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# Factor associated with snoring and sleep disturbance among students of Majmaah University

*Factor asociado a los ronquidos y a los trastornos del sueño entre los estudiantes de la Universidad de Majmaah*

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## Abstract

***Background:*** Sleep apnea is the medical condition related to sleep of the individual. It is considered as one of the serious disorder where the person's breathing is interrupted during sleep. According to numerous studies it is seen that prevalence of sleep apnea is more among medical students as compared to other students. This study has aimed to know about factors of sleep apnea on the basis of the occurrence of snoring and sleep disturbance among the medical student of various colleges under Majmaah University.
***Material and method:*** It is a cross-sectional study conducted among 298 students aged 18-25 years studying in various colleges under Majmaah University. The sample was randomly selected using Simple random sampling method. Data collection was done using questionnaire based on Epworth-sleepiness scale and analyzed using SPSS version 18. Both descriptive and inferential statistics were used to obtain the required results.
***Results:*** In this study the mean age of the students was 21.9, while the mean height and weight of the student were 165.25 cm and 64.74 kg, respectively. The prevalence of snoring among the respondents was 14%. There is significant association between the sex of the respondent and forgetfulness in the daytime (P=0.027) reportedly more in female compared to male. Disorientation of time, place and time person (p=0.028) was statistically significant with the age group. Almost half (43.3%) of the 18-20 reported feeling disoriented, while only 4.3% of age 23 and more reported disorientation. Similarly, a significant association was seen between the respondent's frustration during routine activities and their age group (p=0.008), where 70% of the students of age group 18-20 reported feeling frustrated during routine activities.
***Conclusion:*** This study concludes that there is prevalence of sleep apnea among the medical student where snoring is one of the major issue in which due to the sleep disorder individual are usually frustrated and disoriented. Maintaining healthy lifestyle could be the solution but if condition worsens seeking medical help is must.

*Key words:* Sleep Apnea, snoring, sleep disturbances, medical students.

## Resumen

***Antecedentes:*** La apnea del sueño es una condición médica relacionada con el sueño del individuo. Se considera uno de los trastornos graves en los que la respiración de la persona se interrumpe durante el sueño. Según numerosos estudios, se observa que la prevalencia de la apnea del sueño es mayor entre los estudiantes de medicina en comparación con otros estudiantes. El objetivo de este estudio es conocer los factores de la apnea del sueño en función de la incidencia de los ronquidos y las alteraciones del sueño entre los estudiantes de medicina de varias facultades de la Universidad de Majmaah.
***Material y método:*** Se trata de un estudio transversal realizado entre 298 estudiantes de 18 a 25 años que estudian en varias facultades de la Universidad de Majmaah. La muestra se seleccionó aleatoriamente mediante el método de muestreo aleatorio simple. Los datos se recogieron mediante un cuestionario basado en la escala de somnolencia de Epworth y se analizaron con el programa SPSS versión 18. Se utilizaron técnicas estadísticas descriptivas e inferenciales para obtener los resultados requeridos.
***Resultados:*** En este estudio la edad media de los estudiantes fue de 21,9 años, mientras que la altura y el peso medios del estudiante fueron de 165,25 cm y 64,74 kg, respectivamente. La prevalencia del ronquido entre los encuestados fue del 14%. Existe una asociación significativa entre el sexo del encuestado y el olvido durante el día (P=0,027), que se registra más en las mujeres que en los hombres. La desorientación de tiempo, lugar y persona (p=0,028) fue estadísticamente significativa con la edad. Casi la mitad (43,3%) de los de 18 a 20 años informaron de que se sentían desorientados, mientras que sólo el 4,3% de los de 23 años o más informaron de desorientación. Del mismo modo, se observó una asociación significativa entre la frustración de los encuestados durante las actividades rutinarias y su grupo de edad (p=0,008), donde el 70% de los estudiantes del grupo de edad de 18 a 20 años declararon sentirse frustrados durante las actividades rutinarias.
***Conclusiones:*** Este estudio concluye que existe una alta prevalencia de la apnea del sueño entre los estudiantes de medicina y que los ronquidos son uno de los principales problemas que provocan frustración y desorientación. Mantener un estilo de vida saludable podría ser la solución, pero si la condición empeora, es necesario buscar ayuda médica.

*Palabras clave:* Apnea del sueño, ronquidos, trastornos del sueño, estudiantes de medicina.

## Introduction

Sleep disorders is the problems which is related to irregularity of sleep which include the quality, timing, the amount, and which also results in daytime distress and functional impairment. There are different types of sleep- disorders among which the most conjoint disorders include narcolepsy, restless leg-syndrome, insomnia, and obstructive sleep apnea. Sleep disorders are usually linked with either some medical conditions or various mental issues, such as depression, anxiety or any other cognitive disorders[1]. Sleep apnea is a considered as one of the serious sleep disorder that happens when a person's breathing is interrupted during sleep. It occurs if the upper airway becomes repeatedly blocked during their sleep which reduces or stoops the airflow. The most common symptoms are excessive daytime sleepiness, fatigue, decreases in attention, alertness, concentration, decreased motor & verbal skill, visual-spatial memory, dry mouth, and headache and some other symptoms such as sexual dysfunction creating decreased sexuality, more urination during night are some additional[2].

According to Hypopnea Index (AHI), Globally, the prevalence of sleep apnea ranged from 9% to 38% and was higher in men, likewise it is also found increased to 90% in men and 78% in women. The prevalence is the condition is seen more in obese population[2]. In the Western world, the prevalence is associated "EDS (excessive daytime sleepiness)", ranging from 3%-7% in men and 2%-5% in women which is similar in "middle east and Asian nations"[4].

There are various studies conducted among university students which highlight the risk of sleep apnea and its association with their decreased academic performance. The major challenges seen among college student includes the sleep deprivation and daytime sleepiness which further results for their lower grades, academic failure, learning compromise, mood impairment, and motor vehicle accident risk[5].

The overall objective of this study is to know about sleep apnea on the basis of the occurrence of snoring and sleep disturbance among the medical student of various colleges under Majmaah University. Besides the study also aims to find out its association with the socio-demographic profile of the students and also assess the responsible factors.

## Research Methodology

It is a cross-sectional study conducted among 298 students aged 18-25 years studying in various colleges under Majmaah University. In this study simple random sampling method was used where the required sample were randomly selected through excel generated random number.

For the collection of data questionnaire relating to Epworth, sleepiness scale (ESS) was used. The ESS is kind of self-administered questionnaire having total of eight questions relating with eight different activities engaged for falling asleep[6]. The scoring and rating was done to obtain the required results. Besides, an anthropometric measurement for neck circumference was also performed as the part of data collection of the study. The collected data were analyzed using SPSS version 18. For the data analysis, both descriptive and inferential statistics were used wherein interpretation of association was based on the obtained p-value. Before every data collection, participants were informed about the procedure and purpose of the study, followed by obtaining written consent where confidentiality of participants' identity and information were highly ensured.

## Results

Among the 298 respondents selected for the study, sixty percent were aged 21-23, followed by the age group 18-20(30%). Less than 10% of the respondent were aged 23 and above. The mean age of the students was 21.9, while the mean height and weight of the student were 165.25 cm and 64.74 kg, respectively. Among 205 students whose data was available, the mean neck circumference of the respondent was 20.45.

### Snoring:

In this study snoring among the total respondents was found to be 14%. Detail of snoring among those who snore is given in the **table I**.

According to the **table I** among the respondents who snored, 67% of respondents snored slightly louder than breathing, while 14% responded that they snored as loud as talking. Moreover, 28% of the respondents snored 1-2 times a month, followed by 23% who snored 1-2 times a week, 21% nearly every day. More than half of the respondents (55.8%) reported that changing position actually helps to get relive from snoring, 4.7% who were not relieved of snoring by changing position. Almost two-thirds (72%) of respondents reported that they have not noticed that they quit breathing during their sleep, while 7% of the respondent have noticed that they quit breathing during their sleep nearly every day and 1-2 times a week each. Furthermore, more than half of the respondents (58%) have never woken up in the night due to nasal congestion, followed by 18.6% who woke 1-2 times a month, 9.3% that woke 3-4 times a week, and 7% who woke 1-2 time and 7% nearly every day. Similarly, about half of the respondents (48.8%) have never woken up in the night with sudden breath-holding, gasping, or choking sensation, followed by 32.6% who woke 1-2

times a month, 9.3% that woke 1-2 times a week and 9.3% who woke nearly every day. Among the respondent who reported snoring, one-third of them (74.4%) reported having someone in their family that snored.

## Sleep disturbances

According to **table II**, 23.5% of the respondents reported that they feel tired or fatigued after sleep 1-2 times a week, followed by 1-2 times a month (21.8%), nearly never or never (21.8%), 3-4 times a week (16.8%) and nearly every day (16.1%). Similarly, one-fourth of the respondents reported that they nearly never feel tired or fatigued at their waking time while 25.2% reported that they feel tired or fatigued at their waking time 1-2 times a month (25.5%), followed by nearly every day (22.5%), 1-2 times a month (15.4%), and 3-4 times a week (11.4%). About 21.5% of the respondent have nodded off or fallen asleep while driving a vehicle. Among them, 53% reported that this occurs 1-2 times a month, while 32.8% reported nearly never. Approximately 6% of these respondents reported nodding off while driving 1-2 times a week, followed by 4.7% 3-4 times a week, while 3.1% reported nodding off nearly every day.

**Table I:** Detail of snoring.

| Categories | Frequency (n-43) | Percent (%) |
|---|---|---|
| **Kind of Snoring** | | |
| As loud as talking | 6 | 14.0 |
| Louder than talking | 2 | 4.7 |
| Slightly louder than breathing | 29 | 67.4 |
| Very loud - can be heard in adjacent rooms | 3 | 7.0 |
| Not applicable | 3 | 7.0 |
| **Frequency of snoring** | | |
| Nearly every day | 9 | 20.9 |
| 1-2 times a week | 10 | 23.3 |
| 3-4 times a week | 3 | 7.0 |
| 1-2 times a month | 12 | 27.9 |
| Never or nearly never | 9 | 20.9 |
| **Change in the position to relive snoring** | | |
| Yes | 24 | 55.8 |
| No | 2 | 4.7 |
| Don't know | 17 | 39.5 |
| **Frequency of nasal congestion during sleep** | | |
| Nearly every day | 3 | 7.0 |
| 1-2 times a week | 3 | 7.0 |
| 3-4 times a week | 4 | 9.3 |
| 1-2 times a month | 8 | 18.6 |
| Never or nearly never | 25 | 58.1 |
| **Frequency of waking up in the night with sudden breath holding ,gasping or choking sensation** | | |
| Nearly every day | 4 | 9.3 |
| 1-2 times a week | 4 | 9.3 |
| 1-2 times a month | 14 | 32.6 |
| Never or nearly never | 21 | 48.8 |

**Table II:** Detail of Sleep Disturbance.

| Categories | Frequency (n-298) | Percent (%) |
|---|---|---|
| **Tired or fatigued after your sleep** | | |
| Nearly every day | 48 | 16.1 |
| 1-2 times a week | 70 | 23.5 |
| 3-4 times a week | 50 | 16.8 |
| 1-2 times a month | 65 | 21.8 |
| Never or nearly never | 65 | 21.8 |
| **Feeling tired and fatigued while waking up** | | |
| Nearly every day | 67 | 22.5 |
| 1-2 times a week | 46 | 15.4 |
| 3-4 times a week | 34 | 11.4 |
| 1-2 times a month | 76 | 25.5 |
| Never or nearly never | 75 | 25.2 |
| **Fallen asleep while driving a vehicle** | | |
| No | 234 | 78.5 |
| Yes | 64 | 21.5 |
| **If yes, frequency of its occurrence** | | |
| Nearly every day | 2 | 3.1 |
| 1-2 times a week | 4 | 6.3 |
| 3-4 times a week | 3 | 4.7 |
| 1-2 times a month | 34 | 53.1 |
| Never or nearly never | 21 | 32.8 |

### Other Comorbidities

The majority of the respondent did not have high blood pressure, while 6% had high blood pressure and 13.8% did not know. Similar results were seen in Diabetes mellitus, where 92.3% of respondents did not have diabetes mellitus while 2% had Diabetes mellitus and 5.7% did not know. Furthermore, 90% of the respondents had never suffered from cardiac diseases while 2% had and 8.1% did not know.

## Factors associated with sleep apnea

The association of factor between the sex of the respondent is shown in above **table III** where significant association was seen between the sex of the respondent and forgetfulness in the daytime (P=0.027). About 41% of female respondents reported forgetfulness in the daytime, while 32.8% of the male respondents reported forgetfulness. The statistical association was also seen between the sex of the respondent and having difficulty in concentrating or focusing on your routine activities (P=0.002). About half of the female respondents (50.5%) reported that they feel forgetful in the daytime, while 35.3% of the male respondent reported the same. Similarly, a significant association was seen between the sex of the respondent and feeling of disorientation with time, place, and person(p=<0.001), where 45.6% of the female respondent reported feeling disoriented on contrary to 23% of male respondents. Association was also seen between the sex of the respondent and feeling of sudden blanking out (p=<0.001). About 60% of female respondents reported that they suddenly blank out, while 36.2% of the

**Table III:** Association of factors with sex.

| Factors | Sex | | Total | Chi-Square | P-value |
|---|---|---|---|---|---|
| | Male | Female | | | |
| **Forgetfulness in the daytime** | | | | | |
| No | 35 (30.2%) | 31 (17.0%) | 66 (22.1%) | | |
| Yes | 38 (32.8%) | 75 (41.2%) | 113 (37.9%) | 7.247 | **0.027** |
| Maybe | 43 (37.1%) | 76 (41.8%) | 119 (39.9%) | | |
| **Difficulty concentrating or focusing on your routine activities** | | | | | |
| No | 44 (37.9%) | 36 (19.8%) | 80 (26.8%) | | |
| Yes | 41 (35.3%) | 92 (50.5%) | 133 (44.6%) | 12.580 | **0.002** |
| Maybe | 31 (26.7%) | 54 (29.7%) | 85 (28.5%) | | |
| **Disoriented with time, place, and person** | | | | | |
| No | 48 (41.4%) | 42 (23.1%) | 90 (30.2%) | | |
| Yes | 27 (23.3%) | 83 (45.6%) | 110 (36.9%) | 17.776 | **<0.001** |
| Maybe | 41 (35.3%) | 57 (31.3%) | 98 (32.9%) | | |
| **Sudden blanking out** | | | | | |
| No | 43 (37.1%) | 26 (14.3%) | 69 (23.2%) | | |
| Yes | 42 (36.2%) | 109 (59.9%) | 151 (50.7%) | 23.746 | **<0.001** |
| Maybe | 31 (26.7%) | 47 (25.8%) | 78 (26.2%) | | |
| **Frustrated at a time during your routine activities** | | | | | |
| No | 34 (29.3%) | 14 (7.7%) | 48 (16.1%) | | |
| Yes | 55 (47.4%) | 128 (70.3%) | 183 (61.4%) | 26.667 | **<0.001** |
| Maybe | 27 (23.3%) | 40 (22.0%) | 67 (22.5%) | | |

**Table IV:** Association of factors between Age groups.

| Factors | Age | | | Total | Chi-Square | P-value |
|---|---|---|---|---|---|---|
| | 18-20 | 21-23 | >23 | | | |
| **Forgetfulness in the daytime** | | | | | | |
| **No** | 13 (14.4%) | 42 (23.3%) | 11 (39.3%) | 66 (22.1%) | | |
| Yes | 38 (42.2%) | 66 (36.7%) | 9 (32.1%) | 113 (37.9%) | 8.165 | 0.086 |
| Maybe | 39 (43.3%) | 72 (40.0%) | 8 (28.6%) | 119 (39.9%) | | |
| **Difficulty concentrating or focusing on your routine activities** | | | | | | |
| No | 19 (21.1%) | 48 (26.7%) | 13 (46.4%) | 80 (26.8%) | | |
| Yes | 44 (48.9%) | 80 (44.4%) | 9 (32.1%) | 133 (44.6%) | 7.021 | 0.135 |
| Maybe | 27 (30.0%) | 52 (28.9%) | 6 (21.4%) | 85 (28.5%) | | |
| **Disoriented with time, place, and person** | | | | | | |
| No | 19 (21.1%) | 58 (32.2%) | 13 (46.4%) | 90 (30.2%) | | |
| Yes | 39 (43.3%) | 67 (37.2%) | 4 (14.3%) | 110 (36.9%) | 10.882 | **0.028** |
| Maybe | 32 (35.6%) | 55 (30.6%) | 11 (39.3%) | 98 (32.9%) | | |
| **Sudden blanking out** | | | | | | |
| No | 11 (12.2%) | 50 (27.8%) | 8 (28.6%) | 69 (23.2%) | | |
| Yes | 54 (60.0%) | 85 (47.2%) | 12 (42.9%) | 151 (50.7%) | 9.212 | 0.056 |
| Maybe | 25 (27.8%) | 45 (25.0%) | 8 (28.6%) | 78 (26.2%) | | |
| **Frustrated at a time during your routine activities** | | | | | | |
| No | 5 (5.6%) | 34 (18.9%) | 9 (32.1%) | 48 (16.1%) | | |
| Yes | 63 (70.0%) | 106 (58.9%) | 14 (50.0%) | 183 (61.4%) | 13.843 | **0.008** |
| Maybe | 22 (24.4%) | 40 (22.2%) | 5 (17.9%) | 67 (22.5%) | | |

male respondent reported sudden blank-outs. Moreover, a significant association was seen between the sex of the respondent and feeling of frustration at times during your routine activities (p=<0.001), where 70.3.% of the female respondents and 47.4% of the male respondents reported feeling frustrated during routine activity.

The association of factors and age groups among the student's members of Majmaah University is shown in above **table IV**. Here, disorientation of time, place and time person (p=0.028) was statistically significant with the age group. Almost half (43.3%) of the 18-20 reported feeling disoriented, while only 4.3% of age 23 and more reported disorientation. Similarly, a significant association was seen between the respondent's frustration during routine activities and their age group (p=0.008), where 70% of the students of age group 18-20 reported feeling frustrated during routine activities. Among the ages 21-23, 59% reported feeling frustrated. Similar results were seen in students aged 23 and more, where 50% reported of feeling frustrated during routine activity.

## Discussion

In the current study, sleep apnea was seen more in aged group 21-23 years which is also similar as to other study conducted in medical students. Female students are more prone to this condition as compared to male students which are shown similar in other study. In the study conducted in medical Yarmouk University, the height of students 156-165 cm which was not more different than this current study. Similarly height of students who were suffering from disease was 51-60 kg which was different from others[8]. Neck circumstance had significant role in sleep apnea so above 17 inches for a male or 16 inches for a female recommending visit examination[9].

Snoring is the common factor in sleep apnea as reported by several studies. Most of the students snore little more than normal breathing where only 1-2 times in a month snoring happened which disturbed others as reported in similar studies[10]. More than half of the respondent has reported as they change the position of the pillow which also showed that position therapy is good for snoring[11]. As shown is several studies that episodic breathing during sleep is common in sleep apnea which lasts between 10-20 seconds and can happen from 5 to over 100 times per hour[12]. This current study presents that 1-2 times a month people have noticed about the quietness due to breathing but they never wake up due to difficult in nasal congestion during sleep. And also (48.8%) respondent reported that they have never wake up in the night with sudden breath-holding, gasping, or choking sensation. While one-third of the participants told that they have someone in their family that snored.

In this present study the respondents has reported that they are tired or fatigued after sleep 1-2 times per week as well as during waking time, they feel tired, fatigued almost every day which is also similar compare with other studies. Compare to other study they had reported that at least once in their lifetime they had nodded off to sleep while driving while our study population respond they most of them did not experience such thing[10].

One of the study shows that changing in Blood Pressure may likely to contribute in cardiovascular risk in sleep apnea[13] which is seen contrasting in our study. The relationship between OSA and type 2 diabetes may be bidirectional in nature given that diabetic neuropathy can affect central control of respiration and upper airway neural reflexes, promoting sleep-disordered breathing as mentioned in some article but is also not similar in this current study[14]. People with sleep apnea have lower levels of GABA and abnormally high levels of glutamate, according to the study published on 2016[15]. Some researcher found that while comparing mammillary bodies' structure in brain of healthy and sleep apnea patient nearly 20% smaller than in their untroubled counterparts resulting in forgetfulness[16]. These GABA are responsible for person's thinking skill, mood and concentration. Due to imbalance of these chemical in brain people with sleep apnea face problems. Here in this current study female are facing more problem of forgetting, lack of concentration, mood disorder as compared to male which is significant association was seen between the respondent's frustration during routine activities and their age group (p=0.008).

## Conclusion

This study concludes that there is prevalence of sleep apnea among the medical student where snoring is one of the major issue. The study also reflected that sleep apnea is not only related to age group but also differs with the sex and due to the sleep disorder individual are usually frustrated and disoriented. So as to improve the physical and mental health regular and timely sleep is highly required for not only medical students but also to every individual. As medical students are seen usually stressed out already due to their academic demands they are more the sufferer. Maintaining healthy lifestyle which includes regular meditation, yoga, exercise, adoption of comfortable sleep position, keeping the sleeping room humid and fresh and avoidance of addictive substances can naturally help to overcome the problem of sleep apnea. Seeking medical help can be the next level solution if the condition worsens.

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### Conflict of interest
The authors declare that they have no conflict of interest.

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