Student Section

Association of Sleep Quality with Academic Performance in First Year Undergraduate Medical Students

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ABSTRACT

Introduction: In medical professional course, due to the hectic academic requirements, students often end up depriving the mind of adequate amount of sleep and rest. Sleep deprivation of varying occasions and durations can substantially impair physical, cognitive, and emotional functions affecting their academic performance.

Methodology: A total of 100 first year MBBS students filled the Pittsburgh's Sleep Quality Index (PSQI) for sleep quality and proforma for socioeconomic status (BG Prasad Scale) and their anthropometric measures were noted. The academic performance was assessed based on the performance in the final university examinations. Independent 't' test and Pearson's correlation was applied to correlate sleep quality with the academic performance.

Results: Mean overall score on PSQI was 5.92±3.24; the majority of students had a global PSQI score greater than 6; and about 67% of students were poor sleepers. There was a significant positive association between 1st MBBS marks and age as well as per-capita income and per-capita income per month. 1st MBBS marks were negatively correlated with height and PSQI score in participants. The correlation was significant with age, per-capita income, and per-capita income per month ($p < 0.05$) while the sleep quality score was non-significantly correlated with 1st MBBS marks ($p = 0.257$).

Conclusion: Early screening for poor sleep quality among medical students is an essential step in assessing the magnitude of the problem and its early intervention to improve their academic performance and quality of care provided by them later in their professional life.

Keywords: Academic performance, Sleep quality.

INTRODUCTION

Sleep is believed to have a facilitating role in learning and memory processes, thus the cognitive abilities.[1,2] In medical profession, due to the hectic academic requirements, students often end up depriving the mind of adequate amount of sleep and rest. Sleep deprivation of varying occasions and durations can substantially impair physical, cognitive, and emotional functions. Medical students may not consider sleep as a top priority in the context of their academic requirements as they reduce their sleeping time to have extra hours for studying and work. Poor sleep quality has been associated with reduced academic performance due to lack of concentration, daytime sleepiness, lowered attention level, impaired memory, decision making, and inability to function during the day.[3,4]

Furthermore, various medical problems can profoundly disrupt sleep, including obstructive sleep apnea, depression, chronic sleep deprivation, narcolepsy, cataplexy, and idiopathic hypersomnia.[5,6] Also, there are few data currently available regarding the effect of sleep quality on medical student's performance in India. Considering that the pattern of education and curricular requirements are different for different countries, the current study was aimed to study the sleep quality and its association with academic performance in first year undergraduate medical students.

METHODS

A total of 100 first year MBBS students (Batch 2018-19) were enrolled in the present study conducted at a constituent medical college of the Health University. The inclusion criteria were students with age less than 25 years, of either gender, enrolled in Bachelor of Medicine and

Bachelor of Surgery (MBBS) degree course, and willing to participate in the study. The study was conducted after approval from the institutional ethics committee and a written informed consent was obtained from all the participants prior to the study. All the participants were briefed and communicated on how to fill the questionnaire. The participants were asked to fill the Pittsburgh's Sleep Quality Index (PSQI)[7] to assess their sleep quality and a student's proforma consisting of details on socioeconomic status (via BG Prasad Scale)[8], and their anthropometric measures were noted.

The PSQI measures sleep-related habits in the past month including sleep latency, sleep duration, sleep efficiency,[9] sleep disturbance, subjective sleep quality, daytime dysfunction, and sleep medication use. Sleep efficiency is the ratio of time spent in sleep (total sleep time) to the amount of time spent in bed. PSQI contains seven components, each with a score from 0 to 3 with 3 indicating the greatest dysfunction. The global sleep quality score ranged from 0 to 21 and candidates with PSQI of more than 5 were labeled as having poor sleep quality and those with PSQI of less than or equal to 5 as good sleep quality.[7]

The questionnaire was administered at days other than the examination days to avoid any stress related bias in the study. The academic performance was assessed based on the performance in the final university examinations of the students. Appropriate statistical tools, independent 't' test and Pearson's correlation was applied to correlate the sleep quality with the academic performance.

RESULTS

Out of 100 enrolled students participation rate was found to be 97%. Age of students participating in the study ranged from 17 to 23 years with the mean age of 19.69±1.15 years. The average 1st MBBS marks, anthropometric, socio-economic variables, and PSQI score of the study participants are given in table 1. Mean overall score on PSQI was 5.92±3.24; the majority of students had a global PSQI score greater than 6; about 67% of students were poor sleepers. Only 33% reported getting more than seven hours sleep per night (Table 1).

There was a significant positive association between 1st MBBS marks and age as well as per-capita income and per capita income per month. 1st MBBS marks were negatively correlated with height and PSQI score. The correlation was significant with age, per-capita income, and per-capita income per month ($p<0.05$) and the sleep quality score non-significantly correlated with 1st MBBS marks ($p = 0.257$) (Table 2).

DISCUSSION

Sleep is a state of body and brain that recurs for hours every night and daytime with inactive nervous system, closed eyes, relaxed muscles, and practically suspended consciousness. Sleep is required to perform several different functions such as growth and repair, learning, and memory consolidation.[10]

In the present study, the mean overall PSQI score was 5.92 ± 3.24. Our results are in accordance with study conducted

Table 1: PSQI score, anthropometric, socio-economic variables in the study participants

Variables	Minimum	Maximum	Mean ± SD
Age (years)	17	23	19.69± 1.15
1st MBBS University marks	200	484	375.72 ± 42.96
Height (m)	1.42	1.90	1.69± 0.10
Weight (kg)	42	92	63.28± 11.77
BMI (kg/m^2)	14.80	31.22	21.89± 3.39
Annual income (Rs.)	30000	7150000	871964.29 ± 1132246.92
No. of family members	2	14	5.10 ± 1.70
Per-capita income (Rs.)	4286	1000000	165690.56 ± 172207.12
Per-capita income per month (Rs.)	357	83333	13601.72 ± 14447.92
Overall PSQI score	0	15.0	5.92 ± 3.24
Socio-economic class	1.62	2.11	1.97 ± 1.19

Table 2: Association between 1st MBBS marks and variables

Variables	Correlation	p value
Age	–0.361**	0.001
Height	–0.246*	0.023
Per-capita income	0.334**	0.002
Per-capita income per month	0.332**	0.002
Overall PSQI Score	–0.125	0.257

** Highly significant, * Significant

by Ahrberg K et al[11] on interaction between sleep quality and academic performance. The study participants also showed poor subjective sleep quality and poor sleep efficiency, daytime dysfunction, and sleep disturbance but consumed less sleep medication.

In the present study, mean 1st MBBS marks were 375.71± 42.96. The possible reasons behind poor academic performance could be sudden transition from pre-university course to a professional course. A study conducted by Datta A et al[12] revealed that students who average marks in last semester exam were most affected with disturbed sleep (66.3%) followed by students who got good marks (53.5%) and poor marks (50%) which was statistically significant. Pagal JF et al[13] reported that 7.69% of students with low average scores complained about sleep initiation, and 6.65% had difficulty in sleep maintenance. Sleep is involved in the processes of brain plasticity for memory consolidation that affects academic performance. The information acquired during wakefulness are actively altered, restructured, and strengthened during sleep. Consolidation and encoding of memories are very important for medical education as medical students need to retain a substantial amount of complex knowledge within short period of time.[11]

There was an inverse correlation between 1st MBBS marks and age ($r = -0.361$, $p < 0.001$) in the present study. Ibrahim et al[14] have reported that sleep quality was significantly associated with age, gender, year of study, and current residence with prevalence of poor sleep quality more among <21 years when compared to those >21 years and females compared to males. This kind of association appears to depend on changes occurring with age throughout adult life, which involve increasing vulnerability of the regulatory system of the sleep-wake rhythm.[15]

In this study, the per-capita income per month was significantly correlated with 1st MBBS marks and non-significantly correlated with sleep quality. Approximately 57% of low family income students experienced poor academic performance and sleep quality. The results suggested that socio-economic, lifestyle, and health-related factors are independently associated with poor sleep quality. There is a lack of knowledge and education about sleep aids and their effectiveness due to poor socio-economic background. For instance, the students may not know that behavioral modifications such as regular exercise, meditation, and deep breathing are interventions that can enhance quality of sleep.

1st MBBS marks inversely correlated with sleep quality ($r = –0.125$) that was statistically non-significant ($p>0.257$). Our results are in accordance with other studies.[15,16] Poor sleep quality including short sleep duration, irregular sleep schedules, sleep deprivation, and daytime sleepiness affects the academic performance of medical students and also their work performance in the future when they become practitioners.[17] Adequate sleep is essential to refresh the students every day and help them in learning and memory processing. Limitation of the study includes small sample size.

CONCLUSION

The findings of the study can guide to design proper interventions in order to promote student's overall health and sleep hygiene and thus in turn enhance their academic performance. Screening for poor sleep quality among medical students early in their career is an essential step in assessing the magnitude of the problem and in early management. This shall improve the academic performance of the students and the quality of care provided by them later in their life.

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