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Employment-related musculoskeletal complications experienced by the physical therapists in Bangladesh: a comprehensive cross-sectional case study

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Abstract

Background: Dentists, nurses, and physical therapists have all been associated with an increased risk of work-related diseases. The findings of studies in these different occupations might aid in the development of preventative measures. In Bangladesh, however, no comparable evidence has been recorded among physical therapists. The study's goal was to find out the prevalence of work-related physical problems at different anatomical locations, as well as the link between these disorders and treatment strategies across Bangladeshi physical therapists.

Methods: A physical and online survey of Bangladeshi physical therapists was done. A total of 300 questionnaires were given out, with work-related discomfort or pain detected in nine locations of the body: (1) neck, (2) shoulder, (3) elbow, (4) wrists, (5) upper back, (6) lumbar, (7) thighs, (8) knee, and (9) ankle.

Results: 85.5% of Bangladeshi physical therapists suffer musculoskeletal problems, according to the results of this research. The neck (25.7%), lower back (15.2%), elbow (12.3%), ankle (8.6%), and shoulder (8.6%) were the most often affected locations (7.1%). Upper back (3.0%) and hips (2.2%) ailments had the lowest prevalence.

Conclusion: Work-related musculoskeletal illnesses were common among the Bangladeshi physical therapists, especially in their neck, lower back, elbow, and ankle regions.

Keywords: Musculoskeletal injuries, Physical therapists, Employment-related complications, Bangladesh perspectives

Background

Work-related musculoskeletal disorders (WMSDs) have a high significant occupation problem worldwide. One-third of all injuries in a day occurs due to occupational hazards are WMSDs reports The Bureau of Labor Statistics [1]. In 2012 about 126.6 million people are affected in musculoskeletal disorders (MSDs) in the USA and the number comprises one in 2 people affected [2]. Injuries that involve the musculoskeletal system including muscles, tendons, nerves, ligaments, joints, and structures

of the human body during work are known as WMSDs. Examples include tennis elbow, golfers elbow, tendinitis, thoracic outlet syndrome, carpal tunnel syndrome, tension neck syndrome, and degenerative spine disease. These disorders can be permanent disabilities if not addressed properly in due time.

Occupational status like environment, noise, mental health, work type (repeated work), improper body posture, and malposition all are responsible for WMSDs. Biomechanical load is also a vital issue for raising MSDs or Musculoskeletal Pain (MSP) which may defer via a duration of force and its frequency while performing to do tasks. Gender and Obesity are also notified as important factors here Females are more vulnerable than men

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respectively and obese people are in a high-risk zone to aggravate low back pain [3–5].

A study conducted for 12 months among physical therapists and results shows 29% of participants suffered from low back pain (LBP) due to workload. Several types of job-related tasks are highly responsible for MSDs including bending, twisting, load-bearing, position, posture, repeated work, prolonged work, and others, and a highly significant age group between 21 and 30 years [6]. Inadequate safety training, poor ergonomics, and misuse of equipment contribute as vital factors for raising WMSDs [7]. Because of the problems or pain that emerge as a result of labor, it deteriorates during service. In this instance, the employee's productivity is hampered. This interference has a significant detrimental psychological, economic, and service-related impact. In the USA, Europe, and Australia, the gross expense of WMSDs has been documented to be considerable [8].

Surgical and nonsurgical treatment procedures are the two most prevalent forms of therapy protocols utilized to cure MSDs. The drug, electrotherapeutic modalities, therapeutic exercise, acupuncture, and also many more traditional methods are conducted as nonsurgical phenomena. Pain-relieving probiotics are also suggested through regular protein consumption by their regular diet chart. Few bacterial strains show a significant role against allergic reaction and inflammation in the "in vivo" animal model [9]. Physical therapy also shows a remarkable reflection for WMSDs treatment through therapeutic exercises like strength or resistance, endurance exercise, myofascial release technique, and stretching exercise.

Considering all the aforementioned evidence, our study was derived for the objectives including determining the prevalence of work-related physical problems at different anatomical locations among physical therapists, considering their socio-demographic factors, joint, and segment-specific received treatment during practice, and finally revealing whether there's any correlation between BMI, gender, and WMSDs.

Materials and methods

A comprehensive cross-sectional case study was carried out using a questionnaire to get data from various comparable studies [10–12] that had been published in reputable journals (Elsevier, Scopus, Springer Nature, Wiley, and PubMed) all over the globe. This questionnaire was originally sent to a small group of professional local physical therapists as part of a pilot study, and it was then accepted for use by physical therapists in Bangladesh. Some small adjustments to the questionnaire were made to achieve results. The procedure was conducted in accordance with the Helsinki Declaration and human experimentation ethics criteria.

Profiling of the musculoskeletal issues of the subject's

The 300 professional physical therapists all over Bangladesh have been suffering from different stages of musculoskeletal disorders. All the participants were physically interviewed and the data were conserved for further statistical and non-clinical profiling.

Inclusion and exclusion criteria

The inclusion criteria were the physical therapists that spent at least 1 hour each day in therapy, were aged between 25 and 60 years, willingly share pain-related information, signed informed consent, were also members of our university's alumni association were qualified to enroll. The participants must complete the questionnaire for the questionnaire. The exclusion criteria were the history of (a) trauma, (b) history of MSDs before joining the physiotherapy profession, (c) rheumatologic disorders, (d) congenital disorder, (e) psychological illnesses, (e) long-term systemic corticosteroid administration, (f) systemic disorders of any kind, and/or (g) drug addiction. Interview questions that were not completely filled out were discarded.

Questionnaire

A self-administered questionnaire was developed to collect accurate data and address difficulties. The questionnaire was mainly divided into three domains, covering topics such as (1) Age, Gender, BMI, Designation; (2) Anatomical location basis MSD ratio; and (3) Correlation between MSD and BMI/Treatment seeking behavior/Gender. This questionnaire was created using a modified version of the Nordic Questionnaire [13] and used to find discomfort or uncomfortable sensations in nine different places of the body, including (1) neck, (2) shoulder, (3) elbow, (4) wrists, (5) upper back, (6) lumbar, (7) thighs, (8) knee, and (9) ankle. In the Bangla language, the questionnaire's validation was tested. All of the products were found to be legitimate. The experience of work-related musculoskeletal conditions before the day of entering the physical therapy industry, and general health records. Characteristics of physical therapy center or department setup and WRMDs effect on physical therapists. After joining the physical therapy profession, WRMSDs were defined as musculoskeletal pain in the therapist's body. This uncomfortable scenario may or may not become a hindrance to performing everyday job and non-work activities. Pain perception was assessed by using a 4-point pain index (0= No pain, 1= Mild pain, 2= Moderate pain, 3= Severe pain) influencing, on the basis of former established scoring matrix used [14].

Sample size calculation

Our university’s Physical Therapy and Rehabilitation Division provided the software that was used to compute the sample size. According to the Bangladeshi Physiotherapy Association, there are around 3500 Bangladeshi physiotherapists, therefore the sample size analysis for a level of 0.05 (confidence interval, $\alpha-1 = 95\%$), a ratio of 5%, and an accuracy of 2.5% required at least $n = 140$ physiotherapists. Moreover, at least $n = 165$ professionals should be researched, assuming a 15% knowledge loss. Finally, a total of 300 Bangladeshi physical therapists were enlisted, with 269 of them participating in the study.

Statistical analysis

Data was typed into a system when the whole survey was collected. “R programming” (Version R-4.0.2 for Linux) [15–18] and GraphPad Prism (edition 8.0.1, GraphPad Software Package, San Diego, CA, USA) [19–21] were used to analyze the data. For conducting that cross-sectional study of each of the parameters with each other, the R programming script-based “Tukey’s *t*-test for multiple comparison” was preferred for all the aforementioned parameters [18, 20]. In addition, the median, percentage, and frequency of the values were commenced using the “Descriptive Statistics Algorithm” of GraphPad Prism [19, 21].

Results

In this research, 269 participants were performed in this study where the positive case was 230 (85.5%) and 39 (14.5%) were negative. Regarding age, it was found that 96.3% of therapists who aged equal or less than 30 years suffer from work-related musculoskeletal disorder (WMSD), and 3.7% were not the sufferer. One hundred six (80.3%) therapists aged between 31 and 40 years suffer from WMSD and 19.7% of therapists were not. 12.2% of therapists aged between 41 and 50 years were not suffering from WMSD and sixty-five participants 87.8% suffered. Therapists aged equal or higher than 51 years where 77.8% suffered and two 22.2% of the therapist were not (Table 1).

According to the BMI status of the participants, 61.9% ($N=13$) showed positive and 38.1% ($N=19$) showed the negative result in underweight (<18.5), 90.6% ($N=184$) showed positive and 9.4% ($N=19$) showed the negative result in normal 18.5 to 24.9 lastly 73.3% ($N=33$) showed positive and 26.7% ($N=12$) showed the negative result in overweight (25 to 29.9) between the range of BMI.

According to the experience of the participants, 66.7% ($N=4$) was positive and 33.3% ($N=2$) was negative result showed into the lecturer, 73.3% ($N=44$) showed positive and 26.7% ($N=16$) showed negative in the consultant

Table 1 The socio-demographic report on MSD regarding different factors ($N = 269$)

Personal, demographic and occupational variables	Yes (%)	No (%)	P value*	
Age (years)	≤ 30	52 (96.3%)	2 (3.7%)	0.033
	31–40	106 (80.3%)	26 (19.7%)	
	41–50	65 (87.8%)	9 (12.2%)	
	≥ 51	7 (77.8%)	2 (22.2%)	
Gender	Male	144 (82.3%)	31 (17.7%)	0.041
	Female	86 (91.5%)	8 (8.5%)	
BMI	<18.5 (underweight)	13 (61.9%)	8 (38.1%)	0.000
	18.5 to 24.9 (normal)	184 (90.6%)	19 (9.4%)	
	25 to 29.9 (Overweight)	33 (73.3%)	12 (26.7%)	
Designation	Lecturer	4 (66.7%)	2 (33.3%)	0.004
	Consultant physiotherapist	44 (73.3%)	16 (26.7%)	
	Clinical physiotherapist	172 (90.5%)	18 (9.5%)	
	Others	10 (76.9%)	3 (23.1%)	

physiotherapist, 90.5% ($N=172$) showed positive and 9.5% ($N=18$) showed negative in the clinical physiotherapist, and 76.9% ($N=10$) showed positive and 23.1% ($N=3$) showed negative into other participants, respectively (Table 1).

This study shows 230 participants were suffering from WMSD where 21.7% ($N=15$) participants visited the physician. Others affected anatomical region like shoulders 7.1% ($N=19$), elbows 12.3% ($N=33$), wrists/hands 5.2% ($N=14$), upper back 3% ($N=8$), lower back 15.2% ($N=41$), hips/thighs 2.2% ($N=2.2\%$), knees 6.3% ($N=17$), and ankles/feet 8.6% ($N=23$), where visit to physiotherapist and physician 89.5% and 10.5%, 63.6% and 36.4%, 92.9% and 7.1%, 25.0% and 75.0%, 70.7% and 29.3%, 16.7% and 83.3%, 47.1% and 52.9%, and 47.8% and 52.2%, respectively (Table 2).

Among $N=230$ participants, approximately $N=144$ were male and $N=86$ were female where the highest number of male participants was affected in the neck $N=54$ and $N=22$ was the lower back area. Among WMSD the affected male participants, neck ($N=54$), shoulders ($N=12$), elbows ($N=24$), wrists/hands ($N=6$), upper back ($N=2$), lower back ($N=19$), hips/thighs ($N=5$), knees ($N=11$) and ankles/feet ($N=11$) respectively (Fig. 1). On the other hand, neck ($N=15$), shoulders ($N=7$), elbows ($N=9$), wrists/hands ($N=8$), upper back ($N=6$), lower back ($N=22$), hips/thighs ($N=1$), knees ($N=6$), and ankles/feet ($N=12$) were affected among female participants (Fig. 1).

This data showed the statistics of anatomical areas of WMSD affected participants in the variance of

Table 2 Percentages of physical therapists reporting musculoskeletal symptoms, physician visits, and physiotherapist visits as a result of work-related symptoms (N=230)

Anatomical area	Percentage with symptoms (n=230)	Percentage visiting physiotherapist	Percentage visiting physician
Neck	69 (25.7%)	54 (78.3%)	15 (21.7%)
Shoulders	19 (7.1%)	17 (89.5%)	2 (10.5%)
Elbows	33 (12.3%)	21 (63.6%)	12 (36.4%)
Wrists/hands	14 (5.2%)	13 (92.9%)	1 (7.1%)
Upper back	8 (3.0%)	2 (25.0%)	6 (75.0%)
Lower back	41 (15.2%)	29 (70.7%)	12 (29.3%)
Hips/thighs	6 (2.2%)	1 (16.7%)	5 (83.3%)
Knees	17 (6.3%)	8 (47.1%)	9 (52.9%)
Ankles/feet	23 (8.6%)	11 (47.8%)	12 (52.2%)

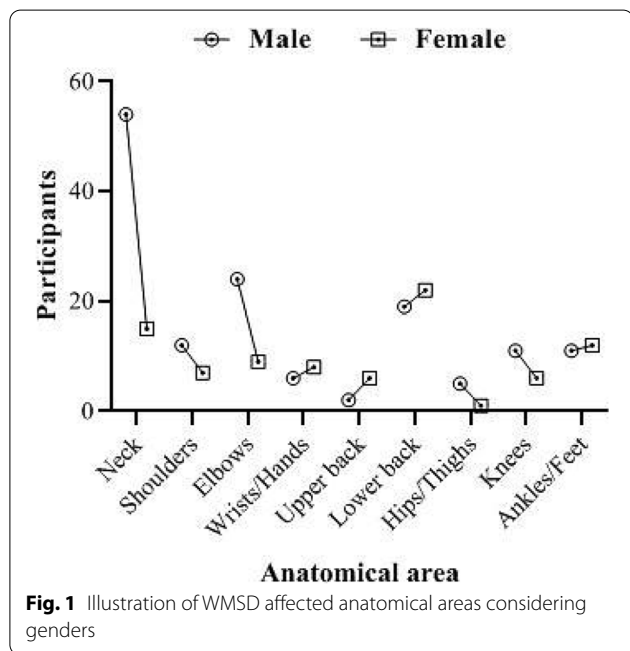


Fig. 1 Illustration of WMSD affected anatomical areas considering genders

BMI range here <18.5 refers underweight, 18.5 to 24.5 refers normal weight and 25.0 to 29.0 refers overweight (Fig. 2). The highest prevalence of anatomical area was neck (N=4) among underweight people where the wrists/hands (N=3), ankles/feet (N=3), lower back (N=2), and elbow (N=1) areas were also affected, respectively (Fig. 2). Similarly, the highest prevalence of anatomical area was the neck (N=59) among normal-weight people where the elbow (N=30), lower back (N=26), shoulders (N=19), ankles/feet (N=16), knees (N=13), wrists/hands (N=8), upper back (N=8), and hips/thighs (N=5) areas were also affected, respectively (Fig. 2).

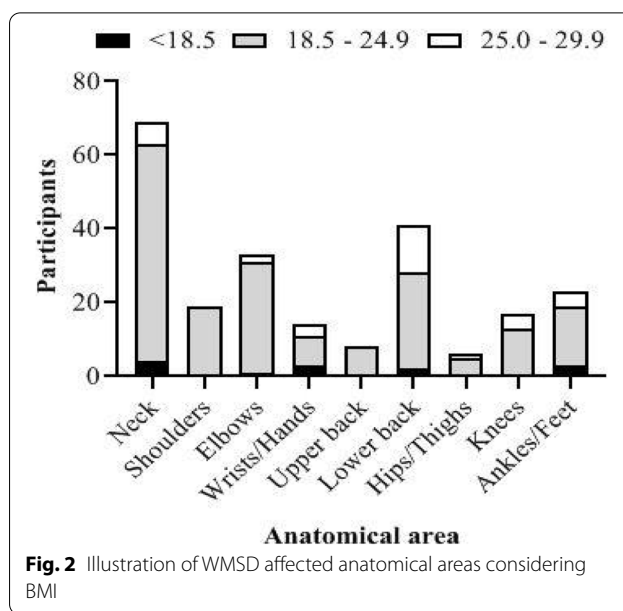


Fig. 2 Illustration of WMSD affected anatomical areas considering BMI

Lastly, the highest prevalence of anatomical area was the lower back (N=13) among overweight people where the neck (N=6), knees (N=4), ankles/feet (N=4), wrists/hands (N=3), elbows (N=2), and hips/thighs (N=1) areas were also affected, respectively (Fig. 2).

Discussion

Physical therapists in Bangladesh who treat these problems had a considerably high prevalence of work-related musculoskeletal ailments, according to this nationally representative comprehensive study. Eighty-five percent of physical therapists in Bangladesh have experienced pain in various parts of their bodies. In addition, 91% of female physical therapists were at risk for musculoskeletal problems, making them more susceptible than male physical therapists. Work-related discomfort can impair physical therapists' quality of life, work-related experience, physical performance, and psychological status at home and work, as well as their effectiveness. The increasing frequency of musculoskeletal problems poses a severe danger to Bangladeshi physical therapists' occupational and physical health. Movement patterns, long-term spine rotation, static flexion posture, absence of balance interval throughout the day, delivering manual treatment, and performing to work through pain and deformities are all plausible causes for physical therapists' importance [5-7, 22].

According to the findings of the study, physio is a high-risk occupation. It has something to do with work-related musculoskeletal disorders. In a position where therapists are prone to practically the same difficulties as they are, there is a great deal of consideration and management to

maintain their health as physical issue specialists, despite their grasp of danger criteria and preventative techniques. To limit the risk of injury and the emergence of work-related diseases among Bangladeshi physical therapists, strategic planning is required [23].

This study represents 96.3% were in the age group between ≤ 30 , 80.3% was 31–40, 87.8% was 41–50, and 77.8% was ≥ 51 , respectively. Young physiotherapy professionals are in more vulnerable conditions due to a lack of poor postural and biomechanical awareness. Middle-age professionals are also in the risk zone due to prolong practice and mechanical hazards [5, 7, 23]. This study also reflects above 90% of participants are in the normal BMI range. Clinical physical therapists are highly prevalent than lecturers (Table 1). Because of work-related orthopedic illnesses, young people are the most susceptible [24–27].

In Bangladeshi physical therapists, the issue in the neck area, which had a prevalence of 25.7%, caused the most damage. According to this study, physical therapists in Bangladesh showed a significant prevalence of lower back (15.2%), elbow (12.3%), ankle (8.6%), shoulder (7.1%), and knee (6.3%) injuries, respectively (Table 2). Due to employment, the neck and lower back are the most susceptible areas of the body [28–32]. The majority of the participants are managed by a physical therapist. Wami et al. discovered that 50.7% of Ethiopian employees suffer from work-related neck discomfort. Nunes et al recently observed 56.1% of neck discomfort among office employees [33, 34]. Atia et al. reported that 67.9% of physical therapists had lower back discomfort in Egypt. According to Salik and Zcan, 26% of physical therapists in Turkey suffer from work-related lower back discomfort [35–37].

Also, due to occupation, the neck and elbow regions are more susceptible in males than females, whereas the lower back and ankle regions are more impacted in females than males (Fig. 1). Kocur et al. reflect female employees are highly affected by the neck and upper back region in his study [37] and Chen et al. also reflect neck pain is more significant due to employment [38]. This study also shows that normal-weight individuals are more likely to be impacted by work-related musculoskeletal disorders, whereas overweight persons are more likely to be afflicted in the lower back and ankle regions of the body (Fig. 2).

Omar et al. showed normal weight and overweight participants are more commonly affected in work-related musculoskeletal disorders among surgeons [39]. Singh et al also stated in their research those normal-weight participants are most vulnerable to work-related musculoskeletal disorders [40]. Occupational setup modification, postural correction, having intervals during prolonged work, regular therapeutic exercise and vitamin

D supplements can reduce musculoskeletal hazards [41, 42]. In recent times, the nutritional importance in physiotherapeutic aspects has been given additional emphasis for gaining maximum benefits from the regular sessions of physiotherapy and home works [43–45]. Besides, in many countries, children and adults are often suggested to conduct proper nutritional supplementation and physical exercise simultaneously to make the impact of physiotherapy on their bodies more effective [46]. In optimizing the cardiorespiratory-physiotherapy purposes, the nutritional status is suggested for many patients [47], where probiotic supplements can be a very innovative option [48]. To many extents, these kinds of supplements can protect against viral infection in the respiratory system [49], modulating the secondary immune response of the patients taking physiotherapy courses [50].

In the current study, there are a few constraints to consider. Initially, a study population estimate was performed for the Bangladeshi physiotherapist. Physiotherapists should, however, be evaluated globally for the incidence of musculoskeletal problems. Second, the surveys were completed by the participants themselves. As a result, the physical examination may have cleared certain questions or processes.

Considering these limitations, this research is the first to give information on the incidence and occupational variables of WMSDs among Bangladeshi physiotherapists. This has also highlighted the necessity for more research into the behavioral effects of WRMDs and Bangladeshi Physiotherapists' views toward them.

Conclusion

The incidence of employment-related lead to physical was substantial in the report's sample of Bangladeshi physical therapists. The most susceptible regions of the body were the neck, low back, knees, ankles, and shoulders.

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Authors' contributions

Conceptualization, Methodology: Md. Amran Hossain. Supervision: Sharmin Ahmed. Project administration: Md. Ariful Islam. Resources and data curation: Tasnuva Shamarukh Proma and Md. Rashaduzzaman. Writing original draft: All the authors participated equally. Visualization: Md. Amran Hossain. Investigation: Md. Ariful Islam. Validation and software: Sharmin Ahmed and Md. Ariful Islam. The author(s) read and approved the final manuscript.

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Declarations

Ethics approval and consent to participate

The total research work was conducted under the Ethical Guidelines and Monitoring of Jashore Medical College (JMC), Bangladesh Medical and Dental Council (BMDC) in collaboration with the RPG Authority (Govt. Registration ID: 05-060-06021) under the Project Category C4 (#Project EA No- 12/2021-2022), which was supervised by Dr. Sharmin Ahmed (Senior Faculty of Pharmacology Department, Jashore Medical College, Bangladesh). Participants gave written informed consent before data collection began.

Competing interests

The authors declare that they have no competing interests.

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