

ORIGINAL ARTICLE

Association of physical activity with musculoskeletal status among undergraduate students

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Keywords

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ABSTRACT

The objective of this study was to find out the association of physical activity with musculoskeletal status (MSK-S) among undergraduate students. In this cross-sectional descriptive study, subjects comprised of 143 students of which 27.3% were male and 72.7% were female between ages 18-26 years. The Musculoskeletal health questionnaire (MSK-HQ) was used to measure MSK-HS. Beacke questionnaire was used for the measurement of a person's habitual physical activity. Among the samples 6.3% of the students were from 1st year, 8.4% from 2nd year, 7.0% from 3rd year, 16.1% from 4th year and 62.2% from 5th year. The association of physical activity with musculoskeletal health status ($p = 0.00$) was significant. The physical activity levels in correlation to the male and female population ($p = 0.31$) were not significant. MSK health among the male and female population found to be statistically significant ($p=0.01$). MSK scores between different academic years were statistically significant difference ($p = 0.02$). This study showed that students who had high physical activity levels had better MSK health status whereas, students engaged in low physical activity had poorer MSK health status. Results indicated that male population had poor MSK health status as compared to the female population. The comparison of different academic years indicated that MSK health status among 1st and 2nd years was poor while it was better for final years. The study indicated that the students were physically active at moderate levels.

INTRODUCTION

Musculoskeletal disorders (MSDs) which negatively affect daily activities are characterized by muscle soreness or damage to the human network that arise after a single incidence or a string of traumas. In addition to the upper limbs like the forearm and wrist, MSD can also produce pain in the postural muscles like the upper and lower back, neck, and shoulders as well as in the lower extremities viz the hips, thighs, knees, and ankles. MSD may develop into more serious inflammatory and degenerative illnesses if it is not addressed. In today's workplace, MSD may be the

condition with the most prevalent symptoms. A survey conducted in 2011, MSDs were the most common health issue among European, American, and Asian Pacific employees. Dental practitioners must be able to sit or stand for extended periods of time and perform repetitive actions, all of which are requirements for MSD. According to studies, MSDs are multifaceted and don't merely have physical causes. Stress and other psychosocial variables have also been found to have a key role in the progression of MSD. Prolonged static postures (PSP) are common in dentistry. Awkward postures that require hunching forward and frequently moving the head, neck, and torso to one

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side are occasionally used in clinical practice. As posture deviates farther from neutral, muscular imbalance develops and the muscles in charge of the popular side of rotating or bending get stronger and the corresponding antagonistic muscles stretch and weaken (1).

Back pain is typically nonspecific or mechanical. Mechanical back pain (MBP) arises intrinsically from the spine, intervertebral disks, or surrounding soft tissues. Mechanical means the source of the pain is also within the spinal joints, discs, vertebrae, or soft tissues. Specific trauma or strenuous activity may cause the pain. MBP implies the source of pain is within the spine and/or its structure. The encompassing muscles and tendons may develop reactive spasm and pain. The pain may radiate (spread) to the buttocks and thighs. Many folks may additionally experience spasms with mechanical back pain. The symptoms of mechanical back pain are generally more noticeable with flexion of the rear and when lifting heavy objects (2).

In south-south Nigeria, a study was conducted among undergraduates to determine association of academic stress and incidence of musculoskeletal diseases. The study reported significant relation between academic stress and bodily discomfort. Authors also developed suggestions for modification in educational curriculum and stress coping strategies (3).

Repetitive stress, use and work-related postures could result in strain of muscle under stress and other surrounding structures. These micro strains could cause pain which could present in different ways, i.e., acute, chronic, localized or diffused. University going students are habitual of prolonged sitting, poor postures, ergonomically poor foot wear, ultimately increasing physical demands and predisposing person to musculoskeletal injuries (4).

From November 2013 to January 2014 a cross-sectional study was conducted on 457 physiotherapy students, and most were females.

Cornell Musculoskeletal Discomfort Questionnaire, International Physical Activity Level Questionnaire, Quality of Life Short-Form Questionnaire, and Brief Multidimensional Students' Life Satisfaction Scale were used to enquire about musculoskeletal problems. Low back pain was the most prevalent MSK problems among them. It was also found that these problems reduced the well-being and satisfaction of life of students (5).

There is limited literature available on the association of physical activity with musculoskeletal status (MSK-S) among undergraduate students. There is a need to identify the effects of musculoskeletal status. This will help us to educate and aware the students about negative outcomes and can educate them regarding the importance of extracurricular activity. By this, a healthier life could be provided to students as this could also decrease their stress level and increased their physically active levels.

MATERIALS AND METHODS

After getting approval from the ethical committee and physiotherapy department a cross-sectional study was conducted. The data was collected from Rashid Latif Medical College, Allama Iqbal Medical University and University of Faisalabad. Sample size was calculated through online sample size calculator EPITOOLS. The reference was considered from the previous studies. The total sample size for this study was 143. The sampling technique was a non-probability convenient sampling technique. Undergraduate students of age from 18 to 24 years were recruited (6). Students with any systematic illness, fracture and physically disabilities or any cardiopulmonary diseases (7) and those who were taking medications that can alter the perceived muscle pain were excluded.

In this study, IBM SPSS 26.0 version was used to analyze the data. Parametric data was reported as mean $\pm$ SD. Chi-square test was used to compare the physical activity levels in different gender of the given population. An Independent t-test was

performed to compare the MSK health status in between gender. To compare the MSK health status of students from different academic years, one-way ANOVA was performed. Chi-square was used to compare the physical activity levels of students from different academic years.

RESULTS

From Table 1 it is indicated that 27.3% were males and 72.7% were females. In Table 1, it is also shown that 6.3% of the students who participated in this study were from 1st year, 8.4% students from 2nd year, 7.0% participants were from 3rd year, 16.1% of participated students were from 4th year and 62.2% were from 5th year.

Table 1. Descriptive statistics of participants

Factors	N	Percentage
Gender		
Male	39	27.3
Female	104	72.7
Academic Year		
First year	9	6.3
Second year	12	8.4
Third year	10	7.0
Fourth year	23	16.1
Five year	89	62.2

One-way ANOVA was used to compare the MSK scores between different academic years. Results shown in Table 2 indicated that there was a statistically significant difference; $F(4) = 2.84$, $p = 0.02$ among given academic years. Students from 1st and 2nd year had poor MSK health whereas, 4th and final year students had better MSK health.

Table 2. One-Way ANOVA used to compare the MSK scores between different academic years

Groups	Mean Square	F	Sig.
Between groups	0.05	2.84	0.03
Within groups	0.02		

To compare the physical activity of students, Pearson's chi-square test was performed on different academic years as shown in Table 3. It was found that the comparison was statistically

significant, $\chi^2 = 16.88$, $p = 0.03$. It concluded that students who participated in this study were physically active at a moderate level. To compare the Musculoskeletal health among male and female population independent sample t-test was performed (Table 4).

Table 3. Chi-Square used to test physical activity level of students across different years

Chi-square tests	Value	d.f.	Sig.
Pearson chi-square	16.89	8	0.03
Likelihood ratio	17.45	8	0.03
Linear-by-linear association	10.91	1	0.00
N of valid cases	143		

The results from Table 4 shows a statistically significant ($t = 2.58$, $p = 0.01$) difference among gender for MSK. This indicated that males had higher score of MSK health status which concluded that musculoskeletal health status of male respondents was poor as compared to female respondents.

Table 4. Independent sample t-test to compare the MSK health among gender

	Gender	t-value (Sig)
Total MSK scores	Male	2.58
	Female	(0.01)

DISCUSSION

Musculoskeletal disorders (MSDs), which negatively affect daily activities are characterized by muscle soreness or damage to the human network that arise after a single incidence or a string of traumas. MSDs were the most prevalent health problem among employees in Europe, America, and Asia Pacific, according to a 2011 survey. MSD is common in occupations that demand lengthy periods of time spent in static positions like sitting or standing, as well as repetitive motions.

Physical activity has great potential to favorably influence both normal and pathological structures, functions, and processes. Musculoskeletal benefits of physical activity can be attained by people of all ages and with various diseases. This potential is substantial because many benefits are gained by activity which is moderate in amount and intensity (8). It is also seen that a combination of frequent musculoskeletal pain and perceived stress constitute a high risk for decreased work performance and reduced work ability.

To find prevalence of musculoskeletal disorders among nursing and medical students, a study was conducted in 2018. The study reported that lower back pain was the most prevalent and its prevalence increased as the year of study increased (9). Therefore, this study aimed to find the physical activity levels among students and its association with MSK-HS. In a representative population, the results showed that MSK status has strong association with work and sports index of physical activity questionnaire domains. Students who had higher physical activity levels had better MSK health status whereas, students engaged in low physical activity had poorer MSK health status and had many musculoskeletal conditions associated.

A study reported that final year students at Peshawar have no musculoskeletal issues during 12 months. In line with this study, the findings also suggest that final year students are much better than 1st and 2nd year students. There could be many reasons for better results i.e., posture awareness and better awareness of musculoskeletal system etc. (10).

CONCLUSION

This study showed that students who had high physical activity levels had better MSK health status whereas, students engaged in low PA had the poorer MSK health status. Results indicated that the male population had poor MSK health status as compared to the female participants. On comparing over different academic years, MSK health status among 1st and 2nd year was poor while final year

students were better. The study concluded that students were physically active at moderate levels.

LIMITATIONS AND RECOMMENDATIONS

The sample size of our study is inadequate as compared to other work present in the extant literature (11), even if the topic was more or less similar.

- One of the main limitations of the study was the number of male subjects in this research
- This cross-sectional design cannot comment upon the cause-effect relationship between fatigue status and aerobic capacity status
- There is an assumption that if the physical activity self-efficacy is elevated during youth that as an adult this efficacy will continue and individuals will be active for a lifetime
- Future researchers are advised to take larger sample size
- Samples should be taken from other cities as well
- It is suggested that longitudinal studies should be done to draw causal inference and informed recommendations

CONFLICT OF INTEREST

The authors declared no conflict of interest.

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