

Prevalence of Work-Related Musculoskeletal Disorders in Iranian Physical Therapists: A Cross-sectional Study



Fatemeh Rahimi, MSc, PT,^a Khadijeh Kazemi, MSc, PT,^a Shahla Zahednejad, PhD, PT,^a Daniel López-López, PhD,^b and César Calvo-Lobo, PhD, PT^c

ABSTRACT

Objective: The purpose of this study was to determine the prevalence of musculoskeletal disorders among Iranian physical therapists.

Methods: A cross-sectional study was carried out. An online survey was completed by Iranian physiotherapists from June 2017 to August 2017. A total of 333 online questionnaires were sent, and 319 questionnaires were fully completed and used for data analysis. The Persian version of the Nordic Questionnaire was the main outcome measurement. This questionnaire identified work-related pain or discomfort in 9 parts of the body, including: (1) neck, (2) shoulder, (3) elbow, (4) wrists, (5) upper back, (6) lumbar, (7) thighs, (8) knee, and (9) ankle.

Results: The findings of this study showed the prevalence of musculoskeletal disorders was 94% in Iranian physiotherapists. Lumbar (65%), neck (57.4%), shoulder (50.2%), upper back (49%), and knee (45.5%) were the most prevalent regions of these disorders. While ankle (19.7%) and elbow (21.6%) disorders showed the lowest prevalence.

Conclusion: The prevalence of work-related musculoskeletal disorders was high in Iranian physiotherapists, especially in the lumbar, neck, shoulder, and upper back regions. (*J Manipulative Physiol Ther* 2018;41:503-507)

Key Indexing Terms: *Musculoskeletal Diseases; Physical Therapists; Work*

INTRODUCTION

Musculoskeletal disorders include a wide range of inflammatory and degenerative conditions affecting muscles, tendons, ligaments, joints, peripheral nerves, and blood vessels.¹ These disorders are associated with high social and economic costs,² ultimately impacting the quality of life.^{1,3} Work-related musculoskeletal disorders

are defined as musculoskeletal injuries that are due to occupational events.^{4,5} These disorders are common in jobs requiring manual work, heavy lifting, or repetitive movements,⁶ and can lead to changes in occupational habits, reduced hours of time worked, or changes in work.^{5,7} The 3 primary risk factors associated with work-related musculoskeletal disorders are repetitive movements, inappropriate physical conditions, and high work pressure.^{8,9} Healthcare providers, especially those in direct contact with the patients, had the highest rates of musculoskeletal complaints.⁹ Although physiotherapists have sufficient knowledge of musculoskeletal injuries and prevention strategies, they are at risk of work-related injuries.⁵

Physiotherapists are exposed to these disorders by repetitive works, manual techniques, inappropriate position, and prolonged situations during treatment.^{10,11} As physiotherapists treat a large number of patients in a day, the risk of work-related injuries is high.¹² Special fields of physiotherapists (orthopedic, neurology, etc), conditions of workplace, age, and sex of physiotherapists are effective in the prevalence of these work-related disorders.¹³ Nearly half of the physiotherapists experience musculoskeletal pain in their early 5 years.^{6,9} The reasons for this early pain experienced among young physiotherapists include lack of

^a Musculoskeletal Rehabilitation Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

^b Research, Health and Podiatry Unit, Department of Health Sciences, Faculty of Nursing and Podiatry, University of Coruña, A Coruña, Spain.

^c Nursing and Physical Therapy Department, Faculty of Health Sciences, University of León, Ponferrada, León, Spain.

Corresponding author: Shahla Zahednejad, PhD, PT, Musculoskeletal Rehabilitation Research Center, Ahvaz Jundishapur University of Medical Sciences, Golestan Boulevard, Ahvaz, Iran 6135715794. Tel.: +98 61 3374 3102. (e-mail: dr.shahzahed@gmail.com).

Paper submitted November 28, 2017; in revised form January 26, 2018; accepted February 28, 2018.
0161-4754

Copyright © 2018 by National University of Health Sciences.
<https://doi.org/10.1016/j.jmpt.2018.02.003>

enough experience of right positions during treatment and reluctance to get help from an assistant.^{3,14} Most physiotherapists experience the first symptoms of musculoskeletal pain before the age of 30.³ Lumbar spine, upper back region, neck, shoulders, hands, wrists, and knees are listed as the main areas of these disorders.^{4,10,12,15} Many studies have been conducted on these disorders in the community of nurses and other medical staff, but the physiotherapy community has been neglected.⁶ Because musculoskeletal disorders have a significant effect on the work and life of physiotherapists, the study of these disorders in the Iranian physiotherapy community seems to be necessary. Therefore, the purpose of this study was to determine the prevalence of musculoskeletal disorders among Iranian physical therapists.

METHODS

Study Design

In this cross-sectional study, an online version of the Nordic Questionnaire was distributed to examine work-related musculoskeletal disorders in the physiotherapy community. A text containing the study objectives and the link of the online questionnaire were sent to physiotherapy groups in different provinces and was available to physiotherapists. Furthermore, this study adhered to the International Recommendations for Reporting Observational Studies in Epidemiology to strengthen our research.¹⁶ The protocol was carried out in accordance with the Helsinki Declaration and the ethics requirements in human experimentation. The study was approved by the Research Committee of the Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

Procedure and Sample

The time required to complete this online questionnaire was about 5 minutes. The questionnaires were completed from June 2017 to August 2017, and about 333 questionnaires were accurately completed. Physiotherapists (21-73 years old) who were working in public or private centers were included in the study. Questionnaires that were not fully completed were deleted. Finally, 319 questionnaires were analyzed.

Nordic Questionnaire

The questionnaire consisted of 4 parts. The first part contained information on age, sex, marital status, employment location, average working hours, activity, and type of activity. The second part included 9 questions regarding pain and discomfort in the last 12 months, and the third part included 9 questions about pain and discomfort in the last 7 days. The last part related to the reduction of working hours and leaving the workplace because of pain and discomfort in the last 12 months. It should be noted that the Nordic Questionnaire is widely used in the study of work-related health.²

This questionnaire was used to identify pain or unpleasant sensation in 9 parts of the body, including the following: (1) neck, (2) shoulder, (3) elbow, (4) wrists, (5) upper back, (6) lumbar, (7) thighs, (8) knee, and (9) ankle. Validity and reliability of this questionnaire were carried out in the Persian language. Indeed, all of the items showed an acceptable validity. The intraclass correlation coefficient (>0.7), standard error of measurement (0.56-1.76), and Kappa coefficient ($\kappa = 0.78-1.00$) showed acceptable reliability of the Persian version of the Nordic Questionnaire.¹⁷

Sample Size Calculation

The sample size was calculated by means of the software from Clinical Epidemiology and Biostatistics Unit, University Hospital Complex of A Coruña, University of A Coruña.¹⁸ According to the Iranian Physiotherapy Association, there is an approximate prevalence of 7000 Iranian physiotherapists, thus the sample size calculation for an α level of 0.05 (confidence interval, $\alpha-1 = 95\%$), a proportion of 5% and a precision of $\pm 2.5\%$, provided at least $n = 280$ physiotherapists. Furthermore, assuming information loss of 15%, at least $n = 330$ physical therapists must be studied. Finally, $n = 333$ Iranian physiotherapists were recruited, and $n = 319$ were included in this research study.¹⁸

Statistical Analysis

Statistical analyses were carried out using IBM SPSS statistical software (Version 22.0, IBM Corp, Armonk, New York). Qualitative outcomes were presented as frequencies and percentages. The χ^2 test was used to compare the qualitative variables between the male and female sexes. The statistical tests were carried out regarding a 95% confidence interval, and statistically significant differences were considered if P value $< .05$.

RESULTS

In this study, 319 physiotherapists (99 men and 220 women) 21 to 73 years old, completed the online questionnaires. Of these, 121 were single, and 198 were married. The results showed that the average daily working hours of physiotherapists was 7.2 ± 2.5 , with a maximum working time of 13 hours and a minimum of 2 hours per day. Table 1 lists the frequency of people with out-of-working hours' activities, sports activities, and the frequency of people working in the clinic, hospital, or working in both places.

The findings of this study showed that the prevalence of musculoskeletal disorders was 94% in Iranian physiotherapists. The highest prevalence was related to the lumbar (65%), neck (57.4%), shoulder (50.2%), upper back (49%), and knee (45.5%), and the lowest was related to the elbow (21.6%) and ankle (19.7%). Table 2 shows the prevalence

Table 1. Frequency of People With Out-of-Workplace Activities or Sport Activities, and the Frequency of People Working in a Clinic, Hospital, or Both

	Activities Out of Working Hours		Sport Activities		Workplace		
	Yes	No	Yes	No	Clinic	Hospital	Both Locations
Frequency (%)	165 (52)	154 (48)	86 (27)	233 (73)	213 (66.8)	18 (5.6)	88 (27.6)

Table 2. Prevalence of Musculoskeletal Disorders in the Past 12 Months and in the Past 7 Days Among Physiotherapists

	Ankle	Knee	Thigh	Lumbar	Upper Back	Wrist	Elbow	Shoulder	Neck
Frequency, n (%), in last 12 mo	63 (19.7)	145 (45.55)	130 (40.8)	208 (65.2)	156 (49)	121 (37.9)	69 (21.6)	160 (50.2)	183 (57.4)
Frequency, n (%), in last 7 d	36 (11.3)	82 (25.75)	69 (21.65)	135 (42.3)	96 (30)	65 (20.4)	39 (12.2)	94 (29.55)	115 (36.1)

Table 3. Frequency of People Who Need Rest or Reduced Activity, Need to Leave the Workplace, or Are Unable to Perform Activities at Work or at Home Because of Musculoskeletal Disorder

	Ankle	Knee	Thigh	Lumbar	Upper Back	Wrist	Elbow	Shoulder	Neck
Frequency, n (%), in last 12 mo	13 (41)	27 (8.5)	39 (12.2)	85 (26.6)	28 (8.8)	38 (11.9)	13 (4.1)	40 (12.5)	60 (18.8)

Table 4. Prevalence of Disorder Based on Sex

	Ankle	Knee	Thigh	Lumbar	Upper Back	Wrist	Elbow	Shoulder	Neck
Men	15.2%	38.4%	26.3%	61.6%	33.3%	27.3%	14.1%	39.4%	47.5%
Women	21.8%	48.6%	47.3%	66.8%	55.9%	42.7%	25%	55%	61.8%
P value	.166	.089	.001	.367	.001	.008	.029	.010	.017

of musculoskeletal disorders in the past 12 months and in the past 7 days among physiotherapists.

According to the results, the highest percentage of rest, decrease in activity, absence, or lack of ability to perform activities at work or home were related to lumbar (26.6%) and neck (18.8%) disorders, and the least was related to elbow and ankle disorders (4.1%). Table 3 shows this frequency.

According to the χ^2 test, there was no significant difference between sex and sports activities or between marital status and workplace in female and male physiotherapists, but men had an out-of-working hours more than women ($P < .05$). The results also showed that in the past 12 months, the prevalence of musculoskeletal disorders was higher in female physiotherapists than in male physiotherapists. There was no significant difference in lumbar, ankle, and knee pain between women and men ($P > .05$). Table 4 shows the prevalence of disorders between men and women.

In terms of workplace leave, rest, and reduced activity at work and home after musculoskeletal disorders, the women's percentage was greater than the men's, but this difference was not significant, except for neck pain, shoulder pain, and wrist pain ($P > .05$).

DISCUSSION

The results of this study showed a high prevalence (percentage of a population with a given condition at a given period of time) of musculoskeletal disorders among Iranian physiotherapists who are therapists for these disorders. Ninety-four percent of Iranian physiotherapists have experienced pain in different areas of their bodies over the past 12 months. Also, female physiotherapists were at greater risk for musculoskeletal disorders. Work-related pain can affect working experience, quality of life, and psychological and physical performances of physiotherapists at work and home, and can reduce individual efficacy of them.^{1,3,5,7} The high prevalence of musculoskeletal disorders is a serious threat to the occupational health and physical health of Iranian physiotherapists. Possible causes of this high prevalence in physiotherapists include repetitive movements, static flexion activity, spinal rotation for a long time, treating a large number of patients in a single day, lack of adequate rest during the day, performing manual therapy, and continuing work during injuries and discomfort.^{5,10,11,14,19} More studies are needed to investigate the causes of high prevalence of work-related musculoskeletal disorders among Iranian physiotherapists.

The findings of this study showed that physiotherapy is a high-risk job. It is related to work-related musculoskeletal disorders. In a field where therapists are exposed to the same injuries that they are undergoing, despite their awareness of risk factors and prevention methods,²⁰ there is a great deal of thought and control to protect their health as therapists for musculoskeletal disorders. Proper plans are needed to reduce the risk of injuries and the prevalence of work-related disorders in Iranian physiotherapists.

Also, the disorder in the lumbar area with the prevalence of 65% had the greatest damage in Iranian physiotherapists. Neck (57.4%), shoulder (50.2%), upper back (49%), and knee (45.5%) had a high prevalence in Iranian physiotherapists, respectively. The prevalence of work-related musculoskeletal disorders in Iranian physiotherapists is higher than the prevalence of these disorders in physiotherapists in other countries.

In Egypt, Atia et al found that the prevalence of low back pain in physiotherapist was 67.9%.⁵ In Turkey, Salik and Özcan found prevalence of work-related low back pain to be 26% in physiotherapists.²¹ Chung et al reported that the prevalence of this disorder in Korean physiotherapists was 53.5%.¹¹ The prevalence of work-related low back pain in Malaysian physiotherapists was 51.7%.¹⁰ The prevalence of low back pain was reported in the North and Central Quizland physiotherapists as 35% and 32% in Kuwait.⁴ Vieira et al⁶ reported the prevalence of work-related low back pain in Miami physiotherapists as 66%. The prevalence of low back pain in Swedish physiotherapists was 56.5%.²² Glover et al reported 44% of physiotherapist in London had work-related low back pain.¹²

According to the results, lumbar is the most serious site of work-related musculoskeletal disorders in all physiotherapists in the world. According to the results of the present study, there was no significant difference in the prevalence of this disorder between male and female physiotherapists, and the prevalence is high in both groups. There is no difference between the prevalence of work-related low back pain in people working at the clinic or hospital, which is probably due to the nature of the physiotherapy, long standing and sitting in a bending and twisting position of the low back for a long time.

Many physiotherapy centers have a high number of patients and only 1 physiotherapist conducting management and treatment of patients, which causes a lot of pressure on the therapist. The results of this study showed that Iranian physiotherapists have a low tendency to reduce their activities and working hours and increase their rest during injury. It could be effective in exacerbating their injury. Results showed that despite physiotherapists encouraging their patients to do regular exercise, most Iranian physiotherapists (73%) had no regular exercise and not enough rest during injury (73.4%).

The Nordic Questionnaire has been previously utilized across different countries in physiotherapists' populations,

such as Nigeria²³ or Malaysia.²⁴ Despite prevention programs for musculoskeletal injuries established in athletes,²⁵ future studies should be carried out to develop these programs for musculoskeletal injuries of physiotherapists.

Recommendations

Means by which we can reduce or prevent work-related conditions for physiotherapists should be investigated. For example, we should consider proper plans to modify the hours of work, the number of patients seen, and remind workers of the correct postures of the various parts of the body during work and at the time of injury.

Limitations

Several limitations should be considered in the present work. First, the sample size calculation was carried out regarding the physiotherapist population of Iran. Nevertheless, worldwide musculoskeletal disorders' prevalence of physiotherapists should be performed. Second, the questionnaires were self-reported online. Therefore, some doubts or procedures could have been clarified by means of physical examination or face-to-face attendance. Finally, the consecutive sampling method may be considered as a limitation, and simple randomized methods would improve the strength of futures studies.

CONCLUSION

The prevalence of work-related musculoskeletal disorders was high in the sample of Iranian physiotherapists included in this study. Body areas of greatest concern were in the low back, neck, and shoulder.

FUNDING SOURCES AND CONFLICTS OF INTEREST

No funding sources or conflicts of interest were reported for this study.

CONTRIBUTORSHIP INFORMATION

Concept development (provided idea for the research): F.R., K.K., S.Z.

Design (planned the methods to generate the results): F.R., K.K., S.Z., D.L.-L., C.C.-L.

Supervision (provided oversight, responsible for organization and implementation, writing of the manuscript): F.R., K.K., S.Z.

Data collection/processing (responsible for experiments, patient management, organization, or reporting data): F.R., K.K., S.Z.

Analysis/interpretation (responsible for statistical analysis, evaluation, and presentation of the results): F.R., K.K., S.Z., D.L.-L., C.C.-L.

Literature search (performed the literature search): F.R., K.K., S.Z., D.L.-L., C.C.-L.

Writing (responsible for writing a substantive part of the manuscript): F.R., K.K., S.Z., D.L.-L., C.C.-L.

Critical review (revised manuscript for intellectual content, this does not relate to spelling and grammar checking): F.R., K.K., S.Z., D.L.-L., C.C.-L.

Practical Applications

- The prevalence of work-related musculoskeletal disorders is high in Iranian physiotherapists.
- Body areas that had the highest report of disorders were the low back, neck, and shoulder.

REFERENCES

1. Punnett L, Wegman DH. Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *J Electromyogr Kinesiol*. 2004;14(1):13-23.
2. Dembe AE. The social consequences of occupational injuries and illnesses. *Am J Ind Med*. 2001;40(4):403-417.
3. Liao JC, Ho CH, Chiu HY, et al. Physiotherapists working in clinics have increased risk for new-onset spine disorders: a 12-year population-based study. *Medicine (Baltimore)*. 2016;95(32):e4405.
4. Alrowayeh HN, Alshatti TA, Aljadi SH, Fares M, Alshamir MM, Alwazan SS. Prevalence, characteristics, and impacts of work-related musculoskeletal disorders: a survey among physical therapists in the state of Kuwait. *BMC Musculoskelet Disord*. 2010;11(1):116.
5. Atia DT, Abdelazeim FH, Radwan H. Impact of work-related musculoskeletal disorders on Egyptian pediatric physical therapists: one-year follow-up study. *Trends Appl Sci Res*. 2015;10(3):175.
6. Vieira ER, Svoboda S, Belniak A, et al. Work-related musculoskeletal disorders among physical therapists: an online survey. *Disabil Rehabil*. 2016;38(6):552-557.
7. Campo M, Weiser S, Koenig KL, Nordin M. Work-related musculoskeletal disorders in physical therapists: a prospective cohort study with 1-year follow-up. *Phys Ther*. 2008;88(5):608-619.
8. Passier L, McPhail S. Work related musculoskeletal disorders amongst therapists in physically demanding roles: qualitative analysis of risk factors and strategies for prevention. *BMC Musculoskelet Disord*. 2011;12(1):24.
9. Cromie JE, Robertson VJ, Best MO. Work-related musculoskeletal disorders in physical therapists: prevalence, severity, risks, and responses. *Phys Ther*. 2000;80(4):336-354.
10. Nordin NAM, Leonard JH, Thyne NC. Work-related injuries among physiotherapists in public hospitals: a Southeast Asian picture. *Clinics (Sao Paulo)*. 2011;66(3):373-378.
11. Chung SH, Her JG, Ko T, et al. Work-related musculoskeletal disorders among Korean physical therapists. *J Phys Ther Sci*. 2013;25(1):55-59.
12. Glover W, McGregor A, Sullivan C, Hague J. Work-related musculoskeletal disorders affecting members of the Chartered Society of Physiotherapy. *Physiotherapy*. 2005;91(3):138-147.
13. Glover W. Work-related strain injuries in physiotherapists: prevalence and prevention of musculoskeletal disorders. *Physiotherapy*. 2002;88(6):364-372.
14. West DJ, Gardner D. Occupational injuries of physiotherapists in North and Central Queensland. *Aust J Physiother*. 2001;47(3):179-186.
15. Girbig M, Deckert S, Kopkow C, et al. Work-related complaints and diseases of physical therapists—protocol for the establishment of a “physical therapist cohort”(PTC) in Germany. *J Occup Med Toxicol*. 2013;8(1):34.
16. Vandenbroucke JP, von Elm E, Altman DG, et al. Strengthening the reporting of observational studies in epidemiology (STROBE): explanation and elaboration. *Epidemiology*. 2007;18(6):805-835.
17. Namnik N, Negahban H, Salehi R, Shafizadeh R, Tabib MS. Validity and reliability of Persian version of the specific Nordic questionnaire in Iranian industrial workers. *Work*. 2016;54(1):35-41.
18. Pita F. Investigación: determinación del tamaño muestral. *Cad Aten Primaria Actual*. 1996;303(6):138-140.
19. Darragh AR, Huddleston W, King P. Work-related musculoskeletal injuries and disorders among occupational and physical therapists. *Am J Occup Ther*. 2009;63(3):351-362.
20. Cromie JE, Robertson VJ, Best MO. Work-related musculoskeletal disorders and the culture of physical therapy. *Phys Ther*. 2002;82(5):459-472.
21. Salik Y, Özcan A. Work-related musculoskeletal disorders: a survey of physical therapists in Izmir-Turkey. *BMC Musculoskelet Disord*. 2004;5(1):27.
22. Grooten WJ, Wernstedt P, Campo M. Work-related musculoskeletal disorders in female Swedish physical therapists with more than 15 years of job experience: prevalence and associations with work exposures. *Physiother Theory Pract*. 2011;27(3):213-222.
23. Abaraogu UO, Ezema CI, Nwosu CK. Job stress dimension and work-related musculoskeletal disorders among southeast Nigerian physiotherapists. *Int J Occup Saf Ergon*. 2017;23(3):404-409.
24. Adegoke BO, Akodu AK, Oyeyemi AL. Work-related musculoskeletal disorders among Nigerian physiotherapists. *BMC Musculoskelet Disord*. 2008;9:112.
25. Saragiotto BT, Di Pierro C, Lopes AD. Risk factors and injury prevention in elite athletes: a descriptive study of the opinions of physical therapists, doctors and trainers. *Braz J Phys Ther*. 2014;18(2):137-143.