Original Research

Assessment of relationship between sleep quality and academic performance

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ABSTRACT
Background: Sleep is crucial for human health and life, as well as for learning, practice, and both physical and mental well-being. The present study was conducted to assess relationship between sleep quality and academic performance.
Materials & Methods:160 students of both genderswere provided with a questionnaire and their response was recorded. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI).Individuals with a global PSQI score of five or less (PSQI≤5) are classified as good sleepers, indicating good sleep quality. In contrast, those with a PSQI score exceeding five (PSQI>5) are considered poor sleepers.
Results: Out of 160 subjects, 70 were males and 90 were females. The mean age was 21.3±5.4 years, GPA was 22.9±3.8 and PSQI was 5.4±1. Among good sleepers, GPA score 3.01- 3.51 was seen in 32, 2.51- 3.01 in 30 and 2.00-2.50 in 25 subjects. Among poor sleepers, GPA score 3.01- 3.51 was seen in 28, 2.51- 3.01 in 25 and 2.00-2.50 in 20 subjects. The difference was non- significant (P> 0.05). Habitual sleep efficiency good (>75%) had GPA between 3.01-3.51 (45), 2.51-3.01 (52) and 2.00-2.50 (63) and poor (<65%) in 5, 6 and 8 subjects respectively. The difference was significant (P< 0.05).
Conclusion: Educators are concerned about the extent of poor sleep quality among students. Academic performance of students was affected by poor sleep quality. It has been demonstrated that programs teaching proper sleep hygiene can enhance the quality of sleep experienced by students.
Keywords: academic performance, Sleep,Pittsburgh Sleep Quality Index

Introduction

Sleep is crucial for human health and life, as well as for learning, practice, and both physical and mental well-being. Research has indicated that inadequate sleep, a higher occurrence of short-duration sleep, and the habits of sleeping late and waking early can influence learning ability, academic success, and neurobehavioral functions.[1] Research has shown that the amount of sleep people classify as delayed or inappropriate, along with oversleeping on weekends and experiencing daytime drowsiness, correlates with diminished academic performance in both children and adults. Certain studies have highlighted the connection between a later start time for classes and academic achievement. Severe drowsiness and academic failure have been linked to reduced overnight sleep or changes in sleep patterns.[2]
Memory consolidation is enhanced by good-quality sleep, which fortifies the synaptic connections that were active while awake. Conversely, when we do not get enough sleep, our focus, attention, and vigilance wane. This complicates the process of acquiring knowledge. It is known that sleep deprivation reduces the ability to learn new things by forty percent.
Research on sleep deprivation, conducted both in lab environments and at home, has shown that persistent poor sleepers exhibit markedly greater fatigue, sleepiness, and cognitive performance issues.[3]
Insufficient sleep is widespread among people globally. Medical students experience poor sleep quality at rates significantly exceeding those of students in other fields and the general population.[4] Numerous studies have identified several risk factors, including hectic academic schedules, frequent examinations, poor academic achievement, emotional stress, and behavioral issues such as internet addiction and the consumption of stimulant beverages and caffeine.[5,6]The present study was conducted to assess relationship between sleep

quality and academic performance.

Materials & Methods

The study was carried out during 25 April 2017 to October 2017 at IGIMS Patna, Bihar among 160 students of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. All were provided with a questionnaire and their response was recorded. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI).It comprises nineteen questions that classify the seven distinct parameters of sleep—such as sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication, and daytime sleepiness—into seven component scores. The Global PSQI score is calculated by summing the scores of the individual components. Individuals with a global PSQI score of five or less (PSQI≤5) are classified as good sleepers, indicating good sleep quality. In contrast, those with a PSQI score exceeding five (PSQI>5) are considered poor sleepers. Self-reported percentages of marks students received in the fall semester were used to derive academic performance. Percentage marks were transformed into grade point averages and noted as numerical variables. It was then converted to a categorical variable by subdividing into three groups viz good (GPA=3.01- 3.50) average (GPA= 2.51-3.00) and poor (GPA= 2.00-2.50). Global PSQI score and the seven individual components of PSQI compared with the academic performance of the students.Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table: I Distribution of subjects

Total- 160		
Gender	**Males**	**Females**
Number	70	90

Table I shows that out of 160 subjects, 70 were males and 90 were females.

Table: II Baseline parameters

Parameters	**Mean**	**SD**
Age (years)	21.3	5.4
GPA	22.9	3.8
PSQI	5.4	1.0

Table II shows that mean age was 21.3±5.4 years, GPA was 22.9±3.8 and PSQI was 5.4±1.

Table III Assessment of relationship of Global PSQI with Grade point Average (GPA)

Global PSQI	3.01-3.51 (60)	2.51-3.01 (55)	2.00-2.50 (45)	Total	P value
≤5 (good sleepers)	32	30	25	87	0.57
>5 (poor sleepers)	28	25	20	73	

Table III shows that among good sleepers, GPA score 3.01- 3.51 was seen in 32, 2.51- 3.01 in 30 and 2.00-2.50 in 25 subjects. Among poor sleepers, GPA score 3.01- 3.51 was seen in 28, 2.51- 3.01 in 25 and 2.00-2.50 in 20 subjects. The difference was non- significant (P> 0.05).

Graph: I. Assessment of relationship of Global PSQI with Grade point Average (GPA)
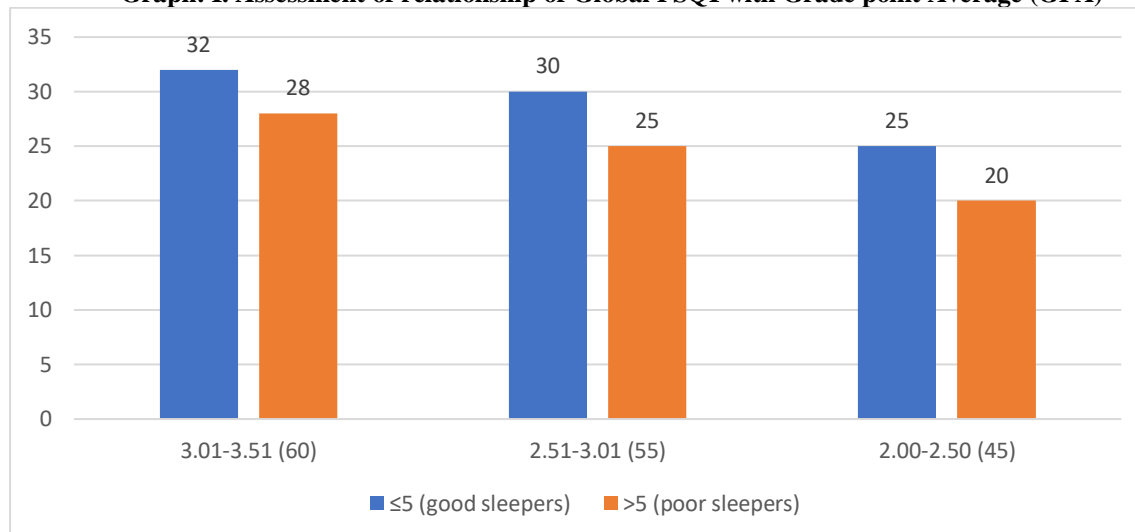
Table IV Relationship between habitual sleep efficiency and Grade Point average

Habitual sleep efficiency	3.01-3.51 (45)	2.51-3.01 (52)	2.00-2.50 (63)	Total	P value
Good (>75%)	40	46	55	141	0.02
Poor (<65%)	5	6	8	19	

Table IV shows that habitual sleep efficiency good (>75%) had GPA between 3.01-3.51 (45), 2.51-3.01 (52) and 2.00-2.50 (63) and poor (<65%) in 5, 6 and 8 subjects respectively. The difference was significant (P< 0.05).

Discussion

Sleep disorder is an emerging public health problem. Any deficiency in either quality or quantity of sleep is considered a sleep disorder.[7,8] The International Classification of Diseases-10 classifies sleep disorders into six symptoms based on major categories, namely insomnia, hypersomnia, sleep-related breathing disorders, parasomnia, circadian rhythm sleep disorders and sleep-related movement disorders.[9] It is estimated that globally 25%–30% of adults suffer with at least one of the sleep disorders.[10] The present study was conducted to assess relationship between sleep quality and academic performance.

We found that out of 160 subjects, 70 were males and 90 were females. We found that mean age was 21.3±5.4 years, GPA was 22.9±3.8 and PSQI was 5.4±1. Jalali et al[11] determined the relationship between sleep quality and students' academic achievement among 102 medical students from different fields, with maximum variation sampling, completed Pittsburgh Sleep Quality Index (PSQI). Based on the quality of sleep questionnaire scores, the results indicated no significant difference between students with high grades and those with low grades. However, there were moderate and sometimes severe sleep disturbances in both groups. The results showed no significant difference between sleep quality and academic achievement. Nevertheless, longitudinal study should be performed to control for confounding factors.

We found that among good sleepers, GPA score 3.01-3.51 was seen in 32, 2.51- 3.01 in 30 and 2.00-2.50 in 25 subjects. Among poor sleepers, GPA score 3.01-3.51 was seen in 28, 2.51- 3.01 in 25 and 2.00-2.50 in 20 subjects. Ramaswamy et al[12] assessed the prevalence of sleep disorders among people above 15 years of age. The Pittsburgh Sleep Quality Index was administered to detect sleep disorders among the participants. Association between various individual factors and sleep disorders was assessed using generalized linear models adjusting for clustering at the household level and expressed as prevalence ratio with 95% confidence interval (CI).

The mean (SD) age of the 501 participants was 38.3 (15.4) years. Poor quality of sleep was present in 36.3% (95% CI 32.2%–40.6%). In multivariate generalized linear model, age >60 years (adjusted prevalence rate ratio [aPRR] 1.68; 95% CI 1.11–2.53), female sex (aPRR 1.57; 95% CI 1.18–2.08), living in a broken family (aPRR 1.47; 95% CI 1.06–2.02) and having a television in their sleeping room (aPRR 1.40; 95% CI 1.40–1.79) were independently associated with poor quality of sleep.

We found that habitual sleep efficiency good (>75%) had GPA between 3.01-3.51 (45), 2.51-3.01 (52) and 2.00-2.50 (63) and poor (<65%) in 5, 6 and 8 subjects respectively. Chandran et al[13] determined the relationship between poor sleep quality and academic performance among undergraduate medical students in India. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). Academic performance was assessed by the student`s self-reported grade point average (GPA), which was then

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compared with the various parameters of sleep quality. After omitting the incomplete entries, the final sample size attained was 218.Mean (SD) GPA was 2.2 (0.6). Median PSQI was 5.0 and poor sleep quality was prevalent among 90 (41.3%) of the students' significant difference was seen in the academic performance between the good sleepers and the poor sleepers. Poor habitual sleep efficiency (<.003).

The shortcoming of the study is small sample size.

Conclusion

Authors found that educators are concerned about the extent of poor sleep quality among students. Academic performance of students was affected by poor sleep quality. It has been demonstrated that programs teaching proper sleep hygiene can enhance the quality of sleep experienced by students.

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