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Association of body mass index and gender with sleep quality in medical students: A Survey.

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ABSTRACT… Objectives: To assess the association of body mass index and gender with sleep quality in medical students: a survey. **Study Design:** Descriptive Cross-sectional survey. **Setting:** Public Sector Medical Colleges of Karachi. **Period:** 1st January to 31st March 2019. **Material & Methods:** 350 medical students were enrolled after taking consent as per declaration of Helsinki. Data were collected from included students of this study, who had age of 18 to 24 years and all other students having history of insomnia, anorexia nervosa and metabolic disorders were excluded from study. All the enrolled participants were assessed by using Pittsburgh Sleep Quality Index (PSQI). **Results:** The mean age of 20.83±1.54. Of the total, 14(3.7%) were overweight/ obese and 304(79.6%) were underweight. Overall 14 (3.7%) reported Good quality of Sleep, and remaining had poor quality of sleep 336 (96.3%) There was significant (p<0.05) association of Sleep Quality with gender but no significant (p>0.05) association between sleep quality with body mass index (BMI) in this study. **Conclusion**: There was significant (p<0.05) association of Sleep Quality with gender but no significant (p>0.05) association of Sleep Quality with body mass index (BMI) in this study.

Key words: Body Mass Index, Gender, Sleep, Sleep Quality.

INTRODUCTION

College life or student life is considered as the most strenuous yet valuable stage of human life, and medicine or medical sciences is deemed to be the toughest among all disciplines or professions. College life or student life is time duration of change, in which students have autonomy and freedom first time from direct supervision of family members or family and have academic or social pressures with erratic or busy schedules of studies. Major change occurs in the student's life such as dietary problems, intake of drinks and disturbed sleep. These factors would be detrimental to the health or wellbeing of medical students.[1] Sleep is a physiological complex process for restoration of well-being or health and it is defined as a state of unconsciousness from which a person can be aroused.[2] Sleep plays a vital role in the homeostasis of the human body, in which it acts as a buffer or first line defense against stress and illness or ill-health.[3] There is no upper limit to getting maximum sleep. However, it has been stated that obtaining around 7 or 8 hours of sleep per day for adults is essential for optimum health and well-being.[4,5] Enough data has been collected and compiled on the endless benefits of getting adequate sleep each night. And yet, a poor sleep pattern is observed in both teenagers or adolescents and adults alike. Speaking of the medical students population, getting suboptimal sleep and pulling all-nighters is now a cultural norm owing to the academic burden, social lifestyle or social Medias, alcohol or caffeine intake, and central nervous system (CNS) stimulants, which prevent students from achieving sufficient sleep.[6] Sleep quality is defined as a measure of the feeling wellbeing, that the human body would be an energetic, active and ready for daily activities of life. Sleep quality is characterized by qualitatively (depth and feeling of restfulness upon awakening) and quantitatively (sleep duration, sleep latency, and

number of arousal).[7]

Sleep quality is described as good sleep and poor sleep, so good sleep includes not only absence of sleep disturbances like restless leg syndrome or insomnia (difficulty in falling sleep or stay asleep) or obstructive sleep apnea but all the presence of conditions which facilitates the adequate duration of sleep or fall asleep on going to bed or maintenance of sleep continuity without disturbances and after awakening feel refreshed or active[8], while Poor sleep quality have a serious health issues most likely i-e physical, mental and psychological as well as poor performance during class work or daily day time activities, and risk factors for development of high blood pressure (HTN), increased body mass index (BMI) that ultimately affects the quality of life (QOL).[9,10] Moreover, association or relationship between poor sleep and high body mass index or obesity, may vary according to the gender and race.[11] Overall, estimates of poor sleeping quality (sleeping disturbances/periodic or frequent sleeping problems or excessive sleepiness in daytime) were ranging between 13.8% and 68.6% among college students, that depends upon the protocol used for measurement.[12,13] Sleep quality is assessed subjectively by Pittsburg Sleep Quality Index (PSQI).[14] It has been observed usually or regularly that in the first few hours of morning in the class, the alertness level of students greatly reduced or decreased due to inadequate sleep or disturbed sleep, which subsequently has an impact on the academic performance and health. However, not enough literature is found in relation to medical students in Pakistan, considering the importance of a sound mind and healthy body in the field of medical profession. Our aim was to assess the association of body mass index and gender with sleep quality in medical students: a survey.

MATERIAL & METHODS
This descriptive cross-sectional survey was conducted in Dow University of health sciences (DUHS), Jinnah Sindh medical university (JSMU), and Karachi medical and dental college (KMDC) of Karachi by Non probability, convenience sampling technique. Duration of study was two months from 1st January to 31st March 2019 and having age of 18 to 24 years. Considering a population of 3800 students from the above mentioned medical institutes, the sample size calculated by Raosoft is figured to be 350 with alpha level 5% and confidence level 95%. All the medical students-from first year to fourth year- willing to participate of the above mentioned medical institutes were enrolled in the study. Students having history of intake of drugs (hypnotics or sedatives), history of insomnia, anorexia nervosa and metabolic disorders will be excluded from study. Approval of research was taken from the Ethical review board (ERB), Karachi medical and dental college (KMDC) of Karachi and Informed consent was taken from the enrolled students, after expressing the purpose and procedure of the study. Proformas for data collections were signed by the students, and samples of participants or consent of students were taken in accordance with the Declaration of Helsinki.[15]

Demographic information of students were taken, such as age, gender, and body weight (Kg) and height (m^2). Body mass index (BMI) was calculated as weight divided by height (kg/m^2). It was categorized on bases of international classification into underweight (BMI $\leq$ 18.5), normal weight (BMI < 25), overweight (BMI between 25 and 30) and obesity (BMI $\geq$ 30).[16] Sleep quality of students were assessed by the Pittsburgh Sleep Quality Index (PSQI) scale for the previous month and differentiate among normal and poor sleepers. This index has a validity, reliability and high levels of subjective consistency.

The Pittsburgh Sleep Quality Index (PSQI) is subjective questionnaire consisting of 19 items with seven components likely subjective sleep quality; sleep latency; sleep duration; habitual sleep efficiency; sleep disturbances; use of sleep medication; and daytime dysfunction. This subjective questionnaire consists of 19 items, which is coded on scale i-e 0-3 and zero (none) to three (three times of week). The sum of all scores expresses the score of sleep quality in between the range of 0-21, with higher scores expresses the poor or lower sleep quality or insomnia.

So that these included students were divided as good (scores <5) and poor or insomnia (scores>5) sleep quality.[14] Descriptive statistics were analyzed as frequency, percentage (%), and mean ± standard deviation. One way ANOVA was used for comparison of Pittsburgh Sleep Quality Index (PSQI) scores with respect to institute.

The Pearson Chi Square test was used for obtaining the association between sleep quality poor sleep and Good sleep with gender and body mass index. The questionnaire and collected data were double checked and entered in computer for analysis. Data was analyzed by using statistical software package system (SPSS) version 22.0. The p<0.05 was considered as a statistical significant in study.

RESULTS
Descriptive statistics of quantitative variables like mean age of participants was 20.83±1.54 years, mean weight was 55.78±10.81kg, mean height was 1.90±0.11 meters, mean Body mass index (BMI) was 15.53±3.5 kg/m2, and the mean PSQI score of studied samples was 10.74±4.03 (Table-I). According to gender based comparison of demographic values of study participants, in which mean values of weight in male (69.48 ±12.365) and female (53.32±8.444), mean values of body mass index (BMI) in male (19.2215±4.20181) and female (14.8783±2.92753) and mean values of PSQI in male (9.1379±4.13139) and female (11.0340±3.95353) showed statistically significant (p<0.05) differences, while values Age and Height showed statistically non-significant (p>0.05) differences (Table-II). The baseline characteristics of studied samples were 382, of which 30.9% belonged to DUHS, 23.8% belonged to JSMU while the remaining 45.3% were from KMDC. Data was gathered from medical student of either sex (84.8% female while 15.2% male respectively). Students from different classes of the medical colleges participated (25.1% belonged to 1st year, 19.1% were from 2nd year, 29.8% third year while the 4th year participants were 25.9%). The Body mass index (BMI) of study participants were underweight (79.6%), normal (16.8%) and Overweight/obese (3.7%). According to Pittsburgh Sleep Quality Index (PSQI) scale,

96.3% had poor sleep (insomnia) and 3.7% had good sleep (Table-III). Gender based comparison was significantly associated with Sleep Quality (p<0.05), while different categories of body mass index were not significantly (p>0.05) associated with sleep quality in medical students (Table-IV).

Characteristics	Mean ±	SD
Age (years)	20.83±	1.54
BMI(kg/m2)	15.53±	3.5
Weight (kg)	55.78±	10.81
Height (m)	1.90±	0.11
Sleep Quality (PSQI)	10.74±	4.03

Table-I. Descriptive statistics of quantitative variables.

	Gender	N	Mean± S. Deviation	P-Value
Age (years)	Male	58	20.71±1.545	0.52
	Female	324	20.85±1.543	
Weight (kg)	Male	58	69.48±12.365	0.000*
	Female	324	53.32±8.444	
Height (m)	Male	58	1.9107±.10047	0.625
	Female	324	1.9027±.11664	
BMI (kg/m2)	Male	58	19.2215±4.20181	0.000
	Female	324	14.8783±2.92753	
PSQI Score	Male	58	9.1379±4.13139	0.001
	Female	324	11.0340±3.95353	

Table-II. Gender based comparison of demographic parameters of the participants.

Characteristics		n=382	%
Name of institute	DUHS	118	30.9%
	JSMU	91	23.8%
	KM&DC	173	45.3%
Gender	Male	58	15.2%
	Female	324	84.8%
Year of Study	1st year	96	25.1%
	2nd year	73	19.1%
	3rd year	99	25.9%
	4th year	114	29.8%
BMI	Underweight	304	79.6%
	Normal	64	16.8%
	Overweight/obese	14	3.7%
Sleep Quality	poor sleep or insomnia	368	96.3%
	Good Sleep	14	3.7%

Table-III. Baseline characteristics of studied samples (n=382).

| Characteristics | | Sleep Quality (PSQI Score) | | | | P-Value |
| | | poor sleep or insomnia | | Good Sleep | | |
		N	%	N	%	
Gender	Male	53	14.4%	5	35.7%	0.02*
	Female	315	85.6%	9	64.3%	
Body mass index (BMI)	Underweight	293	79.6%	11	78.6%	0.76
	Normal	62	16.8%	2	14.3%	
	Overweight/obese	13	3.5%	1	7.1%	

Table-IV. Association of sleep quality (PSQI score) with gender, body mass index (BMI). Non-significant p>0.05 and Significant p<0.05 was obtained using independent sample t-test.

DISCUSSION

In this study, the quality of sleep and its association was assessed with gender and body mass index in medical students of Karachi. Sleep quality is a subjective self-assessment, done by Pittsburgh Sleep Quality Index (PSQI) scale into good (scores <5) and poor sleep (scores>5). According to Pittsburgh Sleep Quality Index (PSQI) scale, 96.3% of the study participants had poor sleep (scores>5) which is similar to an Indonesian study (84.5%) conducted by Alfian et al.[7] In contrary to these results American and Nigerian studies reported 42% and 32.5% respectively.[17,18] The high rate of poor sleep quality may be due to academic burden with exam afterwards, social lifestyle or social medias, alcohol/ caffeine intake, or central nervous system (CNS) stimulants intake, which prevent students from achieving sufficient sleep.[6] It is closely associated with mood disturbances and risk factor for development of high arterial blood pressure or hypertension (HTN), high body mass index (overweight or obesity) and depression that affects the quality of life (QOL).[7,9,10]

The poor sleep quality affects the quality of life including physically and psychologically on the performances of students and exerts several physiological effects like worsening of glucose metabolism by impaired glucose tolerance and insulin sensitivity, increased sympathetic activity, elevated inflammation and imbalance in secretion of ghrelin and leptin, so subsequently affects the appetite and hunger.[19] According to our results, gender based comparison of mean values of body mass index (BMI) and mean values of Pittsburgh Sleep Quality Index (PSQI) in males to females showed statistically significant (p<0.05) differences. Similar type of results reported by a Chinese study.[20] A significant association (p<0.05) was observed in gender based comparison with sleep quality [good (scores <5) and poor sleep (scores>5)] which is supported by a Chinese study showing similar results.[20] These gender based differences are due to structural differences or body difference or biological differences, circadian rhythm or circadian clock genes, respiratory control, sex hormones or sex steroid hormones, stress response, social behaviors that affects the quality of sleep in male and females.[21,22] According to our results, there is no statistically significant (p>0.05) association between different categories i-e underweight, normal weight, overweight and obesity with poor or good sleep quality in medical students. Multiple studies have reported similar results, which support our results.[7,23,24] The poor sleep quality in students is responsible for changes in regulation of appetite by imbalance in secretion of ghrelin and leptin, so influences the calorie intake and intake of food choice.[19,25]

The study showed high rate of poor sleep(scores>5) quality pattern in medical students, so we have need to launch programs for students as to encourage healthy sleeping habits, healthy eating habits and physical activities, so that students can achieve their goals by a healthy performance in their medical education.

CONCLUSION

There was significant (p<0.05) association of Sleep Quality with gender but no significant (p>0.05) association of Sleep Quality with body

mass index (BMI) in this study. Students which show poor sleep pattern ultimately leads to poor curricular and/or extracurricular performance in medical colleges. It is important to realize the need for timely recognition of sleep quality and Body mass index in students.

Conflict of Interest
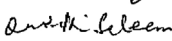This study has no conflict of interest to declare by any author.

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