Variables	Response	n	%
Sleep Apnea	Yes	124	41.3
	No	31	10.3
	Don't know	145	48.3
Insomnia	Yes	243	81.0
	No	24	8.0
	Don't know	33	11.0
Snoring	Yes	214	71.3
	No	39	13.0
	Don't know	47	15.6
Sleep walking	Yes	222	74.0
	No	29	10.7
	Don't know	49	15.3

Mean Knowledge Score (KS) = 14.3±3.7, Minimum KS = 1.0, Maximum KS = 21.0

As shown in table 3, from a list of twelve (12) health conditions, responses showed that diabetes (79.0%), hypertension (64.0%), stroke (73.3%), heartburn (75.3%), coronary heart disease (58.5%), reduced mental function (67.7%), were not perceived health risks associated with snoring. In all 13.3% of respondents had good knowledge of health risks associated with snoring, 36.3% had fair knowledge and 50.3% had poor knowledge of health risks associated with snoring

Table 3:
Respondents' knowledge of health risks associated with snoring (N=300)

Health risks	Frequency (N)	Percent (%)
Diabetes		
Yes	63	21.0
No	237	79.0
Flabby Skin		
Yes	198	66.0
No	102	34.0
Hypertension		
Yes	108	36.0
No	192	64.0
Daytime sleepiness		
Yes	114	38.0
No	186	62.0
Headache		
Yes	125	41.7
No	175	58.3
Stroke		
Yes	80	26.7
No	220	75.3
Heartburn		
Yes	74	24.7
No	226	75.3
Diarrhoea		
Yes	223	74.3
No	77	25.7
Obesity		
Yes	180	60.0
No	120	40.0
Coronary Heart Disease		
Yes	125	41.7
No	175	58.3
Reduced mental function		
Yes	97	32.3
No	203	67.7
Mood swing		
Yes	85	28.3
No	215	71.7

Average KS = 4.9±2.8, Minimum KS = 0.0, Maximum KS = 12.0

Table 4 showed the varied perception of respondents regarding health risks associated with snoring; 54.0 % of them perceived that visiting the clinic to complain about snoring is important, 72.3% perceived that snoring affects sleep quality, 42.3% agreed that snoring is a sign of future health risks and 59.0% agreed that snoring should be treated as a medical problem. On a 12-point perception scale, 43.0% had good perception of the health risks associated with snoring.

As shown in Table 5; 31.3% of respondents reported being told they snore and 15.7% of this admitted that they snore; thus, the prevalence of snoring is taken as 31.3% of the respondents.

Table 4:
Respondents' perception of health risks associated with snoring

Perception Statements	Agree N (%)	Disagree N (%)
It is important to visit the clinic to complain about snoring	162 (54.0)	138(46.0)
Snoring is a sign of having a good night rest	52 (17.3)	248 (82.7)
Habitual snoring can lead to stroke	51(17.0)	249 (83.0)
Damage of the blood vessels in the throat can be caused by snoring	121 (40.3)	179 (59.7)
Tiredness during the day can be caused by snoring	220 (73.3)	80 (26.7)
Snoring is not good for the heart	144 (48.0)	156 (52.0)
Snoring affects sleep quality	217 (72.3)	83 (27.7)
Snoring is just a social problem	159 (53.0)	141 (47.0)
Snoring is a sign of future health risks	127 (42.3)	173 (57.7)
High Blood Pressure in the morning can be caused by snoring	82 (27.3)	218 (72.7)
Habitually snorers are at risk of various heart diseases	126 (42.0)	174 (58.0)
Snoring should be treated as a medical problem	177 (59.0)	123 (41.0)

Average PS = 4.9±2.8; Minimum PS = 0.0, Maximum PS = 12.0

Table 5:
Prevalence and Pattern of snoring among respondents (N=300)

Variable	Frequency (N)	Percent (%)
Do you Snore (n=300)		
Yes	47	15.7
No	215	71.7
Don't Know	38	12.7
Someone ever told you that you snore (n=253)		
Yes	47	18.6
No	206	81.4
Total reported snoring (n = 94)		
Snores	47	15.7
Told snores	47	15.7
Don't snore	203	67.6
Frequency of snoring (n=94)		
Once in a while	47	50.0
3-4 times per week	6	6.4
Almost every day	6	6.4
Don't know	35	37.2
Loudness of sound		
Louder than breathing	43	45.7
As loud as speaking	8	8.5
Louder than normal speaking	1	1.1
It can be heard in the next room	5	1.7
Don't know	37	5.3
Snoring ever bothered other people		
Yes	24	25.5
No	27	28.7
Don't know	43	45.7

Table 6: Percentage Distribution of Respondents according to Knowledge of snoring by Socio-demographic Characteristics

Background characteristics	Knowledge of snoring score Good N (%)	Poor N (%)	Total	X_2 Value (p - value)
Total			**300**	
Sex:				**0.311 (0.577)**
Male	113 (72.0)	44 (28.0)	157	
Female	107 (74.8)	36 (25.2)	143	
Age*(in years)				**5.526 (0.063)**
20-29	187 (76.0)	59 (24.0)	246	
30-39	26 (59.1)	18 (40.9)	44	
40-49	7 (70.0)	3 (30.0)	10	
Marital status:				**0.313 (0.576)**
Single	200 (73.8)	71 (26.2)	271	
Married	20 (69.0)	9 (31.0)	29	
Religion:				**0.245 (0.621)**
Christianity	202 (73.7)	72 (26.3)	274	
Islam	18 (69.2)	8 (30.8)	26	
Ethnic group:				**0.554 (0.907)**
Yoruba	176 (73.3)	64 (26.7)	240	
Igbo	15 (75.0)	**5 (25.0)**	20	
Hausa	5 (62.5)	**3 (37.5)**	8	
**Others	24 (75.0)	8 (25.0)	24	
Programme:				**2.179 (0.703)**
PhD	5 (83.3)	1 (16.7)	6	
MPH	16 (69.6)	7 (30.4)	23	
M.Sc	143 (75.7)	46 (24.3)	189	
MA	28 (70.0)	12 (30.0)	40	
MLIS	28 (66.7)	14 (33.3)	42	
Presently working				**11.556 (0.001)**
Yes	41 (57.7)	30 (42.3)	71	
No	179 (78.2)	50 (21.8)	229	

Table 7:
Percentage Distribution of Respondents according to prevalence of snoring by Socio-demographic Characteristics

Background characteristics	Prevalence snoring score Yes N (%)	No N (%)	Total	X_2 Value (p - value)
Total			**300**	
Sex:				**4.817 (0.028)**
Male	58 (36.9)	99 (63.1)	157	
Female	36 (25.2)	107 (74.8)	143	
Age*(in years)				**1.957 (0.376)**
20-29	77 (31.3)	169 (68.7)	246	
30-39	12 (27.3)	40 (90.9)	44	
40-49	5 (50.0)	5 (50.0)	10	
Marital status:				**0.001 (0.971)**
Single	85 (31.4)	186 (68.6)	271	
Married	9 (31.0)	20 (69.0)	29	
Religion:				**0.257 (0.612)**
Christianity	87 (31.8)	187 (68.2)	274	
Islam	7 (26.9)	19 (73.1)	26	
Ethnic group:				**6.598 (0.086)**
Yoruba	68 (28.3)	172 (71.7)	240	
Igbo	8 (40.0)	12 (60.0)	20	
Hausa	5 (62.5)	3 (37.5)	8	
**Others	13 (40.6)	19 (59.4)	32	
Programme:				**2.210 (0.697)**
PhD	3 (50.0)	3 (50.0)	6	
MPH	8 (34.8)	15 (65.2)	23	
M.Sc	56 (29.6)	133 (70.4)	189	
MA	15 (37.5)	25 (62.5)	40	
MLIS	12 (28.6)	30 (71.4)	42	
Presently working				**0.264 (0.608)**
Yes	24 (33.8)	47 (66.2)	71	
No	70 (30.6)	159 (69.4)	229	

Reported frequency of snoring were once in a while (15.7%), 3-4 times per week (2%), everyday (2%) and 11.7% don't know the frequency of their snoring. The prevalence of snoring was significantly higher in males (36.9%) than females (25.2), p=0.028.

The total score of knowledge of snoring among the respondents in relation to their socio-demographics respondents as shown in table 6 revealed a significant association in only their working status at chi- square =11.556 (p=0.001). The association among other variables although not significant are shown in the same table. Table 7 showed the relationship of socio-demographic variables of respondents and the prevalence of snoring among them. A significant association was observed in the respondents' sex ($\mathbf{X_2}$ = 4.817 (p = 0.028))

DISCUSSION

The sparseness of studies related to snoring and its perceived health consequences especially among university students in Nigeria makes this study very important and of great relevance for all form of interventions (especially corrective) that could be targeted at this and diverse populations.

The prevalence of snoring in this study population was 31.2%, it is lower than prevalence reported in in Brazil (Stefanini et al, 2012) and China (Shih-An and Chia-Yee, 2004) with 42.80% and 46.80% respectively but almost equivalent to that reported among French males of 32% (Marin et al, 1997). Also, as shown in the study by Ogunkeyede, Fasunla, Arulogun and Lasisi, (2014); more males reported snoring. Majority of respondents showed inadequate knowledge of sleep related disorders especially with regards to sleep breathing disorder (sleep apnea) which predisposes people to snoring. In a study which was carried out among graduating medical students in some Nigerian universities, it was discovered that they had low knowledge of sleep apnea and its epidemiology, diagnosis, and management (Ozoh et al, 2015, Sivagnanam et al, 2004). This study thus corroborates this finding and the need for an intervention.
This study revealed that respondents' knowledge of health risks associated with snoring was poor; they could not associate snoring with cardiovascular diseases. However, they could only identify obesity as health risk associated with snoring. These findings correspond with that of Sivagnanam et al., and Ozoh et al., who reported that final year medical students had low knowledge of health risks associated with sleep breathing disorders (Ozoh et al, 2015, Sivagnanam et al, 2004).

With regards to treatment, many of the respondents agreed that snoring should be treated as a medical condition. This is unlike the study conducted among patients in a Nigerian hospital where 77.3% of respondents were not aware that

snoring was a medical problem (Desalu et al, 2016). In this study, many of the respondents believed that it is important to report snoring at the clinic. This finding is contrary to a study conducted among hospitalized adult patients in Nigeria where only 4.5% reported snoring to their doctors (Desalu et al, 2016). The poor perception of health risks associated with snoring was also implicated and was mainly due to respondents not perceiving snoring to be a contributing factor to hypertension and coronary heart diseases.

The overall prevalence of snoring obtained in this study was reported among only a third of the respondents, it was perceived high enough to necessitate health interventions. The prevalence of snoring among respondents was found to be significantly higher among males than females. The prevalence of snoring obtained in this study is comparable to results obtained in a study carried out among hospitalized adult patients in Nigeria (Desalu et al, 2016) and unhospitalised adults in Nigeria by Adewole et al (2008). However, it is lower than that reported among adult population in a study conducted in Dubai, UAE (Shih-An and Chia-Yee, 2004) which also confirmed higher prevalence among males than females. Also, higher prevalence of snoring in male adults has been consistently observed in many studies Patel et al. (2008), Adewole et al (2008), Chaikh et al, (2016), and Shin et al (2003).

In conclusion, snoring is a common sleep disorder among adults in Nigeria yet there is poor knowledge of its health implications. Therefore, there is need for health education to enlighten the people on the health risks associated with snoring so as to increase the quality of life of adults in Nigeria.

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