

## Sleep Patterns and BMI Corelations Among Medical Professionals in a Tertiary Hospital in Maharashtra

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Received: 10-02-2022 / Revised: 15-03-2022 / Accepted: 18-04-2022

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Conflict of interest: Nil

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### Abstract

**Abstract:** Obesity and its associated risks are a leading public health concern. Sleep deprivation is speculated to boost appetite. Medical professionals are prone to sleep deprivation. Thus this study was designed to ascertain association between BMI and sleep deprivation among Medical students and professionals

**Materials and Methods:** Medicals Professionals and students were properly examined to exclude those suffering from any major diseases, psychiatric problems, alcoholics or sleep medication. Height & weight were examined to calculate BMI. Sleep quality & duration was assessed by a self-report questionnaire, PSQI. Pearson's correlation was used to find the association among parameters.

**Results:** 41.3%(102) had overweight BMI of  $\geq 23$ ; 38.1%(94) had poor sleep quality with PSQI score  $>5$  and 43.3% (107) are sleep deprived with sleep duration 5-6 hours. Analysis showed highly significant negative correlation between BMI & sleep duration with 'p' value  $<0.01$  and also highly significant positive correlation between BMI & PSQI score with 'p' value  $<0.01$ .

**Conclusions:** It was found that with increase in BMI there is decrease in sleep duration as well as reduction in sleep quality which again leads to obesity as a vicious cycle. Hence proper education about sleep and life style modification is needed to medical professionals to prevent obesity and its associated comorbidities among them.

**Keywords:** Sleep, BMI, PQSI, Medical

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### Introduction

Currently obesity has become pandemic in the world and poses major health hazards in India and abroad. The prevalence of Obesity is increasing at an exponential rate. It is one of the major factors for cardiovascular and metabolic disorders, [1,2] and other health adversities, among which many are leading causes of death in the world.

Many studies have shown the association of lifestyle behavioural factors like diet and lack of physical exercise as the causes of obesity as well as other lifestyle factors are also linked to it. Recently sleep has been identified as one among them which may play a key role. With emerging technologies and advent of artificial lighting, television, internet, social media, and shift working, the sleep duration is curtailed.

Because of this in our society, sleep deprivation has become a routine in approximately 25% of the population with reduced alertness. [3,4] Certain studies have reported neuro-endocrinal influence of appetite in healthy individuals by sleep curtailment. [5] Many prospective and cohort studies have found short sleep duration causing obesity over time. [6-9]

Sleep deprivation also alters thermoregulation and could increase opportunities to eat and boost appetite by increasing ghrelin and decreasing leptin levels. [5]

To our knowledge, no particular studies have shown exact association or correlation of sleep duration and body mass index among medical fraternity, who are prone to sleep deprivation because of frequent change in their work schedule like night duties, long duties and attending emergencies etc. [10]

Hence in the present study, we aimed to find out the correlation between body mass index and sleep pattern & duration among medical professionals including residents and students.

### Methodology:

The present study was a cross sectional prospective study conducted over a period of 6 months and included 247 subjects. The inclusion was healthy adult volunteers who had completed atleast one year of MBBS course or higher. Subjects were excluded if any of the following were there: any Endocrine disorders like Diabetes Mellitus, Hypothyroidism, Cushing's disease,

Polycystic Ovarian Disorder etc., family history of obesity, alcoholism, any severe painful injury in the past 3 months, any psychiatric illness or Sleep disorders, those on sedatives or steroids and exam going students.

Informed written consent was taken and detailed History was recorded. Anthropometric parameters like Height and Weight were recorded. BMI was calculated using the formulae.

$BMI = Weight \text{ in Kg} / (Height \text{ in m})^2$   
Assessment of sleep duration and patterns was done by PSQI - A self-administered questionnaire, which has high Test-retest reliability and good validity. [11]

It assesses sleep of an individual in the past 1 month. It is a 7 Component scoring index of sleep which include Subjective Sleep Quality, Sleep Latency, Sleep Duration, Efficiency, Disturbances, Medication and Daytime Dysfunction. There are 4-point scale in each component, ranging from 0 to 3, to a Global PSQI Score of 0-21 and score >5 is considered Poor Sleep Quality. Statistical analysis was done using MS excel and SPSS v17.

### Observations:

The study included 247 subjects aged 18 to 23 years, with 114 females and 133 males. Table 1 gives the descriptive data of age, BMI, Sleep duration and PSQI rating of the study population. Subjects had a mean BMI of 21.77 Kg/m<sup>2</sup> with std. deviation of 3.376. 43.3% (107) had normal BMI and 41.3% (102) had BMI of  $\geq 23$  Kg/m<sup>2</sup>.

**Table 1: Demographic Characteristics of Subjects**

Parameter	Number	Percentage
<b>BMI</b>		
<18.5	38	15.4
18.5-22.9	107	43.3
23-24.9	60	24.3
25-30	39	15.8
>30	3	1.2
<b>SLEEP DURATION</b>		

<5	31	12.6
5-6	107	43.3
6-7	47	19
>7	62	25.1
<b>PSQI</b>		
0-5	153	61.9
>5	94	38.1

Mean Sleep Duration of the subjects was 6.59 hours with std. deviation of 1.256. 43.3% (107) were sleep deprived with sleep duration 5-6 hours.

Mean PQSI rating of the subjects was 4.36 with std. deviation of 2.682. 38.1% (94) had poor sleep quality with PSQI score >5.

Pearson correlation was done among the parameters of BMI, Sleep Duration and PSQI score as they followed normal distribution. Findings shows the correlation of these parameters. BMI is significantly correlated negatively with sleep duration and positively with PSQI score. PSQI is negatively correlated significantly with sleep duration.

Lower sleep duration of 5-6 hours was observed in 107 (43%) subjects. Association between BMI and Sleep duration was statistically significant ('p' value <0.05). Near majority of overweight subjects i.e. 45 (75%) out of 60, had 5-6 hours of sleep and all obese subjects had < 6 hours of sleep among which 60% (25) had < 5 hours and 40% (17) had 5-6 hours of sleep.

There was a significant association between BMI and PSQI score ('p' value <0.05). Out of 153 subjects with PSQI <5, 36 (23.5%) were underweight and 100 (65%) were normal weight. Out of 94 subjects with PSQI >5, 43 (46%) were overweight and 42 (45%) were obese.

### Discussion:

This cross sectional study, done using PSQI questionnaire, showed >24% were overweight and >17% were obese. More than 56% subjects were sleeping <6 hours and >38% had poor sleep quality. Physicians and medical students

who are trained to improve the health of others succumb to the development of obesity and its complications, due to many reasons and one important reason is irregular sleep patterns and low sleep durations.

According to study done by Bleich, et al (2012), [12] normal weight physicians could council and provide better recommended obesity care to their patients than obese physicians.

The study showed highly significant positive correlation of BMI with PSQI score i.e. as the BMI increases the sleep quality decreases. These findings were similar to study done by Patel and Hu (2008), [13] which suggested poor quality sleep induces lethargy which in turn reduces the enthusiasm to do physical activity and reduces the desire to do exercise. They also found independent association of weight gain linked to short duration of sleep.

BMI showed highly significant negative correlation with sleep duration in the study. It is similar to the findings of the study done by Israel, et al (2016), [14] which showed a higher number of subjects sleeping 5 to 6 hours and a strong negative correlation of their sleep duration with BMI. This means, as the sleep duration decreases that person tends to gain weight. One of the reason for this is depicted in the study done by Taheri, et al (2004), [15] which found out that subjects who slept less had low leptin & elevated ghrelin levels. These neuroendocrine fluctuations increase the appetite of an individual leading to weight gain. [16]

### Conclusion:

There was significant negative correlation of BMI found with both sleep duration and sleep quality. It was found that short Sleep Duration and poor Sleep Quality is significantly associated with High BMI. Further studies by using objective measurements of sleep like Actigraphy, Polysomnography, Videosomnography will benefit in elaborating the findings and causal mechanisms can be explored. It is advisable to recommend healthy lifestyle with emphasis on proper sleep to general public.

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