

# A Cross Sectional Study on Association between Sleep Quality and Body Mass Index in Medical College Students

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## Abstract

**Background:** College students may experience severe sleep problems that negatively impact their health and well-being at certain times. The Partial sleep loss may increase the risk of obesity and weight gain. **Aim:** To assess the association between sleep quality and BMI in medical college students and to determine whether the students with poor sleep quality are at risk of developing obesity. **Materials and Methods:** 100 medical college undergraduate students of both the sexes aged between 18 - 25 years of Santhiram Medical College, Nandyal was included in the present study. Sleep quality was assessed by Pittsburg sleep quality index (PSQI) questionnaire. PQSI is a questionnaire based study, which is a standardized, quantitative measure of sleep quality with demonstrated high levels of consistency, reliability & validity. Body mass index (BMI) was calculated as weight (in Kg) divided by height-squared (in m<sup>2</sup>). The relationship between Body Mass Index (BMI) and sleep quality was analyzed in the present study. **Results:** Among 100 medical college students; 9 students were underweight, 45 were normal weight, 31 were overweight, and 15 were obese in the present study. The mean PSQI in underweight students was 3.1, normal weight was 3.4, and overweight was 2.67 and obese was 4.9. The mean BMI in students with PSQI<5 was 23.04±3.89 and in those with PSQI >5 were 23.80±4.40. **Conclusion:** There was no association between sleep quality and BMI in the present study. We will extend our study in large sample size and by a different methodology with equal number of participants in each BMI category to determine better outcome in the present study.

**Key words:** Body mass Index, Quality, Sleep.

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## INTRODUCTION

High body mass index has become one of the biggest public health problems worldwide in the last two decades [1]. Obesity is a major risk factor for cardio metabolic disease and other adverse health outcomes, many of which are linked to the leading causes of death in the population. Sleep has been identified as a health behavior that play major role in obesity as well [2]. Substantial research has clarified the role of behavioral factors in the etiology of obesity, particularly diet and exercise [3]. Overall estimates of sleeping problems among college students ranged from 13.8% to 68.6% [4, 5]. The association between the sleep quality and obesity was notable inconsistency regarding the nature of the relationship [6]. Some studies tend to show a relatively linear inverse association, in which shorter sleep duration with greater BMI while others have reported a u shaped relationship, whereby both short and long sleep duration appear to be associated with higher BMI [7, 8]. The present study

was aimed to assess the association between sleep quality and BMI in medical undergraduate students.

## MATERIALS AND METHODS

A total of 100 medical college students of both the sexes aged between 18-25 years of Santhiram Medical College, Nandyal were included in the present study. Students with endocrine disorders and on medications for the same were excluded from the study. A written informed consent was obtained from all the study participants after complete description of the study. This study was approved by the Institutional Ethics Committee (ID:IEC/2018/08). Sleep quality was assessed by Pittsburg sleep quality index (PSQI) questionnaire. PQSI is a questionnaire based study, which is a standardized, quantitative measure of sleep quality with demonstrated high levels of consistency, reliability & validity[9,10]. Body mass index (BMI) was calculated as weight (in Kg) divided by height-squared (in m<sup>2</sup>). Relationship between Body

Mass Index (BMI) and sleep quality was analyzed by performing the Pearson's correlation test. Analysis of variance was performed to find out the significance of quality of sleep levels among different BMI groups in the present study.

## RESULTS

The sample size consists of 100 medical college students out of which are 56 males and 44 females (Figure-1). The mean age of the study is  $19.3 \pm 1.0$  years. Sleep quality was assessed by Pittsburg sleep quality index (PSQI). PSQI score less than 5

indicate good sleep quality and PSQI score greater than 5 indicates poor sleep quality (Table-1). Among 100 medical college students, 09 were underweight, 45 were normal weight, 31 were overweight, and 15 were obese in the present study (Table-2). The mean PSQI in underweight students was 3.1, normal weight was 3.4, overweight was 2.67 and obese was 4.9 (Figure-2). The mean BMI in students whose  $PSQI < 5$  was  $23.04 \pm 3.89$  and in those whose  $PSQI \geq 5$  was  $23.80 \pm 4.40$  (Figure-3). All the parameters were calculated and analyzed by using correlation and variance methods and recorded.

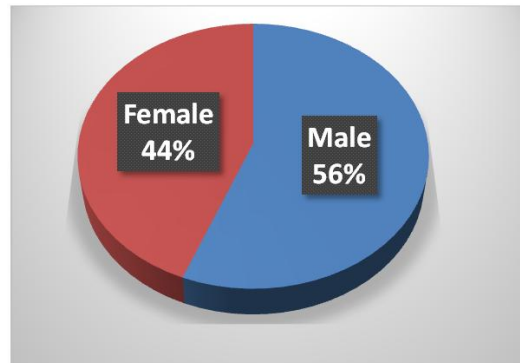


Fig-1: Gender Distribution in medical graduates

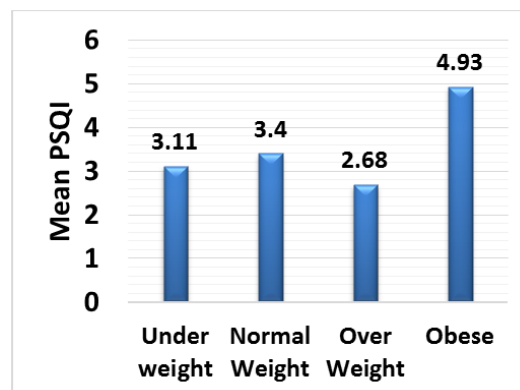


Fig-2: The mean value of Pittsburg sleep quality index (PSQI) and association of BMI among students

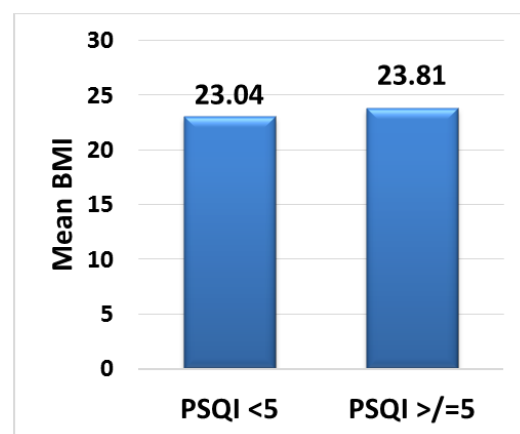


Fig-3: The mean value of BMI and association of Pittsburg sleep quality index (PSQI) among students

**Table-1: Sleep quality assessed by Pittsburg sleep quality index (PSQI) among students**

	Female(n=44)	Male(n=56)
<b>PSQI &lt;5</b>	30 (68.2%)	44 (78.6%)
<b>PSQI ≥ 5</b>	14 (31.8%)	12 (21.4%)

**Table-2: Distribution of Body mass index and sleep quality index (PSQI) association among students**

BMI Classification	N	PSQI <5 (n=74)	PSQI ≥ 5 (n=26)
Under weight (<18.5 kg/m <sup>2</sup> ):	<b>09</b>	<b>06 (8.1%)</b>	<b>03 (11.5%)</b>
Normal Weight (18.5 - 23.0 kg/m <sup>2</sup> ):	<b>45</b>	<b>34 (45.9%)</b>	<b>11 (42.3%)</b>
Over Weight (23.0 – 27.5 kg/m <sup>2</sup> ):	<b>31</b>	<b>27 (36.5%)</b>	<b>04 (15.4%)</b>
Obese (> 27.5 kg/m <sup>2</sup> ):	<b>15</b>	<b>07 (9.5%)</b>	<b>08 (30.8%)</b>

## DISCUSSION

Sleep patterns among college students have focused on the relationship between sleep habits and academic performance [11]. Short sleep duration was associated with obesity, increased food intake, and sedentary habits, but not with level of physical activity [12]. But not all the emerging evidence supports a relationship between short sleep duration and increased BMI; some studies have found no association between sleep duration and BMI [13, 14]. Studies exploring the association between sleep and BMI among adolescents suggest that the relationship might be multilayered [15, 16]. Fragmentation of sleep may be responsible for increased body weight. Sleep duration was not a significant predictor for BMI whereas sleep disturbances play predictive role in Body mass index alteration. Sleep duration was not a significant predictor for BMI whereas sleep disturbances play a predictive role in BMI alteration [17]. The total sample size, number of obese, overweight students was less compared with the previous literature and we have not observed any association between sleep quality and body mass index in our study [18-20]. The future aspects of our study planned to extend on body mass index associated with sleep disturbances in a larger sample size would give us better significance among medical graduate students.

## CONCLUSION

Our study suggests that there is no relation between sleep quality and BMI, which may be due to less number of obese students. We will extend our study in large sample size with different methodology by recruiting the equal number of participants in each BMI category.

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