

Original article

Prevalence, Cause, and Prevention of Muscle Strain and Fatigue among Physical Therapists in Al Zawiya City: A Cross-sectional Study

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Corresponding Email. e.elhanesh@zu.edu.ly**Abstract**

Physical therapists, by virtue of their clinical practical requirements, exhibit heightened vulnerability to occupational hazards, most notably musculoskeletal disorders (MSDs). While we previously established that muscle strain and fatigue are the most prevalent conditions among physical therapists, a comprehensive understanding of their incidence and specific occupational triggers remains essential. This paper addresses this gap by analyzing the underlying causes and establishing preventive measures to mitigate these risks. A cross-sectional study was designed with a self-administered questionnaire. 46 participants out of 62 total respondents who reported a muscle strain and fatigue were recruited from different physical-therapy clinics in Al Zawiya city 74.2%. Performing manual therapy for a long time was the most common activity associated with the injury (39.1%). Furthermore, stopping work when experiencing symptoms had the highest percentage (23.9%) to avoid future injury. Younger physical therapists (under 30 years) were more likely to take rest breaks and stop working when experiencing symptoms (19.6%), while older therapists (over 30 years) were more inclined to change work schedules (8.7%). More experienced physical therapists were more likely to take rest breaks and change work schedules (15.2%), while less experienced therapists were more likely to stop working when hurt or when symptoms occur (10.9%). Muscle strain and fatigue are prevalent occupational hazards among physical therapists; moreover, specific work-related factors, such as prolonged manual therapy, sudden patient movements, lifting, and prolonged static postures, contribute significantly to the risk of muscle strain and fatigue.

Keywords. Occupational Diseases, Potential Risks, Physiotherapists, Muscle Strain, Fatigue.

Introduction

Work-related musculoskeletal diseases (WRMSDs) have numerous effects on healthcare providers, particularly among physical therapists (PTs) due to their job requirements. Physical therapy requires making an effort to provide optimal therapeutic care to the patient, such as manual therapy and massage, as well as dealing with disabled patients. Literature has indeed suggested that physiotherapists are particularly susceptible to WRMSDs because of the nature of their profession, which is often repetitive, intensive work and involves direct contact with patients [1]. In addition, a systematic review reveals that physiotherapists are at high risk for work-related musculoskeletal disorders due to the physical demands of patient handling and manual techniques, and these injury patterns are consistent globally despite minor regional psychosocial differences [2].

In the Libyan context, particularly in Al Zawiya city, our previous research confirmed this trend, revealing a high prevalence of injuries specifically involving the back, shoulders, and hands among local practitioners. The study found that there is a significant association between age and the likelihood of reporting muscle strain and fatigue, with a chi-square statistic (11.111) and a p-value (0.004). The chi-square statistic (10.50) and the p-value (0.033) indicate a statistically significant association between practical service period and the likelihood of experiencing muscle strain and fatigue [3]. As that study established a correlation between age, years of experience, and injury rates, there remains a critical need to delve deeper into the specific mechanisms of "muscle strain," which was identified as a major concern. Despite the existing data, there is a lack of comprehensive analysis regarding the specific clinical tasks that trigger these strains in the local environment and how they differ based on the therapist's specialty. This study aims to determine the prevalence of muscle strain, analyze its primary risk factors, and provide evidence-based recommendations for prevention in clinical settings.

Methods**Ethical Approval**

Ethical approval for this study was obtained from the Ethics Committee of the University of Zawia. All participants provided informed consent before data collection.

Study Design

This study was a cross-sectional study with handed self-administrated questionnaire to evaluate the prevalence, cause, and response to muscle strain injury among physical therapists in Al Zawiya city, Libya.

Study Duration and Setting

The study was conducted over six months, from May to October 2024. A total of 100 prepared questionnaires were distributed by hand to physiotherapists working across a range of public and private healthcare facilities in Al Zawiya city. The sample was drawn from both public and private physiotherapy centers across the city.

Participants

Out of 100 invited participants, 62 responded to the survey. From this group, 46 individuals who reported muscle strain injury were enrolled in the study.

Inclusion and Exclusion Criteria

Inclusion Criteria

A currently licensed physiotherapist who works in public or private clinics in Al Zawiya city and suffers from an occupational muscle strain injury.

Exclusion Criteria

Any participant who does not experience muscle strain injury or has a previous muscle injury that is not associated with work.

Results

Table 1 summarizes the demographic and occupational characteristics of the respondents. Most participants were younger than 30 years (69.6%). 26 participants had more than 5 years of experience (56.5%). Additionally, the majority reported working more than 6 hours per day (67.4%) and more than 3 days per week (69.6%).

Table 1. Demographic and Work-Related Characteristics of Respondents

Variable	N (%)
Whole sample	62 (100)
Enrolled sample	46 (74.2)
Excluded sample	16 (25.8)
age	
<30 years	32 (69.6)
≥ 30 years	14 (30.4)
Years of experience	
<5 years	20 (43.5)
≥ 5 years	26 (56.5)
Working hours	
< 6 hours/day	15 (32.6)
≥ 6 hours/day	31 (67.4)
Work days	
< 3 days/week	14 (30.4)
≥ 3 days/week	32 (69.6)

Table 2 illustrates the distribution of activities being performed at the time of injury among a sample of 46 respondents. The most significant risk factor is performing manual therapy (n=18, 39.1%), followed by responding to unanticipated or sudden patient movements (n=11, 23.9%). Conversely, lifting and transferring patients represent smaller proportions of the sample (10.9%, 6.5%), respectively. Bending or twisting was the least frequent activity associated with injury at 2.2%.

Table 2. The activity being performed when injured

Answer	N (%)
Transferring a patient	3 (6.5)
Lifting	5 (10.9)
Responding to an unanticipated or sudden movement by a patient	11 (23.9)
Performing manual therapy for a long time.	18(39.1)
Maintaining a position for a prolonged period of time.	4 (8.7)
Working when physically fatigued.	4 (8.7)
Bending or twisting.	1(2.2)
Total	46 (100)

Table 3 describes the specific behavioral modifications adopted by practitioners in response to occupational injury. The primary adaptive response identified was to stop working when hurt or when symptoms occur (23.9%). Avoiding lifting and taking more rest breaks accounted for 19.6% of the total responses. Moderate adjustments included altering work schedules and avoiding manual therapy, each utilized by 13.0% of respondents. Interestingly, the increased use of mechanical aids was the least frequent intervention at 10.9%.

Table 3. The response to alter work habits to avoid injury

Answer	N (%)
Avoid lifting	9 (19.6)
Increase use of mechanical aid	5 (10.9)
Take more rest breaks, or pause during the work day	9 (19.6)
Stop working when hurt or when symptoms occur	11 (23.9)
Change work schedule	6 (13)
Avoid manual therapy	6 (13)
Total	46 (100)

Table 4 demonstrates the injury triggers, revealing that practitioners under the age of 30 and those working more than three days per week are particularly susceptible to injuries during manual therapy (26.1% and 32.6%, respectively). Interestingly, while manual therapy remains the leading cause across most subsets, practitioners with more than five years of experience show a high incidence of injury when responding to unanticipated patient movements (15.2%), suggesting that even veteran clinicians remain vulnerable to unpredictable physical stressors. The data also indicate that higher workloads—defined by working more than six hours daily—correlate with a higher frequency of injuries during both manual therapy and sudden patient interactions (21.7% each), highlighting a potential link between cumulative daily fatigue and decreased physical resilience.

Table 4. The activity being performed when injured according to age, Years of experience, Work hours, and Workday

Answer	Age		Years of experience		Work hours		Workday	
	Less than 30 years	More than 30 years	Less than 5 years	More than 5 years	Less than 6 hours	More than 6 hours	Less than 3 days	More than 3 days
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Transferring a patient	3 (6.5)	0 (0.0)	2 (4.3)	1 (2.2)	1 (2.2)	2 (4.3)	2 (4.3)	1 (2.2)
Lifting	3 (6.5)	2 (4.3)	2 (4.3)	3 (6.5)	2 (4.3)	3 (6.5)	2 (4.3)	3 (6.5)
Responding to an unanticipated or sudden movement by a patient	8 (17.4)	3 (6.5)	4 (8.7)	7 (15.2)	1 (2.2)	10 (21.7)	3 (6.5)	8 (17.4)
Performing manual therapy for a long time.	12 (26.1)	6 (13.0)	7 (15.2)	11 (23.9)	8 (17.4)	10 (21.7)	3 (6.5)	15 (32.6)
Maintaining a position for a prolonged period of time.	2 (4.3)	2 (4.3)	2 (4.3)	2 (4.3)	1 (2.2)	3 (6.5)	1 (2.2)	3 (6.5)
Working when physically fatigued.	3 (6.5)	1 (2.2)	3 (6.5)	1 (2.2)	2 (4.3)	2 (4.3)	3 (6.5)	1 (2.2)
Bending or twisting.	1 (2.2)	0 (0.0)	0 (0.0)	1 (2.2)	0 (0.0)	1 (2.2)	0 (0.0)	1 (2.2)
Total	32 (69.6)	14 (30.4)	20 (43.5)	26 (56.5)	15 (32.6)	31 (67.4)	14 (30.4)	32 (69.6)

Table 5 demonstrates how physical therapists shift their professional habits post-injury, showing a clear divide in adaptive strategies. Younger practitioners (under 30) are significantly more likely to incorporate rest breaks (19.6%) compared to their older counterparts, who reported no use of this strategy (0.0%). For those with extensive experience (over 5 years), taking rest breaks (15.2%) and stopping work when symptomatic (13.0%) are the preferred interventions. Workload intensity also dictates the response: individuals working more than six hours a day or more than three days a week show the highest tendency to avoid lifting (15.2%) and cease working when hurt (19.6%). These trends suggest that as professional exposure and workload increase, practitioners shift from proactive scheduling changes toward more immediate, reactive measures to manage physical pain.

Table 5. The response to alter work habits to avoid injury according to age, Years of experience, Work hours, and Workday

Answer	Age		Years of experience		Work hours		Workday	
	Less than 30 years	More than 30 years	Less than 5 years	More than 5 years	Less than 6 hours	More than 6 hours	Less than 3 days	More than 3 days
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Avoid lifting	5 (10.9)	4 (8.7)	4 (8.7)	5 (10.9)	2 (4.3)	7 (15.2)	3 (6.5)	6 (13.0)
Increase use of mechanical aid	4 (8.7)	1 (2.2)	3 (6.5)	2 (4.3)	0 (0.0)	5 (10.9)	2 (4.3)	3 (6.5)
Take more rest breaks, or pause during the workday	9 (19.6)	0 (0.0)	2 (4.3)	7 (15.2)	3 (6.5)	6 (13.0)	1 (2.2)	8 (17.4)
Stop working when hurt or when symptoms occur	7 (15.2)	4 (8.7)	5 (10.9)	6 (13.0)	6 (13.0)	5 (10.9)	2 (4.3)	9 (19.6)
change work schedule	2 (4.3)	4 (8.7)	2 (4.3)	4 (8.7)	2 (4.3)	4 (8.7)	3 (6.5)	3 (6.5)
Avoid manual therapy	5 (10.9)	1 (2.2)	4 (8.7)	2 (4.3)	2 (4.3)	4 (8.7)	3 (6.5)	3 (6.5)
Total	32 (69.6)	14 (30.4)	20 (43.5)	26 (56.5)	15 (32.6)	31 (67.4)	14 (30.4)	32 (69.6)

Discussion

This study revealed that the majority of the sample consisted of physical therapists under the age of 30 (69.6%). A significant portion of the sample worked more than 6 hours per day (67.4%) and more than 3 days per week (69.6%). The earlier study found that the majority of the sample (72.9%) is under 30 years old [3]. However, our study indicated that 56.5% of participants have more than 5 years of experience, while the previous study indicated that 47.9% of the sample falls into the "1-5 years" category, demonstrating that a significant number of individuals in the sample have practical service experience of over 5 years, one year apart from both studies. The previous study revealed that workers with less experience <5 years report higher rates of several injuries, including muscle strain and fatigue (45.8%) [3]. Khadour et al (2025) revealed that physical therapists with less than 4 years of education and under 7 years of experience had a 2–3 times greater likelihood of WMSDs [8]. However, this study revealed that more experienced physical therapists (over 5 years) reported injury while they were performing manual therapy for a long period of time (23.9%); additionally, they were more likely to take rest breaks and change work schedules (15.2%).

On the other hand, less experienced therapists were more likely to stop working when hurt or when symptoms occurred (10.9%). This may indicate that the physical therapist who was performing the job for a long time suffered from a chronic muscle injury that led them to take more breaks and change their work schedules. The prevalence of muscle strain and fatigue among physical therapists was high (74.2%). The earlier study reported that 60.4% of the participants suffer from muscle strain and fatigue [3]. Milhem M (2016) stated that the prevalence of WMSDs among PTs was high (91%) [4]. Nelson found that sprains and strains were the most frequently reported injuries among all health care workers in a rural health facility (59.9%) [5]. However, a Tripoli study conducted by Ajjar, K et al (2025) stated that the prevalence of muscle strain among physical therapists is (21.7%), and fatigue was the leading factor causing injury (27.02%) [6]. The most common activities associated with muscle strain and fatigue were performing manual therapy for a long time (39.1%), responding to sudden patient movements (23.9%), and lifting (10.9%). Furthermore, the Ajjar study revealed that the activities associated with injury were working when physically fatigued, working for a long period, performing manual therapy, and performing repetitive tasks (27%, 25.5%, 18.9%, 16.8%, respectively) [6].

Nevertheless, the Holder study revealed that 21% of participants had an injury due to performing manual therapy for a long time, 24% was due to sudden patient movements, and 25% was due to lifting a patient [7]. The dissimilarities in the results could be due to the differences in the sample size. The data indicated that those working more than 6 hours per day suffered a higher frequency of injuries (31 cases), and they were more likely to avoid lifting (15.25), take more rest breaks (13%), while Physical therapists working less hours (less than 6 hours per day) were more likely to stop working when hurt or when symptoms occur (13%). Physical therapists working more days per week (more than 3 days) were more likely to stop working when experiencing symptoms (19%), take rest breaks (17.4), and avoid lifting (13%). This indicates that the more the job demands, the more the injury occurrence. Milhem et al. (2016) established a strong direct correlation between the number of direct patient treatment hours and the increased likelihood of lower back and neck disorders [4].

The most frequently reported responses to alter work habits and avoid further injury were stopping work when experiencing symptoms (23.9%), avoiding lifting (19.6%), and taking more rest breaks (19.6%). Younger physical therapists (under 30 years) were more likely to take rest breaks and stop working when experiencing symptoms (19.6), while older therapists (over 30 years) had an equal percentage (8.7%) to change work schedules, avoid lifting, and stop working when hurt or when symptoms occur, respectively. Holder et al (1999) revealed a large percentage of PTs (79%) reported that they altered their work habits as a result of their injury [7]. These figures indicate that the respondents felt that a change in work habits was

required in order to decrease the risk of another injury. In this study, 23.9% of injuries resulted from responding to unanticipated patient movements. Research conducted by Molumphy M. et al (1985) stated that lifting with sudden maximal effort was the main cause of injury among physical therapists [9]. Another review study by Galeoto et al (2020) stated that physiotherapists in various countries who were in direct contact with patients, and had to lift and respond to unanticipated patient movement are more prone to musculoskeletal injury [2]. The lack of proper medical equipment forces therapists to react manually to patient instability, leading to higher rates of acute strain, which explains the high percentage in this study.

Conclusion

Muscle strain and fatigue are prevalent occupational hazards among physical therapists, highlighting the physically demanding nature of their profession. Specific work-related factors, such as prolonged manual therapy, sudden patient movements, lifting, and prolonged static postures, contribute significantly to the risk of muscle strain and fatigue. Physical therapists employ various strategies to mitigate the risk of further injury or strain, including modifying work habits, taking breaks, using mechanical aids, and adjusting work schedules. Age, years of experience, work hours, and workday frequency influence the specific activities associated with muscle strain and fatigue.

Recommendations

Implement comprehensive injury prevention strategies, including proper training on body mechanics, ergonomic workstations, and the availability of appropriate equipment to reduce physical demands on physical therapists. Encourage regular rest breaks, particularly for those performing manual therapy, responding to sudden patient movements, or working in prolonged static postures. Promote a culture of self-care and early intervention, where physical therapists are encouraged to stop working and seek appropriate medical attention when experiencing symptoms of muscle strain or fatigue. Develop age-specific and experience-specific interventions and workplace adjustments to address the unique risks and challenges faced by physical therapists at different stages of their careers. Implement flexible work arrangements, such as adjustable work schedules and workday frequencies, to accommodate the physical demands of the profession while ensuring the well-being of practitioners.

Conflict of interest. Nil

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