

Prevalence of Poor Sleep Quality and its Association with Body Mass Index among PG Residents at a Tertiary Care Centre in Ujjain (Madhya Pradesh)

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Abstract: *Objective:* To assess sleep quality and association of body mass index with quality of sleep among post graduate resident doctors of various departments working at a Tertiary Care Centre. *Methodology:* This is a cross-sectional study with sample of 75 postgraduate residents working in various departments of RD Gardi Medical College, Ujjain (M.P.). The Questionnaire Pittsburg Sleep Quality Index (PSQI) and Epworth Sleepiness Scale (ESS) were applied for assessment of quality of sleep and excessive daytime sleepiness respectively. Chi-square test was applied to evaluate and analyze the results. *Results:* A total of 75 responses were obtained, of which 46(61%) showed poor sleep quality on PSQI. There were no significant differences in mean PSQI values between male and female residents. 41% of the students were found to have high BMI. There was no association found between PSQI and BMI among the post graduate residents. Among 3rd year residents 80% have poor quality of sleep comparative to 1st & 2nd year with significant value ($P=0.0023$). *Discussion:* The post graduate residents who go to bed early (before 10pm) were found to have good quality sleep, and the results were statistically significant ($P=0.013$). A significant association was seen with those who spend more than 85% of time in the sleep of the total time in bed ($P=0.007$) had good sleep quality, suggesting relationship of sleep quality with sleep habits. *Conclusion:* Overall poor quality of sleep and EDS (Excessive daytime sleepiness) was observed in post graduate residents. Prevalence of raised BMI is seen high in residents which may prepose the incidence of various metabolic and chronic illnesses in them.

Keywords: Sleep Quality, Body Mass Index, BMI

1.Introduction

Sleep is a recurring process characterized by a decrease in consciousness, altered muscle tone, and autonomic changes that is necessary for normal brain functioning^[1] It is not a passive process but requires the collaboration of various regulatory mechanisms. Interference with regular sleep pattern can be dangerous as well as expensive.^[2]

Occupations associated with great demand and stress or with night or alternating shifts are commonly associated with an increased risk for sleep disorders. Since college, medical students are subjected to a stressful routine.^[3, 4]

Excessive daytime sleepiness seems to be prevalent among students who have reduced sleep durations of 1-2 hours a day. Reduced daytime alertness, impaired cognitive performances and thereby diminished academic performance were found to occur among the students due to sleep deprivation.^[5]

Medical students are more vulnerable to sleep-related problems due to tough syllabus and heavy workload because of clinical postings.^[6]

An alarming increase in the incidence of obesity is seen worldwide. Obesity and overweight have been known to cause many public health problems including cardiovascular and endocrine disorders. Large population studies in the US has linked obesity and overweight to an increase in the incidence of sleep disturbances among the students.^[7]

A recent study has indicated that sleep problems are common among health care workers^[8]. In hospital, residents and fellows have many duties to perform including working in out-patients departments (OPD), in-patients departments (IPD), emergency on-call, and consultation-liaison duties. Normally, residents and fellows work 8 hours daily with extra emergency duties on a rotational basis; however, it is expected sometimes that they perform their duties on most working days, and extended hours are likely occurrences. This results in longer, sometimes double, the number of working hours, or even more. In India, an assessment of sleep quality in post-graduate residents in a tertiary hospital and teaching institute found that 12.5% of the subjects were poor sleepers (Pittsburgh sleep quality index: PSQI>5). They suffered from more day-time sleepiness, were less satisfied with their lives, and they were likely to use potentially addictive substances at some time during their residency^[9]. A prevalence of poor sleep quality of about 30 to 40% has been reported among medical students, and is mainly due to their rigorous training programs^[10, 11]

Studies assessing the quality of sleep among the medical students and the association of body mass index (BMI) on sleep quality have not been studied among the medical students in Jaipur. The objective of this study is to assess the prevalence of poor sleep quality and its association with BMI among medical students.

2.Materials and Method

This cross-sectional study was done between time period of June 2021 and august 2021 at RD Gardi Medical

College, Ujjain (M.P.). The Institutional Ethics Committee approval was obtained prior to the data collection. Resident doctors working schedule of college is 8-10 h daily with a once a weeknight/emergency duty for clinical departments, and total working hours are ranging from 48 h-60h/week with no regular shift workers. Convenient type of sampling was used for the data collection. All resident doctors of clinical and non clinical department included with prior written informed consent. Resident doctors with on benzodiazepines or hypnotics and with earlier diagnosed as insomnia were excluded.

The sociodemographic profile (age, gender, height, and weight), BMI, and the year of residency of all the recruited samples were noted. The quality of sleep was assessed by the Pittsburgh Sleep Quality Index (PSQI), a self-administered questionnaire.^[12] It is a scale to assess the quality and pattern of sleep. It was developed by the Hartford Institute for Geriatric Nursing, New York University. The PSQI has an internal consistency and a reliability coefficient (Cronbach's alpha) of 0.83. It differentiates "poor" from "good" sleep by measuring seven domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the past month. The subject self-rates each of these seven areas of sleep. Scoring of answers is based on a 0-3 on the Likert scale. Each domain is scored as: 0 (very good), 1 (good), 2 (poor), and 3 (very bad). The sum of scores varies between 0 and 21 and determines the PSQI. A global sum of "5" or greater indicates a "poor" sleep.

The Epworth Sleepiness Scale (ESS) was developed to assess sleepiness during daytime. The ESS questionnaire consists of eight questions about daily situations that can induce sleepiness. Each question has the lowest score of 0 ('no chance of falling asleep') to 3 ('high chance of falling asleep'). The score ranges can sum up to 24 and are categorized as normal (ESS < 10) or positive for daytime sleeping (ESS >10).^[13]

Statistical analysis

Frequency and percentage tables were used for the presentation of qualitative data. Chi-square test and regression analysis were used to analyze the relation between PSQI score and age, gender, BMI, and chronic illness. P <0.05 was considered as statistically significant. The Statistical Package for the Social Sciences software, (IBM Corp., Version 20.0. Armonk, NY) was used for data entry and analysis.

3.Results

Among 75 participants 40 were males and 35 were females. Most of residents of below 30 years of age. Out of 75, 31 students were overweight. According to year of residency 1st year were 31, 2nd year 24 and 3rd year resident were 20 in numbers.[table 1] sleep pattern found among participants were time to sleep ranges from 9 pm to 1 am, time to wake up ranges from 5am to 8 am.

Table 1: Sociodemographic and professional characteristics of residents

Gender	Male(40)	Female(35)
Age (years)		
<30	30	29
>30	10	6
BMI		
Normal	23	21
Overweight	17	14
Residency year		
1 st	16	15
2 nd	14	10
3 rd	10	10

Duration of sleep ranges from 4 hours minimum to 9 hours maximum.

Sleep Latency ranges from 5 min to 120 min. PSQI score recorded among residents were min 0 to max 10. EPSS with min 0 to max 15 [table 2]

Table 2: Sleep patterns of residents.

Sleep patterns	Minimum	Maximum	Mode	Mean	Standard deviation
Time to sleep	9:00 pm	1:00 am	11:30pm	NA	NA
Time to wake	5:00am	8:00am	6:30am	NA	NA
Sleep duration (hours)	4 hours	9 hours	7 hours	NA	NA
Sleep latency(min)	5 min	120 min	20 min	NA	NA
PSQI scores	0	10	4	5.9	1.89
Epworth sleepiness scale	0	15	6	7.40	3.70

Significant Prevalence of day time sleepiness among residents were found. In total 75 participants 28(37%) showed ESS >10. Those were with positive scores there

were no gender significance but 3rd year residents have more prevalence comparative to others.

Good quality of sleep seen in 37% of male and 40% of female, there is no significant correlation of good quality of sleep with gender. Most of the residents were of below 30 years of age among them 37% showed good quality of sleep and 44% in above 30 years of age. In normal and overweight the quality of sleep were 41% & 35% respectively and there was no significant correlation seen

BMI with quality of sleep. Only 20% 3rd year residents show good quality of sleep comparative to 1st and 2nd year(45%).there were significant correlation of poor quality of sleep with year of residency with p value of 0.0023.[table 3]

Table 3: The quality of sleep among various variables

Variable	Sub category	Sleep quality			P value *
		Good 29(39)	Poor 46(69)	Total 75(100)	
Gender	Male	15(37.5)	25(62.5)	40(100)	0.312
	female	14(40)	21(60)	35 (100)	
Age	<30	22(37)	37(63)	59 (100)	0.213
	>30	7 (44)	9(56)	16 (100)	
BMI	Normal	18(41)	26(59)	44(100)	0.352
	Overweight	11(35)	20(65)	31 (100)	
Year of residency	1 st & 2 nd year	25(45)	30(55)	55(100)	0.0023**
	3 rd year	4 (20)	16(80)	20(100)	

*P value was calculated by the chi-square test.

**Statistically significant values (P < 0.05).

Good sleep quality is reported by participants who sleep within 15 min of going to bed (54%) as compared to those who take more time to sleep (22%) with p value. The participants who go to bed early (before 10 PM) report good quality 60% as compared to only 29% who go to bed

later. Of the participants, those who spent in more than 85% of the time in bed as sleeping reported good quality sleep (62%) as compared to those who spent <85% time as sleeping [Table 4]

Table 4: Association of quality of sleep with various individual parameters of Pittsburgh Sleep Quality Index

Variables	Sub category	Sleep quality			P value*
		Good 29 (39)	Poor 46 (69)	Total 75 (100)	
How long you take to sleep (min)	<15	21(54)	18(46)	39(100)	0.043**
	>15	8 (22)	28(78)	36(100)	
When do you go to bed	Till 10 pm	14(60)	9(40)	23(100)	0.013**
	After 10 pm	15(29)	37(71)	52(100)	
How much percentage of the total time is spent in sleep (total number of hours asleep)/(total number of hours in bed) × 100	>85	23(62)	14(38)	37(100)	0.007**
	<85	6(16)	32(84)	38(100)	

*P value was calculated by the chi-square test.

**Statistically significant values (P < 0.05).

4. Discussion

This is study to specifically examine the prevalence of poor sleep quality among residents in RD Gardi Medical

college, Ujjain where medical training is as rigorous as in most other countries in the globe. Training facilities are sometimes overstretched by the number of trainees and activities.^[14]

The medical trainees who participated in this study undergo clinical rotations in most of their specialties at the hospital, and many of them live far from the hospital's location. Regarding characteristics of the subjects, significant differences between good and poor sleepers were found in years of study, shifting work schedule, physical and environmental factors and stress. In this study, male and female both are almost equal. It is observed that among gender there is no difference in prevalence of good quality of sleep. However, the study by Barger et al.^[15] states that poor quality of sleep is seen more among females as compared to males beyond psychosocial disparity as women are involved in multiple tasks along with psychological stress and hormonal changes which account for the poor quality of sleep. However, this study was done in participants who have extended work shifts, but in our study sample, the working hours were more or less the same throughout the week.

There was no significant association observed with BMI. Similar results have been found in some studies which concluded that organic disease per se does not explain the prevalence of sleep disorders in patients with chronic illnesses, there is no significant association of BMI with sleep quality as various other factors such as psychological and social contributions to the poor quality of sleep,^[16-18] although the results were statistically not significant. An inverse association between BMI and sleep difficulty and sleep duration was reported in another study.

The participants who go to bed early have reported the good quality sleep, and the results were statistically significant. It was also observed that a significant association was seen with those who spend more than 85% of time in the sleep of the total time in bed, are found to have good quality sleep as compared to those who spend less than 85%. Similar results were observed in another study conducted on Indian medical students stating poor quality sleep with increased sleep latency.^[29] The results were statistically significant.

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