

CLINICAL SCIENCE

Work-related injuries among physiotherapists in public hospitals—a Southeast Asian picture

Nor Azlin M. Nordin, Joseph H. Leonard, Ng Chuen Thye

Physiotherapy Program, Faculty of Health Sciences, Universiti Kebangsaan Malaysia, Jalan Raja Muda Abdul Aziz, Kuala Lumpur, Malaysia, 50300.

OBJECTIVES: A cross-sectional study was conducted to measure the prevalence of work-related injuries among physiotherapists in Malaysia and to explore the influence of factors such as gender, body mass index, years of work experience and clinical placement areas on the occurrence of work-related musculoskeletal disorders.

METHODS: Self-administered questionnaires adapted from the Nordic Musculoskeletal Questionnaire were sent to 105 physiotherapists at three main public hospitals in Kuala Lumpur, Malaysia. The questionnaire had 12 items that covered demographic information, areas of musculoskeletal problems and physiotherapy techniques that could contribute to work-related musculoskeletal disorders. The data obtained were analyzed using the Statistical Package for Social Science version 14 software.

RESULTS: The overall prevalence of work-related injuries during the past 12 months was 71.6%. Female therapists reported a significantly higher prevalence of work-related musculoskeletal disorders than the male therapists (73.0%, $p < 0.001$). Significant differences were observed between the proportion of therapists who had work-related musculoskeletal disorders and those who did not for the group with a body mass index (BMI) > 25 ($\chi^2 = 9.0$, $p = 0.003$) and the group with a BMI of 18–25 ($\chi^2 = 7.8$, $p = 0.006$). Manual therapy (58.6%) and lifting/transfer tasks (41.3%) were the two physiotherapy techniques that most often contributed to work-related musculoskeletal disorders.

CONCLUSION: Work-related injuries are significantly higher among the physiotherapists in Malaysia compared with many other countries. Female therapists reported a higher incidence of work-related musculoskeletal disorders in this study, and work-related musculoskeletal disorders were more common among therapists working in the pediatric specialty. This study contributes to the understanding of work-related disorders among physiotherapists from a southeast Asian perspective where the profession is in its development stage.

KEYWORDS: Occupation; Manpower; Standards; Injuries, Epidemiology.

Nordin NAM, Leonard JH, Thye NC. Work-related injuries among physiotherapists in public hospitals—a Southeast Asian picture. *Clinics*. 2011;66(3):373-378.

Received for publication no September 15, 2010; First review completed on October 5, 2010; Accepted for publication on November 11, 2010

E-mail: leonardjoseph85@hotmail.com

Tel.: 0060196781935

INTRODUCTION

Work-related musculoskeletal disorders (WRMDs) are the most common cause of chronic pain and physical disability that affect contemporary workforces.¹⁻³ In this context, musculoskeletal injuries are considered one of the largest health problems among physiotherapists, because the nature of the work that therapists expose themselves to has a high risk of pain.^{4,5} Although physiotherapists have expert knowledge of musculoskeletal injuries and injury prevention strategies because of their training and continuous professional development, physiotherapists still report a high incidence of work-related injuries during their professional practice.

The nature of the work in a physiotherapy practice is physically demanding, and it involves repetitive tasks, high-force manual techniques for treating patients, techniques that exert direct pressure on certain joints during treatment, awkward positioning of joints during certain maneuvers and prolonged constrained postures.¹⁻³ These physical factors expose physiotherapists to various work-related musculoskeletal injuries.⁶ A paucity of information is available on the extent of this problem among physiotherapists because an enormous amount of research on WRMD among nurses are available.

Past studies have used lifetime prevalence, 12-month prevalence and one-week prevalence in measuring the magnitude of WRMDs among physiotherapists.⁷⁻⁹ Regardless of the time frame for recall, the prevalence of WRMDs has been found to be high, with the lifetime prevalence reported to be 40% to 91%^{10,11} and the 12-month prevalence to be in the range of 58% to 91%.^{2,9} Lower back (48%), neck (33%), upper back (23%) and thumb injuries (23%) are the various injuries that have been reported as work-related injuries in physiotherapists.¹

Copyright © 2011 CLINICS – This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Apart from the nature of the job of therapists, working in certain specific clinical specialties in physiotherapy is also reported to contribute to injuries during work. It has been suggested that musculoskeletal outpatients (31%), neurological rehabilitation (14%) and elderly care (12%) are the three major clinical areas producing serious work-related injuries among therapists.² The therapists who work in general medicine, pediatrics, elderly care, psychiatry and outpatient burns had a 46% greater likelihood of getting work-related injuries during the course of their work.^{11,12} Therefore, the area of practice for the physiotherapists is an important factor for understanding the occurrence of work-related injuries among therapists.

The occurrence of injuries at work differs between junior- and senior-level therapists. Previous studies^{9,13} have cited that the incidence of work injuries is the highest within the first 5 years of practice, and it is common in junior physiotherapists and newly qualified graduates. The occurrence of injuries in junior physiotherapists also correlates with the need for intervention services that are aimed at reducing injury rates among this particular group.¹¹ Some research results have indicated that new physiotherapists are involved in the rotation of clinical postings in various specialties that may also expose them to a higher risk of injuries during their work. The incidence of work-related injuries is also associated with the gender of the therapists because more female therapists report spinal symptoms than male therapists.⁹

Most of the available information on physiotherapy-based work injuries are reported from Western and European countries where manual therapy is widely practiced. Little information exists regarding WRMDs among the physiotherapists in Asian work places, and this study reports the occurrence of such injuries among physiotherapists in the Asian work culture. A difference in the clinical practice among therapists exists in the Asian work place because manual therapy is less commonly practiced among therapists in this region, where electrotherapy and exercises are the most commonly used treatment modalities. However, manual therapy use is increasing among Asian nations, especially in Malaysia, and this may expose the therapists to a high level of risk for work-related injuries. Because the physiotherapists are treating an average of 15 to 20 patients per day for 8 working hours, the risk of work-related injuries may be more significant because of this high workload. Therefore, the main aim of the current study is to establish information on WRMDs experienced by physiotherapists in Malaysia and to explore the influence of factors such as gender, body mass index (BMI), years of work experience and clinical placement areas on the occurrence of WRMDs. The national professional association and the professional governing body can use this information to take adequate measures to minimize the exposure risk to injuries and to develop new injury management strategies.

METHODS

The current work was a cross-sectional study completed among physiotherapists during 2008–2009. Subjects were recruited using the convenience sampling method from the physiotherapy departments of three main public hospitals in Selangor and Kuala Lumpur, Malaysia, because of the relatively high number of physiotherapists working there

and their wide range of clinical specialties. Tuanku Ampuan Rahimah Hospital, which is located in the Selangor state, has 850 beds, 20 clinical disciplines and 20 physiotherapists. Kuala Lumpur Hospital, which is the largest medical facility in Malaysia, has 27 clinical disciplines, 83 wards, 2302 beds and 53 physiotherapists of different grades working in various wards and in outpatient physiotherapy units. The University of Kebangsaan, Malaysia Medical Centre, is a 1050-bed hospital with 32 physiotherapists, and it is an important public hospital in Kuala Lumpur. All physiotherapists who worked at a full-time clinical practice, regardless of age, gender and work experience, were included in this study. Physiotherapists who had musculoskeletal problems prior to the start of work, those who acquired musculoskeletal problems during their career because of other causes, such as motor vehicle injuries, sports injuries and trauma, and those who were in administrative positions without having significant involvement in daily clinical practice were excluded from the study.

A self-administered questionnaire that was adapted from the Nordic Musculoskeletal Questionnaire (NMQ) was used to assess WRMDs. A pilot study using the questionnaire was carried out among six physiotherapists, who responded well to the questionnaire, indicating the clarity of the questions asked. The questionnaires were distributed to the respective physiotherapists through their managers. Subjects were given two weeks to complete the questionnaire, and the completed questionnaires were returned to the respective managers for collection by the researchers. All subjects received an information sheet and signed an informed consent form prior to completing the questionnaire. Ethical approval was granted by the Research and Ethics Committee of the National University of Malaysia and by the Clinical Research Centre of Ministry of Health, Malaysia. The data obtained were analyzed using the Statistical Package for Social Science (SPSS) version 14 software. The analysis was completed using descriptive statistics, and differences in responses between the subgroups of interest were identified using the chi-square test. The alpha level was set at $p < 0.05$.

RESULTS

Out of a total of 105 questionnaires distributed, 81 questionnaires (77%) were returned. Among the respondents who participated in the study, 22.2% ($n = 18$) were males, and the remaining 77.8% ($n = 63$) were females. Furthermore, 48.1% ($n = 39$) were from KLH, 34.6% ($n = 28$) were from UKMMC and 17.3% ($n = 14$) were from TARH. Table 1 shows the demographic characteristics of the respondents.

Table 2 displays the occurrence of WRMDs in general and the occurrence according to the subgroups of gender, BMI, work experience and clinical area of practice. The overall prevalence of WRMDs reported among the therapists during the past 12 months was 71.6% ($n = 58$). The prevalence of WRMDs was 73% ($n = 46$) among female therapists and 66.7% ($n = 12$) among male therapists. The chi-square analysis found significant differences between the proportion of female physiotherapists who reported WRMDs and those who did not report WRMDs ($\chi^2 = 13.3$, $p < 0.001$). Significant differences were found between the proportion of therapists who had WRMDs and those who

Table 1 - Demographic characteristics of the physiotherapists who participated in this study.

		N (%) (Total 81)
Age (yr) (Mean age 31.0 ± 8.6)	21-40	67 (82.7)
	>40	14 (17.3)
Gender	Male	18 (22.2)
	Female	63 (77.8)
BMI (mean 23.2 ± 4.2)	<18	8 (9.9)
	18-25	48 (59.3)
	>25	25 (30.9)
Work experience (yr) (mean 7.9 ± 7.9)	<11	64 (79.0)
	≥11	17 (21.0)
Clinical placement	Neurology	10 (12.3)
	Musculoskeletal	42 (51.9)
	Cardiopulmonary	21 (25.9)
	Pediatric	8 (9.9)
Workplace	KLH	39 (48.1)
	UKMMC	28 (34.6)
	TARH	14 (17.3)

did not have WRMDs for the group with a BMI >25 ($\chi^2=9.0$, $p=0.003$) and the group with a BMI of 18-25 ($\chi^2=7.8$, $p=0.006$). Analysis of WRMDs in terms of the subgroups of clinical placements showed that the incidence of WRMDs was highest among therapists working in pediatric areas (87.5%). The other clinical areas that reported higher rates of WRMDs were cardiopulmonary practice (71.4%), neurology (70%) and musculoskeletal physiotherapy (71.4%).

The body areas that were affected by WRMDs and the physiotherapy techniques identified by the respondents that contributed to work-related injuries are shown in Figures 1 and 2. The lower back was the site of the highest percentage (51.7%) of work-related injuries, followed by the neck (46.5%) and the thoracic spine (44.8%). The elbow (8.6%) and the hand-wrist (12.0%) were rarely affected by injuries. Perceived manual techniques (58.6%) and the lifting or transferring of patients (41.3%) were listed as the two techniques with the largest contribution to work-related injuries in this study.

DISCUSSION

This study found that the prevalence of WRMDs among Malaysian physiotherapists during the past 12 months was 71.6%, which is higher than the previously reported data

from studies in other regions of the world.^{2,14} The higher 12-month prevalence observed in this study can be explained by the conditions under which physiotherapists practice in Malaysia, particularly in public hospitals. Because of the limited number of physiotherapists, most physiotherapy units are understaffed, such that a high clinical workload is unavoidable. Although the Ministry of Health (MOH) of Malaysia has attempted to ensure that all basic hospital equipment is ergonomically appropriate, other factors, such as increased patient-to-therapist ratios, limited therapist-patient contact time and therapists working in all specialties, might contribute to the higher incidence of WRMDs. Furthermore, because therapists were working with more than one patient at a time in some specialty areas, the high clinical work-load challenges the physiotherapists physically and makes them more susceptible to injuries.¹⁵

The prevalence of work-related injuries was significantly higher among female physiotherapists (73%, $\chi^2=13.3$, $p=0.000$). This finding is in agreement with findings from several studies.^{5,7,16} These studies recorded WRMD prevalence among female physiotherapists to be in the range of 73% to 100%. In general, females are physically weaker than males, and this may place them at a disadvantage during patient care tasks, particularly when lifting and transferring patients.⁸ Females are also exposed to pregnancy-related stress, which commonly affects the lower back region. Even though the current study did not include any pregnant therapists, a previous study stated that changes in spinal posture and a weakening of joint structure related to a history of pregnancy increases the risk for WRMDs.⁸ These reasons may explain why the female therapists reported a higher incidence of injuries than their male counterparts.

Physiotherapists with a BMI over 25 reported the highest prevalence of work-related injuries (80%). A significant difference was found between the proportion of physiotherapists who had WRMDs and those who did not have WRMDs in the group of patients with a BMI that was greater than 25 ($\chi^2=9.0$, $p=0.003$). This finding is in contrast with that of a past study⁷ that reported a higher prevalence of WRMDs among physiotherapists with a low BMI. Although a review from a previous study¹³ found a weak association between being overweight and WRMDs, with the exception of carpal tunnel syndrome, a recent work¹⁴ on WRMDs noted that a high BMI was one of the important risk factors for the development of WRMDs. The therapists who are overweight may not be physically active, such that they may be more susceptible to WRMDs.

Table 2 - Distribution of WRMDs by demographic variables and clinical areas.

Variables	WRMD for the past 1 year		χ^2 , p value
	Yes N (%)	No N (%)	
Overall respondents	58 (71.6)	23 (28.4)	15.1, p = 0.000
Gender	Male	12 (66.7)	6 (33.3)
	Female	46 (73.0)	17 (27.0)
BMI	<18	5 (55.6)	4 (44.4)
	18-25	33 (70.2)	14 (29.8)
	>25	20 (80)	5 (20)
Work experience (yr)	< 11	45 (70.3)	19 (29.7)
	11 and >	13 (76.5)	4 (23.5)
Clinical areas	Neurology	7 (70)	3 (30)
	Cardiopulmonary	15 (71.4)	6 (28.6)
	Musculoskeletal	28 (66.7)	14 (33.3)
	Pediatric	7 (87.5)	1 (12.5)

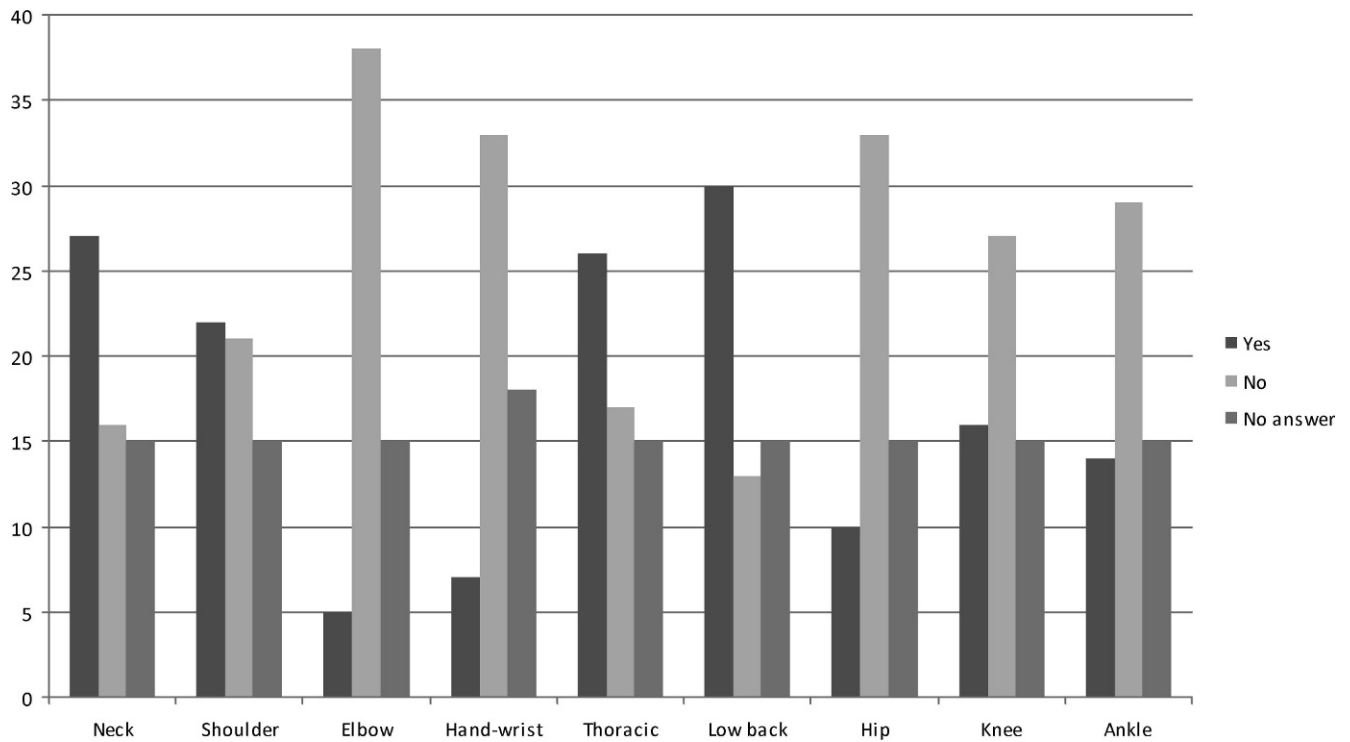


Figure 1 - Body areas affected by WRMDs among the therapists.

Furthermore, WRMDs were more prevalent among pediatric physiotherapists and among those who practiced in musculoskeletal areas. In the pediatric specialty, all except one physiotherapist reported work-related injuries during the past 12 months, and 66.7% of the musculoskeletal

physiotherapists reported WRMDs during the same period. Although the prevalence of injuries among pediatric physiotherapists is underreported in the literature, evidence of a high prevalence of WRMDs among physiotherapists working in the musculoskeletal specialty is well documented.⁸ This

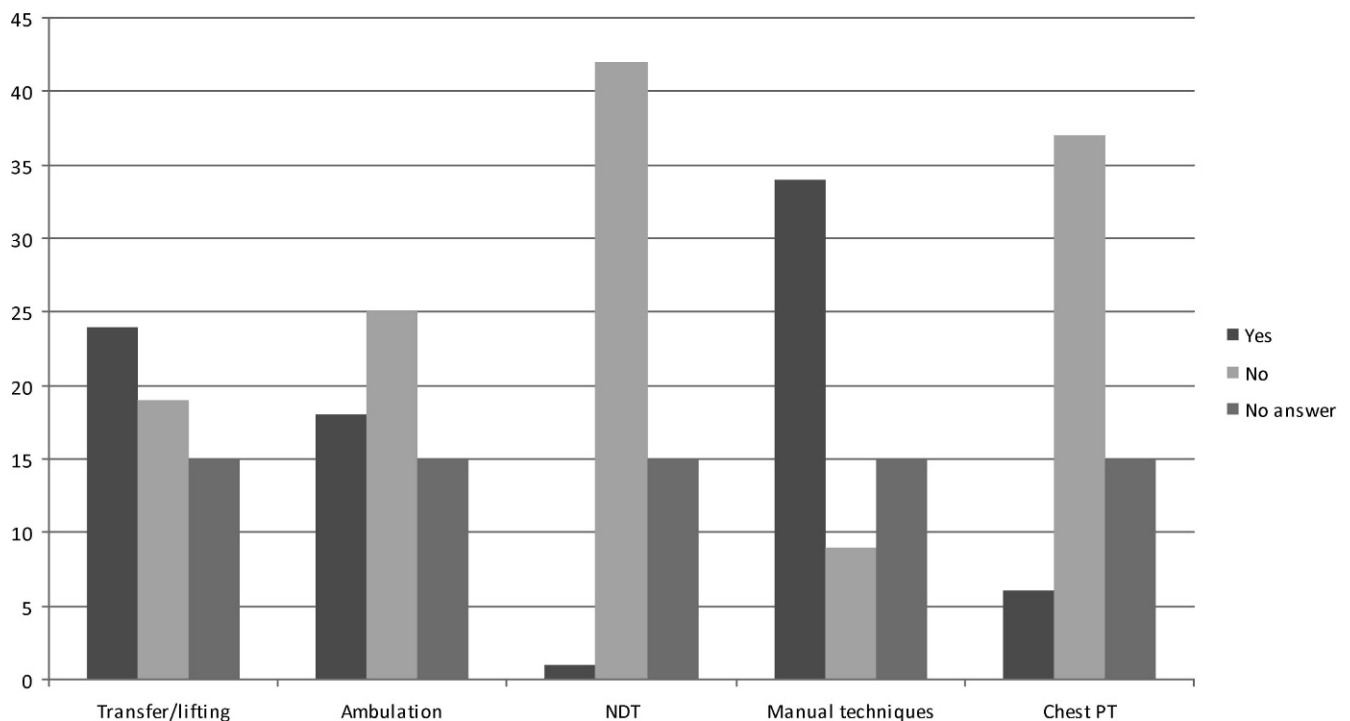


Figure 2 - Physiotherapy techniques that contribute to WRMDs as reported by the therapists.

result may be related to a higher use of manual therapy techniques. Manual therapy has been implicated as a risk factor for WRMD, and physiotherapists who routinely performed manual therapies were 3.5 times more likely to have had musculoskeletal injuries than physical therapists who did not routinely perform manual therapies.⁸

The lower back region was the most common site for WRMDs among physiotherapists (51.7%) in this study, followed by the neck (46.5%) and the thoracic region (44.8%). This result is consistent with findings from previous studies, which found that the prevalence of lower back WRMDs during the past 12 months was between 45% and 69.8%.^{1,8} Injuries to the lower back have been identified as the most prevalent type of WRMD among therapists, followed by injuries of the upper back and neck.⁷ The cause of the high incidence rate of lower back injuries among physiotherapists is directly related with patient-care activities, such as lifting and transferring patients, prolonged standing, frequent twisting and bending.¹⁶

The above claim is supported by our study because the physiotherapists who reported WRMDs were involved in manual therapy techniques (58.6%), such as mobilizations, manipulations and massage, and lifting or transferring activities (41.3%) were the two most likely contributing factors to WRMDs. The findings of this study support those of previous studies,^{7,10,17} which identified lifting patients, transferring patients and performing manual techniques as the top three problematic tasks that put physiotherapists at risk for injuries. It is also interesting to note that the high number of reports suggesting that manual therapy techniques are a contributor to WRMDs do not explain the low percentage of wrist/hand WRMDs recorded in this study. There is a possibility that the results suggesting that manual therapy was a contributor to WRMDs among physiotherapists in this study were based on the stress to the spine due to prolonged standing while performing the task rather than the stress to the hands.

The limitations of this study need to be acknowledged. This study only involved physiotherapists from public hospitals and did not consider physiotherapists who worked in rural centers or private practices. Issues may also be associated with the memory and ability to recall WRMDs over the past 12 months. Despite these limitations, this study has generated baseline data on WRMDs among Malaysian physiotherapists. The high response rate of the received questionnaires from the therapists is a strength of this study because earlier studies only had a response rate that ranged from 53% to 80%.⁷

CONCLUSION

This study concluded that the prevalence of work-related injuries among physiotherapists in Malaysia is as high as those reported in other developed countries. The prevalence of WRMDs is higher among females than males and higher for therapists working in the pediatric specialty. Adequate preventive and appropriate management strategies are recommended to minimize work-related injuries in the physiotherapy practice.

ACKNOWLEDGEMENT

The authors wish to thank all of the physiotherapists from Kuala Lumpur Hospital, Universiti Kebangsaan Malaysia Medical Centre and Tuanku Ampuan Rahimah Hospital for their participation in this study.

Funding: No funding/grant was involved in this study.

Key Findings:

- Most of the previously published works from the Western world and developed countries indicate that work-related musculoskeletal injuries among physiotherapists are very high and that it is a major health concern.
- This may be the first study that addresses the occupational injuries and health concerns of physiotherapists from a southeast Asian perspective.
- Because manual therapy practices among therapists are starting to emerge in Malaysia and a large shortage of physiotherapists exists, this study attempts to expose the occupational health concerns and work-related challenges encountered by the therapists from a developing country such as Malaysia.
- This current study identified that the rate of musculoskeletal injuries encountered by physiotherapists during their practice is far higher than previously reported rates from other parts of the world.

REFERENCES:

1. Glover W. Lifting the Lid on Work-related Ill-health and Musculoskeletal Injury: CSP embarks on large-scale member study. *Physiotherapy*. 2003;89:394-5, doi: 10.1016/S0031-9406(05)60072-7.
2. Glover W, McGregor A, Sullivan C, Hague J. Work-related musculoskeletal disorders affecting members of the Chartered Society of Physiotherapy. *Physiotherapy*. 2005;91:38-147, doi: 10.1016/j.physio.2005.06.001.
3. Kogi K, Kawakami T, Itani T, Batino JM. Low-cost work improvements that can reduce the risk of musculoskeletal disorders. *Int J Ind Ergon*. 2003;31:179-84, doi: 10.1016/S0169-8141(02)00195-6.
4. King P, Huddleston W, Darragh AR. Work-related musculoskeletal injuries and disorders among occupational and physical therapists. *Am J Occup Ther*. 2009;63:351-62.
5. King P, Huddleston W, Darragh AR. Work-related musculoskeletal disorders and injuries: differences among older and younger occupational and physical therapists. *J Occup Rehabil*. 2009;19:274-83, doi: 10.1007/s10926-009-9184-1.
6. Punnett L, Wegman DH. Work-related musculoskeletal disorders: the epidemiologic evidence and the debate. *J Electromyogr Kinesiol*. 2004;14:13-23, doi: 10.1016/j.jelekin.2003.09.015.
7. Adegoke BO, Akodu AK, Oyeyemi AL. Work-related musculoskeletal disorders among Nigerian physiotherapists. *BMC Musculoskelet Disord*. 2008;9:112, doi: 10.1186/1471-2474-9-112.
8. Bork BE, Cook TM, Rosecrance JC, Engelhardt KA, Thomason ME, Wauford IJ et al. Work-related musculoskeletal disorders among physical therapists. *Phys Ther*. 1996;76:827-35.
9. Cromie JE, Robertson VJ, Best MO. Work-related musculoskeletal disorders in physical therapists: prevalence, severity, risks, and responses. *Phys Ther*. 2000;80:336-51.
10. Salik Y, Ozcan A. Work-related musculoskeletal Disorders: A survey of physical therapists in Izmir-Turkey. *BMC Musculoskelet Disord*. 2004;5:27, doi: 10.1186/1471-2474-5-27.
11. West DJ, Gardner D. Occupational injuries of physiotherapists in North and Central Queensland. *Aust J Physiother*. 2001;47:179-86.
12. Glover W. Work-related Strain Injuries in Physiotherapists: Prevalence and prevention of musculoskeletal disorders. *Physiotherapy*. 2002;8:364-72, doi: 10.1016/S0031-9406(05)60749-3.
13. Holder NL, Clark HA, DiBlasio JM, Hughes CL, Scherpf JW, Harding L et al. Cause, prevalence, and response to occupational musculoskeletal injuries reported by physical therapists and physical therapist assistants. *Phys Ther*. 1999;79:642-52.

14. da Costa BR, Vieira ER. Risk factors for work-related musculoskeletal disorders: A systematic review of recent longitudinal studies. *Am J Ind Med.* 2010;53:285-323.
15. Carayon P, Smith MJ, Haims MC. Work organization, job stress, and work-related musculoskeletal disorders. *Hum Factors.* 1999;41:644-63, doi: 10.1518/001872099779656743.
16. Mierzejewski M, Kumar S. Prevalence of low back pain among physical therapists in Edmonton, Canada. *Disabil Rehabil.* 1997;19:309-17, doi: 10.3109/09638289709166544.
17. Souza d'Avila L, Fraga Sousa GA and Sampaio RF. Prevalence of Work-related Musculoskeletal Disorders Among Physiotherapists in the Public Hospital System of Belo Horizonte. *Braz. J Phys Ther.* 2005; 9:219-25.