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Prevalence and correlates of snoring in medical and nursing students in University Malaysia Sarawak

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Abstract

Using a questionnaire, a snoring study was done in 400 medical and 78 nursing students of University Malaysia Sarawak in 2004 and 2005. The response rates were 72.5% for medical students and 83.3% for nursing students. The habitual snoring percentages for all years, first year and final year medical students were 7.2, 9.9 and 3.6 respectively; and for all years, first year and third year nursing students were 12.3, 13.3 and 8.3. These figures were lower than those found in Hong Kong and Germany, despite similar body mass index (BMI). In the combined group of student, positive correlation with snoring was found in male gender (p=0.011), BMI (p=0.002) and sleep apnoea (p=0.05). For medical students, positive correlation was found in male gender (p<0.0005), weight (p <0.001), height (p <0.001) and sleep apnoea (p<0.001), and for nursing students in BMI (p=0.008) and weight (p=0.033). No significant correlation was found in snoring with Epworth Sleepiness Scale and academic performance.

INTRODUCTION

The prevalence and correlates of snoring has been studied in all ages from one-year-old[1] to 100 years old[2], all over the world, including students of primary[3], secondary[4] and tertiary institutions.[5-7] There had been studies on medical student in their first year[5] and final year.[6] To date, the authors are unaware of any study has been done on medical or nursing students in all years of their respective courses. It is the objective of this study to determine the prevalence and correlates of snoring in medical and nursing students in University Malaysia Sarawak (UNIMAS), Malaysia.

METHODS

All the students doing the medical course from year 1 to year 5 in 2004 and the nursing course from year 1 to year 3 in 2005 in UNIMAS were given the questionnaire and asked to return same day or the day after. The questionnaire includes demography, weight (kilogram), height (meter), day time sleepiness and tiredness, sleep duration, time getting to sleep, times waking up at night, frequency of snoring and sleep apnoea, and Epworth Sleepiness Scores (ESS). Explanation of snoring and sleep apnoea was given in the questionnaire as being witnessed by bed partners, room partners, or house members (relatives or friends). The participation was on a voluntary basis.

The frequency of daytime sleepiness and tiredness was classified as never, occasional, sometimes, and always. Times waking up at night were never, 1-2/week, 3-4/week, and 5 or more /week. The frequency of snoring and sleep apnoea was never, occasional (1-2 nights/week), habitual (3-4 nights/week, 5-6 nights/week and every night). Three snoring groups were considered in the data analysis and these were never, occasional (1-2 nights/week) and habitual (3-4 nights/week, 5-6 nights/week and every night). So were the three-sleep apnoea groups which were never, occasional (1-2 nights/week) and habitual (3-4 nights/week, 5-6 nights/week and every night). The ESS was based on the 8 standard situations based on the Epworth Sleepiness Scale[8] and classified in the chance of dozing as no, slight, moderate and high with the corresponding scores of 0, 1, 2, and 3. The eight standard situations were sitting and reading, watching TV, sitting inactive in a public place (e.g. teaching/learning sessions), as a passenger in a car for an hour without a break, lying down to rest in the afternoon when circumstances permit, sitting and talking to someone, sitting quietly after a lunch, and in a car while stopped for a few minutes in traffic.

Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (Kg/M^2). The academic performance was reflected in the last examination results within the past 6 months. The examination results were

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graded from high to low using the system: Grade A (A+ 85-100, A 80-84, A- 75-79), Grade B (B+ 70-74, B 65-69, B- 60-64), Grade C (C+ 55-59, C 50-54, C- 45-49), Grade DF (D 40-44, F 39 or less).

All the data were analyzed using SPSS. Basic data are presented as the mean with standard deviation (SD) for continuous variables and as percentage for category variables. Frequency analysis was done to determine the prevalence of habitual snoring and related factors and one-way ANOVA and Cross-tabulation with χ^2 for the correlation factors in both of the two groups, medical and nursing students. These two groups were then combined to increase the sample size and multivariate analysis using SPSS 12 was used to determine the correlates of snoring in the combined student group.

RESULTS

A total of 400 medical students were asked of the questionnaire and 290 of them responded, with response rate of 72.5%. The mean age, BMI, weight, height, ESS; frequency of sleep apnoea and snoring in relation to gender of the responders are shown in Table 1. Correlation of snoring in the 3 categories (never, occasional and habitual) with gender, age, BMI, weight, height, ESS, sleep apnoea and examination results in medical students were shown in Table 2.

A total of 78 nursing students were asked of the questionnaire and 65 of them responded, with response rate of 83.3%. The mean age, BMI, weight, height, ESS; frequency of sleep apnoea and snoring in relation to gender are tabulated in Table 3. Correlation of snoring with gender, age, BMI, weight, height, ESS, examination results, and sleep apnoea is shown in Table 4.

The findings of the multivariate analysis of all the medical and nursing students, that is the combined group, are shown in Table 5. For occasional snoring, sleep apnoea and gender are the significant factors. Those students who have sleep apnoea are 27 times more likely to have occasional snoring as compared with those who do not have apnoea (p=0.003). Male students are two times more likely to have occasional snoring as compared with the female students (p=0.0499). Factors found to be not significant are age (p=0.262), ESS (p=0.097) and examination results (p=0.186).

For habitual snoring, BMI and gender are significant factors. Those students who have higher BMI are 24% more likely to have habitual snoring as compared with those who have lower BMI (P 0.02). Male students are 5 times more likely to have habitual snoring as compared with the female students (p=0.011). Factors found not significant are age (p=0.098), ESS (p =0.083) and examination results (p=0.114).

Table 1: Mean age, BMI, weight, height, ESS; frequency of sleep apnoea and snoring in relation to gender for medical students.

	Male	Female	Both sexes
Total number 290	39.4%	60.6%	100%
Age in years (mean ± SD)	22.3 ± 2.1	22.3 ± 2.5	22.6 ± 2.4
BMI (mean ± SD)	22.5 ± 3.4	20.9 ± 3.4	21.7 ± 0.5
Weight in kg (mean ± SD)	65.7 ± 11.4	52.0 ± 8.5	58.3 ± 12.6
Height in meter (mean ± SD)	1.67 ± 0.09	1.57 ± 0.06	1.63 ± 0.09
ESS (mean ± SD)	7.6 ± 3.2	7.9 ± 3.2	7.8 ± 3.3
Sleep apnoea			
never	38.5%	60.1%	98.6%
occasional	0.8%	0.3%	1.1%
habitual	0	0	0
Snoring			
never	24.6%	52.5%	77.1%
occasional	8.9%	6.8%	15.7%
habitual	5.9%	1.3%	7.2%

Table 2: Correlation of snoring in 3 categories (never, occasional and habitual) with gender, age, BMI, weight, height, ESS, sleep apnoea and examination results among the medical students

Snoring	Never	Occasional	Habitual	*p*-value
Gender				<0.0005[b]
male	24.6%	8.9%	5.9%	
female	52.5%	6.8%	1.3%	
Mean age in years	22.5 ± 2.3	23.1 ± 2.8	22.9 ± 2.2	0.306[a]
Mean BMI	21.4 ± 3.3	22.6 ± 4.0	23.4 ± 2.8	0.011[a]
Mean weight in kg	56.4 ± 12.0	62.4 ± 13.1	68.2 ± 11.1	<0.0005[a]
Mean height in meter	1.62 ± 0.09	1.68 ± 0.11	1.70 ± 0.08	<0.0005[a]
ESS	7.9 ± 3.3	7.1 ± 2.9	8.2 ± 3.5	0.248[a]
Examination results				0.756[b]
grade A	11.8%	1.7%	0.8%	
grade B	39.7%	11%	1.2%	
grade C	23.2%	4.2%	1.2%	
grade DF	1.2%	0.4%	0	
Sleep apnoea				<0.0005[b]
never	75.2%	15.2%	6.2%	
1-2 nights/week	1.7%	0.4%	0.8%	
3-4 nights/week	0.2%	0.1%	0.2%	
5-6 nights/week	0	0	0	
every night	0	0	0	

a: one way ANOVA; b: cross-tabulation with χ^2

Table 3: Mean age, BMI, weight, height, ESS; frequency of sleep apnoea and snoring in relation to gender for nursing students

	Male	Female	Both genders
Total number 65	9.2%	90.8%	100%
Age in years (mean ± SD)	26.3 ± 6.5	24.5 ± 6.0	24.7 ± 6.0
BMI (mean ± SD)	20.4 ± 3.9	22.4 ± 4.0	22.2 ± 4.0
Weight in kg (mean ± SD)	54.0 ± 10.8	53.7± 11.3	53.7 ± 11.1
Height in meter (mean ± SD)	1.62 ± 6.19	1.54 ± 5.16	1.55 ± 0.05
ESS (mean ± SD)	7.2 ± 2.9	8.1 ± 3.5	8.0 ± 3.4
Sleep apnoea			
never	9.1%	83.6%	92.7%
occasional	0	7.3%	7.3%
never	0	0	0
Snoring			
never	6.2%	60%	66.2%
occasional	1.5%	20%	21.5%
habitual	1.5%	10.8%	12.3%

Table 4: Correlation of snoring in the 3 categories (never, occasional and habitual) with gender, age, BMI, weight, height, ESS, sleep apnoea and examination results among the nursing students

Snoring	Never	Occasional	Habitual	*p*-value
Gender				0.916[b]
male	6.2%	1.5%	1.5%	
female	60%	20%	10.8%	
Mean age in years	25.1 ± 6.4	24.5 ± 5.8	23.0 ± 3.8	0.675[a]
BMI	21.3 ± 3.8	23.1 ± 3.5	26.1 ± 3.9	0.008[a]
Weight	51.7 ± 11.4	55.4 ± 8.7	63.0 ± 9.7	0.033[a]
Height	1.55 ± 0.06	1.55 ± 0.05	1.55 ± 0.03	0.971[a]
ESS	7.8 ± 3.7	8.2 ± 3.8	8.7 ± 1.7	0.784[a]
Examination results				0.701[b]
grade A	12.6%	3.1%	0	
grade B	50.1%	9.4%	3.1%	
grade C	15.6%	6.3%	0	
grade DF	0	0	0	
Sleep apnoea				0.095[b]
never	69.1%	18.2%	5.5%	
1-2 nights/week	1.8%	3.6%	1.8%	
3-4 nights/week	0	0	0	
5-6 nights/week	0	0	0	
every night	0	0	0	

a: one way ANOVA; *b*: cross-tabulation with χ^2

In general in the combined group, gender, BMI and sleep apnoea are significant factors associated with snoring.

The percentages of never snoring, occasional snoring and habitual snoring in various races in the combined group are shown in Table 6.

DISCUSSION

In this study the habitual snoring percentages for all years, first year and final year medical students are 7.2, 9.9 and 3.6 respectively. These are much lower than those in other studies; in Hong Kong of 25.7% for first year[5] and in Germany of 11.9% for final year.[6] Yet BMI readings are much the same in UNIMAS, Hong Kong and German students groups (BMI 21.74, 20.00 and 22.40 respectively).

In this study the habitual snoring percentages for all years, first year and third year nursing students are 12.3, 13.3 and 8.3 respectively. These are correspondingly higher than those for

Table 5: The multinomial logistic regression analysis on all medical and nursing students

Snoring	Factors	OR (95%)	*p* value
Occasional	Sleep apnoea present	27.3 (3.15, 237.15)	0.003
	BMI	1.07 (0.99, 1.17)	0.09
	Male versus female	1.86 (1.02, 3.471)	0.0499
Habitual	Sleep apnoea present	17.95 (0.97, 333.41)	0.05
	BMI	1.24 (1.08, 1.42)	0.002
	Male versus female	4.93 (1.44, 16.93)	0.011

"Never snoring" as a reference group, OR=adjusted odd ratio

Table 6: Percentages of never, occasional and habitual snoring in various races in the combined group

Race	Never snoring	Occasional snoring	Habitual snoring
Malay	86.4	7.5	3.8
Chinese	73.9	17.4	7.6
Iban	66.3	25.0	6.3
Bidayuh	62.9	29.4	5.9
Others	84.0	10.0	5.0

the medical students in the same university. No obvious reason for this comparison is noted.

Among the medical students in our study, snoring was found to have positively correlation with male gender, weight, height and sleep apnoea, but not with ESS and examination result. Among the nursing students in our study, snoring was found to have positively correlation with BMI and weight, but there was no significant correlation with ESS and examination results. It is of interest that Ficker[6] found snoring to be associated with an increased risk of failing examination in a dose-response manner in 201 final year medical students.

The nursing students in UNIMAS had only occasional on-call night duty and at the period of the study, none of them were on call at night. It is therefore feasible to combine the two groups to improve statistical analysis as young adult tertiary student population. In the combined group, snoring was found to have positive correlation with BMI and sleep apnoea, and more male students snored than female. These findings were also reported by Shin[4] among high school students in Korea. Hui[5] from Hong Kong also reported more male than female first year general university students had snoring.

In the combined group, there were more Chinese, Iban and Bidayu snoring than Malay. In comparison, in general adult population in Singapore, Ng[9] found more Malay snoring than Chinese and other races.

This study is based on return of questionnaire from the students, some if not all are living away from home. They may not have accurate information regarding their snoring and sleep apnoea as these depend on witnesses especially from their relatives. Furthermore, there are few male nursing students in this study, and the combination of nursing and medical students may not be representative of young adult tertiary student population in the University. A study involving a much larger number, with representations from different courses would provide a more comprehensive data.

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