

Correlation between physical activity level and musculoskeletal disorders among physiotherapy students

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) are conditions affecting muscles, tendons, nerves, joints and fascia and are an important cause of disability. Neck and low back symptoms are frequently reported among students. Physical activity may influence musculoskeletal health, but evidence regarding the relationship between physical activity and MSDs among physiotherapy students in the Indian student population is limited.

Objective: To assess the correlation between physical activity level and musculoskeletal disorders among physiotherapy students.

Methods: A cross-sectional study was conducted among 200 physiotherapy students from various colleges in Karnataka. A pre-designed questionnaire collected demographic information. Physical activity was assessed using the Global Physical Activity Questionnaire (GPAQ), while musculoskeletal symptoms were assessed using the Standardized Nordic Musculoskeletal Questionnaire.

Results: The mean age of participants was 23 ± 2.6 years. Females comprised 57.5% and males 42.5%. Low, moderate and high physical activity levels were reported by 37.5%, 43% and 19.5% of participants, respectively. The lower back was the most frequently affected region over the previous 12 months (56%), followed by the neck (53%). Statistically significant associations between physical activity level and MSDs were reported for several body regions ($P < 0.05$).

Conclusion: The study findings show a significant association between physical activity level and the prevalence of musculoskeletal disorders among physiotherapy students.

Keywords: musculoskeletal disorder; global physical activity questionnaire; physical activity; Standardized Nordic Musculoskeletal Questionnaire; physiotherapy students

1. Introduction

Musculoskeletal disorders (MSDs) refer to a group of conditions affecting the nerves, tendons, muscles, joints and fascia. These disorders may result in pain, inflammation, degeneration and loss of function in different regions of the body. Musculoskeletal pain, particularly neck pain and low back pain, is a major contributor to disability.

Previous research among health-related students has reported a high prevalence of musculoskeletal discomfort. One study reported that 64.8% of students experienced discomfort or pain in one or more musculoskeletal regions, with the lower back, neck and upper back being commonly affected. Other studies have also reported a high incidence of MSDs among students, with final-year students showing greater involvement.

Musculoskeletal problems may be influenced by physical and ergonomic factors such as lifting and carrying loads, excessive force, pressure, repetitive movements, vibration and prolonged or poor static postures. In students, prolonged sitting and other sedentary behaviours may contribute to musculoskeletal symptoms.

Physical activity is defined as body movement produced by skeletal muscles that requires energy expenditure. Moderate and vigorous physical activity provides important health benefits. The Global Physical Activity Questionnaire (GPAQ) assesses physical activity in work, travel and recreational domains and considers intensity, duration and frequency.

The present study was undertaken because there is limited literature examining the relationship between physical activity level and musculoskeletal disorders among physiotherapy students in the Indian student population.

1.1. Need of the study

Physiotherapy students are exposed to prolonged academic activities, practical training, sitting, standing and clinical work. Understanding whether physical activity level is associated with MSDs may help identify students at greater risk and support preventive strategies.

1.2. Aim of the study

To find out the correlation between physical activity level and musculoskeletal disorders among physiotherapy students.

1.3. Objective of the study

To assess the association between physical activity levels and musculoskeletal disorders among physiotherapy students using the Global Physical Activity Questionnaire and Standardized Nordic Musculoskeletal Questionnaire.

1.4. Hypothesis

Null hypothesis: There is no significant association between physical activity level and musculoskeletal disorders among physiotherapy students.

Alternative hypothesis: There is a significant association between physical activity level and musculoskeletal disorders among physiotherapy students.

2. Materials and Methods

2.1. Study design

A cross-sectional study design was used.

2.2. Study setting

The study was conducted through the Institute of Srinivas College of Physiotherapy, with participants recruited from physiotherapy colleges in Karnataka.

2.3. Study duration

The study was conducted over a period of six months.

2.4. Sample size and sampling

A total of 200 physiotherapy students were included. Snowball sampling was used to recruit participants from various physiotherapy colleges in Karnataka.

2.5. Inclusion criteria

Students aged 18–25 years, of any gender, who were willing to participate were included.

2.6. Exclusion criteria

Students who were unwilling or uncooperative and those with a history of injury, recent surgery or fracture involving the neck or lower back were excluded.

2.7. Outcome measures

1. Global Physical Activity Questionnaire (GPAQ): Used to assess physical activity in work, travel and recreational domains, together with sedentary behaviour. Physical activity was categorized as low, moderate or high.
2. Standardized Nordic Musculoskeletal Questionnaire: Used to assess musculoskeletal symptoms in nine body regions and to identify symptoms during the previous 12 months, previous 7 days and interference with normal activities.

2.8. Procedure

Permission was obtained for data collection and informed consent was obtained from each participant. Participants completed the demographic questionnaire, GPAQ and Standardized Nordic Musculoskeletal Questionnaire. Demographic variables included age, gender, educational level, height, weight, BMI and college. The completed questionnaires were collected and entered for statistical analysis.

2.9. Statistical analysis

Data were analyzed using descriptive statistics. Continuous variables were presented as mean±standard deviation and categorical variables as frequency and percentage. BMI was categorized into underweight, normal weight,

overweight and obesity. The chi-square test was used to assess the relationship between physical activity level and musculoskeletal disorders. Statistical significance was set at $P < 0.05$. SPSS version 20.0 was used for analysis.

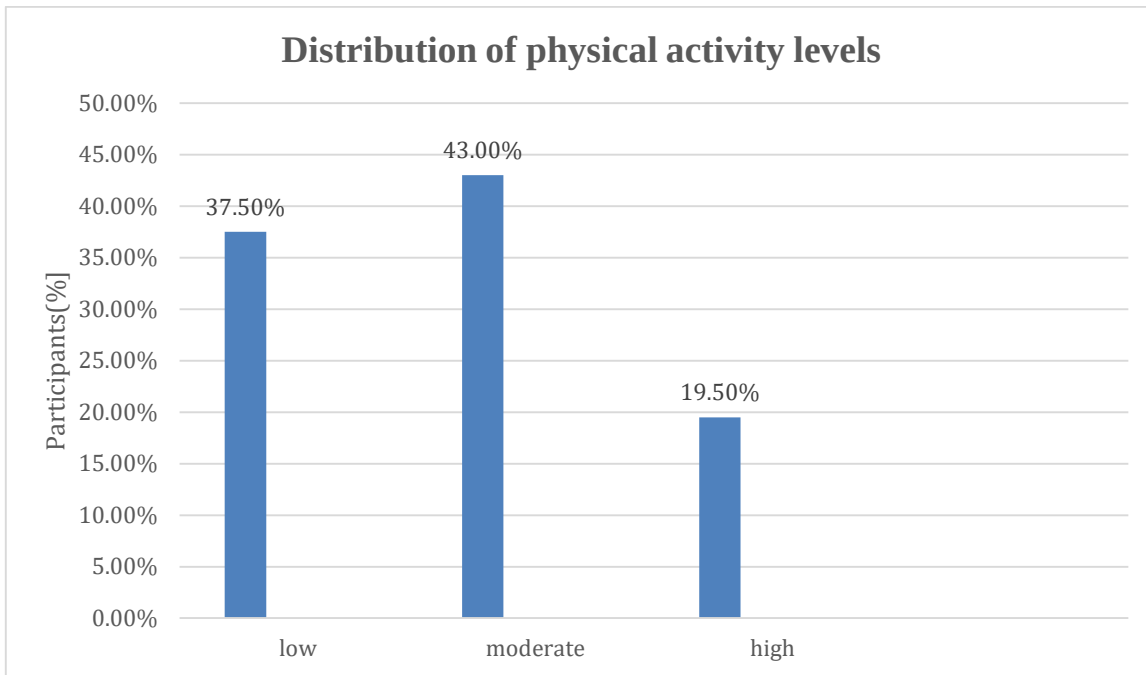
3. Results

A total of 200 physiotherapy students participated in the study. The mean age was 23 ± 2.6 years. Female participants constituted 57.5% and male participants 42.5%. Most participants were undergraduate students.

Table 1: Demographic details of the participants

Variable	Number (n)	Percentage (%)
Age (Mean $\pm$ SD)	23 ± 2.6	
Gender		
Male	85	42.5
Female	115	57.5
Education		
UG	125	62.5
Intern	46	23
PG	29	14.5
BMI		
Underweight	29	14.5
Normal	102	51.0
Overweight	61	30.5
Obesity	8	4.0
Physical activity level		
Low	75	37.5
Moderate	86	43
High	39	19.5

Physical activity level	n	percentage
Low	75	37.5
Moderate	86	43.0%
High	39	19.5%
total	200	100%



Graph 1 - Distribution of physical activity levels

Table 2: Prevalence of MSD

Variable	Number (n)	Percentage (%)
Pain during the last 12 months		
Neck	106	53
Shoulder	67	33.5
Elbows	30	15
Wrists/hands	48	24
Upper back	75	37.5
Lower back	112	56
Hips/thighs	37	18.5
Knees	75	37.5
Ankles/feet	57	28.5
Pain interferes with work		
Neck	57	28.5
Shoulder	45	22.5
Elbows	22	11
Wrists/hands	32	16

Upper back	44	22
Lower back	83	41
Hips/thighs	26	13
Knees	51	25.5
Ankles/feet	44	22
Pain during the last 7 days		
Neck	84	42
Shoulder	44	22
Elbows	20	10
Wrists/hands	31	15.5
Upper back	48	24
Lower back	81	40.5
Hips/thighs	21	10.5
Knees	51	25.5
Ankles/feet	44	22

Distribution of physical activity levels

Fig 1: Distribution of physical activity levels

The distribution shows that moderate physical activity was reported by the largest proportion of participants, followed by low and high physical activity levels.

Table 3: Prevalence of musculoskeletal symptoms by body region

Body region	Past 12 months n (%)	Work interference n (%)	Past 7 days n (%)
Neck	106 (53.0%)	57 (28.5%)	84 (42.0%)
Shoulder	67 (33.5%)	45 (22.5%)	44 (22.0%)
Elbow	30 (15.0%)	22 (11.0%)	20 (10.0%)
Wrist/hand	48 (24.0%)	32 (16.0%)	31 (15.5%)
Upper back	75 (37.5%)	44 (22.0%)	48 (24.0%)
Lower back	112 (56.0%)	82 (41.0%)	81 (40.5%)
Hip/thigh	37 (18.5%)	26 (13.0%)	21 (10.5%)
Knee	75 (37.5%)	51 (25.5%)	51 (25.5%)
Ankle/feet	57 (28.5%)	44 (22.0%)	44 (22.0%)

The lower back was the most frequently affected region during the previous 12 months, with 56% of participants reporting symptoms. Neck symptoms were reported by 53%. Lower back symptoms also showed 41% interference with normal activities and 40.5% symptoms during the previous 7 days.

Table 4: Significant associations between physical activity level and musculoskeletal symptoms

Period	Body region	P value
Past 12 months	Neck	0.016
Past 12 months	Elbow	<0.001
Past 12 months	Hip/thigh	0.030
Past 12 months	Knee	0.047
Past 12 months	Ankle/feet	0.018
Work interference	Shoulder	0.027
Work interference	Knee	<0.001
Past 7 days	Shoulder	0.043
Past 7 days	Hip/thigh	0.043
Past 7 days	Knee	0.003
Past 7 days	Ankle/feet	0.011

All associations listed in Table 4 met the study's stated statistical significance threshold of $P < 0.05$.

4. Discussion

The present study investigated the relationship between physical activity level and musculoskeletal disorders among physiotherapy students. The findings indicate that MSDs were common in the study population and that physical activity level was significantly associated with symptoms in several body regions.

The lower back was the most frequently affected region, with 56% of participants reporting symptoms during the previous 12 months. This finding is consistent with the literature reviewed in the project, in which lower back symptoms were frequently reported among health-profession students and other populations. The neck was the second most commonly affected region in the present study, with 53% reporting symptoms during the previous 12 months.

The study also found that 37.5% of students had low physical activity, 43% had moderate physical activity and 19.5% had high physical activity. The reported association between physical activity and MSDs in multiple body regions suggests that activity level may be relevant to musculoskeletal health among physiotherapy students.

4.1. Comparison with previous literature

The literature reviewed in the project provides comparable findings. Hendi et al. reported a high prevalence of MSDs among health specialty students and a significant relationship with physical activity. Ogunlana et al.

reported high levels of musculoskeletal pain among occupational therapy and physiotherapy undergraduates and identified prolonged sitting and repetitive movements as common ergonomic risks.

Smartphone-related neck problems and other physical and psychosocial factors have also been reported in the literature.

4.2. BMI and physical activity

The project further reported a significant relationship between BMI and physical activity level, with a higher proportion of students with obesity classified in the low physical activity group.

4.3. Interpretation of findings

The findings describe an association between physical activity level and musculoskeletal symptoms across several body regions. Because the study used a cross-sectional design, the observed associations should be interpreted as relationships within the study population rather than evidence that one factor caused the other.

5. Conclusion

The study concludes that there is a significant association between physical activity level and the prevalence of musculoskeletal disorders among physiotherapy students. The lower back and neck were among the most frequently affected regions. Preventive strategies addressing physical activity, posture, prolonged sitting and other modifiable risk factors may be relevant for physiotherapy students.

6. Limitations

- The study used self-reported questionnaires, which may introduce reporting or recall bias.
- Physical activity may be overestimated because perceived intensity can vary between individuals.
- The cross-sectional design does not allow causal relationships between physical activity and MSDs to be established.

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