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PREVALENCE OF SLEEP INERTIA AND ITS ASSOCIATION WITH PHYSICAL ACTIVITY AND DEPRESSION AMONG MEDICAL STUDENTS

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Keywords

Sleep inertia, Physical activity, Depression, Idiopathic Hypersomnia, CNS Hypersomnolences, Excessive Daytime sleepiness.

Article History

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Abstract

Objective:

1. To investigate the prevalence of sleep inertia by (SIQ), among medical students.

2. To assess the level of physical activity by using the (IPAQ-SF), among medical students.

3. To determine the prevalence of depression by using the (DASS-21), among medical students.

4. To investigate whether physical activity moderates the relationship between sleep inertia and depression among medical students.

Methodology: *The sample size of the study was 300 medical students (1826 years old) in medical colleges in Karachi. Validated questionnaires, SIQ, IPAQ-SF, and DASS-21, were also filled out by medical students. The students who had neurological, psychiatric or diagnosed sleep disorders were not considered. The SPSS-22 was used to analyze the data based on the descriptive and inferential statistics.*

Results*: Out of 300 participants, the majority were females (72.7%), with the age range of 21-23 years (55.2%). The most prevalent ones were moderate physical activity (47.8%), moderate sedentary behavior (38.3%), and moderate sleep inertia (50.3%). Regression analysis revealed significant predictive factors of stress, anxiety, and depression in predicting sleep inertia with the model as a whole being significant ($p < 0.001$).*

Conclusion*: The sleep inertia is common among the medical students and closely linked with depressive symptoms and physical inactivity. Physical activity and mental health promotion can enhance the functioning and academic performance of students.*

INTRODUCTION

Sleep inertia is the temporary physiological condition of hypoarousal experienced upon awakening. It is connected to different degrees of impaired neurobehavioral function, disorientation, a need to go back to sleep, and sometimes a negative emotional state. People who act in this way may have trouble getting out of bed, want to go back to sleep, and need more than one alarm call or help from a close friend or family member (for example, if they have trouble understanding their alarm or keep hitting the snooze button). People may also notice a number of signs, such as problems with balance, awkwardness, tiredness, and slowing down of movement (1).15.6% of individuals worldwide report being rather tired during the day; a Russian study revealed a 39.2% frequency in this regard. Conversely, hypersomnia increases the likelihood of mental health problems but is also connected to a range of comorbidities, including obesity and psychiatric diseases (2).

Sleep inertia (SI) is worse when you wake up during the biological night, when your body

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temperature is lower than usual, or when you don't get enough sleep on a regular basis. However, healthy people who haven't had trouble sleeping can also have SI, and even very serious SI (confusional arousals) happens quite often (3). Each person's link between exercise and sleep is different and may change based on a number of factors. Things have bearing on your age, gender, weight (BMI), degree of fitness, and general health. The type of activities you undertake will affect your sleep: mild stretching, walking, or intense training. These differences cause the relationship between sleep and physical exercise to be somewhat complex. Cross-sectional studies have linked low physical activity to a greater incidence of excessive daytime sleepiness (EDS), whereas those who exercise are less likely to develop EDS (4).

Sleep inertia can last two to four hours, thus it is important to do several tests following a nap opportunity to find out whether it affects sprint performance. Because the total amount of time spent in bed differed between conditions, the participants slept better in the napping condition than in the no-nap condition twenty-24 The increase in sleep duration in the napping condition may have hidden the effect of sleep inertia on sprint performance since sprint performance improves as total sleep duration rises (5). Individuals who suffer from depression and hypersomnolence do not experience a decrease in the effectiveness of their sleep, indicating that their sleep efficiency appears to be approximately the same as that of healthy individuals, which is approximately 85%. Nevertheless, this does not prevent patients with major depressive disorder from having difficulty falling asleep or staying asleep; in fact, they continue to report having a poor quality of sleep for themselves (6). The reciprocal association between depression and sleep disturbance increases an original idea which suggests trouble sleeping might represent an early event rather than a symptom of depression. It has serious consequences and is associated with disability, disease, and death. The characteristic of severe depression, the third most prevalent cause of psychiatric disorder worldwide, is impaired mental and physical functioning leading to a reduced quality of life (7). In a group of people with unknown hypersomnia or a condition called narcolepsy 15% to 37% showed signs of depression. But in narcolepsy, the frequency for moderate to severe depressed symptoms ranges from 6% to 56. People with narcolepsy have more severe extreme daytime drowsiness and more impairment of their psychological and physical quality of life, which is related with depressed symptoms (8).

METHODOLOGY

Study Design:

The study was designed as a cross-sectional study that spanned one year.

Participants:

The sample size was determined by the OpenEpi software with a reference to a medical study by Ma et al. in China on sleep inertia among medical students, which gave a sample size of n = 300 (16). The sampling method employed was a non-probability convenience.

Inclusion criteria were registered medical students (MBBS, DPT, BDS, etc.) aged 18-26 years willing to take part in the research, capable of giving informed consent, and able to complete questionnaires in English or the local language were the participants of the study.

The study excluded students diagnosed with neurological or psychiatric problems, taking drugs that influence sleep, and also students with known sleep disorders, like insomnia, narcolepsy, or obstructive sleep apnea etc.

Ethical Considerations:

Before collecting the data, the United College of Physical Therapy gave ethical permission and all participant gave their informed consent. Confidentiality was rigorously maintained and participants received assurance about their ability to withdraw at any time.

Data Collection Tools:

1. Sleep inertia questionnaire (SIQ) to assess the level of sleep inertia,
2. International Physical Activity Questionnaire–Short Form (IPAQ-SF) to find out the physical activity level,
3. Depression Anxiety Stress Scale (DASS-21) to assess the depressive symptoms.

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Data Collection Procedure:

Informed consent was obtained and 300 individuals recruited. The self-reported questionnaires were used to collect the data, such as the SIQ, IPAQ-SF, and the DASS-21, and to ensure the honesty of answers, the instructions were given clearly. Questionnaires were verified to be complete and the study was debriefed, to be transparent and answer any queries of the participants.

Statistical Analysis:

We used SPSS version 22 for data analysis Demographic and study factors were summarized using descriptive statistics, including frequency, mean, and standard deviation. Multiple linear regression was used to look for connections, and $p < 0.05$ was the level of statistical significance.

RESULT

A total of 300 participants took part in this study. The majority were females (n=218, 72.7%) while males were (n=82, 27.3%) **(Figure:01)**.

The age distribution showed that mostly population aged between 21 and 23 (n=165, 55.2%) followed by 18-20 (n=73, 24.4%), and 24-26 (n=61, 20.4%) **(Figure:02)**.

Figure:03 shows that physical activity levels were divided into moderately active (n=143, 47.8%), low activity (n=84, 28.1%) and high activity (n=72, 24.1%).

The level of sedentary behavior were low sedentary behavior (n=142, 47.3%), while some had moderate (n=115, 38.3%) had few had high (n=43, 14.3%) **(Figure:04).**

Moderate sleep inertia (n=151, 50.3%), while mild (n=127, 42.3%) and severe level (n=22, 7.3%). **(Figure:05)**

In DASS 21 stress graph showed that majority were at normal (n=127, 42.3%), followed by mild (n=102, 34.0%), some of them had moderate (n=52, 17.3%), few had severe (n=18, 6.0%) and only 1 participant had extreme severe stress (n=1, 0.3%) **(Figure:06)**.

Anxiety level showed 72 participants were at normal range (24%). 37 of them had mild anxiety (12.3%), moderate was (n=92, 30.7%), (n=48, 16%) severe, and 17% (n=51) extremely severe **(Figure:07).**

For the depression, graph showed that majority were at normal (n=130, 43.3%) followed by moderately depressed (n=68, 22.7%), mild (n=51, 17.0%). Few had severe (n=26, 8.7%) and extreme severe (n=25, 8.3%) **(Figure:08).**

Multiple linear regression showed that stress ($B = 0.144$, $p = 0.008$), anxiety ($B = 0.076$, $p = 0.021$), and depression ($B = 0.121$, $p < 0.001$) were significant predictors of sleep inertia. Physical activity did not show a significant effect on sleep inertia ($B = -0.030$, $p = 0.468$). The overall regression model was significant ($F(4, 294) = 37.562$, $p < 0.001$).

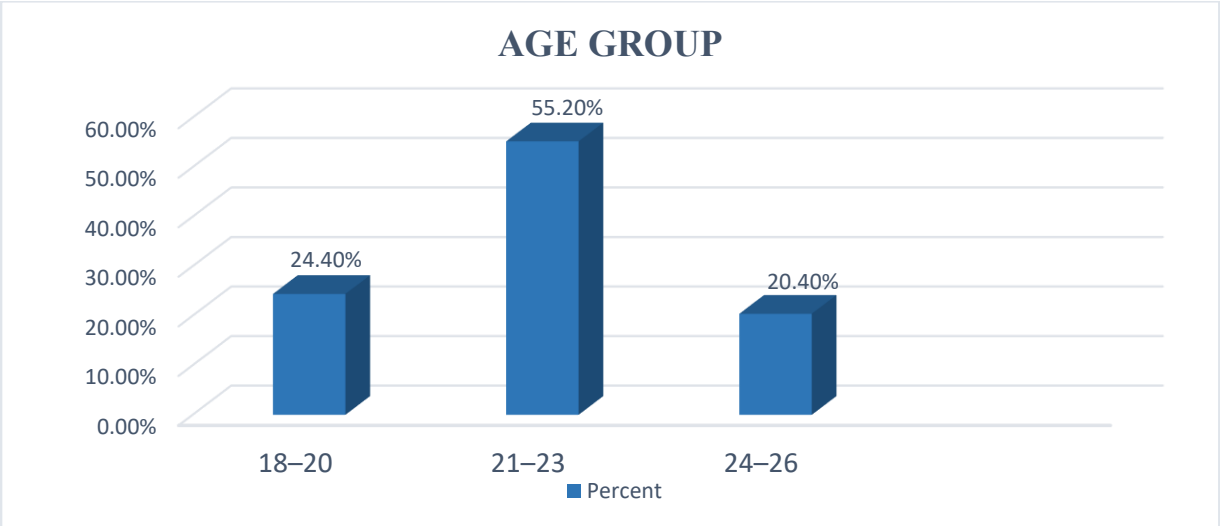

Figure-01: Age group distribution of participants

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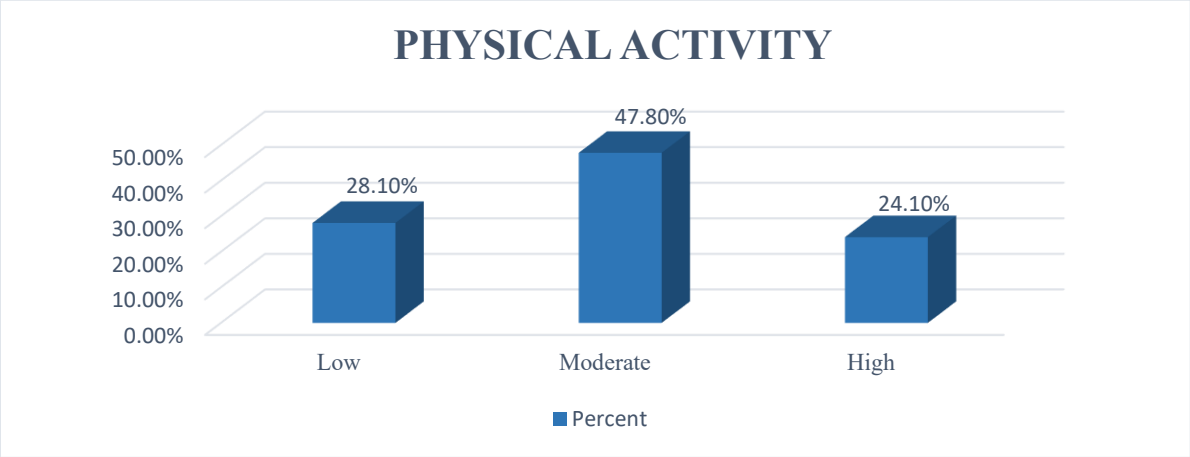

Figure-02: Physical activity levels of participants

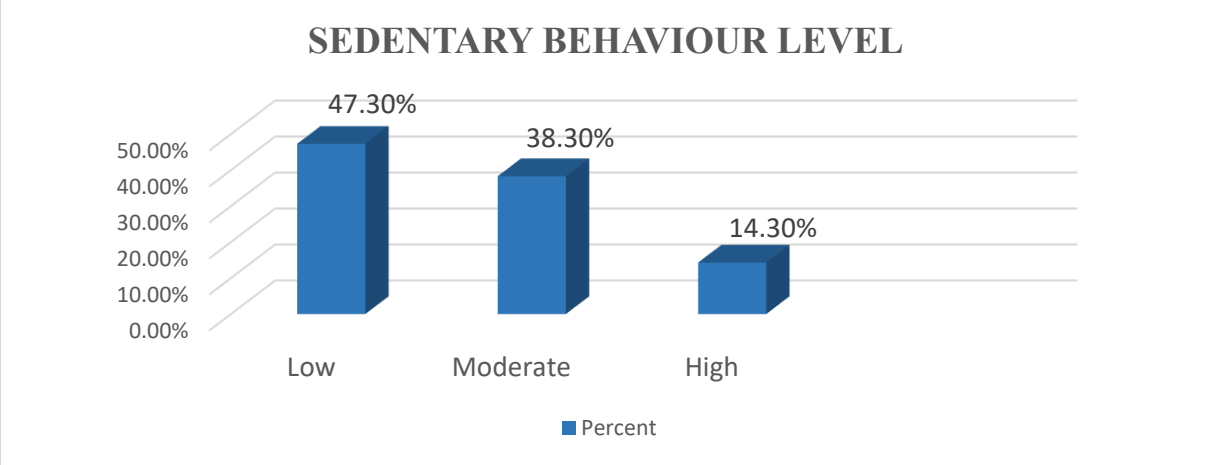

Figure-03: Sedentary behaviour level of participants

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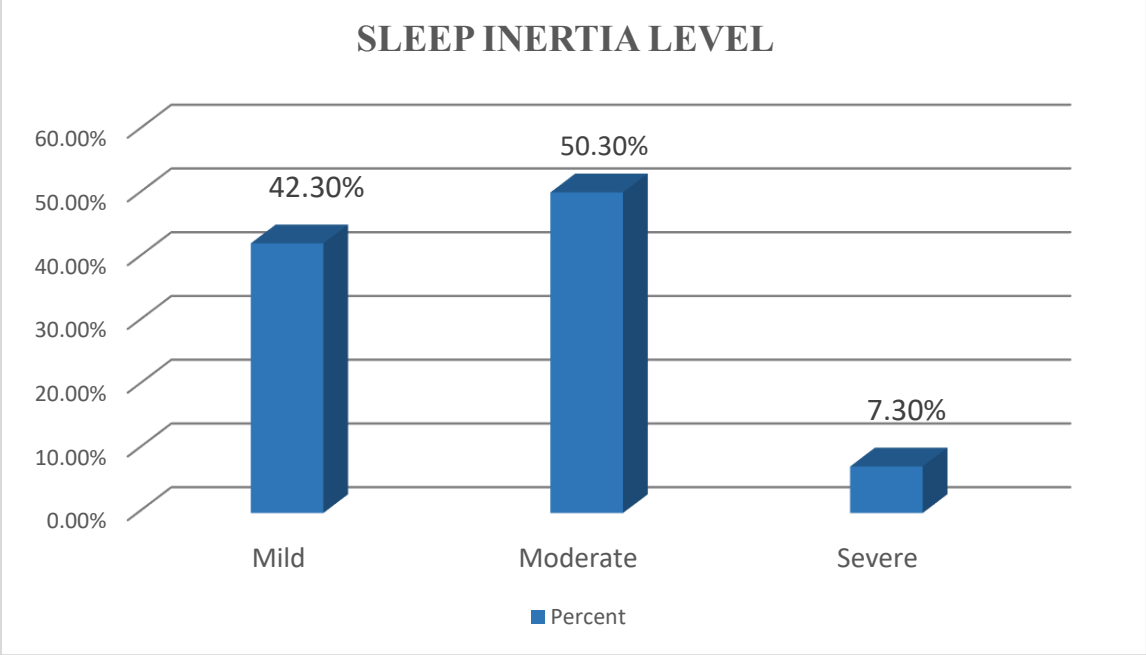

Figure-04: Sleep inertia levels of participants

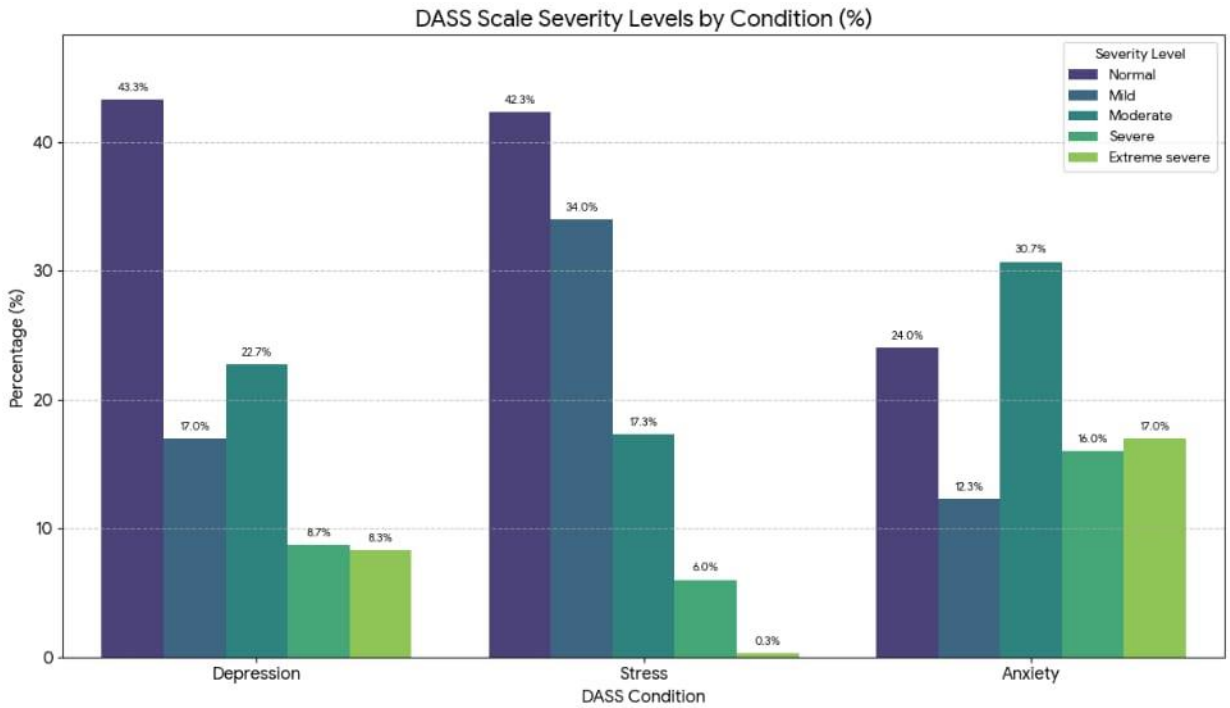

Figure-05: Depression levels of participants

DISCUSSION

This study examined the prevalence of sleep inertia and its correlation with physical activity and depression among medical students. The results shows that 42.3% of students had mild sleep inertia, 50.3% had moderate sleep inertia, and 7.3% had severe sleep inertia. This shows that most of the students felt groggy, drowsy or less alert after waking up, so this shows that sleep inertia is a common problem in this group,

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compared to another study which found a similar results in university students, with mild levels at 31%, moderate at 33%, and severe at 16%. According to author there is less sleep time, evening chronotype, and bad sleep quality increase the risk of severe sleep inertia (9). Both studies show that sleep inertia is common among students. The lesser number of severe symptoms in this study, in comparison with previous studies, can be due to better sleep pattern or routine among medical students.

In this study, physical activity of students is analyzed which shows that 28.1% of students had low physical activity, 47.8% had moderate physical activity level and 24.1% of them were highly physical active. This shows only half of the population is moderately active and some noted percentage is inactive which can be a risk of disease, these findings are compared to another study which stated that most of the healthcare students were at moderate physical activity level and because of this those people had better sleep and attention and less sleep issues (10). Among all the participants, 47.3% students had low sedentary behaviour, 38.3% reported moderate behaviour and remaining 14.3% had high sedentary lifestyle, Similarly there is study which noticed almost same changes in university students. the majority of students in their study showed that they sat for nearly seven hours everyday, which tells that sedentary behaviour can be even high in those who are moderately physical active (10).

we used DASS-21 to measure that, firstly about the stress level, the findings showed that 42.3% of participants had normal levels, 34% of students had mild stress, 17.3% said they had moderate stress, and 6.3% had severe stress and only 0.3% had extreme severe stress. These findings are very relatable to previous studies which showed that university students mostly had mild to moderate stress levels so in relation to this there is a study which was conducted in Saudi Arabia in medical students found 17.9% of those students had mild to moderate stress and 12.7% had severe to extremely severe stress (11).

Turning towards anxiety, our results report 24% of population were within the normal range, 12.3% of students had mild anxiety, 30.7% had moderate anxiety, and 16.0% severe to 17.0% extremely severe compared to another study in UAE shows that greater number of students had severe anxiety in which females had more and it was statistically significant in gender distribution (12). Another study compared, found that Only 3% of their population had mild to moderate anxiety and 25.3% had severe to extremely severe anxiety.it clearly shows that student who had poor sleep had high anxiety levels (11).

For depression, this current study reported, students who were mildly depressed comprised of 17.0%, or moderately depressed 22.7%, severe depression 8.7% of the sample and for extreme severe depression 8.3% of the sample. For comparison to other studies we found a study which reports that a large number of medical and dental students in Saudi Arabia experienced moderate to severe depression after the COVID-19. 18.8% of medical students classified as extremely severe depressive (13).

A study found that low physical activity and bad sleep cause higher depression and anxiety levels among university student in china (14). A study shows that higher levels of physical activity and good sleep quality reports lower emotional disturbance in those people who had depression (15). These results mostly similar with this current study, where physically active students have less depressive symptoms. This shows that by having good physical activity and better sleep pattern can lead to better mental health.

CONCLUSION

This study indicate the sleep inertia is among medical students and directly connected with depression and low physical activity level. Most of the students had mild to moderate levels of sleep inertia which can affect how well they perform in their academics and how they feel. The results indicate that engaging in physical activity may reduce both depression and sleep disturbance. Medical students frequently encounter with high academic stress and irregular sleep pattern, so fostering healthy habits, consistent physical activity and mental health awareness can enhance their quality of life and concentration. Future

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researches using larger and more diverse samples, along with objective sleep measures are recommended to confirm and expand these findings.

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Authors` Contribution:

The following authors have made substantial contributions to the manuscript as under:

MN: Study design, drafting the manuscript, critical review, concept, approval of the final version to be published.

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