INFORMATICS JOURNALS
RESEARCH ARTICLE
©2023 The Academy of Environmental Biology, India
Journal of Ecophysiology and Occupational Health, Vol 26(3), *DOI: 10.18311/jeoh/2026/46377, 343-351, September 2026*
ISSN (Online) : 0972-4397
ISSN (Online) : 0974-0805

Work-related Musculoskeletal Pain Among Physiotherapy Interns: A Cross-sectional Study

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Abstract

Background: Physiotherapy is a physically demanding profession that places practitioners at risk of Work-Related Musculoskeletal Pain (WRMSP). During internships, physiotherapy interns frequently engage in patient handling, repetitive therapeutic procedures, prolonged standing, and awkward postures, increasing their susceptibility to musculoskeletal pain. Early identification of WRMSP and its associated factors is essential for implementing preventive strategies and promoting long-term occupational well-being. **Objective:** To determine the prevalence of work-related musculoskeletal pain among physiotherapy interns and identify its associated risk factors. **Methods:** A cross-sectional study was conducted among 99 physiotherapy interns in selected clinical settings in Bangalore using convenience sampling. Data on demographic characteristics, work-related factors, ergonomic training, pain characteristics, and a standardized body pain chart were collected. Descriptive statistics were used to summarize the data, while Chi-square tests, independent t-tests, and odds ratio analyses assessed associations between variables. Statistical significance was set at $p < 0.05$. **Results:** WRMSP was highly prevalent among physiotherapy interns. The lower back was the most commonly affected region (71%), followed by the neck (39%), upper back (21%), shoulder (17%), and wrist (7%). A significant association was found between the absence of ergonomic training and the occurrence of WRMSP ($\chi^2 = 7.12$, $p = 0.008$). Female interns reported significantly higher pain scores than male interns ($t = 2.05$, $p = 0.043$). Interns treating eight or more patients per day were 3.5 times more likely to experience frequent or constant pain (OR = 3.5; 95% CI: 1.4–8.9; $p = 0.007$). Common contributing factors included poor posture, repetitive tasks, prolonged standing, patient handling, and heavy workload. **Conclusion:** WRMSP is highly prevalent among physiotherapy interns, particularly affecting the lower back. High patient load, inadequate ergonomic training, poor posture, repetitive activities, and prolonged standing contribute significantly to its development. Incorporating ergonomic education, safe patient-handling techniques, and self-care strategies into physiotherapy training programs may help reduce WRMSP and promote occupational health among future physiotherapists.

Major Findings: Work-related musculoskeletal pain was highly prevalent among physiotherapy interns, suggesting that musculoskeletal problems may begin early in their professional careers. The lower back (71%) and neck (39%) were the most commonly affected regions, indicating significant physical demands during clinical training. Higher patient load and lack of ergonomic training were significantly associated with WRMSP, highlighting the importance of workload management and ergonomic education in internship programs.

Keywords: Ergonomics, Internship, Occupational Health, Physiotherapy Interns, Risk Factors, Work-related Musculoskeletal Pain

Article Received on: 09.06.2026 Revised on: 12.06.2026 Accepted on: 15.06.2026

1. Introduction

Work-Related Musculoskeletal Pain (WRMSP) is widely recognised as a major occupational health concern, particularly in professions involving physical exertion and repetitive activities. It refers to pain or discomfort affecting muscles, joints, tendons, ligaments, or nerves and is commonly associated with work-related tasks.

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Factors such as repetitive movements, prolonged static postures, heavy physical loads, and poor ergonomic conditions contribute to its development[1].

Among healthcare professionals, physiotherapists are considered one of the most vulnerable groups for developing WRMSP due to the nature of their profession, which involves frequent patient handling, application of manual therapy techniques, and maintaining awkward or sustained postures during treatment sessions. These repeated physical demands place continuous stress on different body regions, increasing the likelihood of musculoskeletal injury[2-4].

Studies from various regions have consistently demonstrated a high prevalence of musculoskeletal disorders among physiotherapists. The most commonly affected regions include the lower back, neck, shoulders, and upper limbs[5]. Lower back pain, in particular, has been reported as the most prevalent complaint, followed by discomfort in the wrist, hand, and cervical regions[6]. Such conditions can adversely affect clinical efficiency and may even limit the ability to continue professional practice. Previous studies have reported that the prevalence of work-related injuries among physiotherapists can exceed 84% in certain populations, highlighting the seriousness of this issue[7].

Several contributing factors have been identified in relation to WRMSP among physiotherapists. These include physically demanding activities such as lifting and transferring patients, performing repetitive therapeutic procedures, and working in non-ideal postures for prolonged durations. In addition to occupational factors, personal characteristics such as body mass index, gender, and level of physical fitness may also influence susceptibility to musculoskeletal disorders[8]. Environmental and organisational factors, including inadequate ergonomic training, insufficient use of assistive devices, and heavy workloads, may further increase the risk[9].

Although considerable research has been conducted among practising physiotherapists, comparatively limited attention has been directed towards physiotherapy trainees, particularly during their internship period. Internship represents a critical transition phase during which students apply their theoretical knowledge in real-world clinical settings. During this period, trainees are frequently exposed to physically demanding tasks, often without adequate practical experience or sufficient knowledge of proper ergonomic practices. These factors, when combined, may increase the risk of developing early musculoskeletal problems.

Emerging evidence suggests that physiotherapy students and newly qualified professionals also experience a considerable prevalence of musculoskeletal discomfort, although generally at lower rates than experienced clinicians[10]. This indicates that the risk of WRMSP may begin early in the professional journey and may worsen over time if preventive measures are not implemented.

Understanding the prevalence of WRMSP among physiotherapy interns and identifying the factors associated with its occurrence are important for early recognition and prevention. Such information may assist in developing preventive strategies, improving awareness regarding ergonomic practices, and promoting safer clinical work habits. Ultimately, these measures may contribute to better health outcomes, improved work performance, and greater professional longevity among future physiotherapists.

In view of this, the present study aims to assess the prevalence of work-related musculoskeletal pain among physiotherapy interns, thereby providing insights into an area that requires greater attention and preventive focus.

2. Materials and Methods

2.1 Study Design

A cross-sectional study was conducted to investigate the prevalence of Work-Related Musculoskeletal Pain (WRMSP) among physiotherapy interns. The study was carried out over a period of six months in selected clinical and academic settings in Bangalore. Participants were recruited based on the predefined inclusion criteria and their willingness to participate in the study. Before starting the study, ethical clearance was obtained from the college for conducting the research. Information regarding demographic characteristics, work-related factors such as clinical workload, ergonomic training, and pain characteristics was obtained. A body pain chart was used to identify the presence and location of musculoskeletal pain.

2.2 Participants

The study included physiotherapy interns aged between 21 and 25 years who were undergoing an internship in selected clinical settings in Bangalore. Participants were recruited using a convenience sampling method. The

minimum required sample size was calculated using a standard sample size estimation formula, assuming a prevalence of 64%, a 5% level of significance, and a 10% allowable error, which yielded a sample size of 89 participants. To improve the representativeness of the study and account for potential incomplete responses, a total of 99 eligible participants were recruited. Written informed consent was obtained from all participants before enrolment.

2.2.1 Inclusion Criteria

- Physiotherapy interns aged between 21 and 25 years.
- Interns who had completed a minimum of three months of internship.
- Interns are actively involved in clinical duties during the internship period.

2.2.2 Exclusion Criteria

- Interns with a history of pre-existing musculoskeletal injuries or medical conditions before the internship period.
- Individuals who had already completed their internship.
- Participants who did not complete the study questionnaire adequately.

2.3 Procedure

Following approval from the Institutional Scientific Committee, eligible physiotherapy interns were approached during their clinical postings and informed about the purpose and objectives of the study. After obtaining written informed consent, demographic and baseline information, including age, gender, height, weight, Body Mass Index (BMI), and hand dominance, were recorded.

Participants were then provided with a standardised body pain chart to identify the anatomical regions affected by musculoskeletal pain. Information regarding demographic characteristics, work-related factors, and pain characteristics was collected. Adequate time was provided for completion, and any clarifications required by the participants were addressed. Once filled, they were collected, reviewed for completeness, and included in the final analysis.

3. Statistical Analysis

Data were organised and analysed using appropriate statistical methods. Descriptive statistics were used to summarise participant characteristics and study variables. Continuous variables such as age, Body Mass Index (BMI), working hours per day, and number of patients treated per day were expressed as mean ± Standard Deviation (SD). Categorical variables, including gender, ergonomic training status, pain frequency, and affected body regions, were presented as frequencies and percentages. The Chi-square test was used to examine associations between categorical variables. Independent sample t-tests were performed to compare mean pain scores between male and female interns. Odds Ratios (OR) with 95% Confidence Intervals (CI) were calculated to assess the strength of associations between selected risk factors and musculoskeletal pain. A p-value of less than 0.05 was considered statistically significant.

4. Results

4.1 Descriptive Statistics

Total number of participants, n = 99

Table 1 presents the descriptive statistics of the study participants. The mean age of the participants was 22.66 ± 0.78 years, with ages ranging from 21 to 25 years. The mean BMI was 22.62 ± 3.71 kg/m^2. Participants spent an average of 7.42 ± 0.75 hours per day in clinical work and treated an average of 7.44 ± 3.13 patients per day, indicating substantial clinical exposure during the internship period.

4.2 Frequency Distribution

Table 2 shows that female participants constituted 66.7% (n = 66) of the study sample, while male participants accounted for 33.3% (n = 33).

Figure 1 illustrates the distribution of pain frequency among the participants. Most participants reported frequent pain (61.6%), followed by occasional pain (20.2%) and constant pain (18.2%).

Table 1. Mean and standard deviation

Variable	Mean	Standard Deviation (±SD)	Minimum	Maximum
Age	22.66	0.78	21.0	25.0
BMI	22.62	3.71	15.0	34.2
Working Hours / Day	7.42	0.75	6.0	10.0
Patients Treated / Day	7.44	3.13	2.0	25.0

Table 2. Gender distribution

Gender	Frequency (n)	Percentage (%)
Female	66	66.7%
Male	33	33.3%

Table 3. Ergonomic training

Received Training?	Frequency (n)	Percentage (%)
Yes	16	16.2%
No	83	83.8%

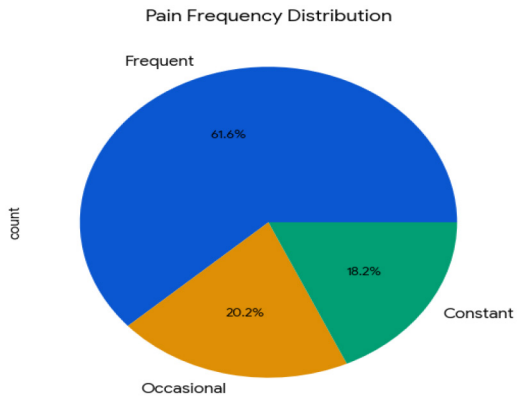


Figure 1. Pain frequency.

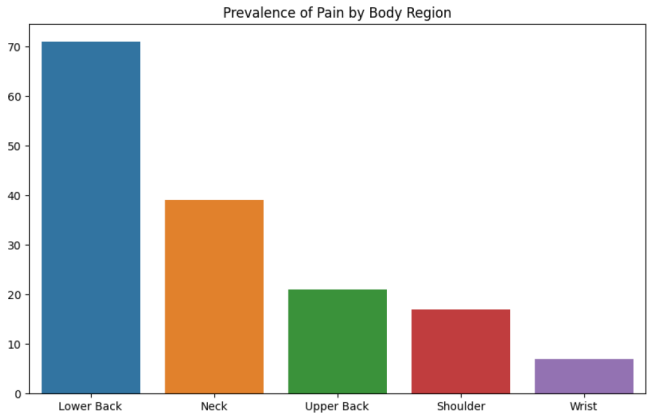


Figure 2. Areas of the body affected by pain.

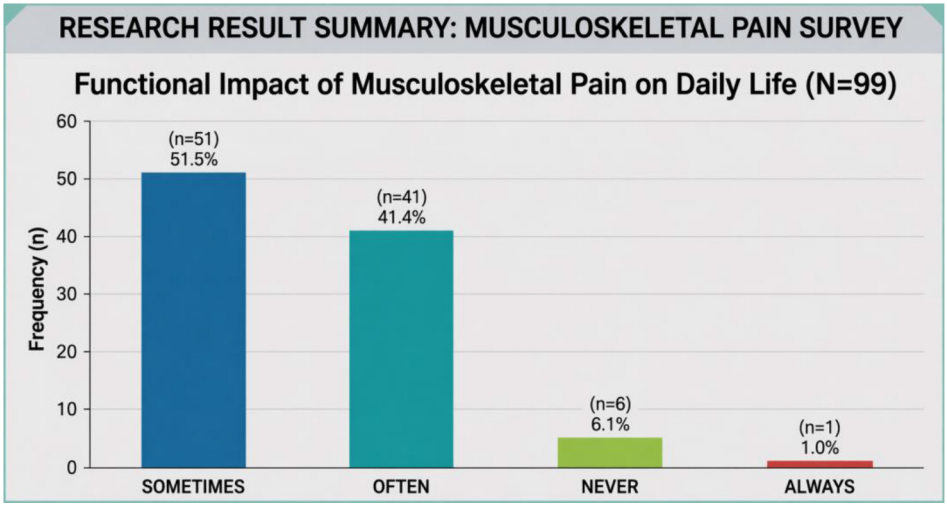


Figure 3. Pain affects clinical duties.

As shown in table 3, only 16.2% (n = 16) of participants reported receiving formal ergonomic training, whereas 83.8% (n = 83) had not received any formal ergonomic training.

4.3 Prevalence of Musculoskeletal Pain

Based on standardised body pain chart responses Figure 2 illustrates the distribution of musculoskeletal pain across different body regions. The lower back was the most frequently affected region (71%), followed by the neck (39%), upper back (21%), shoulder (17%), and wrist (7%).

Table 4. Sick Leave taken due to pain

Response	Frequency
Never	Majority (75.8%)
Sometimes	17.2%
Often	7.1%

4.4 Frequency Analysis

Figure 3 illustrates the functional impact of musculoskeletal pain on daily clinical duties.

Table 4 shows that 75.8% of participants reported never taking sick leave due to musculoskeletal pain,

Table 5. Pain interferes with daily life

Response	Frequency
Sometimes	Highest (55%)
Often	25%
Never	20%

Table 6. Sleep disturbance

Response	Frequency
Sometimes	Highest (52%)
Often	28%
Never	20%

Table 7. Chi-square test, T-test, Odds Ratio, 95% confidence interval, p-value

Analysis Component	Test / Metric	Statistical Result	P-Value (Significance)	Interpretation / Trend
Association Analysis	Chi-Square Test (χ^2)	$\chi^2 = 7.12$	p = 0.008 (Significant)	There is a statistically significant relationship between Ergonomic Training status and reported WRMSP.
Comparative Analysis	T-Test (Gender differences)	t = 2.05	p = 0.043 (Significant)	Female interns reported significantly higher average pain scores (VAS) compared to Male interns.
Risk Factor Analysis	Odds Ratio (OR)	3.5	—	Interns who treated≥ 8 patients/day are 3.5 times more likely to experience frequent/constant pain.
	95% Confidence Interval (CI)	(1.4 to 8.9)	—	The interval is (1.4, 8.9), confirming the significant risk increase.
	P-Value (for OR significance)	p = 0.007	p < 0.01 (Significant)	The calculated Odds Ratio for high patient load is statistically significant.

Table 8. Observation

Category	Observation
Working Hours	Participants working ≥8 hours showed persistent high-intensity pain patterns.
Patients Treated	High patient loads (≥8 per day) were associated with increased frequency of lower back reports.
Injury History	100% of those with a previous injury history reported "Frequent" current pain.
Ergonomic Training	Interns with training reported 13.2% less "Frequent/Constant" pain compared to those without.
Gender	Female interns showed a slightly higher susceptibility to Neck and Shoulder pain.
BMI	Higher BMI scores (>25) showed a moderate association with low back pain intensity.

whereas 17.2% reported taking sick leave sometimes and 7.1% reported doing so often.

Table 5 indicates that musculoskeletal pain interfered with daily activities outside the workplace in 80% of participants, with 55% reporting occasional interference and 25% reporting frequent interference.

Table 6 indicates that sleep disturbance associated with musculoskeletal pain was reported by 80% of participants, with 52% reporting occasional disturbance and 28% reporting frequent disturbance.

4.5 Association Analysis

Table 7 presents the results of the Chi-square test, independent t-test, and odds ratio analysis. A significant association was observed between ergonomic training status and work-related musculoskeletal pain ($\chi^2 = 7.12$, p = 0.008). Female interns reported significantly higher pain scores than male interns (t = 2.05, p = 0.043). Furthermore, interns treating ≥8 patients per day were 3.5 times more likely to experience frequent or constant pain (OR = 3.5, 95% CI: 1.4–8.9, p = 0.007).

Table 8 summarizes the key observations related to work-related musculoskeletal pain among physiotherapy interns. Longer working hours, higher patient load, previous injury history, lack of ergonomic training, female gender, and higher BMI were associated with greater pain frequency, intensity, and occurrence of musculoskeletal symptoms.

4.6 Perceived Causes of Pain

Table 9 shows that poor posture and repetitive tasks were the most commonly reported perceived causes of

Table 9. Perceived Risk Factors for Work-Related Musculoskeletal Pain

Cause	Frequency Trend
Poor Posture	High
Repetitive Tasks	High
Prolonged Standing	Moderate
Lifting Heavy Patients	Moderate
Combination Factors	Common

musculoskeletal pain. Prolonged standing and lifting patients were also identified as contributing factors, while many participants reported that their pain resulted from a combination of factors.

5. Discussion

The present study was conducted to determine the prevalence of Work-Related Musculoskeletal Pain (WRMSP) among physiotherapy trainees during their internship period. The findings revealed that a considerable proportion of interns experienced musculoskeletal discomfort during their internship, indicating that work-related musculoskeletal problems may begin early in a physiotherapist's professional journey.

Previous research from different parts of the world has consistently reported a high prevalence of work-related musculoskeletal problems among physiotherapists. Studies conducted in South Asia have demonstrated that many physiotherapists experience pain due to the physically demanding nature of their profession[2]. Similar findings have been reported in countries such as Turkey and Taiwan, where low back pain was identified as the most commonly affected region, primarily due to repetitive movements and patient-handling activities[9]. Furthermore, global evidence suggests that work-related musculoskeletal disorders are widespread among physiotherapists across different geographical regions. Research conducted in European settings has also reported the occurrence of musculoskeletal problems among physiotherapy students, suggesting that these conditions may originate during the training period itself[10].

Several studies have identified repetitive movements, awkward postures, and manual handling activities as major contributors to the development of musculoskeletal disorders[11]. Research involving physically demanding healthcare professions has demonstrated that these conditions can adversely affect work performance and productivity, emphasising the need for preventive measures. In addition, studies from Saudi Arabia have reported an association between low back pain and psychological stress, while research from India has highlighted the combined influence of physical and psychological factors on the development of musculoskeletal pain[11,12].

A large proportion of interns in the present study reported experiencing pain regularly, indicating that musculoskeletal discomfort is common during internship. Similar findings have been reported among experienced physiotherapists in previous studies[13]. Although most existing studies focus on practising clinicians, the present findings suggest that work-related musculoskeletal pain may develop during internship due to early exposure to clinical responsibilities and physically demanding tasks.

The lower back was the most commonly affected region (71%), followed by the neck (39%), upper back (21%), shoulder (17%), and wrist (7%). These findings may be attributed to the nature of clinical activities performed during internship, including prolonged standing, forward bending, lifting and transferring patients, and maintaining sustained postures. Such activities place considerable mechanical stress on the lumbar spine and cervical region, thereby increasing the likelihood of pain and discomfort.

The occurrence of WRMSP appears to be influenced by both occupational and individual factors. During an internship, trainees are actively involved in patient care activities, including mobility assistance and therapeutic interventions. As they are still developing clinical skills and professional experience, they may not consistently apply optimal body mechanics, thereby increasing their susceptibility to musculoskeletal strain. Previous studies have similarly reported repetitive movements, patient handling, and poor posture as important contributors to musculoskeletal disorders among physiotherapists[14].

Another important finding of the present study was the low proportion of participants who had received formal ergonomic training. Trainees without ergonomic training reported greater difficulty maintaining appropriate working postures during clinical activities, whereas those who had received training appeared to report fewer musculoskeletal complaints. These findings are consistent with previous studies that have emphasised the importance of ergonomic education and physical activity in preventing WRMSP among healthcare professionals[15].

Workload also appeared to be an important contributing factor. Interns who worked longer hours and treated a greater number of patients per day reported a higher frequency of pain. Increased physical demands and limited recovery time may contribute to the development of musculoskeletal symptoms. Furthermore, participants with a history of previous injury reported higher levels of discomfort, suggesting that prior injuries may increase vulnerability to future musculoskeletal problems.

Female interns reported significantly higher pain scores compared to male interns. This finding is consistent with previous studies that have reported a higher prevalence of work-related musculoskeletal symptoms among female healthcare professionals. Possible explanations include differences in muscle strength, anthropometric characteristics, hormonal influences, and pain perception, which may increase susceptibility to musculoskeletal strain during physically demanding clinical activities. Similar findings have been reported among physiotherapists and other healthcare professionals[5,6,16].

Another factor that may contribute to the development of WRMSP among physiotherapy trainees is limited clinical experience. Previous studies have suggested that healthcare students and newly qualified professionals may be more vulnerable to musculoskeletal problems due to insufficient experience in applying ergonomic principles and safe patient-handling techniques during clinical practice[17].

Prolonged standing and sustained working postures have also been identified as important occupational risk factors for musculoskeletal disorders. Physiotherapy interns often spend extended periods performing assessments and treatment procedures, which may increase mechanical stress on the musculoskeletal system and contribute to the development of pain and fatigue[18].

In addition to its physical consequences, musculoskeletal pain may negatively influence work performance, job satisfaction, and overall well-being. Persistent discomfort can affect concentration, increase fatigue, and potentially reduce the efficiency of healthcare professionals during patient care activities[19].

Recent studies continue to highlight the high burden of musculoskeletal disorders among physiotherapy students and young healthcare professionals. Çankaya *et al*., reported a high prevalence of musculoskeletal pain and discomfort among final-year physiotherapy students, emphasising the role of clinical training demands, prolonged postures, and ergonomic challenges in the development of symptoms[20]. Similarly, Cristiano *et al*., demonstrated that musculoskeletal pain persisted and, in some cases, increased following clinical internship, suggesting that early clinical exposure may contribute to the progression of musculoskeletal complaints[21]. Furthermore, Kalita *et al*., identified significant ergonomic risk factors among final-year undergraduate physiotherapy students and emphasised the importance of ergonomic awareness, posture correction, and preventive strategies to reduce the risk of work-related musculoskeletal disorders[22].

Previous evidence has demonstrated that preventive strategies such as ergonomic education, workplace modifications, regular exercise, and early intervention programs can significantly reduce the occurrence of work-related musculoskeletal disorders. The incorporation of such measures into physiotherapy training programs may help establish safer clinical practices and promote long-term occupational health[23].

Overall, the findings highlight the importance of early preventive interventions during internship. Incorporating ergonomic education, safe patient-handling techniques, workload management strategies, and self-care practices into physiotherapy training programs may help reduce the occurrence of WRMSP and promote long-term occupational health among future physiotherapists.

6. Limitations

While the findings provide valuable information regarding Work-Related Musculoskeletal Pain (WRMSP) among physiotherapy interns, several limitations should be considered when interpreting the results. First, the use of convenience sampling and a relatively small sample size may limit the generalisability of the findings. Second, the data were based on self-reported responses, which may be subject to recall and reporting bias. Third, the cross-sectional study design did not permit the assessment of symptom progression over time or the establishment of causal relationships. While the findings provide valuable information regarding Work-Related Musculoskeletal Pain (WRMSP) among physiotherapy interns, several limitations should be considered when interpreting the results. First, the use of convenience sampling and a relatively small sample size may limit the generalisability of the findings. Second, the data were based on self-reported responses, which may be subject to recall and

reporting bias. Third, the cross-sectional study design did not permit the assessment of symptom progression over time or the establishment of causal relationships. Additionally, physiotherapy interns were rotated across multiple clinical departments during their internship period; therefore, musculoskeletal pain could not be analysed according to specific patient conditions or clinical specialities. Furthermore, factors such as physical fitness, psychological stress, ergonomic awareness, and detailed workload characteristics were not evaluated comprehensively and may have influenced the occurrence of musculoskeletal pain.

7. Recommendations

Future studies should include larger sample sizes and participants from multiple institutions to improve the representativeness and generalisability of the findings. Incorporating objective assessment tools in addition to self-reported questionnaires, such as ergonomic evaluations, posture assessments, or observational measures, may improve data reliability. Longitudinal studies are recommended to evaluate the progression of musculoskeletal symptoms over time and to identify causal relationships. Future research should also investigate the influence of psychological stress, physical fitness, ergonomic awareness, and workload characteristics on the development of work-related musculoskeletal pain among physiotherapy trainees.

8. Conclusion

The present study demonstrated that work-related musculoskeletal pain is highly prevalent among physiotherapy interns. The lower back was the most commonly affected region, followed by the neck, upper back, shoulder, and wrist. Factors such as high patient load, prolonged working hours, poor posture, repetitive movements, and inadequate ergonomic training were identified as important contributors to the development of WRMSP. Despite experiencing musculoskeletal discomfort, many interns continued to perform their clinical duties without taking sick leave. These findings emphasise the importance of early preventive interventions, including ergonomic education, safe patient-handling practices, workload management, and self-care strategies. Implementing such measures during an internship may help reduce the burden of musculoskeletal pain and promote long-term occupational health among future physiotherapists. However, the findings should be interpreted considering the study's limitations, including convenience sampling, reliance on self-reported data, the inability to analyse pain according to specific clinical specialities, and the cross-sectional study design. Future studies with larger samples and objective assessment methods are recommended to further investigate WRMSP among physiotherapy interns.

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Author Contribution

Siddesh Ganesan: Study design, methodological support, data verification, manuscript review, critical revision of the article, and final approval of the manuscript; Samiksha Rajesh: Conceptualisation, data collection, clinical assessment, statistical analysis, interpretation of results, manuscript drafting, and correspondence with the journal.

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