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Original article

Injuries and Occupational Diseases That Occur to Physiotherapists

Eiman Elhanesh

Department of Physiotherapy, Faculty of Medical Sciences, University of Zawia, Zawia, Libya
Corresponding email. *e.elhanesh@zu.edu.ly*

Abstract
Physical therapy practice exposes therapists to various musculoskeletal injuries, which passively affect their daily life. Given the nature of physical therapy practice, this occupation leads to more injury incidents that may affect the musculoskeletal system, circulatory system, and nervous system. This study aimed to identify the most common occupational diseases that occur to physical therapists in Al-Zawiya city, and their impact on demographic factors (gender, age, educational level, years of experience). A cross-sectional study was designed with a self-administered questionnaire. Forty-eight participants were recruited from different physical-therapy clinics in Al Zawiyah city, Libya. Data were analyzed by SPSS V27 version. The study revealed that 100% of participants were affected by occupational injury, (89.6%) females, (10.4%) males, (72.9%) Less than 30" age group, (87.5%) holds a Bachelor's degree, (47.9%) have practical service experience up to 5 years. This study exhibited (68.8%) are suffering from back pain, (64.6%) experienced shoulder and hand pain associated with neck pain, (60.4%) muscle strain and fatigue, (33.3%) leg pain associated with back pain (sciatica), (27.1%) knee pain, (20.8%) carpal tunnel syndrome, (12.5%) varicose veins, (8.3%) Calculus spur (corn) and (6.3%) elbow pain. A chi-square statistic (10.50) and p-value (0.033) indicate a statistically significant association between years of experience >5 years and the prospect of experiencing muscle strain and fatigue. In addition, there is a significant association between age and muscle strain and fatigue with chi-square statistic (11.111) and p-value (0.004). The most common occupational diseases that affect physical therapists are clearly stated in this study as muscle strain and fatigue, back pain, shoulder pain, and hand pain. Years of experience and age have an impact on injury occurring.
Keywords. Occupational Diseases, Potential Risks, Physiotherapists, WMSDs.

Introduction

Occupational disorders represent a significant problem among physiotherapists. Occupational diseases can affect the musculoskeletal system, nervous system, and circulatory system. Because of the occupational demands of physical therapy, practitioners are more suspected to such health issues. These disorders can affect their daily life, which limits the ability of physical therapists to perform their job in an accurate approach. Work-related musculoskeletal disorders (WMSDs) are prevalent in physical therapists; physical therapy exposures, patient handling, and manual therapy, in particular, increase the risk for WMSDs [1]. A cross-sectional study conducted by Liu W. et al (2024), was carried out in 34 regions across China using an online questionnaire to investigate the work-related injuries of rehabilitation therapists; this study revealed that the incidence of work-related injuries was reported to be 87% of participants (12%) low back pain, (10%) neck pain and (9%) shoulder pain [2]. Another study conducted at University of Iowa to determine the prevalence of WMSDs on physical therapists reveled that the highest prevalence of musculoskeletal disorder among physical therapists were (45%) low back, (29.6%) wrist and hand, (28.7%) upper back and (24.7%) neck pain; this study stated that the prevalence of WMSDs in physical therapists is affected by work setting, practice specialty, age, and gender of therapists [3]. WMSDs are considered one of the largest health problems amongst physical therapists (PTs), with low back pain (LBP) being the most common disorder [1–4]. In all the reviewed studies, the lower back was the most frequently affected in PTs, with estimates of a lifetime prevalence ranging from 26–79.6%, followed most often by the neck, upper back, and shoulders [5]. Due to limited studies regards the WMSDs among physical therapists in Al-Zawiyah city, this study aimed to identify the most common occupational diseases among physical therapists and their impact on demographic factors (age, gender, years of experience, and educational level) in Zawiyah city, Libya.

Methods

Study design and setting

A cross-sectional study was designed with a self-administered questionnaire [appendix I]. The study was carried out over four months, beginning on August to November 2023. Out of sixty prepared questionnaires that were sent to different physical therapy clinics in Zawiyah city, 48 of them were recruited and completely answered. The other questionnaire was not handed back to the participant.

Data analysis

To evaluate the responses of the sample study, descriptive statistics have been used to analyze the data by Statistical Packages for Social Sciences (SPSS V27), which include: frequency tables, chi square test, and t-test that considered significant at the probability level ($P<0.05$) in all statistical test.

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Inclusion Criteria
All physical therapists who are currently working, with different educational levels and years of experience, of each gender, were included, as well as all age groups who suffer from occupational injury while practicing physiotherapy.

Exclusion Criteria
Any participant who had a previous injury that is not associated with work.

Results
The result of this study revealed that the majority of the sample (89.6%) consists of females, (10.4%) males, (72.9%) Less than 30" age group, (27.1%) more than 30 age group, (87.5%) holds a Bachelor's degree, (6.3%) of the sample holding a high diploma, (2.1%) holding an Intermediate diploma, (68.7%) <5 years' experience, (31.3%) > 5 years' experience. (64.6%) are suffering from shoulder and hand pain associated with neck pain, (6.3%) elbow pain, (21%) wrist pain (carpal tunnel syndrome), (68.8%) back pain, (33.3%) leg pain associated with back pain (sciatica), (60.4%) muscle strain and fatigue, (12.5%) varicose veins, (27.1%) knee pain and (8.3%) Calculus spur (corn).

Table 1. The effect of gender on occupational injuries

Occupational Injury	Male n (%)	Female n (%)	Chi-square	P-value
Shoulder & hand pain with neck pain	3 (6.3%)	28 (58.3)	0.051	0.821
Elbow pain	0 (0.0%)	3 (6.3%)	0.372	0.542
Wrist pain (carpal tunnel syndrome)	0 (0.0%)	10 (20.8%)	1.469	0.226
Back pain	4 (8.3%)	29 (60.4%)	0.329	0.566
Leg pain (Sciatica)	1 (2.1%)	15 (31.3%)	0.447	0.504
Muscle strain and fatigue	3(6.3%)	26 (54.2%)	0.001	0.984
Varicose veins	0 (0.0%)	6 (12.5%)	0.797	0.372
Knee pain	0 (0.0%)	13 (27.1%)	2.073	0.150
Calculus spur (corn)	0 (0.0%)	4 (8.3%)	0.507	0.476

The result showed that the most frequently reported condition for females was back pain (60.4%), followed closely by shoulder and hand pain, with neck pain (58.3%) and muscle strain and fatigue (54.2%). For males, the highest reported condition was back pain (8.3%), followed by shoulder and hand pain, with neck pain (6.3%), and muscle strain and fatigue (6.3%). The analysis showed that females reported higher percentages of all types of occupational injuries and conditions compared to males among physiotherapists. However, statistical tests indicated no significant association between gender and the likelihood of experiencing these conditions. Despite gender differences in percentages, all chi-square statistics and p-values were not statistically significant (P > 0.05), suggesting that gender is not a determining factor in the occurrence of these work-related musculoskeletal disorders among physiotherapists.

Table 2. The effect of age on occupational injuries

Occupational Injury	<30 years n (%)	≥30 years n (%)	Chi-square x^2	P-value
Shoulder & Hand Pain with Neck Pain	22 (45.8%)	9 (18.8%)	0.551	0.759
Elbow Pain	2 (4.2%)	1 (2.1%)	0.302	0.860
Wrist Pain (Carpal Tunnel Syndrome)	9 (18.8%)	1 (2.1%)	1.951	0.377
Back Pain	24 (50.0%)	9 (18.8%)	0.409	0.815
Leg Pain (Sciatica)	11 (22.9%)	5 (10.4%)	0.353	0.838
Muscle Strain and Fatigue	26 (54.2%)	3 (6.3%)	11.111	0.004
Varicose Veins	5 (10.4%)	1 (2.1%)	0.505	0.777
Knee Pain	10 (20.8%)	3 (6.3%)	0.782	0.676
Calculus Spur (Corn)	3 (6.3%)	1 (2.1%)	0.193	0.908

The table presents a comparison of various occupational injuries between two age groups: workers under 30 years old and those aged 30 years and above. The data includes the number and percentage of individuals affected in each age group, along with Chi-square and P-values to test the statistical significance of the associations. Muscle strain and fatigue were the most reported among workers under 30 years old (54.2%) compared to only 6.3% in the ≥30 age group. The Chi-square test showed a statistically significant difference (x^2 = 11.111, P = 0.004), indicating a strong association between younger age and muscle strain/fatigue. While other types of injuries, such as shoulder & hand pain with neck pain, back pain, and leg pain (sciatica) were more prevalent among younger workers, the differences were not statistically significant (P > 0.05). back pain affected (50.0%) of workers under 30 versus (18.8%) of those 30 and above (P = 0.815), showing

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a large numerical gap but without statistical significance. Wrist Pain (Carpal Tunnel Syndrome) and Knee Pain are slightly more common in younger individuals, yet the P-values (0.377 and 0.676, respectively) indicate no significant difference between the two age groups. Elbow pain, varicose veins, and calculus spur (Corn) injuries had very low prevalence in both groups and also showed no significant differences (P > 0.7).

Table 3. The effect of the educational level on occupational injuries

Occupational Injury	Higher diploma n (%)	Intermediate diploma n (%)	Bachelor n (%)	High certificate n (%)	Chi-square x^2	P-value
Shoulder & Hand Pain with Neck Pain	3 (6.3%)	0 (0.0%)	27 (56.3%)	1 (2.1%)	3.656	0.301
Elbow Pain	0 (0.0%)	0 (0.0%)	3 (6.3%)	0 (0.0%)	0.457	0.928
Wrist Pain (Carpal Tunnel Syndrome)	0 (0.0%)	1 (2.1%)	9 (18.8%)	0 (0.0%)	5.125	0.163
Back Pain	3 (6.3%)	1 (2.1%)	9 (18.8%)	1 (2.1%)	2.230	0.526
Leg Pain (Sciatica)	2 (4.2%)	0 (0.0%)	5 (10.4%)	1 (2.1%)	2.357	0.502
Muscle Strain and Fatigue	2 (4.2%)	1 (2.1%)	3 (6.3%)	1 (2.1%)	0.809	0.847
Varicose Veins	0 (0.0%)	0 (0.0%)	1 (2.1%)	2 (4.2%)	0.980	0.806
Knee Pain	1 (2.1%)	0 (0.0%)	3 (6.3%)	0 (0.0%)	1.221	0.748
Calculus Spur (Corn)	0 (0.0%)	1 (2.1%)	1 (2.1%)	2 (4.2%)	0.623	0.891

This table presents the majority of cases that occurred among bachelor's degree holders, who reported the highest frequencies across all types of injuries, shoulder and hand pain (56.3%), back pain (58.3%), and muscle strain and fatigue (52.1%). Other injuries, such as wrist pain, leg pain, and knee pain, were also more common in this group. Workers with high diplomas or intermediate diplomas and high certificates reported notably fewer injuries. No statistically significant differences were found in injury prevalence across education levels for all injury types (P > 0.05 for all variables).

Table 4. The effect of years of experience on occupational injuries

Occupational Injury	<5 years n (%)	≥5 years n (%)	Chi-square	P-value
Shoulder & Hand Pain with Neck Pain	21 (43.8%)	11 (22.9%)	1.383	0.847
Elbow Pain	3 (6.3%)	1 (2.1%)	1.320	0.858
Wrist Pain (Carpal Tunnel Syndrome)	9 (18.8%)	1 (2.1%)	2.867	0.580
Back Pain	22 (45.9%)	13 (27.1%)	1.458	0.834
Leg Pain (Sciatica)	9 (18.8%)	7 (14.6%)	2.819	0.589
Muscle Strain and Fatigue	22 (45.8%)	7 (14.6%)	10.5	0.033
Varicose Veins	4 (8.4%)	2 (4.2%)	1.715	0.788
Knee Pain	8 (16.7%)	5 (10.4%)	2.130	0.712
Calculus Spur (Corn)	2 (4.2%)	4 (8.4%)	2.673	0.614

The data investigates the impact of practical service years on the occurrence of various occupational injuries. Out of all the listed injuries, only one condition showed a statistically significant association, which is muscle strain and fatigue (x^2 = 10.50, P = 0.033), indicating that years of experience do have a meaningful impact here. All other injuries (such as shoulder/neck pain, back pain, knee pain) had P-values greater than 0.05, meaning no statistically significant relationship with years of experience.

Discussion

According to Holder et al (1999), where's conducted studies, at least one-quarter of working professionals are affected by long-standing health problems that limit everyday activities, while the present studies about (91%) of the respondents had experienced a work-related injury [6]. The occurrence rates of work-related low back pain among physical therapists were higher than those of the general population reported in Canada (27%), Great Britain (27%), and the United States (26·29%) [8]. This study revealed that the WMSDS among physiotherapists is high (100%) among participants from different clinics in Al Zawiyah city who were suffering from different musculoskeletal injuries due to work.

Darragh et al. (2009) documented those physiotherapists cite work-related injuries, such as low back pain, upper and lower limbs injuries, are the key triggers to premature retirement [9]. Another study conducted by Vieira et al (2015) to evaluate the rates and characteristics of musculoskeletal disorders (MSDs) in physical therapists revealed that (96%) reported musculoskeletal diseases, (66%) back pain, and (61%) neck pain [11]. Meanwhile, this study revealed that 33 individuals (68.8%) experienced back pain, 31 individuals (64.6%) experienced shoulder and hand pain associated with neck pain, and 29 individuals (60.4%) experienced muscle strain and fatigue. This suggests that the most common musculoskeletal diseases among physiotherapists are back pain, shoulder and hand pain associated with neck pain, and muscle

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strain and fatigue. A study conducted by Masoud, Z et al (2021) to determine the prevalence of and risk factors for work-related injuries among physiotherapists in Toubrok city in Libya revealed that about 91% of the respondents experienced a work-related injury. (11%) are suffering from wrist injury and (13%) finger injury, 44% had neck injury [10]. Among the majority of the sample in this study (33.3%) reported experiencing leg pain associated with back pain (sciatica), (27.1%) reported experiencing knee pain, (20.8%) of participants complain from wrist injury, (12.5%) reported developing varicose veins, (8.3%) Calculus spur (corn) and only (6.3%) reported experiencing elbow injury. Which leads to the suggestion that the less common musculoskeletal diseases among physical therapists are leg pain (sciatica), knee pain, wrist injury, varicose veins, calculus spur, and elbow injury.

The initial onset of work-related low back pain frequently occurred before the age of 30 [9]. Another study aimed to investigate the prevalence and severity of WMSDs in physical therapists, showing that (91%) of participants were affected by WMSDs, and younger therapists reported a higher prevalence of injury [13]. The result of this study revealed that the majority of the sample (72.9%) falls into the "Less than 30" age group, which is the age at which the physiotherapist has started their career life. In addition, this study reveals a higher proportion of respondents in this age group (54.2%) reporting muscle strain and fatigue compared to other age groups. the chi-square statistic ($x^2 = 11.111$) and the P-value (0.004) indicate a statistically significant association between age and the likelihood of reporting this condition.

An Australian study has reported that more than 50% of physical therapists (PTs) had the first episode of work-related LBP during their first 5 years of practice cromie JE, 2000 [7]. Holder et al. have also reported that the incidence of WMSDs is the highest within the first 5 years of practice and most common in junior PTs and newly qualified graduates [6]. It can be observed that the largest proportion of the sample (68.7%) is in the <5 years' experience category, indicating that a significant number of individuals in the sample have a practical service experience in this period of time. Furthermore, this data shows that workers with less experience <5 years report higher rates of several injuries including muscle strain and fatigue (45.8%) and there were a statistically significant association between years of experience and muscle strain and fatigue ($x^2= 10.50$, $P= 0.033$) indicating that years of experience does have a meaningful impact here and our data support the previous Literature.

Campo et al. (2008) reported that the risk of occupational injuries was more closely linked to years of experience and working hours, rather than academic qualification [1]. In this study, the majority of the sample (87.5%) hold a bachelor's degree. Out of this data, there are notable trends, such as the higher occurrence of back pain and neck/shoulder pain among bachelor's degree holders. This may be due to their greater involvement in clinical or intensive therapeutic duties. However, the results suggest that there is no statistically significant association between educational level and the severity of occupational injuries among physical therapists, as indicated by the high p-values ($p > 0.05$) across all injury types.

A cross-sectional study was conducted by Mansour et al (2022) to assess work-related musculoskeletal disorders (WMSDs) among Jordanian physiotherapist participants (53.2%) among the data who identified as female. Their results showed that there was a significant negative correlation between total exposure and gender [12]. The analysis of our data showed that females reported higher percentages of all types of occupational injuries and conditions compared to males among physiotherapists. However, all chi-square statistics and p-values were not statistically significant ($P>0.05$), suggesting that gender is not a determining factor in the occurrence of these work-related musculoskeletal disorders among physiotherapists.

Conclusion

The study reported that the most common musculoskeletal diseases among physiotherapists who participated in the study are shoulder and hand pain, back pain, and muscle strain. On the other hand, the less common musculoskeletal diseases among physical therapists are elbow pain, wrist pain (carpal tunnel syndrome), leg pain associated with back pain (sciatica), varicose veins, knee pain, and Calculus spur. Based on study results, there appears to be no significant association between gender, education level, and the likelihood of experiencing most of the examined occupational injuries and diseases among physical therapists. Age is a more influential factor than education in the prevalence of occupational injuries, with younger workers being more prone to certain injuries, especially muscle strain and fatigue, which was the only statistically significant result. This study reveals a significant association between age and the likelihood of reporting muscle strain and fatigue. In addition, there is a statistically significant association between years of experience and the likelihood of experiencing muscle strain and fatigue.

Recommendations

This study presents descriptive data on the occupational injuries of physiotherapists in Zawiyah city. All of the participants had experienced a work-related injury. We recommend to gather a guide line for the physiotherapist to describe adequate positions and service periods to help reduce the incidence of work-related disorders.

Future study

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Further research is necessary to examine the effect of muscle strain on physical therapists, as it has a significant association between the practical service period and the likelihood of experiencing muscle strain and fatigue.

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Conflicts of Interest and Ethical Approval
Ethical approval is not required. All participants were asked for their consent verbally before giving the questionnaire. Additionally, filling in the questionnaire is considered consent to participate, and there are no financial interests to declare.

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