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Original Research Article

Relationship between stress and sleep quality among undergraduate physiotherapy students of India who are engaged in clinical posting: a cross sectional study

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ABSTRACT

Background: Physiotherapy students are exposed to different kinds of stress while pursuing their course and this stress affects their sleep quality. The author in this study investigated the relationship between stress and sleep quality among undergraduate physiotherapy students across India.
Methods: A cross sectional study was conducted among 150 undergraduate physiotherapy students studying in different physiotherapy colleges across India, using convenience sampling method. Data was collected with help of an Online Google form™. In order to assess the relationship between stress and sleep quality among students, student stress inventory (SSI) and Pittsburgh sleep quality index (PSQI) outcome measures were used.
Results: A high prevalence of stress (99.9%) and poor sleep quality (76.7%) were found among students. To analysis the relationship between stress and sleep, Pearson's correlation coefficient was used, value of correlation coefficient was 0.613 shows a moderate positive relationship between variables and p value was 0.000 (<0.05) shows highly significant relationship between stress and sleep.
Conclusions: The study confirms a strong association between stress and sleep among undergraduate physiotherapy students across India. A recommendation for management required promotion of sleep hygiene and including physical activity in the curriculum of students to deal with the stress.

Keywords: Stress, Sleep, Disorder; Physiotherapy education, Medical students, India

INTRODUCTION

Physiotherapy education is extremely challenging and it is difficult for students to deal with complex learning and stressful environment.[1] The profession requires high academic, theoretical and clinical knowledge along with physical, communication skills and self-learning abilities.[2,3] All these demands increased stress level in students.[4,5]

It is difficult for students to cope with stress in academic life. As the education level increases every year; the level of perceived stress is also increased.[6] Factors causing stress in students are broadly classified as academic and nonacademic.[7] The academic factors are classified as majority of hours spending for studying and clinical posting, fear of making mistakes during clinical posting, pressure of working under a strict clinical instructor, poor coordination between staff and students, discriminative and incivility behavior of staff. Non-academic factors are interpersonal problems, financial concerns, transportation problems and less family support, social adjustment.[8-12]

Majority of the stress have negative effects, but some of them are beneficial for the learning process and memory consolidation.[13] Mild stress is essential for students to work effectively and efficiently.[14] However, extreme levels of these stressor can affect student's learning

capacity, memory retrieval, academic output and also threaten their physical and psychological, emotional well-being. It can associate with lower confidence levels, avoiding education and suicidal thinking with depression, anxiety and sleep disturbance.[15,16]

Sleep is an important part of our daily routine, we spend about one-third of our time in sleep.[17] Sleep deprivation affects the short-term memory, attention power, working capability and circadian rhythm and mental health of students and it will be difficult to create new memories and it will hard to concentrate and respond quickly.[18-20]

Prolonged psychological stress in college students leads to symptoms of insomnia and sleep deprivation decrease the stress tolerance level of students and students are not considered sleep as a priority in the context of their academic requirement and reduce in sleep time affect their physical and mental health.[21-23]

There is bidirectional relationship between daily stressful event and sleep and its effects depend on individual features or person.[24] A high degree of stress and poor sleep quality leads to overall low life satisfaction. This is associated with hypothalamic-pituitary adrenal (HPA) axis which is brain's main circuit that integrates a perceived stressful event and at physiological level.[25,26] Students with a dysfunctional emotional and psychological state may lead to adverse consequences so it is very essential to know that how stress and sleep affects physiotherapy students across India.

METHODS

Study setting

This study was conducted in Alva's college of physiotherapy, Moodbidri, Karnataka, India. Data was collected from all over India to collect the required 131 sample (sample size was calculated with epi info software version 7.2 with CI of 95%, power of 80%, and exposed and unexposed ratio of 0.5% and 10% of incomplete submission of google form is added in sample size, so value of sample size was 131).

Data was collected between March 2022 to April 2022; total 246 students participated in the study across India.

Study design

A cross sectional study was conducted, during the academic year of 2020-2022, among different undergraduate physiotherapy students across India, who were engaged in clinical postings.

Ethical approval

Ethical committee of Alva's college of physiotherapy, Moodbidri, Karnataka.

Participant's requirements

Undergraduate physiotherapy students, aged 20-24 year participate in the study. Students who were regularly attending clinical postings, classes and having backlogged in any subject and part of clinical posting were eligible to participate in the study. Students who were not engaged in clinical posting, classes and students who engage in Internship programme were excluded from the study.

Data collection and analysis

Data was collected with the help of online Google form TM, using two questionnaires, SSI and PSIQ with some basic questions, which were related to student's daily life. All the voluntary students were part of the study. The consent form was taken from all the subjects through the same Google form™ and then data was collected.

Statistical analysis

Categorical variables were presented by frequency and percentages and continuous variables by mean and standard deviation. All data was first entered into an excel sheet followed by SPSS. Normality test (Kolmogorov-Smirnov test) was done for data and it was found that data was normally distributed for both stress and sleep, p value for data was >0.05 which shows normal distribution of data, so for statistical analysis of data parametric test was used.

During the data analysis we excluded the data entered by first year, second year (8.9%) and internship students (25.9%) from the collected data. To maintain the accuracy of study results second year (8.9%) students were excluded from the study. After excluding ineligible participants from the data, data of eligible participants were statistically analysed.

RESULTS

Total 246 students from different physiotherapy colleges across India participated in the study. Total 150 subjects were taken in the study. Out of them 36 were males and 114 were females. Majority of participants were females (76%) in comparison to male (24%) participants. The mean value of gender is 1.24±0.429. Age group of the participants is between 20-24 years, the mean value of age group is (21.55±1.021). Most of the participants were of 21 years (37.3%) age group. All the students were engaged in clinical postings as shown in Table 1.

Total data (n=150) was collected from 17 different states of India. Mean and standard deviation of state response rate was 1.00±0.00. The highest response rate was from Kerala (40%) and Karnataka (24%) states of India.

Table 1: Demographic data of participants.

Characteristics	Level	n	Percentage		P value of stress	P value of sleep
Gender	Male	36	24	1.24±0.429	0.108	0.538
	Female	114	76			
Age	20	21	14	21.55±1.021	0.095	0.255
	21	56	37.3			
	22	51	34			
	23	14	9.3			
	24	8	5.3			
Academic year	3rd year	59	39.3	3.60±0.490	0.528	0.020
	4th year	91	60.7			
Engaged in clinical posting	Yes	150	100	1.00±0.00	0.00	0.00
	No	0	0			
Engaged in physical activity	Yes	73	48.7	1.506±0.501	0.136	0.528
	No	77	51.3			
Habit of late-night phone use	Yes	95	63.3	1.366±0.483	0.34	0.020
	No	55	36.7			
Level of stress	Mild	65	43.3	85.9±21.109	0.00	0.00
	Moderate	80	53.3			
	Severe	5	3.3			
Level of sleep disturbance	Sleep disturbance	115	76.7	1.233±0.424	0.00	0.00
	No sleep disturbance	35	23.3			

Table 2: Stress and sleep level description among students.

Characteristics	Level	Level of stress (n=150)				Sleep disturbance (n=150)	
		Mild	Moderate	Severe	Total	Yes	No
Gender	Male	20	15	1	36	28	8
	Female	45	65	4	114	87	27
Academic year	3rd year	31	28	0	59	43	16
	4th year	34	52	5	91	72	19
Engaged in physical activity	Yes	33	39	1	73	58	15
	No	32	41	4	77	57	20
Habit of late-night phone use	Yes	37	55	3	95	77	18
	No	28	25	2	55	38	17

Stress

The prevalence of all levels of stress among the students was 99.9% (n=150). Mild stress was experienced by 65 students (43.3%), moderate stress by 80 students (53.3%) and severe stress by 5 students (3.3%). The mean value of the student stress inventory scale for stress for participants was 85.9±21.109 as shown in Table 1.

Sleep

The prevalence of poor sleep quality is (PSQI score ≥5) among the students was 76.7% (n=150) and the mean of PSIQ score was 1.2333±0.4243 as shown in Table 1.

Stress and sleep variable interpretation

Total 58.46% of students had mild stress and sleep disturbance. However, 41.53% of students did not have any type of sleep disturbance. 90% of students had moderate stress and sleep disturbance and only 10% of students did not have sleep disturbance. Only 5% of students had severe stress with sleep disturbance. Out of 150 students, 115 students have sleep disturbance and 35 did not have sleep disturbance. All the findings show that stress is significantly correlated with sleep as shown in Table 3.

Stress and its interpretation

The prevalence of perceived stress was high in females 76% (n=114) in comparison to male 24% (n=36) and the stress level was high in 4th year students 60.7% (n=91) in

comparison to 3rd year students 39.3% (n=59) as shown in Table 1 and Table 2.

Sleep and its interpretation

Sleep disturbance was high in females 76.31% (n=87) in comparison with males 77.77% (n=28). Overall, 76.7% of subjects had sleep disturbance and 23.3% of subjects did not have any type of sleep disturbance.

Stress and sleep are both significantly correlated with each other, the p value for both components was p=0.000 which was less than 0.05 and significant. The value of Pearson's correlation coefficient was 0.613 which shows a moderate positive relationship between stress and sleep. As shown in Table 4.

Table 3: Level of stress on basis of severity.

		Global sleep score		Total (n)
		Sleep disturbance	No sleep disturbance	
Level of stress	Mild	38 (58.46%)	27 (41.53%)	65
	Moderate	72 (90%)	8 (10%)	80
	Severe	5 (100%)	0 (0%)	5
	Total (n)	115	35	150

DISCUSSION

The present study highlights the high prevalence of stress (99.9%) and poor quality of sleep (76.6%) among the students across India. It is found in a current study that stress and sleep are both significantly interrelated with each other. Meanwhile, to check sleep hygiene among students, two factors were assessed in the present study that is physical activity and the habit of using late night phone.

Stress

The prevalence of stress in the present study among physiotherapy students was 99.9%. The stress level was high in females in comparison to male students, the main cause of that is high response rate of female students in comparison of male students. The cause can be different usually in our culture males are expected to suppress their emotions, so lower psychological and emotional reactions to stress can slow down the stress level. The other possible reason could be that females are more emotionally responsive and have tendency to over report their medical and psychological symptoms.[1]

Stress level is very high among final year students and the findings of this study are supported by a study conducted in 2013 and the main source of stress in the current study is lack of faculty management in college, lack of confidence during class presentations, poor hostel and college environment, environmental changes and high expectation of parents and tension of students towards their study and career.[1]

However, the stress level among students was very high (99.9%) in comparison with a study which was previously done in India, in Gujarat and percentage of stress among physiotherapy students was 18.27% and stress level is 53% in another study conducted in India.[14,17] But the cause of stress was not assessed in both the studies.

Sleep

The prevalence of sleep disturbance among physiotherapy students was 76.7%. A recent study was conducted among undergraduate physiotherapy students of Gujarat "to find out the prevalence of sleep disturbance among students" and only 20% of students reported poor sleep quality the reason of that was students gave the socially desirable answer of not having sleep disturbance.[17] The other reason may be smaller sample size of the study.

In current study 47.3% of students had "fairly good "quality of sleep and 28% of students reported "fairly bad" quality of sleep. The cause of sleep disturbance is taking medicine during sleeping time, loss of enthusiasm towards work, inadequate sleeping hours, late bed time of students. This could be because of heterogeneity of population and paucity of study conducted among physiotherapy students. Total number of evidence is still less to find out and compare the sleep disturbance level among students.

Stress and sleep

A significant relationship was found between stress and sleep quality. According to Pearson's correlation coefficient value, which was 0.613 it shows moderate positive relationship between variables and p=0.000 which was $p<0.05$ shows the significant correlation between stress and sleep. As shown in Table 4 correlation between components.

In the present study the main cause of stress and sleep disturbance among students as identified is environmental influence (50%) and high expectation of parents (64%) and poor management by faculty (24%) and lack of facilities in hostel (26.7%) and campus (31.3%), staying in crowded place (31%) and feeling nervous during class presentation (26%) students feel guilty because they failed to fulfil their parent's hope (30.7%), irregular sleep wake cycle (76.7%).

Some studies suggested that stress and sleep disturbance is common in females in comparison. In the current study, female participants (76%) were more in comparison to male participants (24%), so stress level and sleep disturbance is more in females (n=87,76.31%) in comparison to males (n=28,77.77%).

Concerning stress and hygienic sleep habits, two factors were assessed in current study. Firstly, physical activity and the habit of using late-night phone, which are very common and part of their daily routine. As per the literature conducted there is a lack of evidence that shows the effect of both factors on stress and sleep, so in the present study both factors were assessed.

Stress, sleep and physical activity

In present study the students who were engaged and not engaged in physical activity had stress and sleep disturbance and the current findings is similar to a study conducted in India.[17] Finding of current study is contradictory with a literature review and the result shows that physical activity significantly improves sleep quality and decreases stress level.[27] The evidence says that less physical activity leads to poor sleep. The value of Pearson's correlation coefficient in present study was 0.136 and 0.527 which shows weak correlation between variables as shown in Table 4.

Table 4: Correlation between components.

Outcome measure	Pearson correlation coefficient (r)	P value	Inference
Stress and sleep	0.613	0.000	Significant positive correlation
Stress and physical activity	0.122	0.136	Weak positive correlation
Sleep and physical activity	-0.052	0.527	Significant negative correlation
Stress and late-night phone use	-0.174	0.034	Significant negative correlation
Sleep and late-night phone use	-1.89	0.020	Significant negative correlation

Stress, sleep and habit of using phone during late night

Result shows that habit of using phone during bedtime not related with the sleep quality and stress level and the cause of current findings could be influence of environment and heterogeneity of study population. The value of Pearson's correlation coefficient is negative (-0.174, -1.89) and p value was <0.05 which shows significant negative correlation between variables as shown in Table 4. However, the current study findings is contradictory with both studies, Corrêa et al conducted study and both studies results says that using phone or computer during night time leads to poor quality of sleep among university students, but the findings of this study also says that data was only collected from one university that was the limitation of this study.[28]

According to the findings we were able to find out a significant relationship between stress and sleep and its associated factors such as physical activity and the habit of using late night phone the current study provided the valuable findings about both the factors, which give a more understanding and reduce the chances of bias.

Coping strategy

The evidence says that any types of physical activity, exercise or relaxation technique reduces the HPA-axis mechanism and decrease the stress levels. According, to ACSM's guidelines and evidence, a minimum of 30 minutes of moderate intensity exercise can reduce the cortisol response to stress and improve the quality of life of a sedentary individual.[29-31] For healthy adults or sedentary person, the department of health and human services and ACSM's recommended at least 150 minutes a week of moderate intensity exercise or aerobic activity (like brisk walking or swimming) or 75 minutes a week of vigorous intensity exercise or aerobic activity (such as running), to improve physical fitness and reduce stress.[32]

According to the findings of the present study, it is necessary to take an initiative to improve the quality of life of physiotherapy students and to include physical activity or exercises as a part of the curriculum and their daily routine, which can help them to cope with stress. As physiotherapy profession requires high physical effort to optimize the functioning of patients, (like lifting, transferring, assisting with exercises and performing manipulations) they are required to maintain a good levels of physical fitness, so they should implement their skills to improve their quality of life.[33] They must give a new definition of stress management for everyone.

This study has some limitations. We were not able to find out a correlation between stress, sleep and physical activity and habit of using late night phone as we did not ask the specific time and duration of physical activity and late-night phone use. Along with that the response rate of students from different states of India was uneven, so stress level is not calculated in respect of different zones of India.

CONCLUSION

Result showed that a significant amount of stress and sleep disturbance are present among physiotherapy students and stress and sleep are both significantly related with each other among students of various physiotherapy colleges across India. As a solution, the study recommends implementing physical activity or exercises as a part of the curriculum that can help students to cope with stress and improve their quality of life.

Recommendations

Further study is recommended in order find out relation between stress, sleep and habit of using late night phone and physical activity. As the coping strategies mentioned in the present study an intervention study can be done on physiotherapy students to find out the effectiveness of coping strategies.

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