RESEARCH ARTICLE

Factors associated with sleep deprivation and their impact on academic performance of hostelites of twin cities of Pakistan

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Abstract

Objective: To determine the factors associated with sleep deprivation and their impact on academic performance of students living in a hostel setting.

Method: It was a correlational study conducted from January to June, 2018 in Rawalpindi and Islamabad, Pakistan, and comprised university students of either sex aged 18-25 years who were studying at different universities of the twin cities. A semi-structured questionnaire was used along with Pittsburgh Sleep Quality Index to collect data which was analysed using SPSS 21.

Results: Of the 850 students, 450(50%) each were males and females. The overall mean age was 21.10±1.84 years. There was academic stress in 672(79%) students which disturbed the normal sleep cycle. Other factors affecting students; sleep were financial issues 632(74%), uncomfortable bed mattresses 671(79%), environmental noise 468 (53%), poor ventilation 666 (78%), hostel near commercial places 233(27%), and the habit of playing mobile games 545(65%). Female students had more sleep problems than males ($p<0.05$). Bivariate correlation showed no association of these factors and cumulative grade point average ($p>0.05$).

Conclusion: The most common factors found to be influencing hostelites' sleep were stress, financial issues, uncomfortable mattresses, environmental noise and playing games on mobile before sleep. Disturbed sleep did not affect academic performance.

Keywords: Academic performance, Factors, Hostelites, Sleep deprivation. (JPMA 70: 851; 2020).

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Introduction

Sleep deprivation is a condition when an individual doesn't get enough sleep characterised by signs of sleepiness during the day, reduced alertness and decreased performance at work or study.[1] Sleep is characterised by three main behavioural states such as wakefulness (W), Rapid-Eye-Movement (REM) and Non-Rapid-Eye-Movement (NREM) sleep through detection and quantification of brain waves of the electroencephalogram (EEG).[2] The loss of sleep is very common problem today which affects many individuals at some point in life.[3] The amount of sleep an individual needs may vary from person to person or from age to age but mostly an individual needs to sleep for at least 7-8 hours daily to feel alert and well-rested.[4] Students living in hostels face many problems which affect their sleep quality and academic records.[5]

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Many hostellites face new challenges such as being solely responsible for themselves, new place with new schedules, unfamiliar environment, social obligations, bullies from among the seniors, non-cooperation from roommates, food problems, financial burden as well as academic stress. Due to these factors students are forced to change their sleeping time and alter their sleeping habits.[6] Thus, hostelites are vulnerable to sleep deprivation and have sleep-related problems. Generally, students living in hostels have a later bed-time and rise-time, longer sleep latency and shorter total sleep.[7] In addition, it is commonly noted that sleep deprivation has severe consequences, impacting student's physical and mental health as well as adequate functioning in the daytime.[8] Sleep restriction in healthy young adults have been found to have deleterious effects on endocrine functions, metabolic and inflammatory responses.[9] Studies have confirmed that insomnia and short sleep duration are associated with a wide range of behavioural, emotional, cardiovascular morbidities and mortality.[6] Furthermore, sleep deprivation also affects

adversely brain's ability to process, which leads to impaired cognition and memory issues.[9,10] The current study was planned to find factors associated with sleep deprivation and their impact on academic performance of hostelites.

Subjects and Methods

This was a correlational study conducted from January to June 2018 in Rawalpindi and Islamabad, Pakistan, and comprised students at 6 private and public universities: Riphah International University (RIU), Yusra Medical University (YMU), Arid Agricultural University (AAU), Islamic International University (IIU), Air University and Iqra University. After approval from the ethics committee of Riphah College of Rehabilitation Sciences, RIU, the sample size was calculated using Raosoft at a confidence level of 95% and confidence interval (CI) of 5%.[11] However, a larger sample was raised to improve the power of the study. Using non-probability sampling technique, hostel students of either sex aged 18-25 years were selected. After taking informed consent, all the participants were asked to complete a survey form that assessed various health behaviours. The questionnaire also contained items used to obtain demographic information, including sex, age, body mas index (BMI), study hours, sleep time, hostel environment, leisure time, daily study hours etc. BMI kg/m^2 was calculated by dividing weight (in kg) over height (in m^2).[12] The National Institutes of Health (NIH) now defines normal weight, overweight and obesity according to BMI rather than the traditional height/weight charts. Overweight is a BMI of 27.3 or more for women and 27.8 or more for men. Obesity is a BMI of 30 or more for either sex.[12] Standardised assessment tools included Pittsburgh Sleep Quality Index (PSQI) which differentiates between poor quality and good quality sleepers by measuring 7 aspects including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction over the preceding month. Scoring of an answer is based on '0' to '3' scale, whereby 3 reflects the negative extreme. The seven component scores are added to get the global score in a range of 0-21 with 0 indicating no difficulty and 21 showing extreme difficulty in sleep.[13] Data was analysed using SPSS 21. Mean, standard deviation (SD), frequency and percentages of different variables were calculated. Bivariate analyses were conducted using the Spearman's correlation for ordinal variables and Pearson correlation for continuous variables, in order to verify various factors. Comparison between the sex was done through independent sample t test. P<0.05 was considered statistically significant.

Results

Of the 850 students, 425(50%) each were males and females. The overall mean age was 21.10±1.84 years. The majority of the students (93%) were from private institutions. There were 107 (13%) underweight students, 624(73%) had normal weight, 105(12%) were overweight and 14(2%) were obese. Students who studied <2 hours were 259(31%), 3-4 hours 503(59%) and 5-6 hours 88(10%). Students with the CGPA <2 were 5(1%),

Table-1: Descriptive Analysis with frequency (n), percentage (%), Mean & SD of PSQI.

Components of the PSQI	n (%)	Mean±SD
Subjective sleep quality		1.2±0.2
Very good	138(16)	
Fairly good	475(56)	
Fairly bad	195(23)	
Very bad	42(5)	
Sleep latency		1.0±1.1
Not during the past month	349(41)	
Less than once a week	247(29)	
Once or twice a week	128(15)	
Three or more times a week	126(15	
Sleep duration		1.2±1.0
>7 hours	258(30)	
6-7 hours	255(27)	
5-6 hours	267(31)	
<5 hours	100(12)	
Habitual sleep efficiency		0.7±1.1
>85%	536(63)	
75-84%	144(17)	
65-74%	81(10)	
<65%	89(11)	
Sleep disturbance		1.3±0.6
Not during the past month	56(7)	
Less than once a week	526(62)	
Once or twice a week	247(29)	
Three or more times a week	21(3)	
Use of sleeping medication		0.4±0.7
Not during the past month	601(71)	
Less than once a week	186(22)	
Once or Twice each week	199(5)	
Three or more times each week	38(3)	
Daytime dysfunction		1.1±0.8
Never	196(23)	
Once or Twice	417(49)	
Once or Twice each week	199(23)	
Three or more times each week	38(5)	
Total (GPSQI)		6.8±3.2

GPSQI: Global Pittsburgh Sleep Quality Index, SD: Standard Deviation.

2-3 were 270(32%) and 3-4 were 575(68%). Of the total, 635(75%) participants were physically active and 215(25%) had a sedentary lifestyle. Also, 90(11%) subjects were smokers, 684(81%) were non-smokers and 76(9%) were involved with other addictions. The participants who spent <2 hours leisure time were 265(31%), 3-4 hours 317(37%) and 5-6 hours 268(32%).

Table-2: Comparison of PSQI between sex with Mean & SD and *p*-values.

Components of the PSQI	Mean±SD	*p*-value
Subjective sleep quality		0.68
Males	1.2±0.74	
Females	1.17±0.75	
Sleep latency		0.004
Males	0.92±0.91	
Females	1.13±1.15	
Sleep duration		<0.001
Males	1.04±0.97	
Females	1.4±1.01	
Habitual sleep efficiency		0.001
Males	0.56±0.93	
Females	0.81±1.12	
Sleep disturbance		0.05
Males	1.2±0.61	
Females	1.31±0.62	
Use of sleeping medication		0.02
Males	0.44±0.69	
Females	0.34±0.71	
Daytime Dysfunction		0.3
Males	1.06±0.75	
Females	1.12±0.83	
Total (GPSQI)		<0.001
Males	6.4±2.9	
Females	7.4±3.2	

GPSQI: Global Pittsburgh Sleep Quality Index, SD: Standard Deviation.

Table-3: Correlation of different factors with GPSQI.

Variables	*r*- value	*p*-value
Absent minded in class	-0.28	<0.001
CGPA	0.003	0.97
Academic performance towards downfall	-0.21	<0.001
Avoid extracurricular activities	-0.14	<0.001
Taking medication	-0.02	0.41
TV in room	0.02	0.66
Hostel near commercial place	0.67	0.05
Take day nap	0.04	0.22
Play mobile games before bedtime	0.51	0.05
Financial issues	0.81	0.02
Academic stress interference with sleep	0.52	0.12
Take meal near bed time	0.008	0.82
Uncomfortable bed/mattress	0.75	0.01
Poor ventilation in rooms	0.41	<0.001
Overcrowded rooms	0.76	<0.001
Environmental noise	0.61	0.04
Feel tired	0.31	<0.001

GPSQI: Global Pittsburgh Sleep Quality Index, CGPA: Cumulative grade point average.

There was academic stress in 672(79%) which disturbed the normal sleep cycle of the students (Table 1). Female students had more sleep problems than males (p<0.05) (Table 2). There was a weak positive correlation of CGPA (r=0.003, p>0.05) with PSQI which showed that despite the many problems faced by the hostelites, they managed to study hard and performed fairly well in studies (Table 3).

Discussion

Findings of the study suggested that stress was the biggest contributing factor of sleep deprivation in hostelites, and 79% subjects were categorised as poor-quality sleepers by the PSQI. Students classified as poor-quality sleepers reported significantly more problems with physical and psychological health than did good-quality sleepers. Students overwhelmingly stated that emotional and academic stress negatively impacted sleep. Lund HG et al. conducted a study on sleep patterns and predictors of disturbed sleep in a large population of college students which showed similar findings.[14] The results of the current study showed that the students who took daytime naps (67%) were prone to sleep deprivation. Overall, 29% students reported irregular sleep pattern which affected their academic performance and 46% students felt absent-minded in their classes due to sleep deprivation. Literature reveals that lack of sleep affects academic performances.[15,16] According to the current study, 65% of the hostelites were addicted to playing games on mobiles (p<0.0.5) before bedtime which affected their sleep. Electronic media use and caffeine consumption before bedtime are predictors of poor sleep quality, as noted by Sara Thomme et al. who conducted a study on mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults.[17] According to a study, 22% of the men and 24% of the women were using mobile phones which affected their normal sleep onset[18] Overcrowded rooms, fatigue and environmental noise (p<0.0.5) were also the causing factors of sleep deprivation in the current study. Chronic sleep loss and associated sleepiness and daytime impairments in students are a serious threat to the academic success, health and safety of the youngsters.[19,20]

An optimal level of stress enhances learning while excess of stress can cause health problems. This results in reduction of students' self-esteem and affects their

academic achievement. A high level of stress may have negative effect on cognitive functioning and learning of students in medical colleges. In a study, there was a moderate positive (0.52) correlation between Academic stress interference with sleep.[21]

The current study showed about 27% of the students were sleep-deprived because their hostels were near some commercial place. Griefahn et al. reported that due to environmental noises, sleep can be affected and may lead to insomnia.[22,23] In the current study, 79% students experienced sleep deprivation due to uncomfortable mattresses in their rooms and 68% students reported fatigue. David F. Mastin et al. reported that uncomfortable bed mattresses and day-nap affected sleep quality.[24] Sleep disturbance and fatigue are interlinked with each other which affects the academic performance of students. In the current study mean value of hostelites' global PSQI was 6.8±3.2, and 475 students reported fairly good sleep, 349 reported sleep latency, 258 students slept more than seven hours, 536 had habitual sleep efficiency, 526 had sleep disturbance once a week, 526 reported daytime dysfunction. Inadequate sleep affects the productive capabilities of young adults and creates psychological and behavioural dysfunction.[25]

The current study showed that female participants experienced more sleep deprivation compared to the males. Hostel students who are getting poor sleep quality may not be at risk at academically. However, other stress-related factors in the long run can affect their productivity and possibly lead to detrimental health effects. Future studies should include studying other factors like mood-affected disorders, physical and mental health conditions that have been reported to be linked with sleep disorders and sleep deprivation. Sleep education is highly recommended in every institution to increase awareness among students and young adults. Moreover, hostel facilities and environment need important consideration for the ease of students. This study focussed on students of many disciplines living in hostels, while future studies should be done on a single type of academic discipline so that factors affecting their academics can be better evaluated and correlated.

Conclusion

The most common factors which influenced hostelites' sleep academic and financial stress, uncomfortable mattresses, environmental noise and the habit of playing games on mobile phones before bedtime. Female students were more prone to sleep deprivation compared to the males. However, disturbed sleep did not affect academic records of the students.

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