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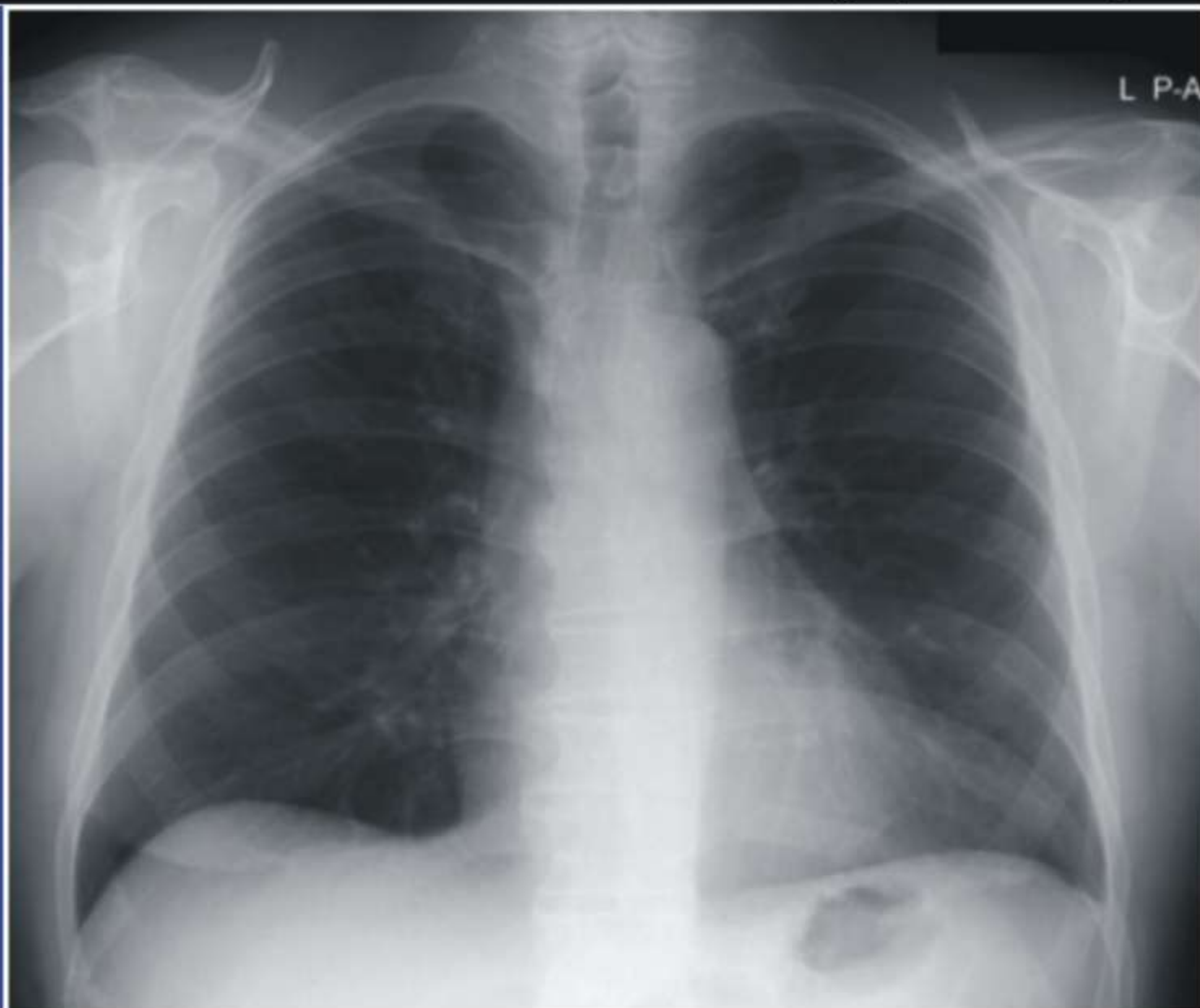
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Work-Related Musculoskeletal Disorders: Prevalence Among Clinical Radiographers in Teaching Hospitals in North-Western Nigeria

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ABSTRACT

Background: The components and activities within the scope of radiography practice pose high risks of work-related musculoskeletal disorders (WRMSDs) to radiographers in the course of performing diagnostic and therapeutic procedures.

Objectives: To determine the prevalence of WMSDs and identify the possible causes among radiographers within the study locality.

Methods: A validated self-administered questionnaire was distributed to all registered and licensed radiographers working in teaching hospitals within the region. The questionnaire contained 21 questions, divided into 3 sections; “A” captured demographic data; “B” captured educational qualifications and work experience; and “C” captured the prevalence, possible causes and responses to WRMSDs.

Results: The respondents were basically within the age range of 21 – 30 years (66.6%), with most of them being male. Most radiographers had clinical working experience between 1 to 10 years, and worked between 6-8 hours and above daily, with a case load of 30 patients and above. The reported case of WRMSD was 93.3%. The major identified causes of WRMSDs were maintaining of prolonged static position (20%), and frequent bending and twisting (16.7%). This study showed no statistically significant correlation between gender and WRMSDs.

Conclusion: There was remarkable evidence of WRMSDs among the practicing clinical radiographers within the North-Western Nigeria.

Keywords: Muscle Strain, Lower back, Injury, Workload, musculoskeletal disorder

Introduction

Work-related musculoskeletal disorders (WRMSDs) are the most common cause of discomfort, work-related and physical disability among workers in most sectors all over the world [1]. Musculoskeletal disorders are injuries to the human support system that can occur after a single event or cumulative trauma which negatively affect the activities of the worker. Musculoskeletal disorders affect the muscles, joints, tendons, ligaments or nerves of the body [2].

WRMSDs can range from pain in the upper limbs, to the postural muscles and down to the lower extremities [3]. Most WRMSDs develop over time as a result of cumulative stress or trauma to the body which is caused either by the work routine or by the employees' working environment [3]. Ironically, healthcare workers are responsible for providing health services but are at highest risk of WRMSDs which affect their health [4].

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Radiographers as part of the healthcare team, are at high risk of WRMSDs considering the nature of their activities which are associated with repetitive movement, static postures, muscular activation pattern and also the use of physical force to lift, push, pull or move equipment and patients [2, 5, 6]. WRMSDs cause severe pains and discomfort that affect the attitude of radiographers towards work and also their output [6].

There has been considerable research reporting musculoskeletal disorders among other health care professions like nursing, physiotherapy, and dental workers. However, very little is known about WRMSDs among radiographers [7], especially within the region of study. Despite the fact that the North-Western region is the most populated of the three regions in Northern Nigeria and with major tertiary health facilities within the region serving as referral centers in the North, the number of radiographers employed within the region are scanty.

Comparing the area of this study to other regions in the world and also Nigeria (like the South-Eastern and South-Western regions of Nigeria), there is limited number of radiographers with less number of high ranking and specialized radiographers. Thus, the objective of this study is to determine the prevalence and identify the possible causes of work-related WMSDs among radiographers working in the tertiary institutions within the North-Western region of Nigeria.

Materials and methods

This study adopted a cross-sectional survey. Validated self-administered questionnaire was distributed to all registered and licensed radiographers working in teaching hospitals within the region with at least a year's experience of continuous clinical practice. There were sixty five (65) radiographers in North-Western Nigeria with fifty (54) of them being males and eleven (11) females as at the time of study. Only 30 (46%) radiographers however, participated in the survey.

Intern radiographers were excluded, so also were those in private centres due to difficulty in chasing them around. The teaching hospitals had both the highest number of radiographers and patient throughout.

The questionnaire was designed to elicit quantitative and qualitative information. It contained 21 questions, which were divided into 3 sections; section "A" captured demographic data such as sex, age, height, weight and marital status. Section "B" took care of educational qualification and work experience such as academic qualification, professional rank, years of experience, place of work and workload per day. Section "C" captured the prevalence and possible causes of work-related musculoskeletal disorder.

The questionnaire was validated by three professional academic researchers from the department of radiology and also the department of medical radiography, Bayero University Kano, Nigeria as well as a statistician from Abubakar Tafawa Balewa University Teaching Hospital, Bauchi.

A pilot study was conducted among some radiographers in University of Maiduguri Teaching Hospital, Borno State, North-Eastern Nigeria and its reliability computed using Cronbach alpha which gave a coefficient of 0.89 (which indicates a good level of consistency and reliability). The questionnaires were handed over to respondents by the researchers and given a period of 3 weeks to fill and return. Data generated were analyzed using SPSS 20.0

Results

This study received a 100% response rate. Majority of the respondents were males (83.3%), with mean age of the respondents being 30.5 ± 6.53 years. Age group 21-30 years had the highest frequency (66.6%). Majority of the respondents (80%) had bachelor's degree in radiography. Clinical working experience ranged from 1 to 10years.

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Most of the respondents (66.7%) work between 5-8 hours daily with a daily case load of 30 patients and above. These are summarized in table 1.

The reported case of WRMSD was 93.3%. A total of 16.7% reported to have experienced multiple occurrence of WRMSD. Lower back was the most affected anatomy reported (36.6%). The knee, hip and ankle/foot were the least affected body (3.3% each). The reported musculoskeletal injuries were muscle strain (33.3%), tendinitis (20%), degeneration (16.7%), vertebral disc problem (10%), ligaments sprain (6.7%), dislocation (3.3%) and neuropathy (3.3%). These are shown in Figures I and II.

The reported activities that could cause the occurrence and reoccurrence of WRMSD were; maintaining prolong static position (20%), frequent bending and twisting (16.7%),

Lifting/moving of patients (16.7%), repetitive/continuous movement (16.7%) and frequent lifting/manipulation of equipment (13.3%) as shown in Table 2.

Table 3 summarizes the respondent's reported changes in working habits which were; stop work when it hurts (6.7%), taking longer break to rest during work (13.3%), reduced working hours (23.3%), avoiding lifting and twisting (33.3%), and taking sick leave for medication and treatment (16.7%).

The reported strategies employed by the respondents to treat WRMSD were; taking adequate rest (26.7%), exercising (20%), medication (20%), visiting a physician/physiotherapist (16.6%), and change in work habits (10%) as shown in Table 4.

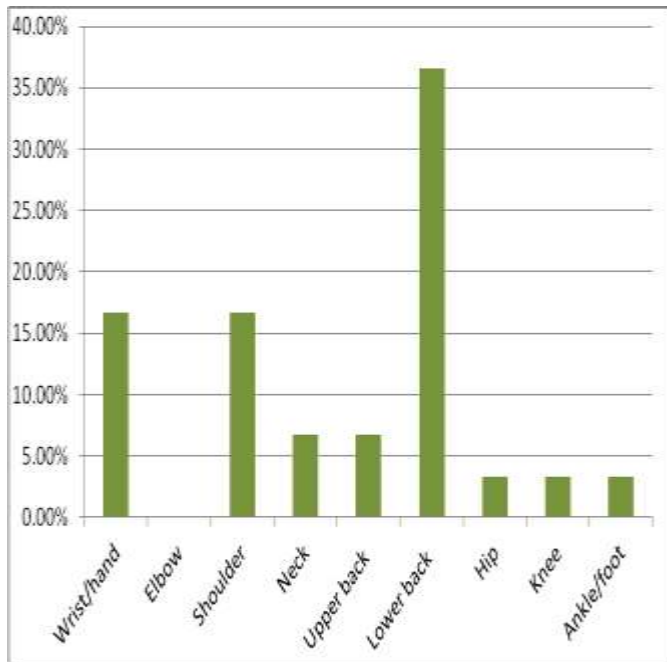


Fig 1: Respondent's body part affected.

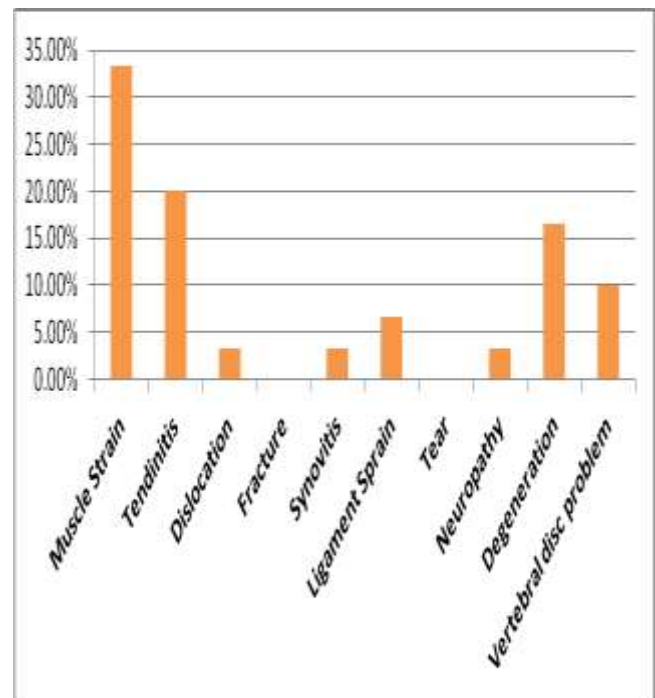


Fig 2: Type of injuries reported.

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Table 1: Demographic characteristics of respondents

Parameter	Category	Frequency (%)
Gender	Male	25 (83.3)
	Female	5 (16.7)
Age (years)	21-30	20 (66.6)
	31-40	2 (6.7)
	≥41	8 (26.7)
Marital status	Single	14 (46.7)
	Married	16 (53.3)
Educational qualification	Diploma	2 (6.7)
	Bachelors	24 (80)
	Masters	4 (13.3)
	Doctorate	-
Professional rank	Radiographer (Rad)	18 (60)
	Senior Rad	4 (13.3)
	Principal Rad	2 (6.7)

Chief Rad	3 (10)	
Asst. Director	2 (6.7)	
Deputy Director	Nil	
Director	1 (3.3)	
Place of Practice	AKTH	13 (43.3)
	ABUTH	10 (33.3)
	UDUTH	7 (23.3)
Years of Experience	1-10yrs	23 (76.7)
	10-20yrs	4 (13.3)
	Above 20yrs	3 (10)
Work hours/day	3-5	2 (6.7)
	6-8	20 (66.7)
	> 8	8 (26.6)
Daily case load	1-15	2 (6.7)
	15-30	8 (26.6)
	> 30	20 (66.7)

Table 2: Tasks which may cause WRMSDs

Activity	% Response
Frequent Lifting/manipulation of equipment	13.3%
Repetitive/Continuous movement	16.7%
Prolong Static position	20.0%
Frequent Bending and Twisting	16.7%
Lifting/moving patients	16.7%
Poor working condition/equipment design	10.0%

Table 3: Effect of WRMSDs on work habit and service delivery

Effects	% response
Stop working when it hurts	6.7%
Take longer break to rest during work	13.3%
Reduced working hours	23.3%
Avoid lifting and twisting	33.3%
Sick leave for medication and treatment	16.7%

Table 4: Strategies to treat WRMSDs

Strategies	% response
Change in working habits	10.0%
Visiting a Physician/Physiotherapist	16.7%
Medication	20.0%
Exercise	20.0%
Adequate Rest	26.7%

Discussion

WRMSDs constitute a major occupational hazard among health workers which cause work-related and physical disability [3-9, 14]. The findings of this study show that clinical radiographers within the region of study are also at high risk of WRMSDs as their counterparts in other regions [5, 8, 9].

The prevalence of WRMSDs from this study was 93.3%, which was similarly reported by Pike *et al* and Evan *et al* [10, 11]. Most of the respondents were males (83.3%) and within the age range of 21-30 years (66.6%). This is consistent with previous reports that the younger age group of 30 years and less, was considered to be at higher risk [4, 12, 13].

Majority of the respondents work 6 hours and above (93.3%) with a daily caseload of 30 patients and above, which could be a predisposing factor for WRMSDs among radiographers in this region. Previous studies have shown that high caseload and long working hours were high risk factors for WRMSD [3-6, 9 - 14].

In this study the lower back was the most affected anatomy reported (36.6%), which is consistent with various studies that reported the prevalence of work-related low back pain ranging between 22% and 74% [3, 15]. It was established that both male and female radiographers experienced back pain most of time due to the different techniques used in performing various tasks [16, 17]. Long hours of sitting and prolonged standing were major causes of WRMSD, especially for radiographers performing computed tomography scan, magnetic resonance imaging scan and ultrasound scan [18].

The shoulder and wrist/hand were the next most reported body part (16.7% each) after the lower back. Radiographers who perform ultrasound scans (sonographers) were at higher risk of having dominant shoulder and wrist/hand pains due to

prolonged and forceful gripping of transducer, maneuver and movement of the upper limb during scanning [10-13]. Muscle strain was the most reported musculoskeletal injury resulting from frequent lifting and bending [4].

Previous reports identified patient handling, poor equipment design, equipment gripping and maneuver, twisting the trunk and bending, sitting or standing for a long period of time, awkward posture while working, long working hours without rest, and increased workload to be common causes of WRMSDs among radiographers and other health workers [3-9, 17].

As a result of WRMSDs, respondents reported alterations/changes in work pattern which affected their output. These changes were avoiding lifting and twisting (33.3%), reduction in working hours (23.3%), taking sick leave for medication and treatment (16.7%), taking longer break to rest during work (13.3%), or stoppage of work when it hurts (6.7%). Thus, WRMSDs affect the overall output/service delivery of the affected worker [13, 19].

Several coping/preventive strategy such as taking adequate rest (26.7%), regular exercise (20%), taking medication (20%), visiting a physician/physiotherapist (16.6%) and changes in work habit (10%) were employed by the respondents. These strategies were to enable them recover and also prevent reoccurrence.

This study showed no statistically significant correlation between gender and WRMSDs ($p = 0.575$) and also between level of education and WRMSDs ($p = 0.413$). Similar reports also show no statistically significant correlation between gender, age, level of education and WRMSDs [1, 5, 6]. The similarity in the reported values may be attributed to the inclusion of similar age groups, similar educational background and similar gender ratio.

Conclusion

Practicing clinical radiographers in North-Western region of Nigeria are not an exception when it comes to high risk of WRMSDs. This study reported 93.3% prevalence of WRMSD with lower back being the most affected anatomy (36.6%), and the most common injury was muscle strain (33.3%). Proper training on ergonomics, as well as prevention and management of WRMSDs is recommended.

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