ORIGINAL RESEARCH

Sleep Quality and Associated Factors among Undergraduate Medical Students of Medical College in Gwalior District of Central India

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ABSTRACT
Background: This study was framed with the aim to investigate the sleep quality and its association with different factors among the undergraduate medical students. This study also investigated the association between bed use of gadgets and time taken to fall asleep (sleep latency).**Material and Methods:** A cross-sectional study was conducted among the 265 undergraduate medical students of a teaching medical college in Gwalior District.This study was based on a self-reported questionnaire, which was administered to undergraduate medical students. The multicomponent questionnaire collected information on sociodemographic characteristics, sleep quality using the Pittsburgh Sleep Quality Index (PSQI), and screen time (minutes) daily spend onTV, TV-connected devices, laptops, smartphones, and tablets. Chi square test and logistic regression was applied. Level of significance was set at *5%*.**Results:**Out of total 265 students 122 were Poor Sleeper and 143 were good sleeper**.** As compared to the students doing exercise more than 3 days a week; the students doing exercise less than 3 days a week were about two times higher risk [OR: 1.848; 95% CI: 1.119-3.051]. Undergraduate medical students who were using less than 8 hour screen time per day as compared to those using more than8 hour screen time per day at lower risk for poor sleep [OR: 0.494 ; 95% CI: 0.297-0.820].Medical students who used gadget within 30 min of going to bed were take longer time (> half hour) to sleep.**Conclusion:** Students doing any physical exercise less than 3 days in a week and spending ≥8 hours daily on screen of any gadget were at risk for poor sleep quality. Bed time gadget usage was found to have a significant negative impact on sleep latency.
Key Words: Exercise; Screen Time; Sleep Latency.

INTRODUCTION

The Digital Technology has been a godsendin reducing obstacles to communication and bridging the gap between people throughout the world. The usability and popularity of smart phone gadgets have increased significantly in recent years. Concerns have been expressed about student academic performance, behavioral pattern, emotional problems, lack of attention, etc. due to the ever-increasing use of smartphones and laptops, especially among medical college students.[1] Electronic gadgets like laptops, Tablets, PCs, TVs have become an integral part of our modern lives and our work flows.However, these devices emit a spectrum of light. [2] Excessive exposure to short-wavelength light associated with thescreens of electronic devices (televisions, computers, cell phones, andtablets) is linked to risks for adverse effects, including acute melatoninsuppression, delayed sleep, and circadian disruption.[3]Even with applications adjusting the screen to “dark mode” may not be sufficientto prevent melatonin suppression and delayed sleep among adolescents. [4] In the previous studies it was found that almost half of adolescents not having 8–10 h of sleep per night as recommended for adolescents aged 13–18 years in the National Sleep Foundation guidelines. Sufficient sleep is essential to ensure their physical and emotional health.[5]“Screen time” signifies the time spent on any screen, namely, smart phone, tablet, television, video game, computer, or wearable technology.[6]Sleep is a vital, often neglected component of every person’s overall health and well-being. Sufficient nap is a biological and psychological requirement and prerequisite to sound cognition, good psychological status, and overall performance. Exposure to luminous light from the electronic devices would hinder sound sleep by altering communication pattern between sleep–wake cycle and the internal clock.[7] Excessive screen time can have many negative consequences in adolescents, such asadverse impacts on cognitive and psychosocial development (e.g., attention and learningdifficulties).[8]This study was framed with the aim to assess the prevalence of poor sleep quality and its association with different factors amongthe undergraduate medical students. This study assessed the association between bed use of gadgets and time taken to fall asleep (sleep latency).

MATERIAL AND METHODS

The present cross-sectional study was conducted among the medical students of G.R. Medical College Gwalior, Madhya Pradesh, India. The students were enrolled in the study after explaining the objective of the study and maintaining their privacy. The students were enrolled in the study after taking the informed consent. Ethical clearance was obtained from institutional ethicalcommittee. The sample size was calculated assuming that 43 % (*Baby RS* , 2021) [1] of medical students had disturbed sleep quality, and with 6% absolute error and 95% confidence interval the sample size was calculated to be 261.44 which were approximated to 265 . So 265undergraduate medical students as participants were enrolled in the study.Those students who were using sedative or sleep medications were excluded from the study. Questionnaire were used to collect data about Socio-Demographic profile such as age, gender, religion, place of residence,semester, or year of study, physical exercise and screen time spend. A self-administered and standardized tool "Pittsburgh sleep quality index" (PSQI) tool that distinguishes poor from good sleep by grading seven domains: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency,sleep disturbance, use of sleep medication, and day time dysfunction over the one month was used to assess the quality and patterns of sleep. [9] Scoring of the answers is based on a 0–3 scale, whereby 3 reflect the negative extreme on the Likert scale. The component scores are summed to produce a global score that range from 0 to 21, wherein higher scores indicate poor sleep quality. Data were analyzed using SPSS (IBM, Chicago, SPSS Inc. SPSS Statistics 22.0). Chi square test and logistic regression was applied to the association and strength of association between the variables. Level of significance was set at $P < 0.05$ level.

RESULTS

The present study was carried out among 265 MBBS students, of which 109 (41.13) were males and 156 (58.87) were females. In the present study 144 (54.34) students older than 20 years. Most of the students 200 (75.47) were the followers of Hindu religion. Among these 265 students, 68 (25.66), 70 (26.42), 71 (26.79) and 56 (21.13) were studying in I MBBS, II MBBS, III MBBS, and IV MBBS Prof, respectively. Among the male students poor sleep quality was found in 45.87 % while among the females it was 46.15 %. About half (47.93%) of the younger medical students (below 20years of age) had poor sleep quality. Among the underweight students poor sleep quality observed high (51.24%). Among the students who were doing exercise less than 3 days a week were observed to have more poor sleep quality (55.45%) and as compared to the students doing exercise more than 3 days a week it was observed that there was significantly about two times higher risk among the students doing exercise less than 3 days a week [OR: 1.848; 95% CI: 1.119-3.051]. Undergraduate medical students who were using less than 8 hour screen time per day as compared to those using more than8 hour screen time per day at lower risk for poor sleep [OR: 0.494 ; 95% CI: 0.297-0.820] [Table 1]

Table 1: Prevalence of poor sleeps quality among the Under Graduate Medical Students

Variables		Number (265) N(%)	Poor Sleeper (122) n(%)	Good Sleeper (143) n(%)	Chi Square/ P Value	OR (95% CI)
Gender	**Male**	109 (41.13)	50 (45.87)	59 (54.13)	0.002/0.964	0.989 (0.605-1.615)
	Female	156 (58.87)	72 (46.15)	84 (53.85)		1 (ref)
Age	**<=20**	121 (45.66)	58 (47.93)	63 (52.07)	0.322/0.572	1.151 (0.708-1.869)
	>20	144 (54.34)	64 (44.44)	80 (55.56)		1 (ref)
Religion	**Hindu**	200 (75.47)	91 (45.50)	109 (54.50)	0.425/0.808	0.557 (0.091-3.403)
	Muslim	60 (22.64)	28 (46.67)	32 (53.33)		0.583 (0.091-3.746)
	Others	5 (1.89)	3 (60.00)	2 (40.00)		1 (ref)
MBBS-Year	**I**	68 (25.66)	30 (44.12)	38 (55.88)	0.205/0.977	0.911 (0.448-1.854)
	II	70 (26.42)	32 (45.71)	38 (54.29)		0.972 (0.480-1.966)
	III	71 (26.79)	34 (47.89)	37 (52.11)		1.060 (0.525-2.139)
	IV	56 (21.13)	26 (46.43)	30 (53.57)		1 (ref)
BMI	**Underweight**	121 (45.66)	62 (51.24)	59 (48.76)	2.457/0.293	1.351 (0.473-3.861)
	Normal	128 (48.30)	53 (41.41)	75 (58.59)		0.909 (0.318-2.592)

	Overweight and obese	16 (6.04)	7 (43.75)	9 (56.25)		1 (ref)
Exercise per week	**<3 days**	101 (38.11)	56 (55.45)	45 (44.55)	5.814/0.016*	1.848 (1.119-3.051)
	≥3 days	164 (61.89)	66 (40.24)	98 (59.76)		1 (ref)
Screen time per day	**<8 hours**	104 (39.25)	37 (35.58)	67 (64.42)	7.540/0.006*	0.494 (0.297-0.820)
	≥8 hours	161 (60.75)	85 (52.80)	76 (47.20)		1 (ref)

*significant at 5% level of significance

Bed time gadget usage was found to have a significant adverse impact on the time taken to fall asleep (sleep latency). A significant adverse relationship was noted between total screen time and the time taken to fall asleep (sleep latency). Bed time usage of gadgets has an impact on the quantity and quality of sleep. Most of the medical students (78.75%) who did not used any gadget before bed within 30 min of going to bed were found to have sleep within 15 min while only 2.16% of the medical students who used any gadget before bed within 30 min of going to bed were found to have sleep within 15 min. Most of the undergraduate medical students who used any gadget before bed within 30 min of going to bed were found to have sleep after 30 min after going to the bed. (Table 2)

Table 2: Relationship between bed use of gadgets and time taken to fall asleep (sleep latency)

Use of Gadget before bed	**Time taken to fall asleep**								**Chi square / p value**
	≤ 15 Min		**16-30 min**		**31-60 min**		**>60 min**		
	number	**%**	**number**	**%**	**number**	**%**	**number**	**%**	
Not used within 30 min of going to bed (n=80)	63	78.75	12	15.0	3	3.75	2	2.5	
Used within 30 min of going to bed (n=185)	4	2.16	30	16.22	128	69.19	23	12.43	183.84 /< 0.001*

*significant at 5% level of significance

DISCUSSION

Good sleep is a topic that is often neglected, but it is a very important aspect of our everyday life. Sleep has been extensively studied and affects efficiency at work, daily tasks, or the prevention of diseases, store memories and maintenance of physical and mental health etc.The timing of sleep and wakefulness is controlled by two areas in the brain. One is highly sensitive to light and drives wakefulness, while the other, called the pineal gland, secretes the sleep hormone melatonin when the light dims in the evening," and also the light from our screens can delay our transition to sleep, even if we are engaged in some soothing activity online". Ongoing sleep deprivation can lead to excessive daytime sleepiness, a loss of the ability to concentrate and difficulty performing daily tasks. [10] Good quality sleep is needed for optimal neurocognitive and psychomotor functions as well as physical and mental health.

In the present study poor sleep quality was observed among the 122 (46.03%) of the students. Another study found that a total of 74% of children met age-appropriate sleep guidelines.[11] In a systematic review study it was found that the prevalence of insomnia in the general population was 7.4%; however, the prevalence among university students ranged from 9.4% to 38.2% and the weighted mean prevalence is 18.5% which is significantly higher than in the general population [12] Bani-Issa W et al. found that the mean PSQI score was 8.09 ± 3.37, and 74.3% of participants reported poor sleep . [13] A study conducted in Karachi reported that 71% of the students have poor sleep quality. [14]

Similar to our study KoushikYeluriet al. also observed that More than 2/3rd of the subjects (68.5%) were found to use a gadget within 30 minutes of bed time. Total screen time had a significant correlation with the time taken to fall asleep. With respect to screen time and sleep quantity, a negative correlation was noted betweentotal screen time and sleep quantity. [2] Our study also had an inverse relationship between screen time and duration ofsleep. In this study, that time taken to fall asleep was higher in subjects who used gadgets at bed time and it carried a significant association. The suppression of melatonin secretion, sleep disruption caused by gadget use, and psychological excitation brought on by gadget use are among the possible causes of sleep delay. [15]

CONCLUSION

About half of the students were found to have poor sleep pattern. Students having the exercise ≥3 days in a week were at less risk of poor sleep quality. Total screen time had a significant negative correlation with the time taken to fall asleep (sleep latency). Bed time gadget use was found to have a significant negative impact on sleep latency. It will be advised to limit technology usase in the bedroom at least 30 minutes before bed.

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CONFLICTS OF INTEREST
There were no conflicts of interest

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