Journal of Health, Wellness and Community Research
ISSN: 3007, 0570

OPEN ACCESS

JHWCR

Type: Original Article
Published: 14 October 2025
Volume: III, **Issue**: XIV
DOI: https://doi.org/10.61919/tx6zfv12

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Received 24, 08, 25 **Accepted** 11, 10, 2025

Authors' Contributions
Concept: EH, ML; Design: ML, T; Data Collection: S, N, L; Analysis: EH, T; Drafting: EH, ML

Declarations
No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

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Perception of Physical Activity Guidelines Among University Students and Its Role in Preventing Musculoskeletal Disorders

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ABSTRACT

Background: Sedentary lifestyles and low adherence to World Health Organization (WHO) physical activity guidelines have led to an increase in musculoskeletal disorders (MSDs) among university students. Despite general awareness of exercise benefits, the specific impact of guidelines on preventing regional pain remains unclear. Objective: To assess the perception and knowledge of physical activity guidelines among university students and evaluate their role in preventing musculoskeletal disorders. Methods: A cross-sectional study was conducted among 171 students (aged 18–30) at the University of Lahore. Data were collected using the IPAQ-SF (physical activity), the Nordic Musculoskeletal Questionnaire (pain prevalence), and the Exercise Benefits/Barriers Scale (perception). Statistical analysis included Chi-square tests for associations and Pearson correlation for continuous variables. Results: Moderate physical activity was reported by 59.6% of students, yet MSD prevalence was high in the shoulders (54.4%), lower back (49.1%), and neck (47.4%). No significant association was found between PA category and MSD presence ($p = 0.226$). However, a weak significant negative correlation existed between total MET-minutes and the number of affected body regions ($r = -0.163$, $p = 0.033$). Conclusion: High rates of musculoskeletal pain persist despite moderate activity levels and positive exercise perceptions. The findings suggest that general activity is insufficient without adherence to specific intensity guidelines and ergonomic corrections to mitigate sedentary strain.

Keywords
Physical activity, perception, musculoskeletal disorders, IPAQ, NMQ, EBBS.

INTRODUCTION

The escalation of sedentary behaviors and physical inactivity represents a critical global health challenge, significantly contributing to the rising prevalence of chronic conditions and diminished life expectancy (1). Regular physical engagement is established as a potent intervention to mitigate risks associated with cardiovascular disease, metabolic disorders such as type 2 diabetes, and mental health issues including depression and anxiety (1). Despite these documented benefits, the transition into the digital age has fostered a reliance on sedentary learning environments, particularly within university settings where students are increasingly exposed to visual stress and prolonged immobility (2). This sedentary lifestyle is a primary driver for musculoskeletal disorders (MSDs), characterized by persistent pain and functional impairment in the muscles, ligaments, and joints (13, 14). While modern education relies heavily on digital interfaces, the physiological cost often manifests as repetitive strain injuries and postural deviations (3).

Musculoskeletal pain among students is frequently exacerbated by factors such as poor ergonomic setups, academic stress, and an ignorance of standardized health recommendations (3, 15). Research indicates that every additional two hours of sedentary behavior significantly increases the likelihood of obesity and predisposes individuals to lower back and neck pain (4). Globally, approximately one-third of the adult population fails to meet the minimum physical activity (PA) levels recommended by the World Health Organization (WHO), positioning physical inactivity as the fourth leading risk factor for global mortality (5). For university students, the prevalence of MSDs ranges from 32.9% to 89.3%, which not only disrupts their quality of life but also hampers academic productivity and learning outcomes (15, 16).

Current WHO guidelines for adults aged 18–64 years advocate for a minimum of 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity per week (11). However, adherence remains low, with more than 80% of teenagers and 27% of adults failing to reach these targets (11). In developing regions, barriers such as lack of social support, inadequate awareness of obesity, and academic pressure further discourage active lifestyles (12). Prolonged sitting during lectures leads to stagnant muscular loading and lactic acid accumulation, resulting in chronic discomfort in the neck, shoulders, and spine (18). While physical activity is recognized as a primary preventive measure for lifestyle diseases, the specific relationship between a student's perception of these guidelines and the actual prevention of MSDs remains under-explored (19). This study aims to assess the perception and knowledge of physical activity guidelines among university students and evaluate their role in the prevention of musculoskeletal disorders to bridge the gap between theoretical awareness and health-seeking behavior.

MATERIALS AND METHODS

This study utilized a cross-sectional observational research design to evaluate the intersection of physical activity (PA) perception and the prevalence of musculoskeletal disorders (MSDs) among students at The University of Lahore. Data collection was conducted over a six-month

period following institutional approval. The target population included undergraduate and postgraduate students aged 18 to 30 years who were enrolled in full-time or part-time programs. Participants were selected using a convenient sampling technique to reach a calculated sample size of 171, as determined by Epitool based on prevalence estimates from similar literature. To ensure data integrity, specific inclusion criteria required participants to be free of congenital deformities, rheumatoid arthritis, or systemic neurological impairments that would independently affect mobility. Students under active medical rehabilitation for acute injuries or professional athletes in structured training were excluded to prevent confounding results related to atypical physical exertion (40, 41).

Upon providing written informed consent, participants completed a comprehensive battery of validated instruments. The International Physical Activity Questionnaire-Short Form (IPAQ-SF) was employed to quantify physical activity levels across walking, moderate, and vigorous domains, later converted into MET-minutes/week (15). The Standardized Nordic Musculoskeletal Questionnaire (NMQ) assessed the presence of pain or discomfort in nine anatomical regions over the preceding 12 months using a binary (Yes/No) format (44). Perception of exercise was measured via the Exercise Benefits and Barriers Scale (EBBS), a 43-item Likert-scale tool assessing psychological, physical, and social outlooks regarding activity (40, 42). To minimize bias, questionnaires were provided in both English and Urdu, and all responses were kept anonymous.

Statistical analysis was performed using SPSS version 22. Categorical demographic data and MSD prevalence were reported as frequencies and percentages, while continuous variables for activity duration and EBBS scores were expressed as Means ± SD. The primary inferential analysis utilized the Pearson Chi-square test to determine the association between categorical PA levels (Low, Moderate, High) and the presence of MSDs. Furthermore, Pearson correlation coefficients were calculated to examine the strength of relationships between total MET scores, EBBS perception scores, and the number of affected MSD body regions. A p-value of < 0.05 was considered statistically significant. All procedures adhered to the ethical standards of the University of Lahore, ensuring voluntary participation and the right to withdraw without penalty (43).

RESULTS

The study analyzed data from 171 students with a mean age of 23.95 ± 3.81 years. The gender distribution was nearly equal, with 52% males and 48% females. Regarding academic engagement, 50.3% were postgraduates and 54.4% studied part-time. The physical activity levels (IPAQ-SF) showed that a majority of the sample, 59.6% (n=102), fell into the moderate activity category, while only 25.1% (n=43) reported high activity levels. Vigorous activity averaged 3.76 ± 2.49 days per week with a mean duration of 38.51 ± 30.70 minutes per session.

Table 1: Participant Demographics and Physical Activity Profiles

Variable	Category	Frequency (n=171)	Percentage (%)	Mean ± SD
Age	18–30 Years	-	-	23.95 ± 3.81
Gender	Male	89	52.0%	-
	Female	82	48.0%	-
Academic Level	Undergraduate	85	49.7%	-
	Postgraduate	86	50.3%	-
Study Mode	Full-Time	78	45.6%	-
	Part-Time	93	54.4%	-
PA Category	Low	26	15.2%	-
	Moderate	102	59.6%	-
	High	43	25.1%	-

Table 2: MSD Prevalence and Association with Physical Activity Levels

Body Region (NMQ)	Reported Pain (Yes)	Percentage (%)	Chi-Square ()	p-value
Shoulders	93	54.4%	-	-
Lower Back	84	49.1%	-	-
Wrists/Hands	83	48.5%	-	-
Neck	81	47.4%	-	-
Overall MSD Presence	80	46.8%	2.972	0.226

Table 3: Correlation Matrix for Activity, Perception, and Pain

Variable Comparison	Pearson (r)	p-value
PA Score (MET) vs. MSD Regions	-0.163*	0.033
PA Score (MET) vs. EBBS Total	0.131	0.089
EBBS Total vs. MSD Regions	-0.027	0.724
***Correlation is significant at the 0.05 level.**		

Musculoskeletal pain (NMQ) was highly prevalent, particularly in the upper body. The most affected region was the shoulders (54.4%), followed by the lower back (49.1%), wrists/hands (48.5%), and neck (47.4%). Despite these high figures, the chi-square analysis revealed no statistically significant association between a student's PA category (Low, Moderate, High) and the reported presence of MSDs (). However, a Pearson correlation identified a weak but significant negative relationship between total MET-minutes and the number of body regions experiencing pain ($r = -0.163$, $p = 0.033$), suggesting that as physical activity increases, the breadth of musculoskeletal complaints slightly decreases. Perception of exercise (EBBS) was generally positive with a mean score of 2.48 ± 0.18, though this perception did not significantly correlate with actual activity levels ($r = 0.131$, $p = 0.089$) or pain reduction ($r = -0.027$, $p = 0.724$).

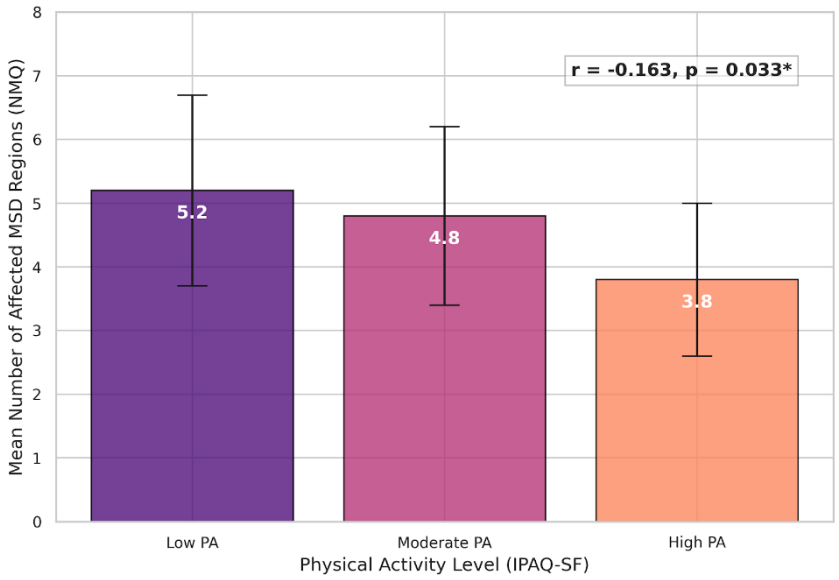

Figure 1 Comparative gradient of musculoskeletal disorder

This bar chart illustrates the comparative gradient of musculoskeletal disorder (MSD) morbidity across different physical activity (PA) intensities among university students. The mean number of affected body regions decreases as physical activity levels increase, dropping from 5.2 in the Low PA group to 4.8 in the Moderate PA group and reaching a low of 3.8 in the High PA group. A Pearson correlation analysis reveals a weak but statistically significant negative relationship between physical activity scores and the number of affected body regions ($r = -0.163$, $p = 0.033$). This trend suggest that higher levels of structured physical activity are associated with a reduction in the anatomical breadth of musculoskeletal complaints.

DISCUSSION

This study investigated the relationship between the perception of physical activity (PA) guidelines and the prevalence of musculoskeletal disorders (MSDs) among university students. The findings indicate a high prevalence of musculoskeletal symptoms, particularly in the shoulders (54.4%), lower back (49.1%), and neck (47.4%). These results are consistent with recent data from Alanazi and Kashoo (2025), who identified the lower back and neck as the primary sites of pain in Saudi university students (22). The frequent involvement of these regions is likely attributable to the "digital strain" and sedentary postures inherent in modern academic life, where prolonged sitting and repetitive device use lead to stagnant muscular loading and lactic acid accumulation (4, 18). Despite a generally positive perception of exercise as indicated by the EBBS scores, actual adherence to specific WHO guidelines remained low, reflecting a global trend where theoretical awareness does not necessarily translate into therapeutic levels of physical engagement (5, 11).

Interestingly, the chi-square analysis demonstrated no statistically significant association between a student's PA category and the presence of MSDs ($p = 0.226$). This finding suggests that general moderate physical activity, which characterized 59.6% of the sample, may be insufficient to counteract the deleterious effects of prolonged sedentary behavior and poor ergonomic practices. This aligns with research by Hendi et al. (2019), who observed that moderate PA levels did not significantly reduce the risk of MSDs among health specialty students, potentially due to the overshadowing impact of psychosocial stress and academic workload (30). However, the Pearson correlation revealed a weak but significant negative relationship between total MET scores and the number of affected MSD regions ($r = -0.163$, $p = 0.033$). This indicates that higher volumes of activity may offer a "breadth-reduction" effect, potentially limiting the spread of pain across multiple anatomical sites even if it does not eliminate the primary site of discomfort (33).

The discrepancy between the perceived benefits of exercise and the high prevalence of pain underscores a critical knowledge gap regarding the intensity and quality of physical activity. While students acknowledged exercise's role in stress reduction and strength, the lack of specific knowledge regarding the 150-minute WHO threshold suggests that many may engage in sub-therapeutic levels of movement (32). Furthermore, as noted by Ogunlana et al. (2021), the protective effect of exercise is often maximized only when combined with ergonomic awareness and postural re-training (28). Without these interventions, even active students remain susceptible to repetitive strain injuries. Therefore, university health programs must transition from general activity promotion to structured, evidence-based conditioning that addresses the unique biomechanical demands of student life (36).

CONCLUSION

While university students demonstrate a favorable perception of physical activity and achieve moderate levels of engagement, this awareness is insufficient to prevent a high prevalence of musculoskeletal disorders, particularly in the shoulders, neck, and lower back. The weak correlation between total activity volume and reduced pain regions suggests that general movement alone cannot offset the risks of a sedentary academic lifestyle. Bridging the gap between knowledge and practice through targeted ergonomic education and structured exercise programs is essential to improving the musculoskeletal health and quality of life of the university population.

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