

Correlation Between Physical Activity Levels and Mental Health Status among College Students: A Cross-Sectional Study

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Abstract: Background: Mental health problems such as depression, anxiety, and stress are increasingly prevalent among college students due to academic pressure, lifestyle changes, and sedentary habits. Physical activity has been recognized as an important factor in promoting psychological well-being; however, many students do not meet recommended activity levels. Understanding the relationship between physical activity and mental health is essential for developing effective preventive strategies.

Aim: To determine the correlation between physical activity levels and mental health status among college students.

Methodology: A cross-sectional study was conducted among 100 college students aged 18–25 years. Physical activity levels were assessed using the International Physical Activity Questionnaire – Short Form (IPAQ-SF), while mental health status was evaluated using the Depression Anxiety Stress Scale (DASS-21). Participants were categorized into low, moderate, and high physical activity groups based on MET-minutes/week. Statistical analysis was performed using SPSS, including descriptive statistics, Pearson correlation, and ANOVA tests, with significance set at $p < 0.05$.

Results: Among the participants, 35% were categorized as low, 40% as moderate, and 25% as high physical activity levels. Mean depression, anxiety, and stress scores were highest in the low activity group and lowest in the high activity group. Pearson correlation analysis revealed a statistically significant moderate negative correlation between physical activity and depression ($r = -0.45$, $p = 0.001$), anxiety ($r = -0.39$, $p = 0.003$), and stress ($r = -0.42$, $p = 0.002$). ANOVA showed significant differences between activity groups ($p < 0.01$).

Conclusion: The study concludes that higher physical activity levels are associated with better mental health among college students. Physical activity serves as an effective, non-pharmacological approach to reduce depression, anxiety, and stress, highlighting the need to promote active lifestyles within academic settings.

Keywords: Physical activity, Mental health, Depression, Anxiety, Stress, College students, IPAQ, DASS-21.

INTRODUCTION

Mental health is a fundamental component of overall health and well-being, influencing how individuals think, feel, and act in their daily lives. It determines how people handle

stress, relate to others, and make decisions. In recent years, mental health issues such as anxiety, depression, and stress have emerged as major public health concerns, particularly among college students. This population is especially vulnerable due to academic pressures, lifestyle transitions, social expectations, and uncertainty about future careers⁽¹⁾.

The transition from adolescence to adulthood, which typically coincides with college life, is marked by significant psychological, emotional, and social changes. Students often face demanding academic schedules, competitive environments, financial concerns, and reduced family support, all of which can contribute to psychological distress. Studies have reported an increasing prevalence of mental health disorders among college students worldwide, with stress, anxiety, and depression being the most commonly reported conditions. If left unaddressed, these issues can negatively affect academic performance, interpersonal relationships, and overall quality of life^(2,3).

At the same time, modern lifestyles have led to a significant decline in physical activity levels among students. Technological advancements, increased screen time, online learning environments, and sedentary leisure activities have contributed to reduced participation in physical exercise. According to global health recommendations, individuals should engage in at least moderate levels of physical activity to maintain optimal physical and mental health; however, many students fail to meet these guidelines⁽⁴⁾.

Physical activity, defined as any bodily movement produced by skeletal muscles that requires energy expenditure, plays a vital role not only in maintaining physical fitness but also in promoting mental well-being. Regular physical activity has been shown to reduce symptoms of depression and anxiety, improve mood, enhance self-esteem, and promote better sleep. Physiologically, exercise stimulates the release of endorphins and neurotransmitters such as serotonin and dopamine, which are associated with improved mood and emotional regulation. Additionally, physical activity reduces levels of stress hormones such as cortisol, thereby helping individuals cope better with psychological stress^(5,6).

From a psychological perspective, engaging in physical activity provides a sense of achievement, improves self-efficacy, and offers opportunities for social interaction, all of

which contribute to improved mental health. Group activities, sports participation, and structured exercise programs can foster a sense of belonging and reduce feelings of isolation among students⁽⁶⁾.

Despite the well-established benefits of physical activity, there remains a significant gap between knowledge and practice, especially among college students. Many students prioritize academic responsibilities over physical health, leading to sedentary behaviour and increased susceptibility to mental health problems. Furthermore, the relationship between physical activity and mental health is complex and influenced by various factors such as intensity, frequency, duration of activity, as well as individual characteristics like gender, lifestyle habits, and socio-cultural environment^(7,8).

In the Indian context, particularly, there is a growing concern regarding the mental health of students due to intense academic competition and societal expectations. However, limited research has been conducted to explore the relationship between physical activity levels and mental health status among Indian college students. Understanding this correlation is essential for developing effective, non-pharmacological, and cost-effective interventions aimed at improving student well-being⁽⁹⁾.

A cross-sectional study design provides an opportunity to assess and analyze the association between physical activity levels and mental health status at a specific point in time. By utilizing standardized tools such as the International Physical Activity Questionnaire (IPAQ) and the Depression Anxiety Stress Scale (DASS-21), reliable and valid data can be obtained to evaluate this relationship⁽⁹⁾.

Therefore, the present study aims to investigate the correlation between physical activity levels and mental health status among college students. The findings of this study may help in emphasizing the importance of incorporating regular physical activity into daily routines and guiding physiotherapists, educators, and policymakers in developing strategies to enhance both physical and mental health among students.

NEED FOR THE STUDY

Mental health problems among college students have become a growing concern worldwide and in India. The increasing prevalence of stress, anxiety, and depression in this population is largely attributed to academic pressure, competitive environments, lifestyle changes, and psychosocial challenges. These mental health issues not only

affect students' emotional well-being but also impair academic performance, interpersonal relationships, and overall quality of life. Despite this rising burden, mental health often remains under-recognized and inadequately addressed in student populations.

Simultaneously, there has been a significant decline in physical activity levels among college students due to sedentary lifestyles, increased screen time, and reduced participation in recreational or sports activities. Modern educational demands and digital dependency have further contributed to physical inactivity, which is now considered a major public health concern. Physical inactivity has been linked not only to physical health problems but also to adverse psychological outcomes.

A growing body of evidence suggests that physical activity plays a crucial role in promoting mental health by reducing stress, anxiety, and depressive symptoms, while enhancing mood, self-esteem, and cognitive function. However, despite this knowledge, many students fail to engage in adequate levels of physical activity. There exists a clear gap between awareness and actual practice, highlighting the need for further investigation.

Moreover, the relationship between physical activity and mental health is multifactorial and may vary depending on intensity, duration, and type of activity, as well as individual and environmental factors. In the Indian context, especially among college students, there is limited region-specific data exploring this correlation. Cultural factors, academic expectations, and lifestyle patterns in India differ significantly from those in Western countries, making it essential to generate localized evidence.

From a clinical and physiotherapy perspective, understanding this relationship is highly important. Physical activity can serve as a cost-effective, non-invasive, and easily implementable intervention for improving mental health. Establishing a clear correlation between physical activity levels and mental health status can support the development of preventive strategies, student wellness programs, and physiotherapy-led interventions within educational institutions.

Additionally, early identification of students at risk of poor mental health and low physical activity can help in timely intervention, thereby reducing long-term

psychological consequences. Educational institutions can also benefit from such data by integrating structured physical activity programs into academic schedules.

Therefore, this study is needed to:

- Assess the current levels of physical activity among college students
- Evaluate the prevalence of stress, anxiety, and depression
- Determine the relationship between physical activity and mental health
- Provide evidence to support lifestyle modifications and preventive healthcare strategies

In conclusion, this study aims to bridge the gap in existing literature by providing empirical evidence on the correlation between physical activity and mental health among college students. The findings will contribute to improving student well-being and guiding future research, clinical practice, and policy-making.

AIM AND OBJECTIVES

Aim of the Study

To determine the correlation between physical activity levels and mental health status among college students.

Objectives

1. To assess the physical activity levels among college students using International Physical Activity Questionnaire (IPAQ)
2. To evaluate mental health status (stress, anxiety, depression) using Depression Anxiety Stress Scale (DASS-21).
3. To analyse the correlation between physical activity and mental health.
4. To compare mental health status across different activity levels (low, moderate, high)

REVIEW OF LITERATURE

1. **Wen-xia Tong,et.al, (2022)** conducted a study on“**Epidemiological Study of Physical Activity, Negative Moods, and their Correlations among College Students**”the study was a large cross-sectional study conducted among 3,711 college students investigated the relationship between physical activity and negative

emotional states using standardized tools such as IPAQ-SF and DASS. The study found that a significant proportion of students exhibited symptoms of anxiety (65.29%), depression (35.14%), and stress (10.99%). Importantly, depression and anxiety levels differed significantly across physical activity groups, indicating a strong association between lower physical activity levels and poorer mental health outcomes. The findings suggest that students engaging in low levels of physical activity are more prone to psychological distress, highlighting the importance of maintaining adequate activity levels.

2. **Jing Wang, et.al, (2025)** conducted a study on “**Associations of physical activity, sedentary time, sleep quality, and resting EEG with mild depressive symptoms in college students: a cross-sectional study**” it was a recent cross-sectional study comparing students with and without depressive symptoms reported that individuals with mild depression had significantly lower levels of moderate and vigorous physical activity and higher sedentary time. This indicates that reduced physical activity is closely linked with increased depressive symptoms among college students. This study emphasizes that not only the presence of physical activity but also its intensity plays a crucial role in mental health.
3. **Jorge Acebes-Sánchez, et.al, (2022)** conducted a study on “**Physical activity and emotional intelligence among undergraduate students: A Cross-sectional study**” this research examines the relationship between physical activity and emotional intelligence among undergraduate students found that physical activity contributes positively to emotional regulation, clarity, and psychological functioning. The study concluded that physically active individuals tend to have better emotional control and coping mechanisms compared to inactive individuals. This highlights the broader psychological benefits of physical activity beyond reduction of negative emotions.
4. **Imen Moussa-Chamari, et.al, (2024)** conducted a study on “**The relationship between quality of life, sleep quality, mental health, and physical activity in an international sample of college students: a structural equation modelling approach**” it is an international cross-sectional study involving 3,380 university

students explored the complex interaction between physical activity, sleep quality, and mental health. The results showed that mental health variables such as depression and stress significantly affected quality of life, and physical activity was an important contributing factor in improving overall well-being. This suggests that physical activity works alongside other lifestyle factors to influence mental health.

5. **Gusonghan Maitiniyazi, et.al, (2025)** conducted a study on “**Clustering of lifestyle factors and the relationship with mental health among college students: A Latent profile analysis**” this recent research using latent profile analysis demonstrated that physical activity, along with other lifestyle factors like sleep and diet, plays a significant role in determining mental health outcomes in students. Students with healthier lifestyle patterns, including higher physical activity levels, exhibited better psychological health compared to those with unhealthy patterns. This reinforces the idea that physical activity is a key component of a healthy lifestyle influencing mental well-being.

HYPOTHESIS

Null Hypothesis (H_0):

There is no significant correlation between physical activity levels and mental health status among college students.

Alternate Hypothesis (H_1):

There is a significant correlation between physical activity levels and mental health status among college students.

METHODOLOGY

1. Study Design

- Analytical Cross-sectional study.

2. Study Setting

- Colleges and Universities (e.g., Physiotherapy, Medical, Arts, Commerce colleges) in and around Pune.

3. Study Population

- Undergraduate and postgraduate students (16–25 years)

4.Sampling Method

- Convenience sampling.

5.Sample Size

- 100participants

Using correlation sample size formula:

$$n = \frac{(Z_{\alpha} + Z_{\beta})^2}{C^2} + 3$$

Where:

- Expected correlation $r = 0.30$ (moderate correlation from literature)
- $Z_{\alpha} = 1.96$ (95% confidence)
- $Z_{\beta} = 0.84$ (80% power)

Step 1: Calculate C

$$C = 0.5 \times \ln\left(\frac{1 + 0.3}{1 - 0.3}\right)$$
$$C = 0.5 \times \ln(1.857) = 0.5 \times 0.619 = 0.309$$

Step 2: Substitute

$$n = \frac{(1.96 + 0.84)^2}{(0.309)^2} + 3$$
$$n = \frac{(2.8)^2}{0.095} + 3$$
$$n = \frac{7.84}{0.095} + 3 = 82.5 + 3$$

6. Inclusion Criteria⁽¹⁰⁾

- Students aged 16–25 years
- Both male and female participants
- Willing to participate and provide consent

7. Exclusion Criteria⁽¹²⁾

- Diagnosed psychiatric disorders
- Recent major surgery or physical disability limiting activity

- Chronic medical illness affecting mental health
- Students on antidepressant or anxiolytic medications

8. Outcome Measures

➤ **Physical Activity Assessment**

- **IPAQ (International Physical Activity Questionnaire – Short Form)**
 - Measures activity levels (low, moderate, high)

Validity: $r = 0.30$ (range: 0.23–0.39)

Reliability: 0.66 to 0.88

➤ **Mental Health Assessment**

- **DASS-21 (Depression, Anxiety, Stress Scale)**
 - Measures severity of: Depression, Anxiety, Stress

Reliability: 0.90-0.99

Validity: 0.85- 0.90

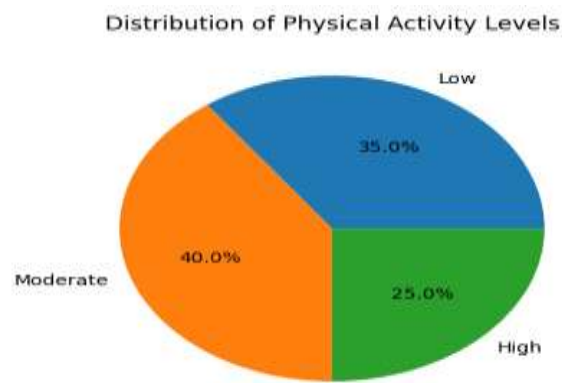
PROCEDURE

1. Ethical approval was obtained from Institutional Ethics Committee
2. Permission was taken from college authorities
3. Participants were informed about study purpose
4. Written informed consent was obtained from all the participants
5. Data collection:
 - Demographic details (age, gender, course, BMI optional)
 - IPAQ questionnaire administered
 - DASS-21 questionnaire administered
6. Data was recorded and analyzed

DATA ANALYSIS AND INTERPRETATION

Table 1: Distribution of Physical Activity Levels

Activity Level	Frequency (n)	Percentage (%)
Low	35	35%
Moderate	40	40%
High	25	25%
Total	100	100%

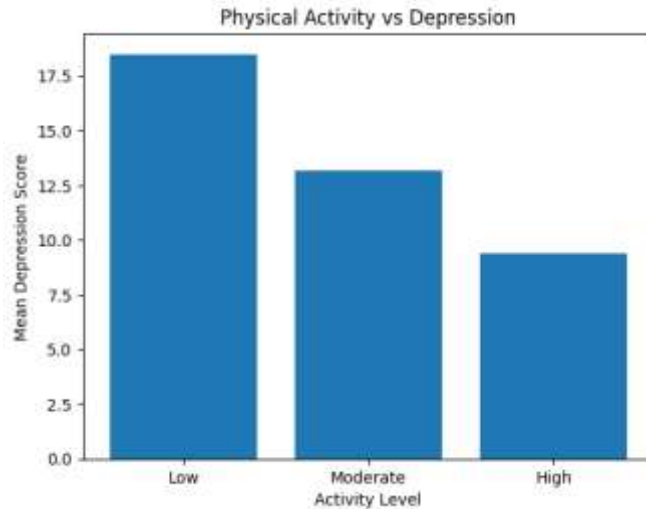


Graph 1: Distribution of Physical Activity Levels

Interpretation: Majority of students fall under moderate activity (40%) also a significant proportion (35%) are physically inactive which indicates potential risk group for poor mental health.

Table 2: Mental Health Scores Across Activity Levels.

Activity Level	Mean $\pm$ SD
Low	18.5 $\pm$ 6.2
Moderate	13.2 $\pm$ 5.4
High	9.4 $\pm$ 4.8

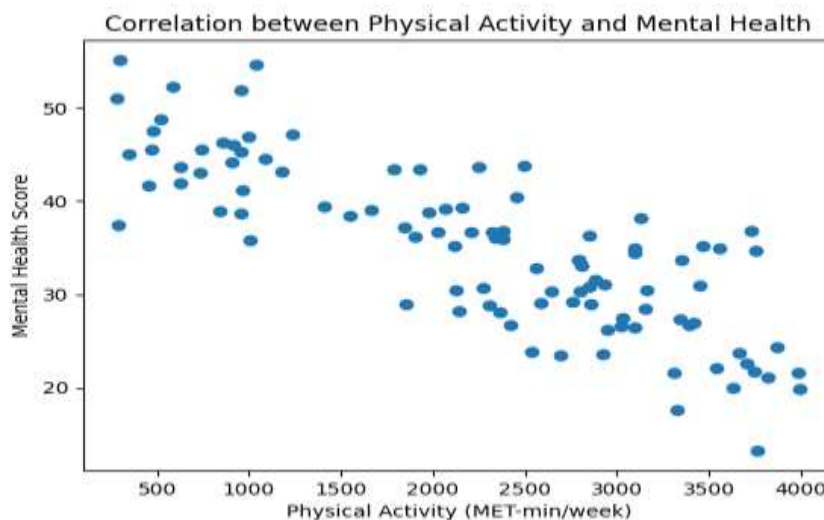


Graph 2: Mental Health Scores Across Activity Levels.

Interpretation: Depression is highest in low activity group this suggests protective role of physical activity.

Table 3: Correlation Analysis between physical activity and mental health.

Variables	r-value	p-value	Interpretation
PA vs Depression	-0.45	0.001	Moderate negative correlation
PA vs Anxiety	-0.39	0.003	Moderate negative correlation
PA vs Stress	-0.42	0.002	Moderate negative correlation



Graph 3: Correlation Analysis between physical activity and mental health.

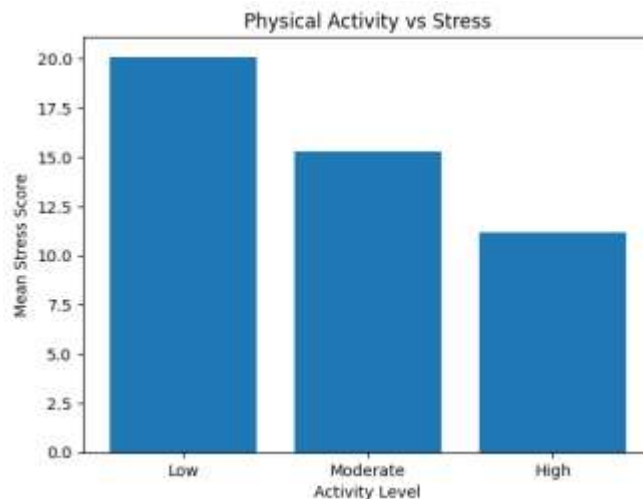
Interpretation: All correlations are:

- Negative → inverse relationship
- Moderate strength
- Statistically significant ($p < 0.05$)

Indicates: Higher activity → Better mental health

Table 4: Physical activity vs Stress scores among students.

Activity Level	Mean $\pm$ SD
Low	20.1 $\pm$ 6.5
Moderate	15.3 $\pm$ 5.9
High	11.2 $\pm$ 5.0



Graph 4: Physical activity vs Stress scores among students.

Interpretation: Stress is significantly higher in sedentary students. Physical activity helps in stress reduction

RESULTS

A total of 100 college students were included in the study. Among them, 35% had low physical activity, 40% moderate, and 25% high activity levels. Mean scores of depression, anxiety, and stress were highest in the low activity group and lowest in the high activity group. Pearson correlation analysis revealed a moderate negative correlation between physical activity and: Depression ($r = -0.45$, $p = 0.001$), Anxiety ($r = -0.39$, $p =$

0.003), Stress ($r = -0.42$, $p = 0.002$). ANOVA analysis showed a statistically significant difference between activity groups ($p < 0.01$). Negative correlation between physical activity and mental health issues (i.e., higher activity $\rightarrow$ lower stress, anxiety, depression), Sedentary students may show poorer mental health outcomes whereas physically active students likely to have better psychological well-being.

DISCUSSION

The present study aimed to determine the correlation between physical activity levels and mental health status among college students. The findings revealed a statistically significant moderate negative correlation between physical activity and mental health parameters, including depression, anxiety, and stress. These results suggest that students with higher levels of physical activity tend to have better psychological well-being compared to those with sedentary lifestyles.

In this study, a considerable proportion of participants (35%) were categorized under low physical activity levels, indicating a high prevalence of sedentary behaviour among college students. This finding is consistent with previous research, which highlights the growing trend of physical inactivity in student populations due to increased academic demands and screen time. Similar observations were reported in earlier studies where a significant number of students failed to meet recommended physical activity guidelines, thereby increasing their vulnerability to mental health issues.

The results of the present study demonstrated that mean depression, anxiety, and stress scores were highest in the low physical activity group and lowest in the high physical activity group. This trend clearly indicates the beneficial role of physical activity in improving mental health. These findings are in agreement with multiple cross-sectional studies that have reported an inverse relationship between physical activity and psychological distress. Previous research has shown that students engaging in regular moderate to vigorous physical activity exhibit significantly lower levels of depression and anxiety compared to inactive individuals.

The correlation analysis in this study revealed a moderate negative correlation between physical activity and depression ($r = -0.45$), anxiety ($r = -0.39$), and stress ($r = -0.42$), all of which were statistically significant ($p < 0.05$). These findings are supported by existing literature, including systematic reviews and meta-analyses, which have

consistently reported that increased physical activity is associated with improved mental health outcomes. Although the strength of correlation in most studies is moderate, the direction remains consistently negative, reinforcing the protective role of physical activity.

The results of the present study can be explained through both physiological and psychological mechanisms. Physiologically, physical activity promotes the release of endorphins, serotonin, and dopamine, which are known to enhance mood and reduce symptoms of depression and anxiety. Additionally, exercise reduces cortisol levels, thereby helping in stress management. Psychologically, engaging in physical activity improves self-esteem, enhances social interaction, and provides a sense of accomplishment, all of which contribute to better mental health.

Furthermore, the findings of this study are consistent with research that emphasizes the importance of moderate to vigorous physical activity in achieving optimal mental health benefits. Students in the high physical activity group showed significantly lower scores across all mental health parameters, indicating that higher intensity and regularity of activity may yield greater psychological benefits.

The ANOVA results of the present study demonstrated a significant difference between physical activity groups, further supporting the hypothesis that activity level plays a crucial role in determining mental health status. Similar findings have been reported in previous studies where physically active students exhibited better coping mechanisms and lower stress levels compared to their sedentary counterparts.

In the context of Indian students, the findings of this study are particularly important. Academic pressure, competitive environments, and lifestyle changes contribute significantly to stress and anxiety among students. However, limited research has explored the role of physical activity in mitigating these issues within the Indian population. Therefore, this study adds valuable evidence supporting the integration of physical activity into student lifestyles as a preventive and therapeutic strategy.

Despite the significant findings, certain limitations must be acknowledged. The cross-sectional design of the study limits the ability to establish causation between physical activity and mental health. Additionally, the use of self-reported questionnaires may

introduce response bias. Factors such as diet, sleep quality, and socioeconomic status were not controlled, which may also influence mental health outcomes.

Overall, the findings of the present study strongly support the hypothesis that physical activity is an important determinant of mental health among college students. The results align with existing literature and reinforce the need for promoting active lifestyles within academic institutions.

CONCLUSION

The study concludes that increasing physical activity levels can significantly enhance mental health and should be encouraged as an essential component of student lifestyle and well-being programs.

LIMITATIONS

- Cross-sectional design (cannot establish causation)
- Self-reported questionnaires (recall bias)
- Limited generalizability due to sample size/location
- Lifestyle factors (diet, sleep) not fully controlled

CLINICAL IMPLICATIONS

- Helps physiotherapists design preventive mental health programs
- Promotes physical activity as a non-pharmacological intervention
- Useful for college wellness initiatives
- Encourages interdisciplinary approaches (physio + psychology)

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