



Relationship Between Academic Stress, Coping Strategies, and Musculoskeletal Disorders Among Health Sciences Undergraduates in the College of Health Sciences, Nnamdi Azikiwe University

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Abstract

Introduction: Coping strategies are the specific efforts, behavioural and psychological, that individuals employ to tolerate, reduce, or minimize stressful events. Musculoskeletal disorders (MSDs) are the most common causes of severe long-term pain and physical disability that affect many people globally. The adverse health effects of stress are enormous and vary among people, probably because of differences in how stress is managed and the strategies used to cope with it. This study aimed to determine the academic stress, coping strategies, and musculoskeletal disorders among students at the College of Health Sciences Okofia Nnewi Campus.

Material and Methods: This was a cross-sectional survey comprising 366 students recruited using a stratified random sampling technique. The Academic Stress Inventory, Stress Coping Style Inventory, and Cornell Musculoskeletal Discomfort Questionnaires were used. Data were analyzed using frequency counts, percentages, mean \pm standard deviation, Mann-Whitney U, Kruskal-Wallis, and Spearman rank tests. Statistical significance was set at $P < 0.05$.

Results: Moderate levels of academic stress (82.0%), good coping strategies (55.5%), and high prevalence of MSDs were observed among the students (94.0%), with the neck being the most affected (69.4%). Females had a significantly higher intensity of MSDs than males. A significant positive correlation was observed between academic stress and intensity of musculoskeletal discomfort ($\rho = 0.323$; $p < 0.01$). Academic stress, coping strategies, and MSDs of the participants varied significantly across departments ($p \leq 0.05$).

Conclusions: A high prevalence of MSDs, moderate academic stress levels, and good coping strategies were observed.

Key words: Academic stress; Coping strategies; Musculoskeletal disorders; Undergraduates

Introduction

Stress is a state of worry or mental tension caused by a difficult situation; however, the way people respond to stress makes a big difference to their overall well-being [1]. Stress is the body's response to a task or demand. Stress can be beneficial when it helps to avoid danger or meet a deadline but when it lasts for a long time, it may be harmful to health [2]. Several factors cause stress experienced by college students [3,4]. One of the most prominent stressors in students is academic stress, coming with serious implications psychologically and physically [5]. Academic stress is one of the major causes of stress, anxiety, and depression among undergraduates. Academic stress affects the body composition of the students through behavioral changes [6]. College students are exposed to academic stressors, such as an extensive academic course load, long studying hours, time management, competition among peers, concerns with finances, family pressures, and adapting to a new environment [4]. Nevertheless, some strategies can help individuals adapt and manage stressful situations. Adapting to stressful situations is a coping strategy [7].

Coping strategies are thoughts and behaviors used to manage stressful situations. Coping strategies involve efforts done consciously and voluntarily, different from subconscious defense mechanisms, that reduce or tolerate stress [8]. Coping strategies are specific efforts, behavioral and psychological, that individuals use to manage stress [9]. Coping strategies have two primary functions: managing the problem causing stress and governing emotions relating to those stressors [10–13]. There are three types of coping strategies: problem-focused, emotion-focused, and avoidance [14–16]. Problem-focused coping is a proactive and goal-oriented coping style that alters stressful situations with direct efforts to address the problem. Emotion-focused coping manages stressful events by regulating emotional responses, such as blaming oneself or others, anger, or engaging in distractions, to shift focus from the stressful stimulus. Avoidance coping involves avoiding stressful situations instead of confronting and addressing them. Medical students use active coping mechanisms to cope with stress [17–20]. Medical students rarely use avoidance strategies [18]. Ineffective coping mechanisms and personality may exacerbate stress, leading to negative behavior, psychosomatic symptoms, and decreased academic achievements [21]. Poor study posture and bad chairs can cause muscle strain, joint imbalance, and soft-tissue injury. This posture could become habitual, leading to musculoskeletal disorders (MSDs) [22].

MSDs are the common cause of severe long-term pain and physical disability that affect several people globally. MSDs include sprains, strains, tears, soreness, pain, carpal tunnel syndrome, hernias, and connective tissue injuries [23]. MSDs affect muscles, tendons, ligaments, joints, nerves, and blood vessels [24]. MSDs have a complex and multifactorial origin [25]. Physical, emotional, and social factors can interact to predispose one to MSDs, with stress being the most predisposing factor [26]. The prevalence of MSDs ranges between 20% and 33% globally, varying based on the nature of the activity and affecting adolescents and adults [1].

Students have a prevalence between 32.9% and 89.3% in different countries. This rate can cause a decrease in the educational attainment of students [27]. The University is largely dependent on an effective and stress-free environment for students, where they spend a significant time achieving their goals of learning and social integration [28]. MSDs have an adverse effect on daily activities and increase the rate of absenteeism from school [29]. Maintaining the same posture for prolonged periods

has serious detrimental effects on students' health, including a higher incidence of musculoskeletal complaints, discomfort, and fatigue. The risk of MSDs increases when task requirements exceed the students' abilities [30]. Some academic stressors, such as mental workload, difficult academic work, examinations, and poor social support, increase the risk of developing MSDs [31]. Stress is a predisposing factor for the occurrence of MSDs, particularly among students [32]. Students often experience physical stress, as they frequently adopt poor study posture while sitting and standing, leading to muscle strain and joint imbalance, developing chronic and recurrent episodes of pain over time if left unaddressed [22].

Academic stress is the most prevalent mental health cause among medical students and can cause depression, anxiety, behavioural problems, irritability, social withdrawal, and physical illnesses if not identified in time [33], which can affect their quality of life. The adverse effects of stress associated with health are vast and diverse among students owing to differences in how stress is perceived, and mechanisms used to cope with it [33], which affects their quality of life. Despite the negative effects of academic stress on students, studies in Nigeria determining the relationship between these variables (academic stress, coping strategies, and MSDs) are limited. Most studies conducted only focused on determining the prevalence of MSDs and their associated risk factors without considering the relationship between these risk factors and the disorders. Moreover, some focused only on students in one department without considering students in other departments. This study aimed to examine the relationship between academic stress, coping strategies, and incidence of MSDs among students.

Materials and Methods

This was a cross-sectional survey comprising 366 students recruited using a stratified random sampling technique. This study was approved by the Faculty of Health Sciences and Technology, Ethical Review Committee of Nnamdi Azikiwe University, Nnewi Campus. Participants provided informed consent. The Academic Stress Inventory, Stress Coping Style Inventory, and Cornell Musculoskeletal Discomfort Questionnaires were used. Data were analyzed using frequency counts, percentages, mean \pm standard deviation, Mann–Whitney U, Kruskal–Wallis, and Spearman rank tests. Statistical significance was set at $P < 0.05$.

Results

Socio-demographic profiles of the participants

A total of 366 undergraduates (44.8% males, 55.2 females), with a mean age of 21.60 ± 2.17 years, participated in this study.

Academic stress, coping strategies, and MSDs among the participants

The mean academic stress of the participants was 106.15 ± 17.87 , which is within the range for moderate stress with 82.0% of the participants having moderate stress levels. The mean coping strategy (88.37 ± 9.05) of the participants were the range for good coping strategy with most participants (55.5%) having good coping strategy. The prevalence of MSDs was 94.0% (Tables 1 and 2), giving a high level of MSD among the participants. The body part mostly affected with MSDs were the neck (69.4%), lower back (64.2%), upper back (58.5%), and hip/buttocks (56.0%) (Table 3).

Scores	Mean	Standard deviation	Interpretation
Academic stress	106.15	17.87	Moderate
Coping	88.37	9.05	Good

Table 1: Mean academic stress and coping strategies among the participants

Scores	Categories	Frequency	Percentage
Prevalence	Absent	21	5.7
	Present	344	94.0
Academic stress	Mild	23	6.3
	Moderate	300	82.0
	Severe	42	11.5
Coping	Poor	1	0.3
	Average	159	43.4
	Good	203	55.5

Table 2: Prevalence/levels of musculoskeletal disorders, academic stress, and coping strategies among the participants

Body parts	Prevalence (%)
Neck	69.4
Right shoulder	41.8
Left shoulder	31.4
Upper back	58.5
Right upper arm	18.3
Left upper arm	15.0
Lower back	64.2
Right forearm	14.8
Left forearm	10.7
Right wrist	34.7
Left wrist	18.0
Hip/buttocks	56.0
Right Thigh	13.9
Left thigh	11.2
Right knee	20.2
Left knee	18.6
Right lower leg	17.5
Left lower leg	16.9
Right foot	36.1
Left foot	35.8

Table 3: Patterns of musculoskeletal disorders among the participants

Spearman rank order correlation showing the relationship between intensity of MSDs, academic stress, and coping strategies among the participants

A significant positive correlation was observed between academic stress and intensity of MSDs ($\rho=0.323$; $P<0.001$), indicating that individuals with higher stress level had a higher intensity of MSDs. No significant correlation was observed between coping strategies and intensity of MSDs ($P>0.05$). Coping of the participants had significant positive correlation with their academic stress level ($\rho=0.264$, $P<0.001$),

indicating that individuals with higher stress levels adapted better coping strategies. Participants' age had a significant positive correlation with their coping strategies, indicating that older participants had better coping strategies than their younger participants ($P<0.05$). However, age had no significant correlation with the participants' academic stress and intensity of MSDs. Participants' level of study had a significant negative correlation with their academic stress and intensity of MSDs ($P<0.05$), indicating that students in higher classes had lower academic stress and intensity of MSDs (Table 4).

Variable		Intensity of MSDs	Stress	Coping
Intensity of MSDs	Rho=	-	0.323	0.082
	P=	-	<0.001	0.119
Stress	Rho=	0.323	-	0.264
	P=	<0.001	-	<0.001
Age	Rho=	-0.074	-0.086	0.150
	P=	0.157	0.101	0.004
Level of study	Rho=	-0.210	-0.171	0.087
	P=	<0.001	0.001	0.097

Table 4: Spearman rank order correlation showing the relationship between intensity of musculoskeletal disorders, academic stress and coping strategies among the participants

MSDs, Musculoskeletal disorders

Mann–Whitney U test showing sex differences in intensity of MSDs, academic stress, and coping strategies among the participants

Females had significantly higher intensity of MSDs than males ($U=13062.50$, $P=0.001$). However, no significant sex difference was observed in academic stress and coping strategies among the participants ($P>0.05$) (Table 5). The intensity of the MSDs among the participants significantly varied across departments, with Physiology and Medical Laboratory Sciences departments having the highest and least scores, respectively, ($p<0.05$). Academic stress among the participants significantly varied across the departments, with Human Nutrition and Medicine departments having the highest and least scores, respectively, ($p<0.05$). Coping strategies among the participants significantly varied across the departments, with Physiology and Nursing Sciences departments having the highest and least scores, respectively, ($p<0.05$) (Table 6).

Variable	Mean rank		U	P
	Male	Female		
Intensity of MSDs	162.15	200.83	13062.50	0.001
Stress	177.39	187.57	15562.50	0.359
Coping	181.21	185.36	16188.00	0.708

Table 5: Mann–Whitney U test showing the sex differences in intensity of MSDs, academic stress and coping strategies among the participants

MSDs, Musculoskeletal disorders

Variable	Mean rank	U	P
Intensity of MSDs			
Anatomy	192.50	17.144	0.029
Physiology	219.53		
Medicine	203.18		
Medical rehabilitation	184.09		
Medical Lab	147.60		
Radiography	185.34		
Nursing Science	218.16		
Environmental Health	153.66		
Human Nutrition	192.90		
Stress			
Anatomy	221.99	27.918	<0.001
Physiology	235.85		
Medicine	163.23		
Medical rehabilitation	169.07		
Medical Lab	179.09		
Radiography	161.16		
Nursing Science	179.93		
Environmental Health	152.84		
Human Nutrition	276.90		
Coping			
Anatomy	202.24	21.517	0.006
Physiology	230.11		
Medicine	177.18		
Medical rehabilitation	209.49		
Medical Lab	180.75		
Radiography	156.23		
Nursing Science	147.29		
Environmental Health	170.95		
Human Nutrition	153.80		

Table 6: Kruskal–Wallis U test showing the department differences in intensity of MSDs, academic stress and coping strategies among the participants.

Discussion

The occurrence of stress among students can have negative effects on their health and studies. This study aimed to determine the academic stress, coping strategies, and MSDs among students at the College of Health Sciences, Okofia Nnewi Campus. A total of 366 undergraduates (females, 55.2%; males, 44.8%), with a mean age of 21.60±2.17 years participated in this study. The prevalence of MSDs was 94.0%, with the neck affected most. The participants had moderate levels of academic stress and good coping strategies.

Moderate level of academic stress was reported among 82.0% of the participants, which is similar to a previous study [32]. Another study reported that students (77.3%) experience moderate stress levels [33], which is similar to our study.

The mean coping of the participants was 88.37±9.05, which was within the range for good coping strategy, which is similar to a previous study [35]. However, this finding is contrary to that of a previous study

[33], where coping with stress was average. According to the study, individuals' low self-esteem and concerns about the future may be the cause of this.

This study revealed a high prevalence of MSDs among the participants (94.0%). This finding supports previous studies that indicated a high prevalence of MSDs among undergraduates [22,27]. This could be because of prolonged sitting, repeated movements, and bad posture while reading. However, the biases introduced by the self-report questionnaire may have influenced these findings, as the participants may have exaggerated their experience.

In this study, the body parts most affected with MSDs were the neck (69.4%) and lower back (64.2%), which is similar to a previous study [36]. Prolonged sitting and maintaining static postures aggravate low back pain. This may be because many students read for a long time with their neck flexed, which could increase muscle tension, causing pain and discomfort. Less hours of sleep are linked to more musculoskeletal pain in the neck, lower back, and knees in high school students [37].

A significant positive correlation was observed between academic stress and intensity of MSDs. This signifies that individual with higher stress levels also had a higher intensity of MSDs, which is consistent with previous studies [22,32]. In a previous study MSDs were significantly associated with academic stressors and environmental factors [38], suggesting that academic stress is a risk factor for developing MSDs. However, for students to not be stressed, a flexible academic calendar should be adopted.

Sex, level of study, and department were related to the prevalence of MSDs. Most students reported moderate academic stress, with females having a higher occurrence, which is similar to previous studies [22,27]. Although no significant relationships were observed between sex and academic stress, females had a higher incidence of MSDs than males, which is also similar to a previous study [39]. They could be because academic stress is more prevalent in females than in males. However, this finding is contrary to a study that reported that males had a higher incidence of MSDs than females [32]. The participants' level of study had a significant negative correlation with their academic stress and intensity of MSDs. This signified that student in higher classes had significantly lower academic stress and intensity of MSDs. However, age had no significant correlation with academic stress and intensity of MSDs, which is similar to previous studies [35,40].

This study had some limitations. First, its reliance on self-reported data may be subjected to biases, such as exaggeration or underreporting. Second, the cross-sectional design prevents the establishment of causality between academic stress, coping strategies, and musculoskeletal disorders.

Conclusions

This study highlights a high prevalence of MSDs and moderate levels of academic stress among students, with significant correlations between stress and MSD intensity. These findings underscore the need for interventions to reduce academic stress and improve coping strategies to mitigate MSDs. However, the reliance on self-reported data and cross-sectional design limit the ability to establish causality. Further longitudinal studies are recommended.

Conflict of interest

The authors declare no conflict of interest.

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