

LINKING MENTAL STRESS AND PHYSICAL ACTIVITY IN PHYSICAL THERAPY STUDENTS OF KOHAT: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Inadequate management of mental stress can lead to significant psychological distress. While physical activity is often cited as a mitigating factor, the precise nature of this relationship remains unclear. This study aimed to investigate the association between physical activity and mental stress among undergraduate physical therapy students, and to explore how stress levels vary across gender, age, academic semester, and exam history.

Methods: A cross-sectional survey was conducted over six months at Kohat University of Science and Technology (KUST), employing a convenience sampling method. Data from 235 participants were collected using the International Physical Activity Questionnaire (IPAQ) short form and the Perceived Stress Scale (PSS). Institutional permissions and participant consent were obtained. Data analysis was performed using SPSS version 26.

Results: The study found that 62.1% (n=146) of participants experienced moderate stress, while 25.5% (n=60) reported high stress. Regarding physical activity, 43.4% (n=102) were minimally active, 31.9% (n=75) were in the Health-Enhancing Physical Activity (HEPA) category, and 24.7% (n=58) were inactive. Stress was significantly associated with gender, with females reporting higher perceived stress than males (p=0.007). Higher stress levels were also linked to having taken a recent exam, being in the fourth academic semester, and having a mean age of 21.73 years. No statistical association was found between physical activity levels and mental stress (p=0.211).

Conclusion: The majority of participants were minimally active and experienced moderate stress, irrespective of their physical activity level. Stress was significantly associated with female gender and recent exam history. However, no direct association was established between physical activity and mental stress in this cohort, suggesting that academic and demographic factors may be more salient contributors to perceived stress in this student population.

Keywords: Perceived stress, Physical activity, PSS-10, IPAQ, Association

INTRODUCTION

Mental stress is a type of stress that happens due to the way a person perceives events in his internal or external environment which eventually results in psychological anxiety or distress. With stress, the body shows physiological responses such as increase heart rate, blood pressure and decrease in cardiac output to stress. The physiological responses to stress may help the person either to overcome the stressor or may help him fleeing from it⁽¹⁾. We cannot escape stress as it is normal requirement for dealing with daily stressors. But if stress exceeds beyond our coping capability, it can hinder our work and effective functioning⁽²⁾. The increased environmental demands if gets beyond our adaptive capability, can cause threat and danger to our mental wellbeing⁽³⁾. If exposure to stress is chronic, it can have deleterious effects on one's psychological and physiological functioning⁽⁴⁾. Our mental and physical health is strongly affected by everyday lifetime stress and its effect is more than other risk factors like smoking, alcohol consumption and physical inactivity⁽⁵⁾. Unidentified triggering stimulus results in anxiety causing the person to worry, feel uneasy and experience irritating feelings. One may also feel depressed as you would notice him sad, he might feel himself unworthy and he may not show any interest in activities that were once pleasurable for him. So, it is of prime importance to identify the prevalence and cause or risk factors that are leading to mental stress in students⁽³⁾. Symptoms of depression, anxiety, and stress are very common among university students, especially those studying in medical field⁽⁶⁾. Students experience stress because of multiple factors, that can be due to burden of studies, financial issues, problems related to accommodations, their social life as they may are looking for career building, homesickness, improper and inadequate sleep⁽⁷⁾. Students leaving their families and entering university life, along with increasing study demands they may also work part-time to cope with the financial burdens as their families may not be able to support them. Students also struggle to achieve high marks so that they may be able to get into their desired career. All these stresses may combine overall, and the student may not be able to cope with these exceptionally increasing demands⁽⁸⁾. Reduced household income may also be a risk factor for mental stress⁽⁹⁾. Physical activity has been shown by the laboratory findings to be effective against mental stressors⁽¹⁰⁾. Muscle

contraction during physical exercise causes the body to move. Epidemiological studies have shown that engaging in regular physical activity enhances both brain clarity and overall well-being⁽¹¹⁾. The effects of psychological stress are decreased by physical activity as reported by Stults-Kolehmainen et al. in 2014, and that increase in stress makes person to become physically more inactive⁽¹²⁾. Exercise is known to help boost happy emotions⁽¹³⁾. Moderate to vigorous physical activity can result in better mental health⁽¹⁴⁾. According to recommendations by World Health Organization (WHO), adults should perform 150 minutes of moderate intensity activities such as brisk walking, doing water aerobics, riding a bike on level ground or with few hills, playing doubles tennis, pushing a lawn mower per week or 70 minutes of vigorous intensity activity such as jogging or running, hiking uphill, cycling more than 10 miles per hour or steeply uphill, swimming fast or lap swimming per week. Both moderate and vigorous intensity exercises such as cycling, jogging in combination with doing water aerobics can be performed according to needs⁽¹⁵⁾. Data collected worldwide from 122 countries in a study done in Denmark (2012) shows that 31.1% of the adult population are physically inactive in which 43% are from Eastern Mediterranean and 17% are from Southeast Asia⁽¹⁶⁾. Women as compared to men are more inactive, and inactivity is more in high-income countries⁽¹⁶⁾. High occurrence of physical inactivity has been shown by the observational studies conducted in Saudi Arabia and is about 43% to 80% of the population, more common among females. The international guidelines suggested by a study in Spain in 2020, for weekly moderate to vigorous physical activity are not met by most of the Saudi adults⁽¹⁷⁾. Globally, an estimated 20% to 25% of the student population is stressed as observed by a study done US in 2018, with 50% having stress in the form of either depression or anxiety⁽⁷⁾. In general population of Spain, depression and anxiety are highly prevalent. But little is known about mental health of college students. Different samples of undergraduate students around the globe have shown moderate to high prevalence of stress, anxiety, and depression⁽¹⁷⁾.

Literature Review:

Physical inactivity is the fourth leading danger for

global mortality contributing to 6% of deaths globally. Noted that one in four adults worldwide engages in insufficient PA and in South Africa, one in two adults engages in insufficient PA⁽²⁰⁾. Covid-19 reports from United States of America suggested that those individuals who did not follow the recommended guidelines for physical activity and spent more time onscreen had more symptoms of depression and stress as compared to those who were physically active⁽¹⁷⁾. Although many researches support that higher levels of physical activity results in decrease of stress. It is suggested by some researchers that moderate activity is more helpful in decreasing stress, according to WHO at least 150 min of moderate-intensity aerobic PA or at least 75 minutes of vigorous-intensity aerobic PA throughout the week for adults aged 18 to 64 years⁽¹¹⁾. Although people use aerobic exercises for relieving stress, but these exercises have also shown to have either less or no effect on the perceived stress⁽⁴⁾. The transformation from childhood to adolescent shows one of the unique types of changes that occur in physical and mental wellbeing such as growth spurt, primary and secondary sex characteristics, emergence of abstract thinking, growing ability of absorbing the perspectives or viewpoints of others, increase ability of introspection and the development of personal and sexual identity etc. that occur in an individual. Research has shown that there is a decrease in level of physical activity during adulthood which leads to chronic diseases and early death⁽²¹⁾. It has been postulated that adolescence (12-13 years) is a critical age for the development of mental disorders such as anxiety and depression with a very high percentage especially in age group of 14 years⁽²²⁾. A meta-analysis conducted in China in 2013, showed that the percentage of depression was to be 24.3% in participants and they were also showing the symptoms of anxiety as well which compels them to be addicted to drugs or suicidal attempts⁽²²⁾. Various Researches have shown that the ratio of anxiety and depression increases as ones start to attend college due to high academic burden and increase in responsibility of an individual. In America nation-wise study was conducted on college students which indicated that 4.8% of the students reported to have anxiety and depression while in adolescence ages from (15-24 years) it was found to be 5.8% as calculated by diagnostic and statistical manual of mental disorder. Since PA has

been related to physical and mental wellbeing of an individual which means that those with high level of PA have less anxiety and depression and vice versa⁽²³⁾. A study conducted in 2019, on university students which shows that the level of PA is low in university students and another meta-analysis indicates that among undergraduate students, PA habits are around 40-50% which does not meet the required recommendations for PA in this age group⁽²³⁾. One cannot deny the health benefit of PA in terms of cardiovascular fitness, diabetes, cancer, and hypertension well-being but it can also benefit one in terms of psychological well-being. Research conducted in US showed that inactive people showed increased risk of anxiety, depression and stress as compared to those who were very active. Additionally, those who engaged in high levels of activity had lower risk of depression compared to those who did moderate levels of physical activity⁽²⁴⁾. Another research shows that aerobic exercise has a great effect on the mental stress and concluded that after regular exercise for 21 minutes for 10 weeks results in decrease mental stress⁽²⁵⁾. Since obesity is a major public health concern and it has been linked to various factors, but psychological stress has played a key role in development of obesity specially in population with less income⁽²⁶⁾. PA is a part of physiotherapy practice. From many years physiotherapists have been using PA and exercise to treat a variety of conditions that include neuromuscular diseases, respiratory, orthopaedic, paediatric, Non-Communicable Diseases (NCD). Today, NCDs have been noted to be the leading cause of death worldwide, reported to reach epidemic proportions and resulting in more deaths than all other causes combined. The substitute from child to young adult a decrease of physical activity has been observed, which may lead to more negative effect in human body. Furthermore, the changes to university may be go along with more stress and psychological distress. PA in emerging adults may help in improving cognitive functioning and performance, reduce perceived stress and psychological distress, which may in return improve academic performance. Confounding factors of the impact of vigorous PA on physical and mental health may include socio-demographic factors, body weight, social support, and substance use. However, few studies have investigated the impact of vigorous PA on physical and mental health in low- and middle-income countries⁽²⁷⁾, the

objective is to determine the association of mental stress with physical activity among undergraduate students of KUST.

Methods:

Employing a cross-sectional analytical survey design, this six-month study aimed to test the hypothesis that an association exists between mental stress, physical activity, and factors including age, gender, semester, recent exam status against a null hypothesis of no association; data was collected from a calculated sample of 235 undergraduate physical therapy students, selected via a non-probability (convenience) sampling technique from a total population of 598 at Kohat University of Science and Technology (KUST), Kohat, using a 95% confidence interval. The study's inclusion criteria comprised undergraduate Doctor of Physical Therapy (DPT) students at KUST who were willing to participate, of both

genders, and aged 18 years or older; conversely, the exclusion criteria eliminated DPT graduates who declined consent, individuals who had experienced any form of physical or mental trauma within the preceding month, those unable to perform physical activity due to a disability, and individuals with specific psychological disorders such as Post-Traumatic Stress Disorder (PTSD) or co-occurring substance use.

Results

Normality of Data

Descriptive statistics was applied using SPSS version 26. A sample size of 235 was taken between the ages of 18 to 25. For normality of age, Shapiro Wilk test was used ($p=0.000$). The data was not normally distributed.

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Age of respondent	.162	235	.000	.942	235	.000

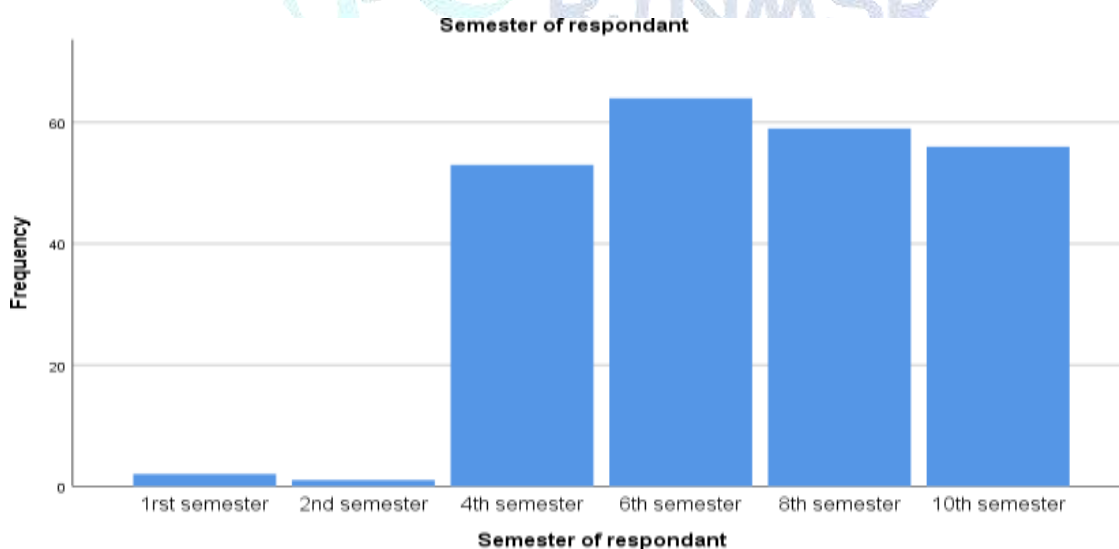
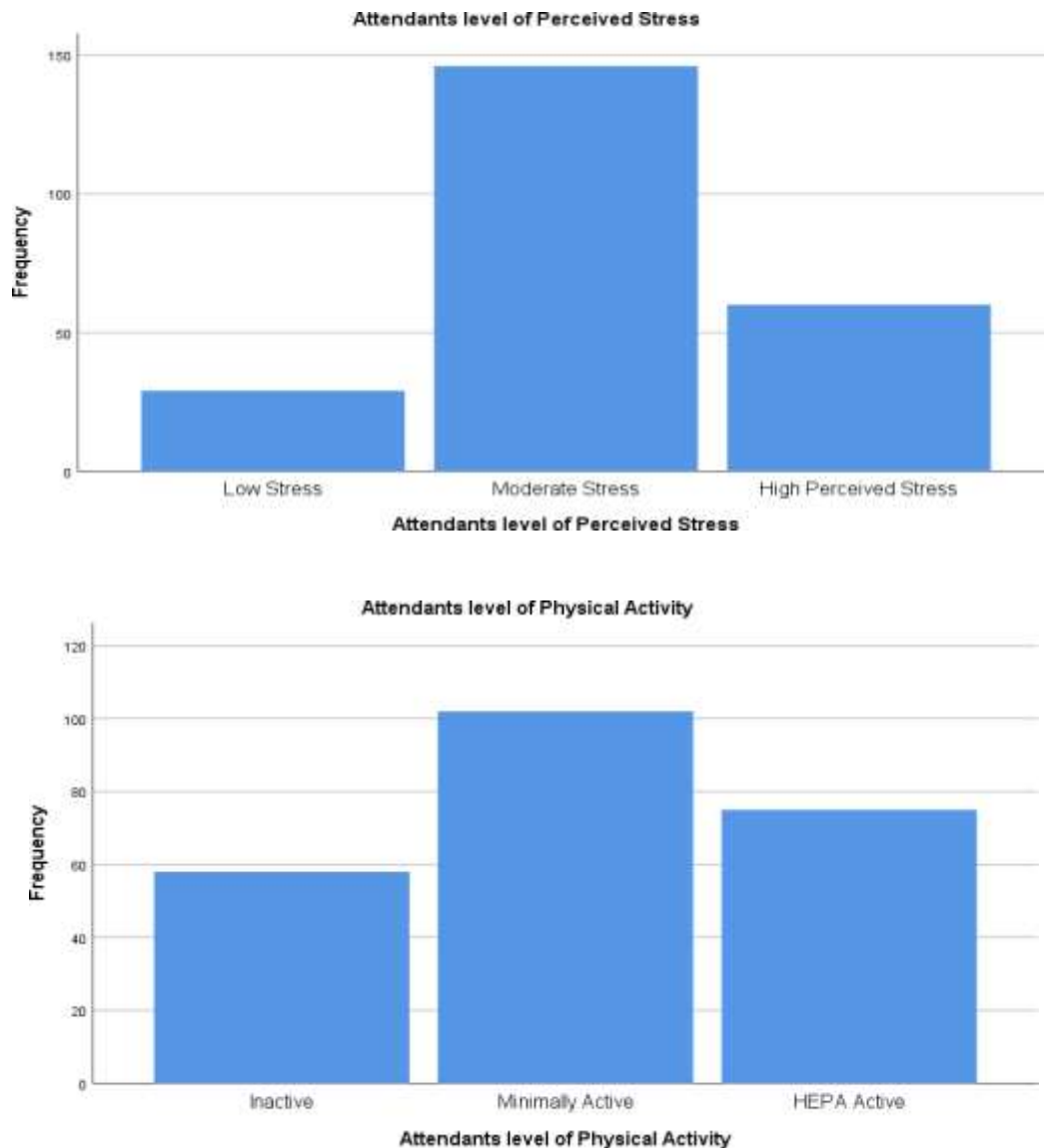


Figure showing semester of participants. Majority of the participants 27.2% (n=64) were from 6th semester, (n=2) (0.9%) participants were from first semester, 0.4%(n=1) participant from second semester, 22.6% (n=53) participants from fourth semester, 25.1% (n=59) participants from eighth semester, and 23.8% (n=56) participants from

tenth semester.

Participants' level of mental stress and level of physical activity were assessed. Results of our study showed that out of total population 235, 12.3% (n=29) of the participants had low stress, 62.1% (n=146) of the participants had moderate stress and 25.5% (n=60) of the participants had high perceived stress.



Physical activity levels showed that 24.7% (n=58) of the participants were in the inactive category, 43.4% (n=102) were in the minimally active category and 31.9% (n=75) were in the HEPA active category (Figure 5).

Association between Physical Activity and Level of Mental Stress

For association between level of physical activity and level mental stress, chi square test was applied. No statistical association ($P=0.211$) was seen between physical activity and mental stress. Mean stress level of inactive participants was 2.0690, minimally active participants was 2.2353 and HEPA active participants was 2.0400. Total mean score was 2.1319

Attendants level of Physical Activity	Mean	N	Std. Deviation
Inactive	2.0690	58	.58825

Minimally Active	2.2353	102	.58321
HEPA Active	2.0400	75	.62472
Total	2.1319	235	.60238

Comparing participant's level of physical activity with perceived stress. Out of total 235 participants, majority of the participants (n=62) (43.4%) were in the minimally active category of physical activity and had moderate stress (62.1%). (n=8) (24.7%) participants were inactive and were in the low stress category (12.3%). (n=38) (62.1%) participants had moderate stress and were inactive (24.7%). (n=12) (25.5%) participants had high perceived stress and were inactive (24.7%). (n=8)

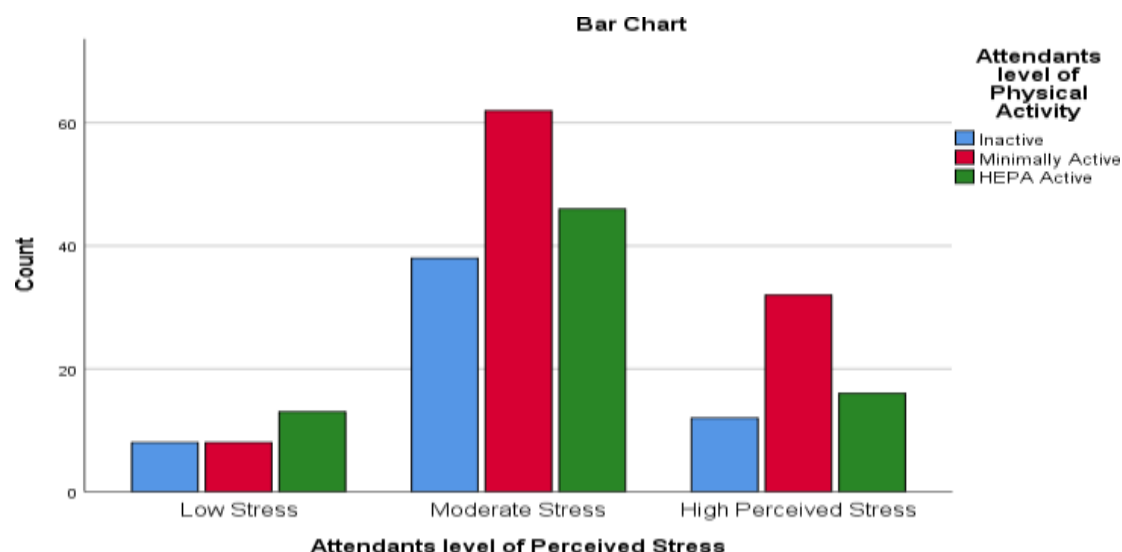
(43.4%) participants were minimally active and had low stress (12.3%). (n=32) (25.5%) participants had high perceived stress and were minimally active (43.4%). (n=13) (31.9%) participants were HEPA active and had low stress (12.3%). (n=46) (31.9%) participants were HEPA active and had moderate stress (62.1%). (n=16) (31.9%) participants were HEPA active and had high perceived stress (25.5%).

Attendants level of Perceived Stress * Attendants level of Physical Activity Cross Tabulation

Inactive					Minimally Active	HEPA Active	Total
Attendants level of Perceived Stress	Low Stress	8	8	13	29		
	Moderate Stress	38	62	46	146		
	High Perceived Stress	12	32	16	60		
Total		58	102	75	235		

Graph comparing participants' levels of physical activity with their level of mental stress. Most of the participants were in the minimally active category of physical activity (24.7%) and had moderate levels of perceived stress (43.4%). In the inactive

and minimally active category, both had 8 participants each with low stress levels. (n=38) participants in the inactive category had moderate stress levels and 46 participants in the HEPA active category had also moderate stress levels.



Gender of respondent * Attendants level of Perceived Stress Cross Tabulation

			Attendants level of Perceived Stress		
Low Stress			Moderate Stress	High Perceived Stress	Total
Gender of respondent	Male	13	28	11	52
	Female	16	118	49	183
Total		29	146	60	235

In the high perceived stress category, 1 participant was from first semester, 0 participants from second semester, 22 participants from fourth semester, 8 participants from sixth semester, 15 participants

from eighth semester, and 14 participants from tenth semester.

Semester of respondent * Attendants level of Perceived Stress Cross Tabulation

			Attendants level of Perceived Stress		
Low Stress			Moderate Stress	High Perceived Stress	Total
Semester of respondent	1st semester	0	1	1	2
	2nd semester	0	1	0	1
	4th semester	4	27	22	53
	6th semester	7	49	8	64
	8th semester	8	36	15	59
	10th semester	10	32	14	56
Total		29	146	60	235

Discussion

The aim of this study was to assess the varying levels of physical activity and mental stress among undergraduate physical therapy students at Kohat University of Science and Technology (KUST). The findings revealed a notable distribution in physical activity levels: 24.7% of participants were classified as inactive, 43.4% as minimally active, and 31.9% as HEPA (Health-Enhancing Physical Activity) active. A gender-based analysis showed distinct patterns; among the 52 male participants, the majority (n=25) fell into the HEPA active category, whereas among the 183 female participants, most (n=82) were in the minimally active category. This disparity aligns with global and regional trends, where observational data, including a 2012 worldwide survey of 122 countries, consistently indicates higher physical inactivity rates among females compared to males. Sociocultural factors, such as greater involvement in outdoor sports for males and potential

restrictions or domestic responsibilities for females, likely contribute to this difference. Supporting this, studies from regions like Saudi Arabia have also documented a higher prevalence of physical inactivity among female populations. Regarding mental stress, the assessment indicated that 12.3% of participants experienced low stress, 62.1% moderate stress, and 25% high stress. Gender differences were statistically significant ($p=0.007$), with a higher proportion of females (64.48%, $n=118$) reporting moderate stress compared to males (53.84%, $n=28$). This finding is consistent with research from other academic settings, such as a 2018 study in a Malaysian university, which also reported higher stress levels among female undergraduate students. The elevated stress in female students may be attributed to the dual burden of academic pressures and domestic responsibilities, alongside potential barriers to physical activity such as time constraints, lack of motivation, or inadequate

access to exercise guidance. Conversely, the relatively lower stress levels observed in males may be linked to their higher physical activity, which is widely recognized as a buffer against stress. Further analysis identified specific academic and demographic correlates of stress. Students in their 4th semester reported the highest perceived stress levels (41.51%), possibly due to the intensity of the academic curriculum at that stage. A significant association was found between mental stress and having attempted a previous exam ($p=0.001$), with those who had taken an exam exhibiting higher stress (40%) than those who had not (18.75%). Age also showed a significant association with stress levels (Kruskal-Wallis $p=0.008$), with the highest stress concentrated in students with a mean age of 21.7 years. no statistically significant association was found between physical activity levels and mental stress in this cohort ($p=0.211$). This result suggests that, within this sample, engagement in physical exercise did not directly correlate with lower perceived stress. This aligns with some existing literature indicating that exercise may have a limited or inconsistent effect on perceived stress levels. The data showed that the majority of participants (62.13%, $n=146$) experienced moderate stress regardless of their physical activity category. This phenomenon may be explained by the overwhelming nature of academic and clinical demands in physical therapy education. Students, whether active or inactive, might be subject to significant stressors from their coursework, clinical hours, and daily life management, which could diminish the potential stress-relieving benefits of physical activity. Conversely, some physically inactive students reported low stress, potentially because they faced fewer cumulative pressures or had other effective coping mechanisms.

Conclusion

It is concluded that majority of participants were minimally active. Most of the participants in this study had moderate stress regardless of the physical activity level they were in. Although stress was found to be associated with gender as females had more perceived stress than male. Those who had any previous exams also had higher levels of stress as compared to those who didn't. High stress was present in the students with mean age of 21.73. Also, we found that students of fourth semester had comparatively higher stress levels as compared to other semesters.

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