Original Article

Depression, Stress and Anxiety Among Undergraduate Students; Association With Physical Activity, Sedentary Behavior & Academic Performance

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Abstract

Objective: This study aims to determine the prevalence of depression, anxiety, stress among undergraduate students and its association with physical activity and academic performance.

Study Design: An analytical cross-sectional study was conducted.

Place and duration of study: This was an analytical cross sectional study conducted on undergraduate students of Institute of Physical Medicine & Rehabilitation, Khyber Medical University, Peshawar

Material and Methods: Based on eligibility criteria 83 students were recruited in the study through convenience sampling technique. The sample included both male (n=33) and female students(n=50), with a mean age of 22.5 ±0.458 years. The assessment of stress, anxiety and depression, and physical activity was carried out using; The Depression, Anxiety, and Stress Scale (DASS-21) and the International Physical Activity Questionnaire respectively. Sedentary behaviour was assessed in terms of screen time.

Results: The data was analysed by SPSS version 22. Cross tabulation and Chi square test were applied to examine the association (p value < 0.05). The results of this study showed high prevalence of depression 65%, anxiety 71% and stress 57%. Stress was significantly associated with sedentary behaviour (p < 0.05). Academic performance was found to be greatly influenced by varying levels of stress and depression (p<0.05). However, no significant association was identified between physical activity and academic performance.

Conclusion: This study revealed that stress, anxiety, and depression are highly prevalent among undergraduate students. Higher levels of stress were associated with increased sedentary behaviour. Interestingly, academic performance was positively influenced by elevated levels of stress and depression.

Keywords: Anxiety, Academic Performance, Depression, Physical Activity, Stress

1. Introduction

Mental health is an essential and pivotal component of health. [1] It is defined by the World Health Organization as the state of positive psychological well-being in which an individual realizes his or her own abilities, alleviates normal life stresses, work productively, enthusiastically and is able to make positive contribution to the community. [2] According to survey conducted, almost 350 million people are affected by mental illness. [3] Psychological problems like anxiety, depression and stress is commonly found in students around the world. [4] Significant proportion of university undergraduate medical students is affected by anxiety, depression and stress. [5] Depression is chronic mental disorder usually characterized by feeling of loneliness, low self-esteem, feeling of sadness and self-reproach, withdraw from social contact. [6] Anxiety is characterized by feeling of distress also associated with somatic symptoms like sweating, tachycardia, dry mouth, diarrhoea. [7] Stress is considered as nonspecific response that result due to different kind of stressors person either response positively or negatively. [8] For challenging environment positive stress response is beneficial for students. [9] Among college and university students stressors maybe the contributing factors for development of many various mental problems like difficulty in

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concentration, depression, anxiety, psychiatric illness and eating disorder. [10, 11] Medical students may have more physical and emotional challenges and psychological hazards and also mood disorders as they think about professional goals and future. [12-14] Financial instability, poor social support, bad relationship, high family expectations are also factors toward depression, anxiety and stress. [15] Both developed and developing nations are affected by mental health problems. [16] high levels of psychological distress is observed among undergraduate students of the UK 17.3%, China 11%, Malaysia 41.9%, Canada 30% and Nepal 20.9%. [17-21] A study conducted in medical college Peshawar shows prevalence of depression 65%, prevalence of anxiety 70.3%, prevalence of stress 69.7%. [22] physical therapy students perceive more stress than other health care students. [23] Students of physical therapy follow same course content as medical students follow so they are also exposed to mental health. [24] stress associated with anxiety and depression has also negative effect on academic performance. [25] Stress and anxiety is inevitable even in developed countries where good mental health care and education is provided to the medical students. [26] it is completely normal to take stress in daily life situations as it improves performance in academic work load but if the stress exceeds the threshold limit then it may be detrimental for social life, academic performance and efficiency of the medical students. [27] Also the excessive amount of stress in medical students may have negative consequences and lead to problems like lack in concentration, diminished attention, negligence and increased chances of error. [28] Medical professionals recommend that almost 150 min of exercise in a week can significantly reward with good health both mental and physical. [29] Physical activity develops body by the contraction and stretching of muscles which in fact lead to the positive connection with personal wellness. [30]

University life presents numerous academic, social, and personal challenges that can significantly impact students' mental health and overall well-being. [31] Stress, anxiety, and depression are increasingly common among undergraduate students and may influence their lifestyle habits, such as physical activity and sedentary behaviour. [32] These factors can, in turn, affect academic performance. Understanding the relationships among these variables is essential for developing effective interventions and support programs that promote both mental health and academic success. Therefore, this study was conducted to explore how stress, anxiety, depression, physical activity, and sedentary behaviour are associated with academic performance among undergraduate students.

2. Materials & Methods

This was an analytical cross sectional study conducted on undergraduate students of Institute of Physical Medicine & Rehabilitation, Khyber Medical University, Peshawar. The study protocol was reviewed and approved by the Ethics Review Committee Allied Health Sciences (No: KMU/Dean/AHS-25/807). The sample size was calculated using Raosoft online sample size calculator with 95% confidence level, 5% margin error. Total 83 students were recruited in the study through convenience sampling technique. Participants comprised male and female students from all levels of the undergraduate program to ensure representation across different academic years. Students with previous history of (1) Schizophrenia, (2) Bipolar disorder, (3) clinically diagnosed major depression, (4) Post-Traumatic Stress Disorder, (4) Obsessive Compulsive Disorder and (5) Substance abuse were excluded from the study. Socio-demographic data (such as age, enrollment year, gender, religion, province, socioeconomic status, parent's marital status, current relationship status, current financial situation) and academic information (such as GPA and examination scores) were obtained from all participating students. Informed consent was obtained from all subjects involved in the study.

The level of psychological distress was determined using the Depression, Anxiety, and Stress Scale DASS-21, a validated tool that is extensively used to measure the state of depression, anxiety and stress. Physical activity among sample students was determined using the International Physical Activity Questionnaire IPAQ. Screen time is a common indicator to quantify the duration of sedentary behavior. [33] Sedentary behavior was estimated through self-reported screen time, defined as the total number of hours per day spent on electronic devices such as smartphones, laptops, and televisions.

Data was analyzed using Statistical Package for the Social Sciences SPSS version 22. Descriptive statistical methods were employed for determining sample characterizes. Prevalence of level of psychological distress and physical activity was obtained using frequency tables. Cross-tabulation and Chi-square tests were applied to determine the association between psychological distress, academic performance, and physical activity; p value < 0.05 was considered as statistically significant.

3. Results

The mean age of study sample was 22.5 years with standard deviation of 0.45 having 33 males and 50 females. Socioeconomic status was categorized as low, middle, and high based on participants' self-reported family income and parental occupation.

Table 1: Socio-Demographic Characteristics of the Study Sample

Age	22.5 ±0.458 years
Gender	Male (n=**33**) (39.75%) Female (n=**50**) (60.24%)
Marital status	Single (**n= 81**) (97.59%) Married (n= **2**) (2.40%)
Socioeconomic status	Middle (n=**83**) (100%)
Religion	Islam (n=**83**) (100%)

The trend across academic years revealed that the majority of the students were from the 4th (n=31) and the 5th year (n=21) of study. Figure 1

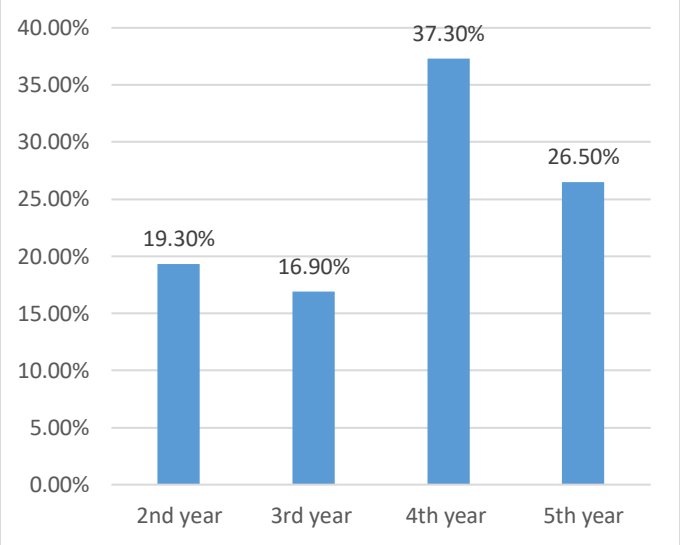
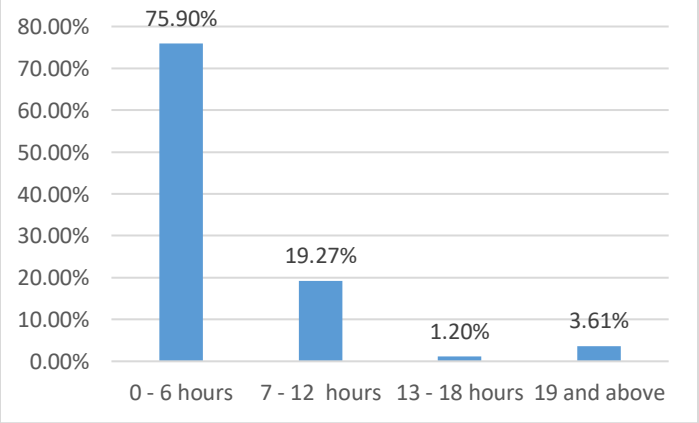


Figure 1: Distribution of students across academic years



Sedentary Behaviour (Screen time) was assessed as the total number of hours spent per day on electronic devices such as mobile phones, laptops, or televisions. See figure 2.

Figure 2: sedentary behaviour as the total number of hours spent per day on electronic devices

The academic performance was assessed using the of mean of Grade Point Average (GPA) of all the previous semesters obtained by each student as the GPA serves as a standardized indicator of academic achievement. Based on literature, academic performance was classified as at risk (GPA= < 2.5), good (2.5 to 2.9), very good (3.0 to 3.4) or excellent (≥ 3.5). [1] see figure 3

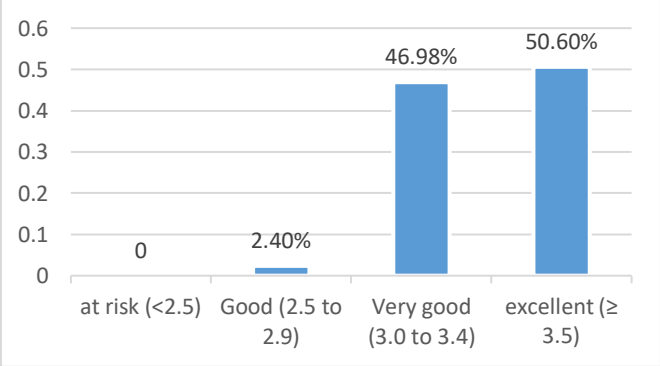


Figure 3: Academic Performance based on GPA obtained

Based on frequency chart, it was determined that the overall prevalence of depression was 65%. While 71% students reported anxiety and 57% reported stress. For each student, scores were recorded for the intensity of their routine physical activities, categorized as mild, moderate, and vigorous. The trend of physical activity showed that majority of the students were engaged in performing moderate and low level activities while only few were vigorously active. See Figure 4

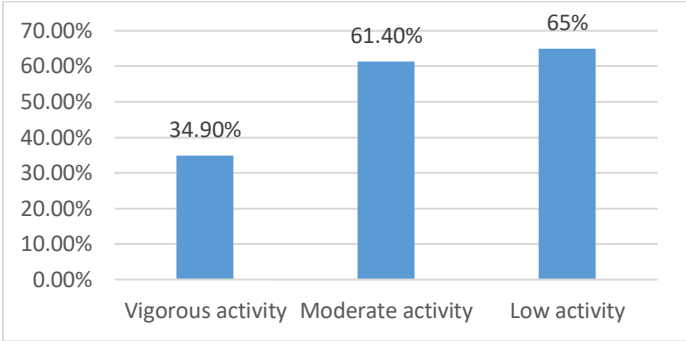


Figure 4: levels of physical activity

Based on cross-tabulation and chi square test, it was observed that academic performance is strongly associated with stress and depression. Table 2

Table 2: Association between Psychological Distress and Academic Performance

Based on cross-tabulation and chi square test, it was observed that stress is strongly associated with all the determinants of the study, that is, strong correlation with sedentary behaviour, academic performance and physical activity were observed. Table 3

Variable		Academic performance			P value	df
		Good (GPA 2.5-2.9)	Very Good (GPA 3-3.490	Excellent (GPA ≥3.5)		
Depression	Normal	0	18	11	P=0.013	8
	Mild	0	5	3		
	Moderate	2	9	6		
	Severe	0	4	8		
	Extremely Severe	0	3	14		
Anxiety	Normal	0	10	6	P=0.073	8
	Mild	0	4	3		
	Moderate	0	8	3		
	Severe	1	6	3		
	Extremely Severe	1	11	27		
Stress	Normal	0	21	11	P=0.012	8
	Mild	1	6	2		
	Moderate	0	7	11		
	Severe	0	2	10		
	Extremely Severe	1	3	8		

Table 3: Association of psychological distress with study determinants

	Physical activity	**Sedentary Behavior (screen time)**	**Academic performance**
Depression	***0.06***	0.22	***0.01***
Anxiety	0.28	0.59	0.07
Stress	***0.03***	***0.01***	***0.01***

Further it was established in this study that physical activity does not directly impact academic performance among students according to cross-tabulation and chi square test.

4. Discussion

The aim of this study was to determine the prevalence of stress, anxiety, depression and its association physical activity, sedentary behaviour and academic performance among undergraduate students of physical therapy in Khyber Medical University.

The study revealed a high prevalence of stress, anxiety, and depression among undergraduate students. Higher stress levels were significantly associated with increased sedentary behaviour, indicating that students experiencing greater psychological strain tend to engage in fewer physical activities. Interestingly, academic performance was positively associated with elevated levels of stress and depression, suggesting that a moderate degree of psychological pressure may enhance motivation and academic outcomes. However, no significant relationship was identified between physical activity and academic performance. These findings highlight the complex interplay between mental health, lifestyle behaviors, and academic achievement among university students.

In this study we observed a high prevalence of psychological distress such as depression 65%, anxiety 71% and stress 57%. The findings of this study can be compared with a cross sectional study conducted in undergraduate medical students of Nepal by Sreeramredy et al et al. In his study, the prevalence of psychological distress was assessed with DASS-42. His study showed a comparatively low prevalence of anxiety 41.1%, stress 27% and depression 29.9% than reported in our study. [21] The reason behind this may be annual system and difference in examination schedules. R.Beiter at al study conducted on undergraduate students showed prevalence of stress, anxiety and depression 38%, 40% and 33% respectively which was less than our study. (35) This might be due to

environmental difference between the population. Another cross sectional study organized in Sindh on undergraduate physical therapy students showed 54.2% prevalence of stress and the prevalence of depression was 48%, again the results were different from our findings. (36) It might be due to the different assessment tools (DASS-42) used for depression and stress. A Cross sectional study conducted in Karachi on undergraduate medical students showed the prevalence of anxiety 70% by using AKUADS (Agha khan university anxiety depression scale) which is quite similar to our study. (37) The prevalence of depression 60% and prevalence of anxiety recorded 66% in India which is close enough to the results of our study. [38] According to cross sectional study conducted among undergraduate medical students showed the prevalence of depression, anxiety and stress was 65%, 70% and 69% respectively. (22) Their findings favoured our analysis. Our study suggested that academic performance can be affected by stress and the same findings were founded in study conducted from Malaysia which identified stressor level related to academics by means of General health questionnaire and medical student stress questionnaire. (39)

On the basis of our analysis a strong relationship existed between physical activity and psychological distress, which was favoured by many of the studies. A cross sectional study conducted in 10 European countries revealed that psychological distress had association with physical activity by Zung self-rating anxiety scale (SAS) and modified form of PACE (physical activity calorie expenditure) which was same as our results. (40) Most of the students in our study were physically inactive and they had adapted sedentary life style. In our study there was no association of depression, anxiety and stress with age, religion, socioeconomic status, financial status and parental status.

Validated self-reported questionnaires, for physical activity and level of stress, anxiety and depression, were used in this study that enabled efficient data collection; however, recall bias may still exist, and recruiting from a single institution with convenience sampling technique may limit broader generalizability.

Conclusion:

This study revealed that stress, anxiety, and depression are highly prevalent among undergraduate students. Higher levels of stress were associated with increased sedentary behaviour. Interestingly, academic performance was positively influenced by elevated levels of stress and depression, suggesting that a certain degree of psychological pressure may enhance students' motivation and performance. However, no significant relationship was found between physical activity and academic performance.

Disclosure /Conflict of interest:

Authors declare no conflict of interest.

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