

ORIGINAL ARTICLE

Frequency and Associated Factors of Physical Activity and Sleep with Depression in College Going Students

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ABSTRACT

Objective: To determine the frequency and associated factors of physical activity and sleep with depression in college going students.

Methods: This cross-sectional study was conducted among students of various universities, colleges, and institutes of Delhi from April to July 2022. Students aged between 18-26 years, consisting of both males and females were included. Physical activity level was assessed by the International Physical Activity Questionnaire-Short Form (IPAQ-SF), depression level was assessed by the Center for Epidemiologic Studies Depression (CES-D) survey, and sleep quality was measured by the Pittsburgh Sleep Quality Index (PSQI).

Results: Of 120 participants, there were 48 (40.0%) males and 72 (60.0%) females. Most of the students had moderate/high physical activity 88 (73.3%), 63 (52.5%) had no symptoms of depression and 70 (58.3%) had no difficulty in sleep. A significant association of physical activity was found with gender (p-value 0.036), smoking (p-value 0.022), alcohol (p-value 0.033), pocket money (p-value 0.033), and depression (p-value 0.007). Sleep dysfunction was found higher in those students who had depression as compared to students who did not have depression i.e., 34 (59.6%) vs. 16 (25.4%) respectively (p-value <0.001).

Conclusion: Most students demonstrated sufficient physical activity, no symptoms of depression and difficulty in sleep. However, significant associations of physical activity and sleep were seen with depression. Students with symptoms of depression had higher prevalence of sleep dysfunction. The causal connections between levels of physical activity, sleep quality, and mental health require further research.

Keywords: College Students, Depression, Insomnia, Physical Activity.

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INTRODUCTION

Sleep issues and poor sleep quality are prevalent among university students. Due to academic, social, and schedule demands, students are more vulnerable to sleep disorders and deprivation.¹ Sleep issues can result in poor academic performance as well as bad health outcomes such as exhaustion, mood instability, and impaired focus. Numerous variables, including behavioural, lifestyle, and demographic aspects are linked to poor sleep quality. Sleep deprivation was found to be positively correlated with advanced age, irregular nutrition, lack of exercise, smoking, poor mental health, chronic illnesses, or multiple disorders.² Poor mental health in university students may be caused by decline in appropriate sleep habits and sleeping hygiene. University students in several nations

have been found to have poor sleep quality, which affects about 50% of students.³ Mental wellness and sleep quality have a bidirectional link.¹

Depression shows high prevalence rates, chronic nature, difficult treatment and recovery and thus it is a significant mental health concern all over the world.⁴ Depression causes feelings like feelings of inadequacy, fright, anger in university students.⁵ According to published literature, depression in college students in India at varies from 21.5% to 71.25%.⁶

Numerous researches demonstrate the beneficial effects of physical activity on sleep quality and mental health, but overall data is still ambiguous.⁷⁻⁹ Researchers have found that with the help of physical activity depressive symptoms can be reduced and regulated.⁹ Engaging in sports led to improved mental health.¹⁰

The purpose of this research is to determine the

frequency and associated factors of physical activity and sleep with depression in college going students. The increased incidence of physical inactivity, sleep problems, and depression among college students make them a topic of attention. To the best of our knowledge there haven't been many research looking into the relationship between Indian students' physical activity, sleep, and mental health. Significance of this study is to serve as a targeted program on physical activity, sleep quality and depression in impacted student groups, and promote mental health in college students.

METHODS

This cross-sectional study was conducted among students of various universities, colleges, and institutes of Delhi from April to July 2022. Ethical clearance was obtained from the Research Committee of School of Physiotherapy, Delhi Pharmaceutical Sciences and Research University, Delhi vide reference # 10/2044/SOP/DPSRU/2021/1043. Students were recruited after describing the objectives of the study and promising their anonymity. Students took part after signing an informed consent form stating their willingness to engage in the study.

Convenience random sampling was used to select students from various universities, colleges, and institutes of Delhi. Inclusion criteria were college students between the age of 18-26 years, both male and female, both day scholars and hostellers, students willing to participate, and communicating in either Hindi or English language. Exclusion criteria included school students, college students with age ≤ 17 and ≥ 27 years, communicating in languages other than Hindi or English, and having any complicating factors, like a medical, surgical, or neurological disease.

Participants filled three self-reported questionnaires assessing physical activity habits, depressive symptoms, and sleep patterns anonymously.

The International Physical Activity Questionnaire (IPAQ) – Short Form evaluates level of usual physical activity. It asks for everyday sitting time as well as vigorous, moderate, and walking activity. The IPAQ is made up of seven questions that ask about past week's physical activity. Responses to questions are used to calculate the overall physical activity, assessed in MET-min/week and sitting time. A Score of 600, 3000 and more than 3000 MET's was classified as mild, moderate and high physical activity.¹¹ It has a Cronbach's alpha coefficient of 0.758, and has reliability and internal consistency.¹²

The Center for Epidemiologic Studies Depression (CES-D) survey evaluates depression levels. It includes 20 questions assessing depressive symptoms encountered in the previous week. Response possibilities include rarely (score 0), some of the time (score 1), occasionally (score 2), and most of the time (score 3). The survey's total score varies between 0 to 60. A score of 16 or higher suggests depression.¹³ It has a Cronbach's alpha coefficient of 0.90 showing internal consistency, significant correlations with other mood state measures indicated its concurrent validity.¹⁴

The Pittsburgh Sleep Quality Index (PSQI) evaluates prior month's sleep quality and any indications of sleep disturbance. It has 19 questions, and has 7 subscales: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. A global sleep quality score ranging from 0 to 21 is comprised of seven subscales. Response choices vary from good to poor, with scores varying from 0 to 3. A score of 5 or higher denotes poor sleep quality.¹⁵ It is reliable and has internal consistency (0.72) and it also showed good convergent and divergent validity.¹⁶

A self-structured data collection form was used for sociodemographic details (age, gender, college year, residence, type of family, family income and pocket money) and personal history assessment (smoking, alcohol and exercise habits).

Data entry and analysis were done using a Statistical Package for Social Sciences (SPSS) version 20.0. Mean \pm SD were computed for quantitative variables like, age, duration of exercise, and weight while frequency and percentages were computed for categorical variables like, gender, residence, smoking, alcohol, family income, pocket money, exercise habits, and depression. Inferential statistics were explored using Chi-square/Fisher exact test to compare relationship of physical activity and sleep quality with demographic characteristics and depression of college students. The p-value of ≤ 0.05 was considered statistically significant.

RESULTS

Of 120 participants, the mean age and weight of college students were 20.78 ± 1.35 years and 59.17 ± 12.97 kg. There were 48 (40.0%) males and 72 (60.0%) females. The mean duration of exercise in students was 43.97 ± 25.38 min/day. Most of the students were non-smoker 110 (91.7%), did not take alcohol 104 (86.7%), day scholar 112 (93.3%), had annual income up to 8 lacs 66 (55.0%), pocket money up to 1000 Rs 104 (86.7%), doing

Table 1: Components and grading of PSQI (n=120)

Components of PSQI	n (%)
Subjective Sleep Quality	
Very Good	36 (30.0)
Fairly Good	66 (55.0)
Fairly Bad	18 (15.0)
Sleep Latency	
No Difficulty	38 (31.7)
Mild Difficulty	40 (33.3)
Moderate Difficulty	26 (21.7)
Severe Difficulty	16 (13.3)
Sleep Duration	
>7 Hours	18 (15.0)
6-7 Hours	54 (45.0)
5-6 Hours	28 (23.3)
<5 Hours	20 (16.7)
Habitual Sleep Efficiency	
>85%	60 (50.0)
75-84%	32 (26.7)
65-74%	24 (20.0)
<65%	4 (3.3)
Sleep Disturbances	
No Difficulty	12 (10.0)
Mild Difficulty	90 (75.0)
Moderate Difficulty	16 (13.3)
Severe Difficulty	2 (1.7%)
Use Of Sleeping Medication	
Not During the Past Month	116 (96.7)
Less Than Once a Week	2 (1.6)
Once Or Twice a Week	2 (1.7)
Daytime Dysfunction	
No Difficulty	42 (35.0)
Mild Difficulty	52 (43.3)
Moderate Difficulty	22 (18.3)
Severe Difficulty	4 (3.3)
Global PSQI Score	
No Disturbance (0-5)	70 (58.3)
Mild Insomnia (6-10)	38 (31.7)
Moderate Insomnia (11-15)	12 (10.0)

- PSQI: Pittsburgh Sleep Quality Index

Table 2: Association of physical activity with depression and demographic features of students by using IPAQ (n=120)

	Total	Physical Activity		p-value
		Mild (n= 32)	Moderate/High (n= 88)	
Gender				
Male	48	18 (37.5)	30 (62.5)	0.036 ^{^*}
Female	72	14 (19.4)	58 (80.6)	
Residence				
Day Scholar	112	28 (25.0)	84 (75.0)	0.207 [~]
Hosteller	8	4 (50.0)	4 (50.0)	
Smoking				
Yes	10	6 (60.0)	4 (40.0)	0.022 ^{~*}
No	110	26 (23.6)	84 (76.4)	
Alcohol				
Yes	16	8 (50.0)	8 (50.0)	0.033 ^{~*}
No	104	24 (23.1)	80 (76.9)	
Annual Family Income (INR)				
Up To 8 Lacs	66	22 (33.3)	44 (66.7)	0.099 [^]
8-15 Lacs	34	8 (23.5)	26 (76.5)	
>15 Lacs	20	2 (10.0)	18 (90.0)	
Pocket Money				
Up To 1000 Rs	104	24 (23.1)	80 (76.9)	0.033 ^{~*}
More Than 1000 Rs	16	8 (50.0)	8 (50.0)	
Depression				
Yes	57	22 (38.6)	35 (61.4)	0.007 ^{^*}
No	63	10 (15.9)	53 (84.1)	

- INR: Indian Rupees, IPAQ: International physical activity questionnaire

[^]Chi-Square/[~]Fisher Exact test applied, ^{*}p-value ≤ 0.05

exercise 68 (56.7%), and had 0 to 2 siblings 88 (73.3%). There were 57 (47.5%) students who had depression and 63 (52.5%) students who did not have depression. The mean IPAQ score, global PSQI score, and CES-D score were 1892.60±941.90 (METs mins/week), 6.22±3.11, and 16.80±10.69 respectively.

Table 1 shows components and grading of PSQI. Majority of the students had fairly good subjective sleep quality 66 (55.0%), mild difficulty in sleep latency 40 (33.3%), 6 to 7 hours sleep duration 54 (45.0%), less than 85% habitual sleep efficiency 60 (50.0%), mild difficulty in sleep 90 (75.0%), did not use sleeping pills 116 (96.7%), mild difficulty in day time dysfunction 52 (43.3%), and mild/moderate insomnia 50 (41%).

Most of the students had moderate/high physical activity 88 (73.3%) while 32 (26.7%) had mild physical activity. A significant association of physical activity was found with gender (p-value 0.036), smoking (p-value

0.022), alcohol (p-value 0.033), pocket money (p-value 0.033), and depression (p-value 0.007). (Table 2) Sleep dysfunction was found significantly higher in those students who had depression as compared to students who did not have depression i.e., 34 (59.6%) vs. 16 (25.4%) respectively (p-value <0.001). (Table 3)

DISCUSSION

This cross sectional survey was conducted on 120 college students of Delhi. Most of the students had moderate/high physical activity 73.3% while 26.7% had mild physical activity. In a previous study performed in Beijing around 29% of subjects were doing minimal, 47% were doing moderate, and 24% were doing vigorous physical activity.¹² In another study performed in students of Asia Metropolitan University in Malaysia, 22% students were doing low physical activity, 38% were

Table 3: Association of sleep dysfunction with depression and demographic features of students by using PSQI (n= 120)

	Total	Sleep Dysfunction		p-value
		Yes (n= 50)	No (n= 70)	
Gender				
Male	48	16 (33.3)	32 (66.7)	0.186 [^]
Female	72	34 (47.2)	38 (52.8)	
Residence				
Day Scholar	112	46 (41.1)	66 (58.9)	0.718 [~]
Hosteller	8	4 (50.0)	4 (50.0)	
Smoking				
Yes	10	6 (60.0)	4 (40.0)	0.316 [~]
No	110	44 (44.0)	66 (60.0)	
Alcohol				
Yes	16	8 (50.0)	8 (50.0)	0.588 [^]
No	104	42 (40.4)	62 (59.6)	
Annual Family Income (INR)				
Up To 8 Lacs	66	32 (48.5)	34 (51.5)	0.078 [^]
8-15 Lacs	34	14 (41.2)	20 (58.8)	
>15 Lacs	20	4 (20.0)	16 (80.0)	
Exercise Habits				
Yes	68	22 (32.4)	46 (67.6)	0.025 ^{^*}
No	52	28 (53.8)	24 (46.2)	
No of Siblings				
0-2	88	34 (38.6)	54 (61.4)	0.299 [^]
>2	32	16 (50.0)	16 (50.0)	
Pocket Money				
Up To 1000 Rs	104	44 (42.3)	60 (57.7)	0.791 [^]
More Than 1000 Rs	16	6 (37.5)	10 (62.5)	
Depression				
Yes	57	34 (59.6)	23 (40.4)	<0.001 ^{^*}
No	63	16 (25.4)	47 (74.6)	

- INR: Indian Rupees, PSQI: Pittsburgh Sleep Quality Index

[^]Chi-Square/[~]Fisher Exact test applied, ^{*}p-value ≤ 0.05

doing moderate physical activity, and 40% were doing high physical activity.¹⁷ In one study, median of physical activity score (METs mins/week) for males were 2,611.00 and for females were 1,554.00 which is similar to present study.¹⁸

In present study, a significant association of physical activity was found with gender, smoking, alcohol, pocket money, and depression. According to a study, physical inactivity was associated with gender (female), low self-efficacy for physical activity, and responders with probable mental health issues.¹⁹ According to one study, a high degree inverse association was found

between smoking and physical activity. Smoking was associated with considerably lower chances of engaging in either moderate or vigorous physical activities similar to present study.²⁰ A negative association between smoking and physical activity level was found in one study. Furthermore, physical activity level showed a negative significant correlation with alcohol usage in college students similar to present study.²¹ Insufficient money, time constraints, shortage of secure sports facilities, a lack of interest in sports, and a body that can't endure physical activity were the main hurdles to physical activity in students who were

physically inactive.²² According to a study, participant's levels of physical activity (moderate and high) showed significant and negative association with their depression scores.²³ A study found that subjects doing high levels of physical activity had a lower risk of developing depression than subjects doing low levels of physical activity.²⁴ Similarly, in present study, the group which were doing high physical activity had lower depression level.

In this study mean CES-D score was 16.80. Almost half of the participants had no depression and 47.5% had presence of depressive symptoms. The results of this study are slightly higher than a previous study performed in Beijing in which the mean depression score was found to be 13.59 and 40% of participants showed presence of depressive symptoms.¹¹ A meta-analysis examined 39 researches performed between the year 1997 and 2015 and involved 32,694 college students. It found that 23.8% college students in China showed presence of depression.⁵

Examining the correlates of depression in college students can be the most relevant method for creating beneficial interventions to deal with depression. One study found that depression was associated with increased consumption of alcohol.²⁵ According to a study, the incidence of depression was linked to family history of mental illness, the presence of co-morbid conditions in the student, and the form of family (nuclear, joint, or broken).²⁶ Students experiencing depression have risk of developing major health issues if proactive steps are not taken to treat their symptoms. The typical student age group frequently turns to substance misuse and other unhealthy habits to alleviate depressive symptoms. Many times, students develop eating disorders, and some decide to commit suicide.²⁷ Universities should provide free psychological counselling to their students due to the increasing need for effective coping methods.

Prevalence of sleep dysfunction and its association with various factors was studied in the present study. In this study mean PSQI total score was 6.22. A score above 5 indicates presence of sleep dysfunction. Sleep dysfunction score of current study was higher than a previous study performed in Beijing in which mean sleep score was 4.53 and almost 20% of participants had poor sleep quality.¹¹ In another study performed in Jamia Millia Islamia, New Delhi, India 51% had poor sleep quality.²³ Present study found sleep dysfunction/insomnia present in 41.7% population.

Significant association of sleep quality was found with exercise habits and depression in the present study. Frequent smoking, insufficient exercise, tiredness,

symptoms of depression, and snoring showed significant association with poor sleep quality.²⁸ Students exercising >30 mins/week on <1 day showed higher chances of poor sleep compared to students exercising for 5-7 days/week.² Similarly, in present study PSQI was associated with exercise habits. Similar to present study, a study showed that insomnia is a key predictor of depression and that sleep disruptions are much more prevalent in depressed people.^{29,30} Poor quality of sleep was significantly associated with depression.²²

In this study sleep dysfunction was found to be higher in those students who had depression as compared to students who did not have depression i.e., (59.6%) vs. (25.4%) respectively. Students having poorer quality of sleep had 1.52 times higher chances to have symptoms of depression than students with good quality of sleep, for every 1 unit increment in Global PSQI score.²² The stepwise regression model's findings of one study found that physical activity and sleep quality showed significant relationship with levels of depression.¹¹

There were some limitations faced by this research. Students from few colleges of Delhi were taken thus generalizability of findings cannot be done. In order to achieve results that have greater generalizability, future researches may gather a wider variety of individuals from a number of colleges with different rankings in various regions. Despite the aforementioned restrictions, this is one of the very few studies conducted among college students in India that has emphasized the significance of links between physical activity and sleep quality with various sociodemographic factors and mental health in Delhi college students.

CONCLUSION

Most students demonstrated sufficient physical activity, no symptoms of depression and difficulty in sleep. However, physical activity and sound sleep both significantly correlated with depression. The causal connections between levels of physical activity, sleep quality, and mental health require further research. The effects of various interventions and their prospective effects on sleep, health, and wellbeing should be developed and studied in more detail in the future.

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ETHICAL APPROVAL: The study protocol was approved by the Research Committee of School of Physiotherapy, Delhi Pharmaceutical Sciences and Research University, Delhi (Reference # 10/2044/SOP/DPSRU/2021/1043, Date 08-02-2022).

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