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Association of working hours, job position, and BMI with work-related musculoskeletal disorders among the physiotherapists of Gujarat—an observational study

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Abstract

Background: Physiotherapists are prone to develop work-related musculoskeletal disorders (WMSDs). Region wise distribution and frequency of work disturbance have been studied in physiotherapists but exploration of the probable association of working hours, job position, and body mass index (BMI) with WMSDs is not adequately done in the Gujarat, India. Hence, the present study was undertaken to investigate these aspects among the physiotherapists of Gujarat.

Results: An online cross-sectional survey including 322 physiotherapists was conducted and the data was collected after gaining informed electronic consent. Present study showed no significant co-relation between job position (0.602), weekly working hours (0.930), and BMI (0.589) with WMSDs prevalence. The 1-year work disturbance and 1-week musculoskeletal difficulties were found to be due to low back-related complaints (35.09%, 33.85%).

Conclusion: It is inferred that high prevalence of WMSDs in physiotherapists may be due to one of various factors including job position, working hours, and BMI but they are not significantly correlated with WMSDs.

Keywords: Musculoskeletal disorders, Occupational Health, Occupational injury, Physical Therapists, Prevalence, Risk factors

Background

Work-related musculoskeletal disorders (WMSDs) have become very common worldwide recently [1]. They can be described as inflammatory and degenerative diseases and disorders that result in pain and functional impairment [2]. According to World Health Organization (WHO), any health problem of the locomotor apparatus including all forms of reversible, light, transitory disorder or irreversible, disabling injuries of the nerves, tendons, muscles, bones, joints, ligaments, spinal disc, cartilage, and blood vessels can be defined as WMSDs [3, 4]. Repetitive demanding working conditions associated with

rapid industrialization and increasing needs of healthcare facilities represent one of the biggest problems causing WMSDs in variety of professions [5]. According to previous studies, physiotherapists typically report a higher incidence of WMSDs and are at high risk of developing long-term disabilities associated with them [6–8].

Physiotherapists in routine training and practice are prone to variety of physical and psychological stressors [9]. Multifactorial mechanisms are reported to be responsible for pain and disorders related to work. They may include but are not limited to numerous risk factors such as repetitive excessive strain on the spine; prolonged awkward static postures (stooping, slouching, ducking); poor positioning; repetitive movements of neck and shoulder flexion/abduction; prolonged application of manual strength; inadequate work breaks; coping

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with patient's anxieties—mental stress; genetic predisposition; physical conditioning; age; time pressure; high demand and poor social support etc. [5, 8–10]. One of the previous studies has reported that the postures attained during work, which requires more than 50% of the body's muscles to contract to hold the body static against the force of gravity, is one of the most significant physical factor [11]. It is also reported that with increase in the age and years of clinical work, the static forces because of such postures can affect much more than dynamic forces and can result in musculoskeletal pain [12].

One of the previous studies conducted by Cromie et al. (2000) reported that the lifetime prevalence of WMSDs was 91%. They also found that 1 in 6 physical therapists moved within by changing specialty practice or setup or left the profession due to WMSDs [13]. In a nationwide study of Indian physiotherapists, Muruganatham et al. (2015) suggested highest prevalence of WMSDs (42.01%) between 22 and 25 years of age where majority of physiotherapists (35.48%) first experienced their WMSDs within 5 years of graduation [14, 15].

Several studies have assessed the prevalence of WMSDs and the effects of specific anatomic site, gender, posture etc. on physiotherapists in India [14–16]. However, the studies related to the exposure assessments and studies exploring the association of WMSDs with various factors were found to be inadequate for determining the effect of those factors. Therefore, this study aimed to investigate the relationship of WMSDs with working hours, job position, and body mass index (BMI) among the qualified physiotherapists having minimum graduate degree from Gujarat State in India. Exploration of work pattern disturbance was done to find out the reporting of disturbed work pattern within 12 months and 7 days due to WMSDs.

Methods

The clinicians and teachers from physiotherapy profession were invited from all over Gujarat State to fill up a Google form circulated through e-mails, social media and personal messages for this internet based online survey which lasted from 8th to 22th November 2020. Three hundred twenty-two responses from total of 351 were considered for analysis due to incomplete or unclear data of the remaining responses.

Subjects who were qualified physiotherapists having at least undergraduate professional degree and worked for at least 6 h per week clinically were included after agreeing to participate by checking in the electronic participation consent. Each subject was required to fill up an assessment form consisting of questions regarding their basic demographic details; professional details such as job/position, experience, weekly working hours, and

health information using standardized Nordic Musculoskeletal Questionnaire (NMQ) and submit it online.

The nature and severity of self-reported musculoskeletal complaints with respect to 9 body areas were assessed using standardized NMQ. It is a symptom questionnaire, designed for all musculoskeletal symptoms and captures occurrences of such symptoms over the past 7 days (weekly prevalence) and over the past 12 months (annual prevalence). The tool was developed to be used as a questionnaire or as a structured interview [17, 18]. Based on the previous studies, the kappa values for 27 variables ranged between 0.57 and 1.00 in the reliability assessment. The kappa value for criterion validity for the agreement between participants' clinical records and questionnaires was found to be 0.76 [19].

Data were collected and analyzed for association between WMSDs and weekly working hours, Job position and BMI. Frequencies of disturbance of work pattern within previous 12 months and 7 days due to WMSDs were analyzed. Basic descriptive analysis and graph generation was done using Microsoft Excel for Windows, whereas chi-square test of association for finding association was done using SPSS 20 for Windows.

Results

Descriptive statistics showed the gender and age group distribution of the sample having more female respondents (79.19%) and more subjects from younger age groups, i.e., 25–30 years (58.07%) and 31–35 years (27.02%). It showed that 141 (43.79%) respondents were full-time working clinical physiotherapists and that approximately half of physiotherapists ($n = 171$, 54.04%) worked 5–6 h daily. Distribution of physiotherapists according to BMI categories reflected that most of the physiotherapists ($n = 157$, 48.76%) were from normal or lean category having BMI between 18.5 and 22.9 kg/m². The mean BMI was calculated to be 24.08 + 4.38 kg/m² among the total study population (Table 1).

The distribution of physiotherapists having WMSDs based upon their job position, weekly working hours, and BMI categories was calculated from the results. It showed that the highest prevalence of WMSDs (i.e., 70.92%) was present in the physiotherapists working as a full-time clinician whereas lowest number of WMSDs was present in the physiotherapists working as part-time clinician (i.e., 63.27%). The highest number of WMSDs (i.e., 81.25%) was present in the physiotherapists working for weekly 37–43 h whereas lowest number of WMSDs was present in the physiotherapists working less than 18 h per week. More than 60% physiotherapists in all the BMI categories reported about WMSDs with the highest number of WMSDs (i.e., 73.44%) present in the physiotherapists from overweight category (Table 2).

Table 1 Descriptive statistics ($n = 322$)

Characteristic		Frequency (n)	Percentage (%)
Gender	Male	67	20.81
	Female	255	79.19
Age (years)	25–30	187	58.07
	31–35	87	27.02
	36–40	26	8.07
	41–45	18	5.59
	> 45	4	1.24
Job position	Post-graduate student	5.91	19
	Full-time clinician	43.79	141
	Academician	35.09	113
	Part-time clinician	15.22	49
Weekly working hours	7–12 h	0.62	2
	13–18 h	5.28	17
	19–24 h	13.35	43
	25–30 h	25.78	83
	31–36 h	28.26	91
	37–42 h	14.91	48
	More than 42 h	11.80	38
BMI categories (kg/m ²)	< 18.5 (underweight)	16.15	52
	18.5–22.9 (normal or lean)	48.76	157
	23.0–24.9 (overweight)	19.88	64
	≥ 25 (obese)	15.22	49

Table 2 Specific characteristic wise prevalence of MSDs ($n = 322$)

Characteristic		Frequency (n)	MSD (n)	MSD (%)
Job position	Post-graduate student	19	13	68.42
	Full-time clinician	141	100	70.92
	Academician	113	72	63.72
	Part-time clinician	49	31	63.27
Weekly working hours	7–12 h	2	0	0
	13–18 h	17	5	29.41
	19–24 h	43	26	60.47
	25–30 h	83	52	62.65
	31–36 h	91	67	73.63
	37–42 h	48	39	81.25
	More than 42 h	38	27	71.05
BMI categories (kg/m ²)	< 18.5 (underweight)	52	36	69.23
	18.5–22.9 (normal or lean)	157	102	64.97
	23.0–24.9 (overweight)	64	47	73.44
	≥ 25 (obese)	49	31	63.27
Total		322	216	67.8

Table 3 shows the values of chi-square test of association for job position, BMI category, and weekly working hours with the prevalence of WMSDs in physiotherapists. The results show that the p values are statistically not significant at $\alpha = 0.05$ levels indicating that no variable is significantly associated with the prevalence of WMSDs.

Fig. 1 indicates frequencies of disturbance of work pattern within previous 12 months and musculoskeletal troubles within previous 7 days due to WMSDs in physiotherapists distributed on the basis of anatomical region being affected.

Discussion

The results of present study reveal that weekly working hours, BMI, and job position of a physiotherapist do not have any significant relation with the disorders of musculoskeletal system.

Globally, numbers of studies have reported that incidences of WMSDs are on rise, despite the development of new and innovative equipment to make clinical practice of physiotherapists easier [10, 20–22]. It is already suggested that cumulative effect of chronic fatigue, discomfort, and pain along with the poor work habits, e.g., poor posture can lead to development of musculoskeletal symptoms [6, 9, 22]. Reducing direct patient-contact hours has been reported to be the most used strategy to overcome the effects of WMSDs by physiotherapists [3, 13, 16]. In addition, as physiotherapists work on an average for 45–60 min with a patient during single session they become more prone to development of WMSDs with increase in working hours [15]. The main finding of present study suggested that the weekly working hours do not correlate with the prevalence of work-related MSDs. Contradicting findings were found in a study from India, where, WMSDs were found to be more prevalent in the younger physiotherapists which was thought to be because of the reason that younger physiotherapists work usually for more hours and work more vigorously [15]. However, Bork et al. (1996) found that the physiotherapists > 50 years of age the higher patient-contact hours per week and still had lower prevalence of WMSDs probably due to survivor bias and experience based learning [3]. Holder et al. (1999) reported highest injury prevalence in PTs and PTAs who worked between 41 and 50 h per week which was similar to the findings of this study [6].

The work setting of a physiotherapist is reported to affect the prevalence and severity of WMSDs [3, 16, 23]. The prevalence of injury at a specific anatomical location was reported to vary with the practice setting where physiotherapists work [6]. Present study reported 72.93% prevalence of WMSDs in full-time clinicians whereas academicians, part-time clinicians, and post-graduate students reported identical prevalence. Bork et al. (1996) said that physical therapists who worked in hospital-based settings had a greater prevalence of work-related musculoskeletal symptoms in the low back than did non-hospital-based therapists which was contradictory to this study [3]. Buddhdev and Kotecha (2012) also reported higher prevalence in clinical practitioners (approximately 55%) as compared to the academicians (10%). All these previous studies are in line with the findings of present study suggesting impact of job position or work setting with WMSDs in physiotherapists. Further exploration of region wise comparison on the basis of work setting can provide understanding about the effect of job position on the anatomical region of the body.

Furthermore, present study revealed higher prevalence of WMSDs in higher BMI category physiotherapists who were overweight. An Indian study by Maheshwari et al. (2015) reported similar findings with majority of physiotherapists in normal or lean category similar to present study [15].

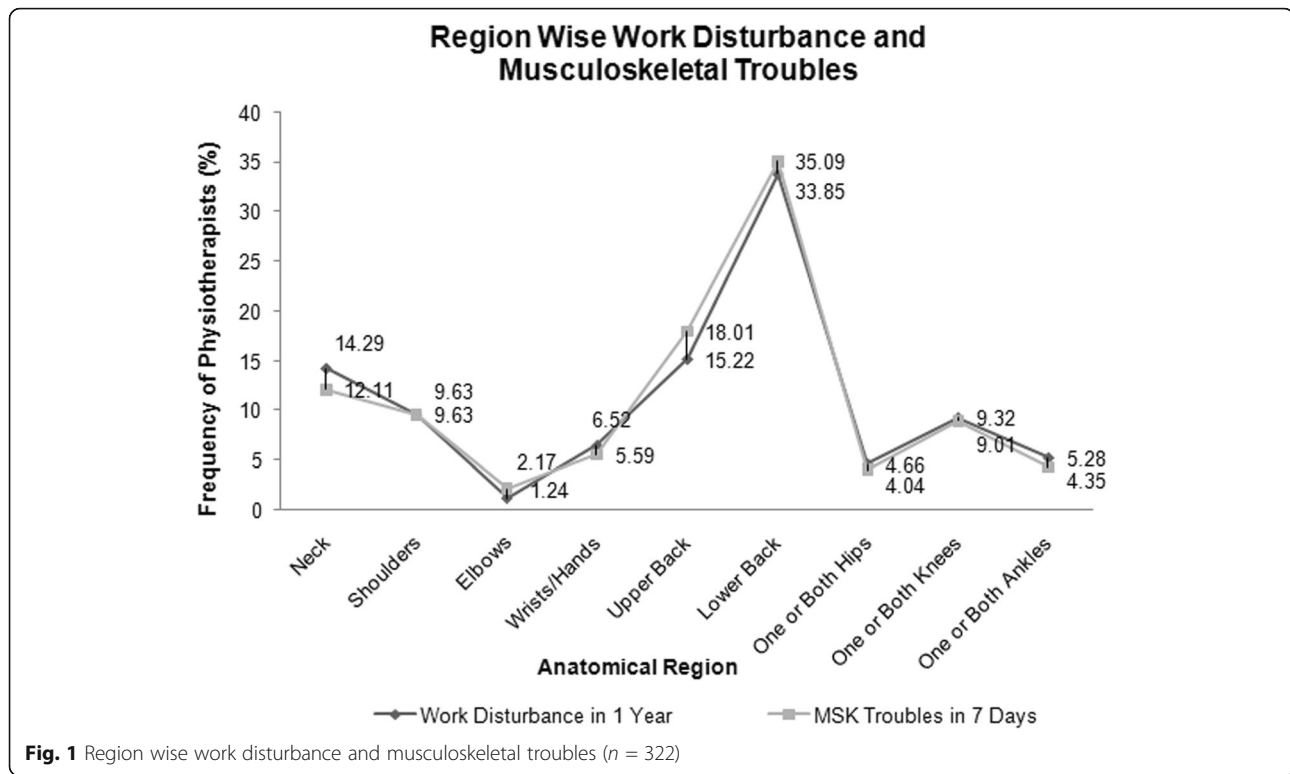
Lower back-related issues were found to be most responsible when region wise impact of WMSDs on 1 year work disturbance pattern (35.09%) and 1 week musculoskeletal issues (33.85%) were analyzed followed by upper back and neck regions. The pattern is similar to the many previous studies which reported lower back, neck, and upper back to be the reason for change of work setting, specialty, or profession for physiotherapists [2, 6, 13, 24].

This study highlights the need to train and practice preventive measures for avoidance of WMSDs during professional practice for physiotherapists. The role of efficient and health ergonomics, healthy work environment, injury prevention, counseling, etc., must be focused to decrease the prevalence of WMSDs and increase the productivity of physiotherapists [25].

The study has its limitations like any other study. The responses of physiotherapists from higher age group were few as the data was collected using online survey

Table 3 Chi-square values for association between the variables ($\alpha = 0.05$)

Variables	Chi-square value	Degree of freedom	P value (2-sided)	Statistical significance
Job position	1.86	3	0.602	Not significant
BMI category	1.62	3	0.589	
Weekly working hours	1.88	6	0.930	



technique, and they may be less familiar with use of such methods. This can be overcome by conducting in-person survey for such physiotherapists using printed survey form. Further, participant memory could have affected their responses as the survey included self-reported measure, and this might have in turn affected results.

Conclusion

Present study shows that there is a no significant relation of job position, weekly working hours, or BMI with prevalence rate of WMSDs. The WMSDs in physiotherapists are mostly affecting lower back and neck and are one of the major reasons for work disturbances and difficulties for physiotherapists.

Abbreviations

WMSDs: Work-related musculoskeletal disorders; MSDs: Musculoskeletal disorders; BMI: Body mass index; WHO: World Health Organization; NMQ: Nordic Musculoskeletal Questionnaire

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Authors' contributions

VR and AD conceptualized and designed the study methodologically as well as collected, analyzed, and interpreted the data, and are equal contributors in writing and revising the manuscript. All authors have read and approved the manuscript.

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Availability of data and materials

Data will be shared on specific request to the author depending upon the nature and purpose of the requirement.

Ethics approval and consent to participate

Ethics approval was received from IEC (Ref. No. EC/SPB/032, dt. 07/11/2020) of SPB Physiotherapy College, Surat. Electronic participation consent was taken for each subject after providing written information about the study at the start of survey.

Consent for publication

Not applicable.

Competing interests

No competing interests.

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