Title: A descriptive study on work related musculoskeletal disorders (WMDs) among physiotherapy practitioners in Kigali city: prevalence, risk factors and preventive strategies

Authors: Sagahutu JB, PhD[1], Nuhu A, PhD[1]

[1]Department of Physiotherapy, College of Medicine and Health Sciences, University of Rwanda, P.O.BOX: 3286 Kigali-Rwanda, Rwanda.

Corresponding author: Jean Baptiste Sagahutu

Email: jeanbaptigol@gmail.com (Tel: +250788800152)

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Abstract

Background: Work-related Musculoskeletal Disorders (WMDs) represent a significant occupational problem among physiotherapy practitioners worldwide; however, data on this problem are sparse in Rwanda**.**

Objective: To identify the prevalence, risk factors and preventive strategies for WMDs among physiotherapists in Kigali-Rwanda.

Methods: A cross-sectional descriptive quantitative design was used. A self-administered questionnaire was used among 49 physiotherapists. Data were analysed using the descriptive statistics. Ethical clearance was obtained from the IRB of University of Rwanda, College of Medicine and Health Sciences.

Results: The prevalence of WMDs among physiotherapists in Kigali was 77.8%. The lower back was the most affected body part (77.1%). Forty percent experienced WMDs in their first one to five years of experience. Working in the same positions for long periods (40.0%) and treating excessive number of patients per day (31.1%) were the most perceived risk factors. The commonest identified preventive strategies were to avoid sitting or standing for long periods of time 77.8% and adjust plinth or bed height 77.8. Only 31.1% stopped patients' treatment if it caused or aggravated their WMDs.

Conclusion: The prevalence of WMDs among physiotherapists in Kigali was high. Risk factors were identified and various preventive strategies were suggested by physiotherapists themselves.

Key words: Musculoskeletal disorders, Physiotherapy, Risk factors, Preventive strategies

Introduction

Work-related musculoskeletal disorders (WMDs) represent a wide range of disorders, which can differ in severity from mild periodic symptoms to severe chronic and debilitating conditions. Examples include, shoulder pain, carpal tunnel syndrome, tension neck syndrome, and low back pain (Piedrahita, 2006). Many studies regarding the incidence of WMDs indicate that Physiotherapy is a profession that is more exposed to WMDs (Cromie, Robertson, & Best, 2003; Glover, McGregor, Sullivan, & Hague, 2005; Passier & McPhail, 2011; West & Gardner, 2001). Studies among physiotherapists (PTs) have revealed as many as 91% experience WMDs during their career (Cromie, Robertson, & Best, 2000), with recurrence rates of up to 88 % (West & Gardner, 2001). It has also been reported that 80% of PTs experience symptoms in at least one body area over a 12 month period (Cromie et al., 2003). One in six PTs reportedly changed area of specialty or left the profession as a result of pain or injury (Passier & McPhail, 2011).

The physically demanding nature of work tasks and clinical demands are believed to contribute to high incidence of WMDs among PTs (Glover et al., 2005). Elements of physiotherapy practice which have been suggested as risk factors include treatments which demand repetitive movements or continuous bending, lifting/ transferring dependent patients, responding to unanticipated or sudden movements by patients, performing manual therapy, restricted work place, and understaffing (Rugelj, 2003).

It has been reported that repetitive movement, awkward postures, and high force levels are the three primary risk factors that have been associated with WMDs (Tinubu, Mbada, Oyeyemi, & Fabunmi, 2010). The authors further found that other perceived risk factors include: perform activities that require lifting heavy loads, lifting patients, working in awkward postures, and transferring patients out of bed and from the floor.

These tasks put PTs at high risk for acute and cumulative WMDs and exposes them to many of the occupational risk factors leading to work-related musculoskeletal problems, especially in the lower back (Rugelj, 2003).

In a similar study carried out in Australia, West and Gardner (2001) found that many of the injured PTs changed their duties (41%) or their work setting (39%), reduced patient contact hours (31%) or changed the type of patient treated (29%). Few had left the profession (3%) or retired early (1%).

WMDs among PTs may be age-related and also associated with professional years of experience (Salik & Ozcan, 2004). It was also found that most PTs first developed symptoms before the age of 30 years and that majority of these initial episodes occurred within five years practicing physiotherapy. It was also suggested that PTs aged more than 50 years had the lowest prevalence of WMDs. However, Salik and Ozcan (2004); Adegoke, Akodu and Oyeyemi, (2008) suggested that this should be reviewed with caution to identify the reasons. Most studies showed that women have a high prevalence of WMDs than men (Glover et al., 2005; Salik & Ozcan, 2004). This may be attributed to their height and body weight which put them at a disadvantage during patients' treatment and/or transfer (Bork et al., 1996).

It has been opined that the cultural values of PTs may make it difficult for practitioners to avoid the risk of WMDs during their work since these cultural values are generic and unique to Physiotherapy (Cromie, Robertson, & Best, 2002). Even if PTs are at high risk to WMDs, they did not appear to seek treatment, take time off from work, or seek evaluation in response to WMDs (Passier & McPhail, 2011). Cultural factors may be responsible, in part, for this behaviour (Cromie et al., 2003; Cromie et al., 2002) as there is evidence that PTs prefer to treat themselves or seek informal treatment from colleagues (Glover et al., 2005).

WMDs have a significant cost burden on health care systems. This cost is evaluated in two ways: human and social cost for the workers and their families, and financial cost for the employers and for the society as a whole (Piedrahita, 2006). Worldwide, 1.3 million people suffered from work-related illnesses, among them 572,000 reported suffering from WMDs (Health and Safety Executive (HSE), 2010).The prevalence of WMDs among PTs is high, especially in low income countries where there is no or little access to ergonomically well-designed materials (Cromie et al., 2000).

Ergonomics should be a priority in the work place, so WMDs are prevented instead of being treated; use of aids and self-protective strategies such as modification of technique or the environment (OHCOW, 2003). Seven strategies reported in previous multidimensional interventions to reduce WMDs associated with patient handling include: equipment provision/purchase, education and training, risk assessment, review and change of policies and procedures, change or introduction of patient assessment system, work environment redesign, and work organization/practice change (Passier & McPhail 2011).

Physiotherapy education, in Rwanda, started in 1996. Based on numbers obtained from the Association of Rwandan Physiotherapy, the current number of PTs is estimated at 346 in the whole country, most of whom are concentrated in City of Kigali. Physiotherapy professionals in Rwanda as one of the low-income countries might experience WMDs. However, there is no published study that collected and reviewed the data on WMDs among PTs in Rwanda. The researchers were motivated by the fact that they had seen many PTs complaining of back, neck, and shoulder pain in and after working hours from different hospitals.

Identification of the prevalence and risk factors of WMSD as well as the preventive strategies used by PTs in Kigali or believe could be used in the future would be of great importance.

Methods

A cross-sectional, descriptive, quantitative study design was used in this study. This study was conducted in Kigali, the capital city of Rwanda. All hospitals and rehabilitation centers located in Kigali, including private clinics whose PTs had at least one year of experience were eligible recruitment sites. Participants were recruited from three referral hospitals (Rwanda Military Hospital (RMH), Centre Hospitalier Universitaire de Kigali (CHUK), King Faysal Hospital (KFH)), two districts hospitals (Muhima and Kibagabaga hospitals), one neuropsychiatric hospital (Caraes Ndera), two rehabilitation centers (Gikondo and Home de la Vierges des Pauvres (HVP) Gatagara, and six private physiotherapy clinics (Polyclinique la Medicale, Harmony clinic, Metarelax clinic, Biomedical Center, College of Medicine physiotherapy clinic and Horaho life clinic). The total number of PTs working in these settings was 52. Forty-nine (49) who met the inclusion criteria participated in the study. The inclusion criteria were PTs (male and female) who had at least one year of working experience. Eighty percent of PTs experience symptoms of WMDs in at least one body area over a 12 month period (Cromie et al. 2000). PTs who had musculoskeletal disorders before starting physiotherapy practice or related to accident and other known causes were excluded.

A validated self-administered questionnaire from similar study (Adegoke, Akodu, & Oyeyemi, 2008) was used in this study. The questionnaire comprised of two sections. Section A included the demographic characteristics of the participants. Section B was made by WMFDs, risk factors, and coping strategies. English questionnaire was used because all PTs understood and were trained in English Language. Ethical clearance to

conduct this study has been obtained from the College of Medicine and Health Sciences Institutional Review Board and further permission was obtained from the department of clinical research in different concerned settings mentioned above. Participant information sheet was provided to all participants. A signed informed consent was requested from each participant to show voluntariness and comprehension. Participation in the study was voluntary, and the participants were free to withdraw from the study at any time. Respect, confidentiality and anonymity were ensured. The potential beneficence and expected risk of the study have been well explained to physiotherapists. No physical, psychological, social, legal and economic risk was expected during this study.

Data Analysis

Most of the data were ordinal or nominal in nature. Therefore, the coding was necessary to enter them into the SPSS version 21 computer programs. Data were analysed using the descriptive statistics such as frequency, mean, standard deviation and percentages. Fisher's Exact Test was used to assess the association between body parts affected and demographic characteristics as well as workload variables.

Results

Demographic characteristics of the participants

Forty-nine questionnaires were distributed but only 45 (91.8%) were returned. The 45 respondents comprised 15 (33.3%) females and 30 (66.7%) males with a mean age of 30.89 ±5.7 years. Among the 45 participants, 42 (93.3%) were working full time. Most of them (60%; n=27) were working in hospitals.

Prevalence of Work-related Musculoskeletal Disorders and affected body parts

Thirty-five PTs (77.8%) reported experiencing work-related musculoskeletal disorders during the 12 months period prior to the study. This prevalence is dominated by males (65.7%; n=23). The low back was the most common body site affected by the disorders

(77.1%; n=27) followed by upper back (57.1%; n=20) while the elbow (5.7%; n=2) and the hip joints (5.7%; n=2) are the least affected body parts. The ankle joint was not affected as shown in figure 1.

Figure 1: ***Distribution of WMDs in different body parts***

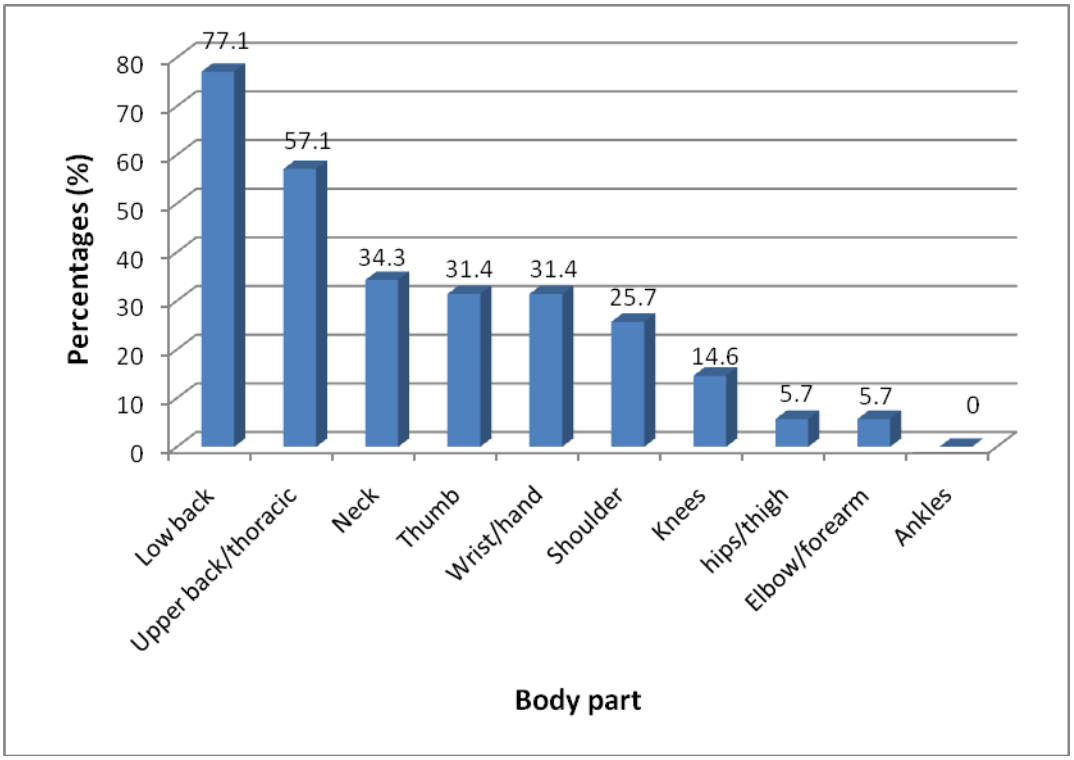

Table 1 shows the distribution of WMDs in the 35 PTs according to gender, experience and workload. The upper back/ thoracic region (60.8%; n=14) was the most common in males while low back (83.3%, n=10) was common in females. There was no statistically significant gender difference and body part affected. Similarly, there was no association between working experience and body parts affected (Table 1), although neck nearly reached significance for gender (p=0.059) while hip/thighs was significant (p=0.045) for experience.

Table 1: Percentage distribution of WMDs in the 35 PTs according to gender, experience

Body parts	Gender		Statistics	Experience		Statistics
	Female (n=12)	Male (n=23)	p-value	1-5 years (n=18)	> 5 years (n=17)	p-value
Neck	58.3	21.7	0.059	38.9	35.7	1.000
Shoulder	25.0	26.1	1.000	27.8	21.4	1.000
Upper back/ thoracic	50.0	60.8	0.721	61.1	50	0.738
Elbow/ forearm	8.3	4.3	1.000	11.1	0	0.486
Low back	83.3	73.9	0.685	66.7	92.8	0.088
Wrist/hand	33.3	30.4	1.000	38.9	14.3	0.121
Thumb	33.3	30.4	1.000	38.9	21.4	0.471
Hips/thighs	8.3	4.3	1.000	0	14.3	0.045
Knees	16.6	13.0	1.000	11.1	21.4	0.402

There was no association between the workload in terms of time and number of patients treated per day with the affected body parts (Table 2).

Table 2: Percentage distribution of WMDs in the 35 PTs according to workload

Body parts	Daily workload (time)		Statistics	Daily workload (patients)		Statistics
	1-8 hours (n=22)	> 8hours (n=13)	p-value	1-7 pts (n=19)	> 7pts (n=16)	p-value
Neck	40.9	22.2	0.478	44	11.1	0.071
Shoulder	31.8	11.1	0.337	28	22.2	1.000
Upper back/ thoracic	50	44.4	1.000	52	66.7	0.491
Elbow/ forearm	4.5	11.1	0.371	8	0	0.489
Low back	72.7	77.7	0.337	72	88.9	0.415
Wrist/hand	36.4	22.2	0.648	36	22.2	0.493
Thumb	40.9	11.1	0.337	32	22.2	0.723
Hips/thighs	4.5	0	0.279	4	0	1.000
Knees	18.2	0	0.134	20	0	0.109

Risk factors associated with work-related musculoskeletal disorders

The respondents were asked to consider 17 risk factors and indicate the extent to which each contributes to the occurrence of WMDs. A scale ranging from 0 (indicating no problem) to 10 (indicating major problem) was used to ascertain which job risk factor is important for the occurrence of WMDs. For each risk factor the responses were categorized as “no problem” (0 and 1), “minimal problem” (2 to 4), “moderate problem” (5 to 7) and “major problem” (8 to 10). The results were obtained by expressing major problem responses. The three most important risk factors identified by the physiotherapy

practitioners were working in the same positions for long periods (40.0%; n=18), treating excessive number of patients in one day (31.1%; n=14) and lifting or transferring dependent patients (31.1%; n=14). The details are presented in the following table 3.

Table3: Risk factors considered as major problems for the development of WMDs (8 - 10)

Risk factors	**n (%)**
Working in the same positions for long periods (Standing, bend over, sitting, kneeling, forwarding on treatment bed)	18(40.0)
Treating an excessive number of patients in a day	14(31.1)
Lifting or transferring dependent patients (who need full assistance)	14(31.1)
Working in awkward and cramped positions	13(28.9)
Bending or twisting your back in an awkward way	13(28.9)
Continuing to work while injured or hurt	12(26.7)
Working near or at your physical limits (using excessive force when treating patients)	9(20.0)
Not enough rest breaks or pauses during the workday	9(20.0)
Performing manual orthopedic techniques (Joint mobilizations, soft tissue mobilization)	8(17.8)
Working with confused or agitated patients who require more muscular demands	7(15.6)
Inadequate training on work related injury prevention	7(15.6)
Carrying, lifting, or moving heavy materials or equipment (e.g., continuous passive motion machines)	6(13.3)
Assisting patients during gait training activities	5(11.0)
performing the same tasks over and over	5(11.0)
Work scheduling (Overtime, irregular shifts, Length of workday)	4(8.9)
Reaching or working away from your body (reaching objects in awkward positions)	4(8.9)
Unanticipated sudden movement or fall by patient	3(6.7)

Coping strategies to reduce the rate of work-related musculoskeletal disorders

The coping strategies adopted by physiotherapists in Kigali are shown in Table 4. The three most common coping strategies were avoiding sitting or standing for long periods of time (77.8%, n=35), adjust plinth/ bed height (77.8%; n=35) and selecting techniques/ procedures that will not aggravate their discomfort (75.6%; n=34).

Note that a participant could tick more than one coping strategy that uses or thinks can be used to reduce WMDs, which explains why “n” may exceed the total number of participants.

Table 4: Coping strategies adopted by physiotherapists

Coping strategies	n(%)
Avoid sitting or standing for long periods of time (pause regularly so I can stretch and change posture).	35(77.8)
Adjust plinth/bed height so I can stretch and change posture	35(77.8)
Select techniques/procedures that will not aggravate my discomfort	34(75.6)
Modify patient's position/ my position	32(71.1)
Have enough staff to help me handling dependent heavy patients	26(57.8)
Have training on ergonomics and how to prevent occupational hazards	26(57.8)
Use mechanical lift equipment when lifting dependent patients (lifting belt, splints).	26(57.8)
Modify my Physiotherapy procedure in order to avoid stressing an injury	25(55.6)
Use a different part of my body in administering my Physiotherapy procedure	20(44.4)
Seek treatment from my colleagues or other health professionals.	18(40.0)
Stop a treatment if it causes or aggravate my discomfort	14(31.1)
warm up and stretch before performing my Physiotherapy duties	13(28.9)

Discussion

Prevalence of WMDs and the affected parts of the body

Prevalence of WMDs in last 12 months which last more than 3 days among PTs in Kigali was found to be 77.8%. This prevalence is lower than the 12 months prevalence of 91.3% reported in a similar study done in Nigeria (Adegoke et al., 2008). This may be due to the higher sample size (n=126) in Nigeria than Kigali. The Nigerian study was also done across the country rather than in a specific region as was done in this study.

Manual therapy techniques are widely or commonly practiced in Nigeria, this could as well be another possible explanation for the high prevalence of WMDs in Nigeria than Kigali. Previous researches have linked manual therapy, which involves considerable standing and/ or sitting for long periods to WMDs among PTs (Cromie et al., 2000; Rugelj, 2003). However, our prevalence rate (77.8%) is higher than the prevalence of 58% reported by Glover et al. (2005), 40% by West and Gardner (2001) and 62.5% by Cromie et al. (2000), which also used different methodologies.

In this study, the low back was reported as the most common site of WMDs among physiotherapists in Kigali, with a prevalence of 71.7% followed by upper back (57.1%)

and neck (34.3%). These finding are consistent with those of previous studies that have overwhelmingly implicated low back as the body part most commonly affected by WMDs among PTs (Glover et al., 2005; Salik & Ozcan, 2004; West & Gardner, 2001). Our finding may be a further reflection of the overall picture of the poor conditions of practice that may cause high prevalence of WMDs among PTs.

Bio-demographic characteristics of the participants and WMDs

The results of the present study show that there were more male (66.6%) than female (33.4%) participants. This male domination shows the image of the population from which the sample was drawn. However, there is no published database available explaining this disparity in gender among PTs in Kigali. WMD was slightly more prevalent in females (80%) than males (76.6) in this study. This difference is similar to the findings from studies conducted previously (Glover et al., 2005; Salik & Ozcan, 2004). (Adegoke et al., 2008) suggested the causes to be both lower height and much weight of the females that put them on higher risk of getting WMSDs during patients' treatment and/ or transfer. Females are also exposed to pregnancy-related stress, which commonly affects the lower back region (Nordin, Leonard, & Thye, 2011).

Females are more affected by low back pain (83.3%) and neck pain (58.3%) while upper back/ thoracic pain (60.8%) and shoulder pain (26.1%) are common in males. Our findings are consistent with previous related study (Glover et al., 2005) for low back pain, neck pain and wrist/ hand to be common in females; however, they also reported shoulder pain to be most prevalent in females.

The results of this study show that the mean age of the participants was 30.8 years, which shows the relatively young age of Physiotherapists in Kigali. The prevalence of WMDs is higher (80.9%) among physiotherapists below 30 years. These findings are higher compared to those of Glover et al. (2005) in the United Kingdom (59%) and Adegoke et

al. (2008) in Nigeria (61.7%) who also reported a higher prevalence of WRMDs among physiotherapists younger than 30 years. The possible explanation for the current results is that younger physiotherapists may be associated with lack of professional experience, and the lower knowledge and skill levels people tend to have in the early years of this career as also reported by Salik and Ozcan (2004).

Our study shows that there is a high prevalence (80%) of WMDs among PTs with BMI over 24.9. This result is similar to previous related study (80%) in Southeast Asian (Nordin et al., 2011). A high BMI was one of the important risk factors for the development of WRMDs. As cited by Costa, Vieira, da Costa and Vieira (2010), PTs who are overweight are not physically active thus they may be more susceptible to WRMDs.

Risk factors of WMDs

The risk factors commonly identified by PTs in this study as contributing to the occurrence of the WRMDs in decreasing order of importance were: working in the same position for prolonged period of time, treating an excessive number of patients in one day, lifting or transferring dependent patients, working in awkward and cramped positions and bending or twisting the back in awkward way. Previous studies similarly identified treating large number of patients in a day and working in the same position for long periods of time, lifting or transferring dependent patients (Cromie et al., 2000; West & Gardner, 2001). The highest number of PTs work in hospital settings where they treat a very large number of patients.

In this study, PTs selected unanticipated sudden movement or fall by patients, reaching or working away from the body and work scheduling (overtime, irregular shift and length of work day) as the least important work factors to the occurrence of their WRMDs. This perceived risk factors identified in our study are not specific to individual musculoskeletal disorder but rather relate various musculoskeletal disorders which is one of the study

limitations. However, other similar studies found that mobilization and manipulation contribute to the occurrence of upper limb, neck, and upper back pain (Cromie et al., 2000); while performing the same task over and over (Glover et al., 2005), and lifting and transferring dependent patients (West & Gardner, 2001) were reported to be related to the occurrence of low back symptoms. In this study, PTs' self-reported the perceived risk factors, which might reflect their belief rather than actual contributions of the work-related factors to their disorders.

Coping strategies towards reducing the risk for development of work related musculoskeletal disorders

The results of this study show that the most common selected coping strategies among PTs in Kigali were avoiding sitting or standing for long periods of time (77.8%), adjust plinth/ bed height (77.8%) and selecting techniques/ procedures that will not aggravate their discomfort (75.6%). These findings are much similar to the related studies done in Nigeria (Adegoke et al., 2008). However, in this study avoiding sitting or standing for long periods of time was among the first most adopted coping strategies. Other PTs preferred to have sufficient staff to help them handling dependent heavy patients, have training on ergonomics and how to prevent occupational hazards. They have further reported to use mechanical lift equipment when lifting dependent patients, modify the physiotherapy procedure in order to avoid stressing an injury, use a different part of the body in administering treatment, and seek treatment from colleagues or other health professionals. These results implicate the need of training among PTs on prevention of WMDs, enough PTs to help each other in their daily clinical duties, the adjustable materials in their working settings.

Limitations of the study

The results of this study are based on self-reported information from the participants, which could have been exaggerated the response to some of the questions. Participants were asked to report on the musculoskeletal disorders that happened in the last 12 months that could have been affected by inability to recall of the information. The in-depth information could not be collected in this study because it used a quantitative method which constituted the limitations of this study. A comparison of the results with the other health professionals would therefore have been very useful. The results of this study can't reflect the general health at the national level because it was the first study done among the studied population and with quite limited sample size.

Conclusion and recommendations

Work-related Musculoskeletal Disorders (WMDs) are prevalent in PTs in Kigali city. Low back and upper back are the most affected parts of the body. The most reported risk factors were working in the same position for long, treating an excessive number of patients in one day, lifting or transferring dependent patients, working in awkward and cramped positions and bending or twisting the back in awkward way respectively; particularly, increase the risk for WMDs. Various preventive strategies have been suggested by PTs themselves and should be considered in efforts at addressing the scourge of WMD.

Ergonomics could be the overall measure to prevent WMDs and physiotherapists are encouraged to address ergonomically adjustable equipment to help minimize stressors such as to emphasize and teach the use of proper lifting techniques using good body mechanics.

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Conflict of interest: None

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