

Full Length Research Paper

Work-related musculoskeletal disorder among health workers: a cross-sectional survey of National Orthopaedic Hospital, Enugu

IKE Edith Chinonyelum¹, NWONU Eunice Ifeyinwa², UGWU Stella Ngozika³, OBIDIKE Obinna Reginald⁴, MOLOBE Ikenna Daniel^{5*} and ABOLARIN Olatunbosun⁶

¹Department of Training Schools, Education, Research and Statistics, National Orthopaedic Hospital, Igbobi, Yaba, Lagos, Nigeria.

²Department of Nursing Sciences, University of Nigeria, Enugu, Nigeria.

³Post Basic School of Nursing, Orthopaedic Nursing Programme, National Orthopaedic Hospital, Enugu, Nigeria.

⁴National Agency for Food and Drug Administration and Control, Nigeria.

⁵Daniel Continental Innovations Services, Nigeria.

⁶Global Fund and USAID TB Funded Projects, Nigeria.

*Corresponding author. E-mail: danike1@yahoo.com

Accepted 2 November, 2017

This study was carried out to investigate work-related musculoskeletal disorders (WMSDs) as it affects five different health care workers (Doctors, Nurses, Lab Technicians, Physiotherapists and Health attendants) working in National Orthopaedic Hospital, Enugu. In this facility based cross-sectional study, stratified sampling technique was used to select 210 health workers from the population of interest. Questionnaire was administered to 210 health workers and a 100% return rate was achieved. The result revealed that the common MSD affecting the respondents is low back pain (53.5%) with 80% of the respondents having occupational lifetime (prevalence) history of work-related musculoskeletal disorder (WMSDs), a 12-month period prevalence of 69% and a point prevalence of 42.20% were also recorded. The prevalence distribution of WMSD among the health workers were; Doctors (60.7%), Laboratory (71.4%), Nurses (78.2%), Physiotherapist (83.3%), and Health attendants (100%). Working in awkward and cramped position ranked the highest (73.3%) as a major risk factor contributing to WMSDs. The table of association revealed profession and workload as having strong significant relationship with prevalence of WMSDs (p-value = 0.001; 0.000), respectively, depicting a strong positive relationship between profession, workload and prevalence of WMSDs. As revealed by the study, a large percentage of the study population has WMSDs. Therefore, a system of hospital workplace safety, continuous education, and skills development that is based on best available evidence of quality and safety best practices, as well as communication of behavior change is recommended.

Key words: Musculoskeletal disorders, health workers, risk factor, prevalence, orthopaedic hospital.

INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) are responsible for morbidity in many working populations. Apart from lowering the quality of workers' life and reducing productivity, WMSDs are the most expensive form of work disability, attributing to about 40% of all costs toward the treatment of work-related injuries (Yasobant and Rajkumar, 2014).

Middlesworth (2016) defines musculoskeletal disorders (MSDs) as injuries and disorders that affect the human body's movement or musculoskeletal system such as the muscles, tendons, ligaments, nerves, discs, blood vessels and are preventable. In line with the above, Tinubu et al. (2010) observed that the term musculoskeletal disorders encompass a gamut of

inflammatory and degenerative conditions that affects the muscles, tendons, ligaments, joints, peripheral nerves, and supporting blood vessels with consequent ache, pain or discomfort.

Similarly, Salik and Özcan (2007) defined work-related musculoskeletal disorders (WMSDs) as musculoskeletal disorders that results from a work-related event. WMSDs are characterized as multifactorial caused by interactions between various risk factors, which result in conditions that vary across different occupations (David, 2005). Supporting the above assertion, Campo et al. (2008) observed that findings of scientific research have identified physical, psychosocial, organizational, individual and occupational "risk factors" for the development of WMSDs. These studies measured the levels of a variety of factors across a range of occupations at different levels of risk and investigated their associations with the incidence (or prevalence) of MSDs for the populations concerned.

In analyzing risk factors, McCauley Bush (2011) defined risk factor as any source or situation with the potential to cause injury or lead to the development of a disease. Note that work-related musculoskeletal disorders are causally linked to physical load resulting from occupational activities such as high intensity forces, long exposure duration, highly repetitive exertions, strong postural demands, strong or long-lasting muscular strain, as well as environmental and psychosocial factors. He further explained that work-related physical factors relates to high levels of exposure to one of physical factor such as repetitive lifting of heavy objects in extreme or awkward postures, stereotyped motions, forceful exertions, non-neutral postures, vibration, or a combinations of these factors. Furtherance to this, exertion of high-intensity forces may result in acute overloading of the loaded tissues. As high-intensity forces are active within the body tissues particularly during lifting or carrying heavy objects; more so, pushing, pulling, holding or supporting an object or a living being is also implicated as high-intensity forces. The risk for the musculoskeletal system depends to a great extent on the posture of the operator. Especially, twisting or bending the trunk can result in an increased risk for the development of diseases at the lower back (McCauley Bush, 2011).

In line with the above, Alexopoulos et al. as cited in Tinubu et al. (2010) noted that a number of intrinsic and extrinsic factors have been implicated in the aetiology of WMSDs with repetitious movement, awkward postures and high level forces as the three primary risk factors associated with WMSDs. Health workers are at high risk of exposure to these factors.

Health workers are professional and non-professional personnel who are trained and are expected by the public to render quality and adequate healthcare services to achieve greater patient satisfaction, better treatment outcome and sound organizational goals (Mohase and

Khumalo, 2014). In this study, the health workers to be studied are the doctors, nurses, physiotherapists, laboratory technicians and health assistants. The repetitive nature of their work exposes them to these risk factors which may trigger WMSDs. Thornton et al. (2008) posit that WMSDs are common among health care workers, as they routinely perform activities that require long standing, lifting heavy loads, lifting patients, working in awkward postures - twisting or bending the trunk, and transferring patients out of bed and from the floor. These work tasks put health workers at high risk for acute and cumulative WMSDs.

It is estimated that almost one-third of all cases of sick leave among health care workers are related to musculoskeletal disorders (MSDs). Even in developed countries, it appears that WMSDs among health care providers are under-reported. In developing countries such as India, it is much negligible. However, back, neck, shoulder and knee problems are the most common complaints among medical, dental and nursing personnel (Alexopoulos et al. 2006; Tinubu et al., 2010). Work-related pain was found to be high in nurses, dentists and physiotherapists, whereas non-work-related pain was found to be predominant in physicians and lab technicians (Yasobant and Rajkumar, 2014).

Objectives of the study

The specific objectives are:

1. To identify the common musculoskeletal disorders among the health workers (Doctors, Nurses, Lab Technicians, Physiotherapists, and Health Attendants) in NOHE.
2. To identify the risk factors that contribute to the development of WMSDs as perceived by these health workers and the health workers mostly affected.
3. To determine the prevalence and distribution of WMSDs among the health workers.
4. To identify the effects of WMSDs among the health workers and the coping strategies employed by the study participants.

METHODOLOGY

Research design

This non experimental, descriptive, quantitative cross sectional facility based survey was carried out on health workers in National Orthopaedic Hospital, Enugu. In order to understand the phenomena under investigation, the research approach employed was exploratory and descriptive in nature to determine work related musculoskeletal disorders among health workers in National Orthopaedic Hospital, Enugu.

Target population

The target population under study comprises of health workers namely Medical Doctors (70), Medical laboratory scientists (35), Physiotherapists (15), Nurses (300) and Health Attendants (110) of National Orthopaedic Hospital, Enugu.

Participants for this study were fully employed Doctors, Medical laboratory scientists, Physiotherapists, Nurses and Health Attendants of the hospital who were present and gave their consent. In all the above-mentioned categories of professionals and nonprofessionals, clinicians and clinician-cum-academics with willingness to take part in the study were included as study participants.

Sampling technique

The only National Orthopaedic hospital in Enugu was selected for this study. Stratified sampling technique was used to select the different profession of health workers. From available record from the study hospital, the healthcare workers of interest to this study were distributed as follows: (70 doctors, 35 medical laboratory scientists, 15 physiotherapists, 300 nurses, 110 health attendants), from the list, the proportional allocation for each stratum of the health workers was calculated.

Instrument for data collection

A combination of validated and standardized questionnaire was utilized as the survey instrument for collecting different types of data. Data were collected on demographics, the common body region for WMSD, the risk factors, occupational lifetime, 12-months and point prevalence of WMSDs among the health workers, as well as the effects of WMSDs and coping strategies employed by the study participants.

Procedure for data collection

The roster for each profession was used as the sample frame and stratified into stratum. From each stratum, simple random sampling technique using random number tables was used to select the required sample size (based on proportional allocation to each stratum), but in a situation where the selected participant refused to participate in the study, the candidate was replaced by the next name on the sample frame. Self-administered questionnaires were distributed to participants on weekdays during break time over a period of six weeks from August to September, 2016.

Data analysis

Data was analyzed using the descriptive statistics of

mean, standard deviation and percentages for demographic variables. Chi-square analysis was utilized to determine the association of prevalence of self-reported musculoskeletal symptoms with personal characteristics and job risk factors between participants with and without WMSDs among the different health worker group. Considering null hypothesis, the level of significant is set at P value is <0.05 . Data was analyzed using the SPSS version 21.0 and presented in tables and chart.

Ethical consideration

The research topic was approved by the School of Post Basic Nursing Studies National Orthopaedics, Enugu, and consequently a Letter of Introduction issued by the HOD of the school. With this, permission to conduct the study was sought from the ethical committee board (Research, Education and Training) of National Orthopaedic Hospital, Enugu and an ethical certificate issued. Participants were properly informed of the purpose of the study; that it is purely for academics and a written informed consent obtained before completing the questionnaire. Participation was voluntary and questionnaire is anonymous. Plagiarism was avoided by referencing the people's work in the study.

RESULTS

Findings of the study were presented based on the objectives of the study. The result of two hundred and ten (210) respondents with the entire questionnaire completely filled was analyzed representing 100% return rate. As portrayed in Table 1, the percentage age distribution shows that about a third 70(33.3%) of the respondents are within the age group of 30-39 years, 62(29.5%) within the ages of 40-49 years, 53(25.2%) within the ages of 20-29 years, while only 25(11.9%) were between the ages of 50-59 years. In summary, the age group (30-39) years formed the highest percentage of the respondents, depicting that most of the health workers fall within the workforce age. The mean age of the respondents is 37.3 ± 7.9 .

As regards sex, male respondents were 86 (41.0%) while the female respondents accounted for 124(59.0%) of the study participants. In relation to profession, Nurses 119(56.7%) constitutes the highest percentage of the health workers that participated in the study followed by the Technician/Scientist health attendants 43(20.4%). The Doctors represent 28(13.3%) in the survey. Other representatives were the Laboratory Officers 14(6.7%) and physiotherapist 6(2.9%). Majority (77.1%) of the respondents were under the clinical practice only, while (22.9%) partook in both clinical and academics in the study setting. 59% of the respondents specialized in

Table 1. Demographic characteristics of respondents (n=210).

Characteristics	Frequency	Percentage (%)
Age		
20 – 29 years	53	25.2
30 – 39 years	70	33.3
40 – 49 years	62	29.6
50 – 59 years	25	11.9
Mean Age	37.3 ± 7.9	
Gender		
Male	86	41.0
Female	124	59.0
Profession		
Doctor	28	13.3
Nurse	119	56.7
Physiotherapist	6	2.9
Laboratory	14	6.7
Health attendant	43	20.4
Area of Practice		
Clinical	162	77.1
Clinical/Academics	48	22.9
Specialization		
Orthopaedics	124	59.0
Educator	5	2.4
Burns and plastics	51	24.3
A and E Nurse	3	1.4
Trauma	1	0.5
Public Health	10	4.7
Heamatology / Lab. Sci / Histopathology	14	6.6
Years of Practice		
1 –5 years	56	26.7
5 – 10 years	91	43.3
10 – 15 years	35	16.7
>20 years	28	13.3
Number of hours per day spent in direct patient care in the last 12 months		
5-7 h	45	21.4
8-10 h	127	60.5
>10 years	38	18.1
Total	210	100.0

general Orthopaedics which forms the highest of the respondents' specialization area. Other major specialization area was Burns and Plastics representing 51(24.3%) of the respondents.

In terms of work experience, the highest percentage 91(43.3%) of the respondents had working experience of 5-10 years. Respondents with experience more than 10 years are 63(30%) and 56(26.7%) respondents have 1-5 years working experiences. More than half 127(60.5%) of the respondents spend 8-10 h/day in direct patient care of which is the highest response in the survey followed by 45(21.4%) respondents that spend 5-7 h/day caring for

patients.

Common musculoskeletal disorders among the health workers in NOHE

Overall, 168(80%) of the respondents have had a work lifetime of work-related musculoskeletal disorder (WMSDs) while 20% have not had or experienced WMSDs in their entire work life as shown in Figure 1.

As shown in Table 2, of the 168(80%) health workers who has developed WMSDs, half (50.6%) of the

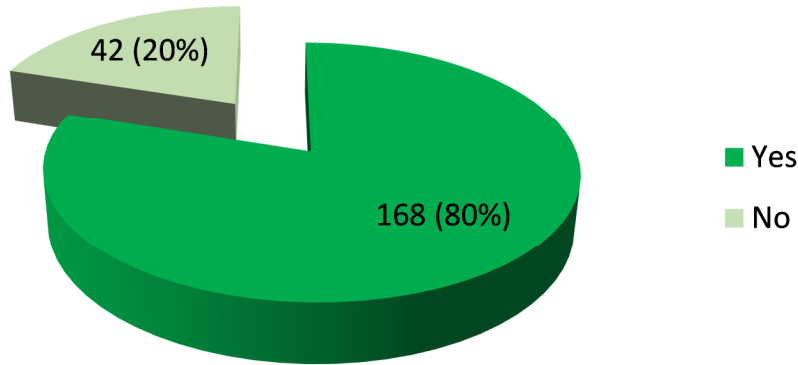


Figure 1. Occupational lifetime history of work-related musculoskeletal disorder (prevalence).

Table 2. Respondents responses to Body Region Experienced Pain (n=168).

Body Region	Yes	No
Neck	35(20.8)	133(79.2)
Shoulder	42(25.0)	126(75.0)
Elbow	19(11.3)	149(88.7)
Hand /wrist	26(15.5)	142(84.5)
Upper back	28(16.7)	140(83.3)
Lower back	85(50.6)	83(49.4)
Hip/Thigh	30(17.9)	138(82.1)
Knee	34(20.2)	134(79.8)
Ankle/feet	34(20.2)	134(79.8)

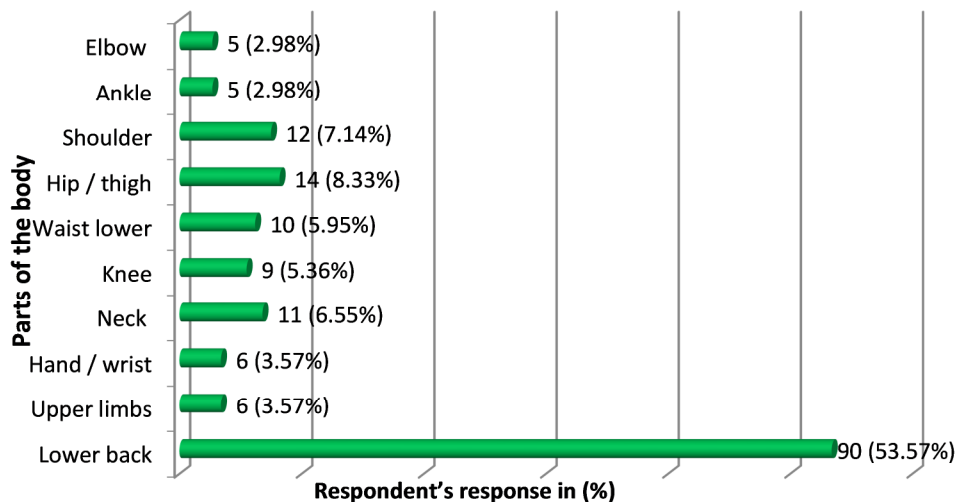


Figure 2. The body parts affected with pain n=168.

respondents have lower back pain, followed by pain at the shoulder 42(25.0%), neck 35(20.8%), knee 34(20.2%) and ankle feet (20.2%). This may be due to the nature of the work procedure, position adopted or

equipment design used by the respondent health workers. As illustrated in Figure 2, a further probe on the body part mostly affected revealed pain at the lower back constituting 90(53.57%) of the total response, with the

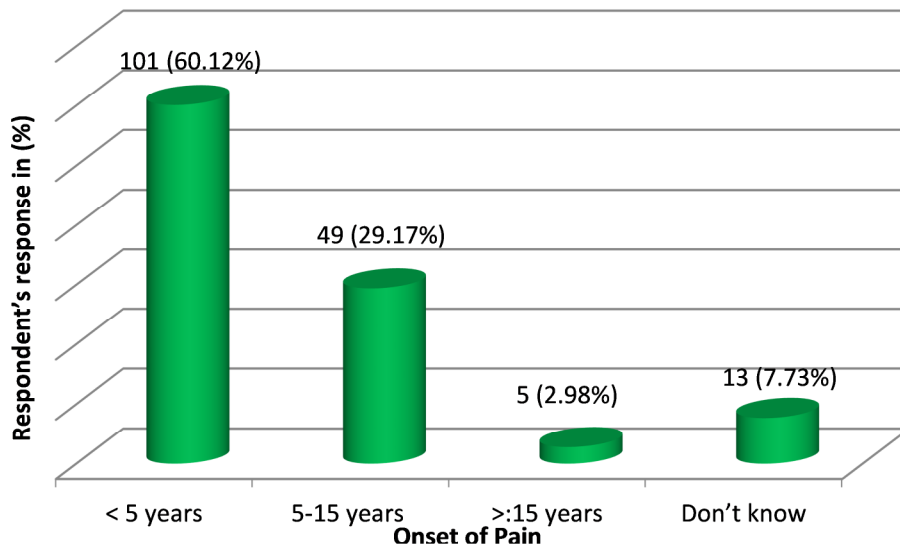


Figure 3. First experience of the work-related musculoskeletal disorder n=168.

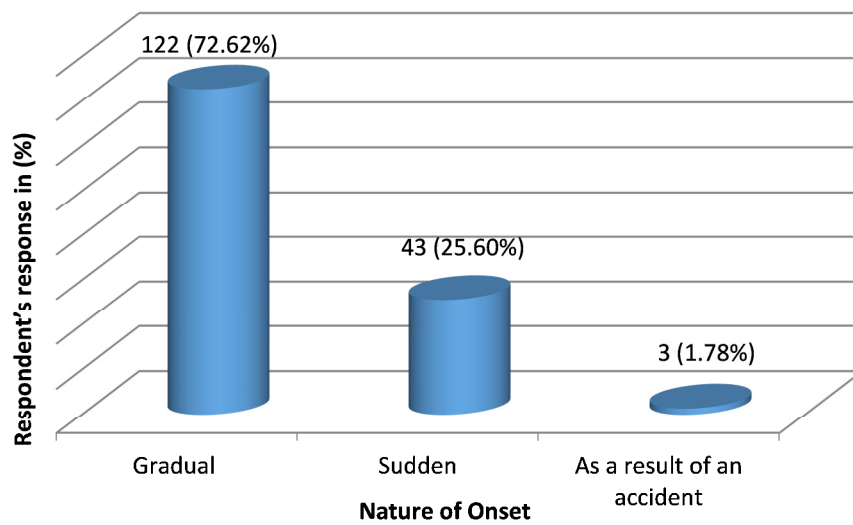


Figure 4. Nature onset of work-related MSD n=168.

elbow and ankle having the least affected 5(2.98%), respectively.

As depicted in Figure 3, most 101(60.12%) of the respondents developed WMSDs within the first 5 years following appointment, 49(29.17%) of them had WMSD between 5-15 years while only 5(2.9%) had experienced it after 15 years of appointment. The onset of the work-related musculoskeletal disorder as depicted in Figure 4 revealed that (72.62%) was gradual while (25.60%) acknowledged that the onset was sudden. The other (1.78%) said that it was as a result of an accident.

The majority of the respondents 130(77.38%) have treated themselves or sought treatment from health

professionals as a result of work-related problem while 38(22.62%) have not (Figure 5). Figure 6 shows the analysis of the respondents that have ever changed area/specialty of their practice as a result of work-related problem. Nearly all (96.20%) of the respondents have never changed their area of practice.

Risk factors to the development of WMSDs and the health workers mostly affected

Overall as illustrated in Figure 7, more than two-third 150(71.40%) of the respondents attend to about 10-29

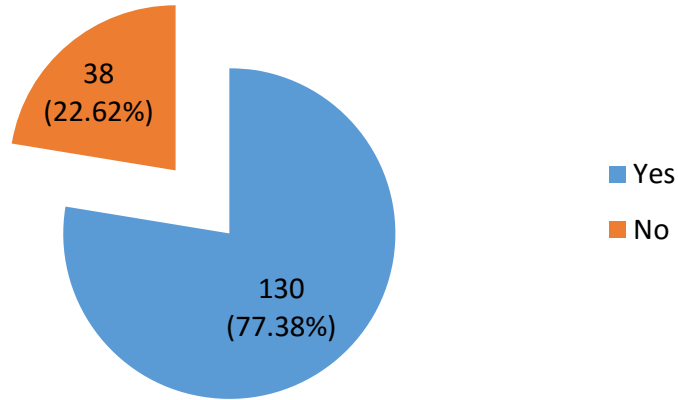


Figure 5. Respondent responses on ever treated or sought treatment from health professional as a result of WMSD n=168.

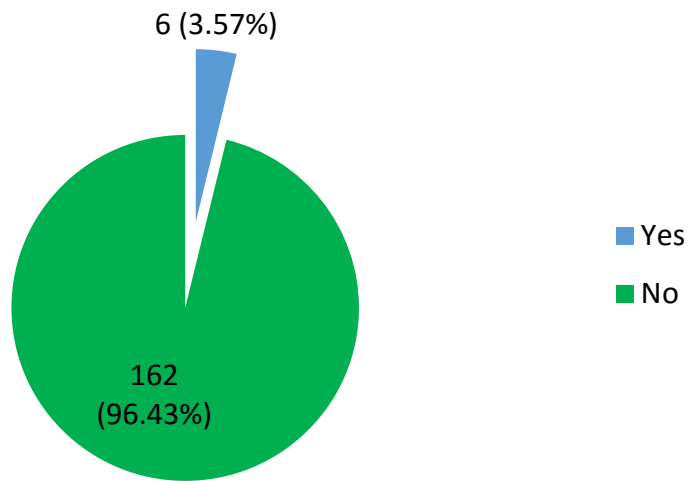


Figure 6. Respondent that have ever changed area/specialty of their practice as a result of work-related problem n=168.

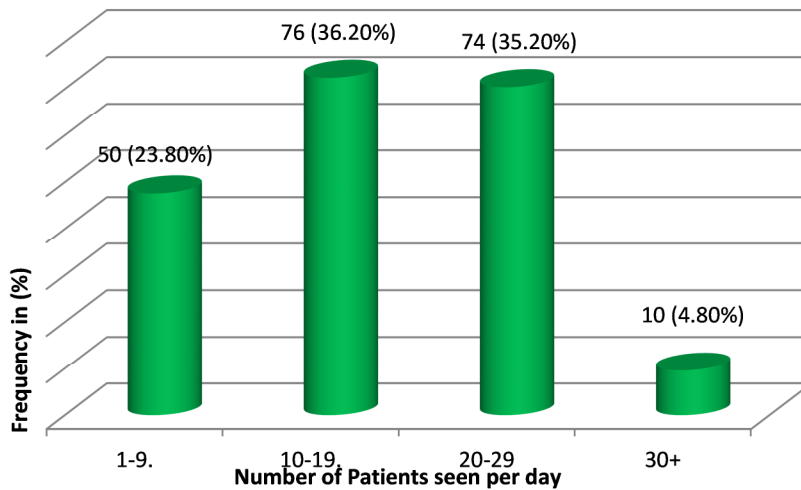


Figure 7. Number of patients seen per day.

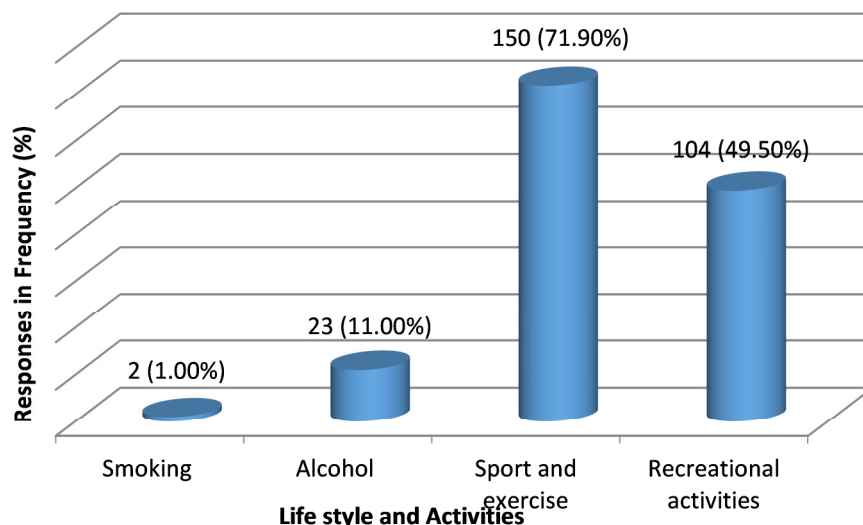


Figure 8. Type of activities engaged in by the respondents.

Table 3. Respondents' responses on job risk factors that may contribute to WMSDs.

Job risk factors	Not at all a problem	Minimal problem	Moderate problem	Major problem
Performing the same task over and over	35(16.7)	35(16.7)	32(15.2)	108(51.4)
Treating an excessive number of patients in one day	8(3.8)	37(17.6)	48(22.9)	117(55.7)
Performing manual Orthopaedic techniques (Joint mobilizations, soft tissue mobilization)	33(15.7)	53(25.2)	73(34.8)	51(24.3)
Not enough rest breaks or pauses during the workday	15(7.1)	31(14.8)	42(20.0)	122(58.1)
Working in awkward and cramped positions	6(2.9)	19(9.0)	31(14.8)	154(73.3)
Working in the same positions for long periods (Standing, bend over, sitting)	2(1.0)	21(10.0)	37(17.6)	150(71.4)
Bending or twisting your back in an awkward way	5(2.4)	21(10.0)	57(27.1)	127(60.5)
Working near or at your physical limits	9(4.3)	40(19.0)	59(28.1)	102(48.6)
Reaching or working away from your body	15(7.1)	39(18.6)	70(33.3)	86(41.0)
Continuing to work while injured or hurt	7(3.3)	17(8.1)	38(18.1)	148(70.5)
Lifting or transferring dependent patients	11(5.2)	24(11.4)	51(24.3)	124(59.0)
Working with confused or agitated patients	20(9.5)	55(26.2)	70(33.3)	65(31.0)
Carrying, lifting, or moving heavy materials or equipment (e.g., continuous passive motion machines)	13(6.2)	24(11.4)	50(23.8)	123(58.6)
Unanticipated sudden movement or fall by patient	19(9.0)	46(21.9)	35(16.7)	110(52.4)
Assisting patients during gait activities	32(15.2)	64(30.50)	73(34.8)	41(19.5)
Work scheduling (Overtime, irregular shifts, length of workday)	8(3.8)	36(17.1)	77(36.7)	89(42.4)
Inadequate training on injury prevention	16(7.6)	30(14.3)	63(30.0)	101(48.1)

patients in a day while only 10(4.8%) attend to over thirty patients in a day. This work burden may be a risk factor to the development of WMSDs.

Findings from Figure 8 show that majority 150(71.9%) of the respondents engage in sports and exercise and 104(49.5%) of the respondents engage in recreational

activities. On lifestyle, 23(11%) engage in alcohol drinking while 1% engages in smoking.

The three most profound risk factors to the development of WMSDs as identified by the respondents (shown in Table 3) includes working in awkward and cramped position 154(73.3%), working in the same

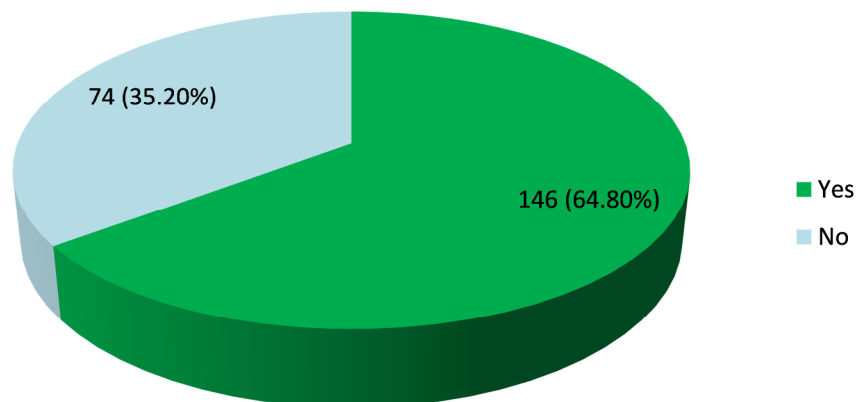


Figure 9. Respondents trained in ergonomics or how to prevent occupational hazards n = 210.

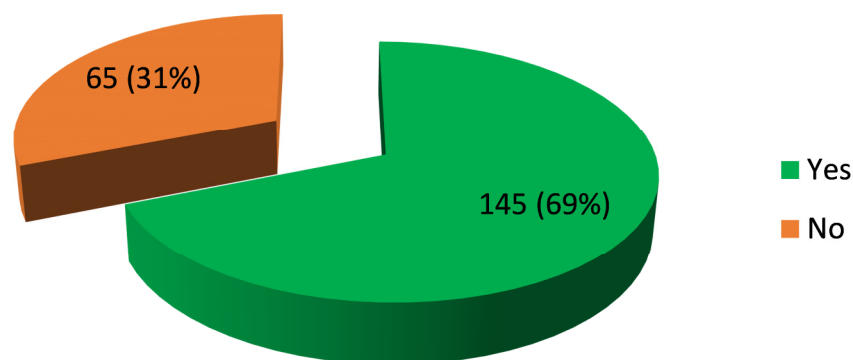


Figure 10. History of WMSD In last 12 Months (12 months Period prevalence).

positions for long periods like standing, bending, sitting 150(71.4%), and continuing to work while injured or hurt 148(70.5%). Other risk factors as identified by the respondents are Bending or twisting your back in an awkward way 127(60%), Lifting or transferring dependent patients 124(59%), Carrying, lifting, or moving heavy materials or equipment 110(58.6%), Not enough rest breaks or pauses during the workday 122(58.1%), Treating an excessive number of patients in one day 117(55.7%), Assisting patients during gait activities 110(52.4%), Unanticipated sudden movement or fall by patient 110(52.4%), Performing the same task over and over 108 (51.4%), Working near or at your physical limits 102(48.6%), and Inadequate training on injury prevention 101(48.1%).

A further analysis on ergonomics shown in Figure 9 reveals that nearly two-third 146(64.8%) of the respondents acknowledged that they have received ergonomic or occupational training while 74(35.20%) claimed they have not received such training.

As relation to health workers are mostly affected; the

association as shown in Table 7 reveals a positive strong significant relationship between profession and prevalence of WMSDs (p -value= 0.001). As identified by the result, the most affected health workers were the Technicians/scientist health attendants (100%), followed by physiotherapist (83.3%) and Nurses (78.2%).

Prevalence and distribution of WMSDs among health workers in NOHE

As regards the 12-month period prevalence of WMSDs among the surveyed population as shown in Figure 10, more than two-third 145(69%) of the respondent have had WMSDs within a period of one year while 65(31%) have not experienced WMSDs in the past 12 months. This is an indication of an increase in the 12-month period prevalence of WMSDs. Figure 11 shows that more than half 121(57.6%) of the respondents experienced WMSDs within a period of seven days. This reveals a week history of the disease condition prior to the survey

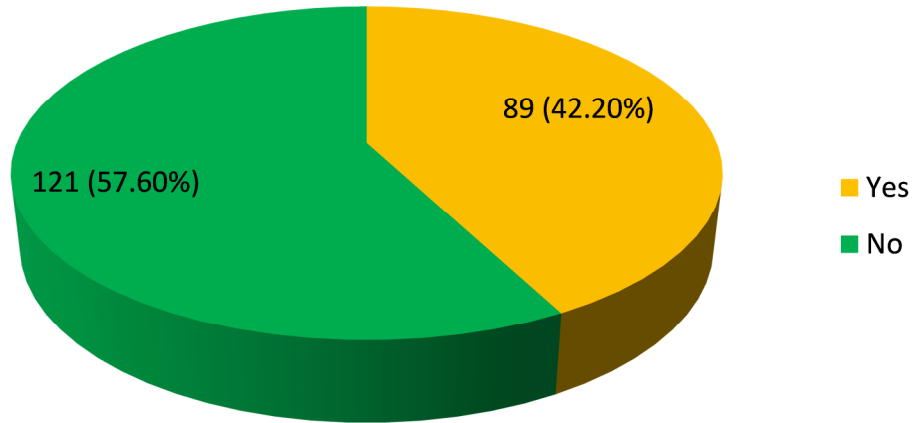


Figure 11. History of WMSD In last 7 Days (Point Prevalence).

Table 4. Responses of the respondents on the effects of WMSDs n=168.

Effects of WMSDs	Very unlikely	Unlikely	Undecided	Likely	Very likely
Take a sick leave	38(22.6)	32(19.0)	12(7.1)	50(29.8)	36(21.5)
Avoid work	90(53.6)	37(22.0)	20(11.9)	15(8.9)	6(3.6)
Have a restricted work	18(10.7)	22(13.1)	53(31.5)	58(34.5)	17(10.2)
Seek for transfer to other unit	52(30.9)	24(14.3)	26(15.5)	42(25.0)	24(14.3)
Change career entirely	115(68.5)	27(16.1)	11(6.5)	5(3.0)	10(5.9)
Go on study or sabbatical leave	98(58.3)	27(16.1)	17(10.1)	19(11.3)	7(4.2)
Seek medical care	6(3.6)	12(7.1)	9(5.4)	34(20.2)	107(63.7)

which is an indication of current prevalence.

Regarding distribution of WMSDs among health workers, the association (Table 7) shows the prevalence distribution of WMSD among health workers as follows; Doctors (60.7%), Nurses (78.2%), Physiotherapist (83.3%), Laboratory (71.4%) and Technicians/Scientist health attendants (100%). This result indicates that all the studied health attendants had experienced any of the WMSDs. This calls for a serious ergonomic intervention among this health worker group.

Effects of WMSDs in the study population and their coping to avoid the development of the condition

Table 4 illustrated on the effect of work-related musculoskeletal disorder on the respondents. It was revealed that high percentage of the respondents (63.3%) is very likely to seek medical care. While more than a third 58(34.5%) acknowledged that they will likely have a restricted work, less than a third 50(29.8%) said they will likely take sick leave. In contrary, (68.6%) are very unlikely to change career entirely and (58.6%) are very unlikely to go on study or sabbatical leave.

Table 5 reveals the coping strategies employed by the respondent towards reducing the risk of developing WMSD. Most 105(50%) respondents acknowledged that they will always modify the patient's position and their position, followed by those 97(46.2%) that have their choice of always getting someone else to help them handle a heavy patient. While (68.1%) acknowledged that they will not take excuse or avoid work, a large proportion 115(55%) said that sometimes they will pause regularly, and stretch and change posture.

A further probe on other ways to reduce strain on body region shows that most 109(51.9%) of the respondents prefer to use adjustable bed/plinth while carrying out their duties; this is followed by one-third 70(33.3%) of the respondents who prefer lifting belt in reducing strain on their body when carrying out their duties. Most respondents 174(84.8%) and 172(81.9%) do not prefer to use splint and to use sliding board in this regard, respectively (Table 6).

Association between socio-demographic characteristics and prevalence of WMSDs

Table 7 describes the association of the respondents'

Table 5. Responses to coping strategies to be adopted by respondents towards reducing the risk for development of work-related musculoskeletal disorder.

Coping strategies	Always	Sometimes	Rarely	Never
I get someone else to help me handle a heavy patient	97(46.2)	85(40.5)	21(10.0)	7(3.3)
I modify patient's position/my position	105(50.0)	79(37.6)	17(8.1)	9(4.3)
I use a different part of my body to support in administering my procedure	19(9.0)	78(37.1)	69(32.9)	44(21.0)
I warm up and stretch before performing my duties	22(10.5)	77(36.7)	75(35.7)	36(17.1)
I modify my procedure in order to avoid stressing an injury	79(37.6)	86(41.0)	27(12.9)	18(8.6)
I pause regularly so i can stretch and change posture	42(20.0)	116(55.2)	37(17.6)	15(7.1)
I adjust plinth/bed height so i can stretch and change posture	63(30.0)	95(45.2)	29(13.8)	23(11.0)
I select techniques/procedures that will not aggravate or provoke my discomfort	68(32.4)	71(33.8)	39(18.6)	32(15.2)
I stop a treatment if it cause or aggravate my discomfort	30(14.3)	49(23.3)	63(30.0)	68(32.4)
I take excuses, and avoid work	11(5.2)	19(9.0)	37(17.6)	143(68.1)

Table 6. Respondents' response on other ways to reduce strain on their body when carrying out their duties.

Ways to reduce strain	Yes	No
I will prefer to use adjustable bed/plinth	109(51.9)	101(48.1)
I will prefer to use sliding board	38(18.1)	172(81.9)
I will prefer lifting belt	70(33.3)	140(66.7)
I will prefer to use splints	32(15.2)	178(84.8)
None of the above	19(9.0)	191(91.0)

socio-demographic characteristics and occupational lifetime WMSDs (Prevalence). The following were deduced from the result of the findings:

(i) The Age shows p-value of 0.010, which is less than 0.05. This means that there is an association between age and prevalence. In this result, the higher in age, the more the prevalence of WMSDs. As (92%) of those under the age group of 50-59 years has experienced WMSDs, therefore, there is a statistically significant relationship between age and prevalence of WMSDs.

(ii) The Gender shows p-value of 0.141, which is greater than 0.05. Therefore, there is no association between gender and prevalence of WMSDs.

(iii) The Profession shows p-value of 0.001, which is less than 0.05. This means that the relationship between profession and Ever Experienced WMSDs is significant.

(iv) The Area of Practice shows p-value of 0.071, which is greater than 0.05. This means that the difference in Ever Experienced WMSDs is not significant. This means also that there is no relationship between Area of Practice and Ever Experienced WMSDs.

(v) The Specialization shows p-value 0.017, which is less than 0.05. This means that the difference in Ever Experienced WMSDs is significant. Therefore, there is a relationship between specialization area and prevalence

of WMSDs.

(vi) The Years of Practice shows p-value 0.311, which is greater than 0.05. This means that the difference in Ever Experienced WMSDs is not significant. Therefore, there is no relationship between Years of Practice and Ever Experienced WMSDs.

Association between workload and prevalence of WMSDs

****Fisher's exact test, significant at $p < 0.05$***

According to the table of association (Table 8):

(a) The Number of hours per day spent in direct patient care in the last shows p-value 0.000, which is less than 0.05. This means that the difference in Ever Experienced WMSDs is statistically significant. Therefore, there is a strong positive relationship between workload and Ever Experienced WMSDs.

(b) The variables Patients seen per day shows p-value 0.001, which is less than 0.05. This means that difference in Ever Experienced WMSDs is significant. Therefore, there is a positive strong relationship between these variables and Ever experienced WMSDs.

Table 7. Association between socio-demographic characteristics and Ever Experienced WMSDs (Occupational lifetime Prevalence).

Socio-demographic characteristics	Ever Experienced WMSDs			χ^2	P-Value		
	Yes (N%)	No (N%)	N				
Age							
20 – 29 years	50 (40.1)	10(8.3)	60	9.148	0.010		
30 – 39 years	33 (23.7)	11 (8.3)	44				
40 – 49 years	42(49.0)	20(32.3)	62				
50 – 59 years	23(92.0)	2(8.0)	25				
Gender							
Male	73(84.9)	13(15.1)	86	2.171	0.141		
Female	95(76.6)	29(23.4)	124				
Marital status							
Single	44(66.7)	22(33.3)	66	11.190	0.004		
Married	120(85.7)	20(14.3)	140				
Widowed	4(100.0)	0(0.0)	4				
Profession							
Doctor	17(60.7)	11(39.3)	28	18.198	0.001		
Nurse	93(78.2)	26(21.8)	119				
Physiotherapist	5(83.3)	1(16.7)	6				
Laboratory	10(71.4)	4(28.0)	14				
Technician/scientist health attendant	43(100.0)	0(0.0)	43				
Area of practice							
Clinical	134(82.7)	28(17.3)	162	3.268	0.071		
Clinical/Academics	34(70.8)	14(29.2)	48				
Specialist							
Orthopeadics	104(83.9)	20(16.1)	124	15.455	0.01 b7		
Educator	1(20.0)	4(80.0)	5				
Burns and plastics	38(74.5)	13(25.5)	51				
A and E Nurse	2(66.7)	1(33.3)	3				
Trauma	1(100.0)	0(0.0)	1				
Public Health	10(100.0)	0(0.0)	10				
Heamatology / Lab. Sci / Histopathology	12(85.8)	2(14.2)	14				
Years of practice experience							
1 – 5 years	42(75.0)	14(25.0)	56			3.578	0.311
5 – 10 years	76(83.5)	15(16.5)	91				
10 – 15 years	30(85.7)	5(14.3)	35				
>20 years	20(71.4)	8(28.6)	28				

*Fisher's exact test, significant at $p < 0.05$

DISCUSSION

The findings of this study show that 53.40% of the health workers had suffered the lower back pain. Other body locations commonly affected were the shoulder (25.0%), neck (20.8%), knee (20.2%) and ankle feet (20.2%). Lower back and neck as areas of WMSDs might be due to prolonged standing, frequent twisting and bending in addition to lifting and transferring patient or heavy objects. Shoulder pain as noted by Ganuyi et al. (2015) might be directly related with patient-care activities, such as lifting and transferring patients. The nature of stresses sustained by human back during lifting is multiple,

including vertical compression, horizontal shear, rotatory torque and a variety of combination of these. During such an activity, every structural elements of the human trunk, i.e., the vertebrae, the spinal ligaments and the spinal muscles will take part and endure the stress, and these different structural elements are stressed differently in different phases of any given lift. Weightlifting generates large compressive forces acting in the long axis of the spine. The magnitude of such forces depends at any given moment on the amount of weight being lifted, its acceleration and posture of the trunk. The interaction of these entities determines the strength of muscular contraction required for the accomplishment of the task.

Table 8. Association between workload and Ever Experienced WMSDs (Prevalence).

Risk factors	Experienced WMSDS			X ²	P-Value
	Yes (N%)	No (N%)	N		
Number of hours per day spent in direct patient care in the last 12 months					
5-7 h	27(60.0)	18(40.0)	45	20.718	0.000
8-10 h	114(89.8)	13(10.2)	127		
>10 years	27(71.1)	11(28.9)	38		
Patient seen per day					
1-9	17(34.0)	33(66.0)	50	16.324	0.001
10-19	23(30.3)	53(69.7)	76		
20-29	45(60.8)	29(39.2)	74		
30+	4(40.0)	6(60.0)	10		

In the standing posture, the centre of gravity lies in or anterior to the first lumbar vertebrae, there is virtually no muscular activity when the body is in a balanced upright position. As one stoops, the trunk approaches a horizontal position and compressive forces acting in the long axis of the spine increases.

The load moment due to the weight and movement of the head during activities about a fixed axis in the neck is counteracted by neck muscular activity causing a muscular moment and consequent discomfort leading to WMSDs especially with repetitive and sustained neck movements over a long period of time. More so, movement of the head carried out at the limit of the range, can also be counteracted by passive soft tissue structures such as ligaments, joint capsules and muscular connective tissue. The induced load moments only partly reflect the joint compressive and shear forces and the load on the different neck structure. When the neck is in a neutral vertical position, approximately 2% of the maximum muscular strength has to be used. In a slightly flexed neck position, 10% is used and in a much flexed position, 1.7-2.5% of maximum voluntary contraction maintained for an hour causes signs of fatigue in the upper trapezius muscle and consequent pain (Rambabu and Suneetha, 2014; Adegoke, 2008).

This findings of this study as regards body region affected is in consistence with that found in Ganuyi et al. (2015) on Patterns of occurrence of work-related musculoskeletal disorders and its correlation with ergonomic hazards among health care professionals working at the University of Maiduguri Teaching Hospital, Nigeria, where Low back pain was the most complaint (71.6%) among health care professionals followed by shoulder (46.8%) and then neck (42.2%). The upper back (14.7%) and the elbow (8.3%) were the less affected. Prolonged sitting and standing and working in an awkward posture were most common ergonomic hazards among participants. It also corresponds to the work of Mbada et al. (2012), which reported that low back were mostly affected followed by the shoulder and knee. Similarly, the findings from Alexopoulos et al. (2006)

study revealed the back, neck, shoulder and knee problems as the most common complaints among medical, dental and nursing personnel. This may be due to the nature of the work procedure relating to the hospital setting or equipment design used by these health workers.

In relation to risk factors that may lead to the development of WMSD, the three most profound risk factors to the development of WMSDs as identified by the respondents includes working in awkward and cramped position 154(73.3%), working in the same positions for long periods like standing, bending, sitting 150(71.4%), and continuing to work while injured or hurt 148(70.5%). Other risk factors as identified by the respondents are Bending or twisting your back in an awkward way 127(60%), Lifting or transferring dependent patients 124(59%), Carrying, lifting, or moving heavy materials or equipment 110(58.6%), Not enough rest breaks or pauses during the workday 122(58.1%), Treating an excessive number of patients in one day 117(55.7%), Assisting patients during gait activities 110(52.4%), Unanticipated sudden movement or fall by patient 110(52.4%), Performing the same task over and over 108 (51.4%), Working near or at your physical limits 102(48.6%), Inadequate training on injury prevention 101(48.1%). These risk factors exert continuous pressure on the muscle tissue predisposing them to exhaustion with accumulation of lactic acid that causes pain.

The findings of this study are higher than the risk factors to the development of WMSDs as recorded by Tinubu et al. (2010) among Nigeria Nurses in Ibadan with working in the same positions for long periods (55.1%), lifting or transferring dependent patients (50.8%) and treating an excessive number of patients in one day (44.9%) perceived as the most job risk factors for WMSDs. Its findings is also in line with the risk factors to the development of WMSDs as identified by the Indian study by Yasobant and Rajkumar (2014), who documented that assisting patients during gait activities (50%), repetitive tasks (50%), and working in awkward or cramped positions (35%) are the factors perceived by

physiotherapists as most likely to limit their capacity to continue working in a physically demanding role.

The present study showed that the number of hours the respondents spend in attending to patients could be a risk factors as more (36.20%) of the respondents attends to about 10-19 patients in a day followed by 35.20% who attend to 20-29 patients in a day. In Table 8 as perceived by the respondents, working in awkward and cramped position ranked the highest (73.3%) as a major problem or risk factor that contribute to WMSDS followed by working in the same positions for long periods like standing, bending, sitting or kneeling which was rated 71.4% as major risk. Likewise, the Number of hours per day spent in direct patient care was significant at p-value 0.000. Therefore, there is a relationship between workload and Ever Experienced WMSDS.

The National Institute for Occupational Safety and Health (NIOSH) reported that health workers can develop musculoskeletal disorders from a number of common work activities including the following: Forceful exertions (activities that require a person to apply high levels of force, such as during lifting, pushing, or pulling heavy loads), awkward postures when lifting and repeated activities without adequate recovery time. More so, Healthcare workers who spend the most time transferring, bathing, and dressing patients have the highest rates of musculoskeletal injuries (Delive et al., 2003).

In the present study, although 64.8% of the respondents health workers have had training in ergonomics yet, overall, 80% have had a work-related musculoskeletal disorder (WMSDs) in their work life, with a 12-month period prevalence of 69% and a point prevalence of 42.20%, depicting a high prevalence of WMSDs among the health workers in the study population. This finding when compared to a previous study among nurses in Ibadan by Tinubu et al. (2010), who reported a prevalence of 84.4%, states that this percentage of nurses have had WMSDs once or more in their occupational lives, indicating that WMSDs are commonly observed and prevalent among healthcare workers in Nigeria. A similar study by Mbada et al. (2012) reported a 90.7% 12-months period prevalence of self reported WMSDs at any part of the body among nurses. This is higher than that observed in this study. The research of Smith and Roy (2007) in a study from rural Japan reported a 12-month prevalence of 91.9%. In another study conducted in the US, Josephson (2008) reported a prevalence of 72.5%. However, it is worth noting that prevalence of WMSDs has no much difference across national boundaries.

The present study conducted shows the prevalence distribution of WMSD among health workers as follows; Doctors (60.7%), Laboratory (71.4%), Nurses (78.2%), Physiotherapist (83.3%) and Technicians/Scientist health attendants (100%). The Technicians/health attendants constitute the highest in prevalence of the affected health

workers in this study. The nature of their job involves direct attending or assisting the patients, lifting and turning the patient which is one of the risk factors. This may probably explain the very high prevalence of WMSDs among them. The physiotherapist constitute the second to the highest affected. There is no doubt that the nature of physiotherapist job may be one of the factors of the high prevalence as they are involved in lifting or moving of the patients while assisting them during physiotherapy activity and exercises. Other previous studies such as Scott (2006), reported that WMSDs are common among health care workers, with the nursing population that constitutes about 33% of the hospital workforce at particularly high risk, and accounting for 60% of the reported occupational injuries. The present study confirms the claim of Scott's higher prevalence which has the prevalence among nurses at 78.2%. However, Amosu et al. (2011) in his work stated that all healthcare workers who lift and move patients are at a high risk of back injury and other musculoskeletal disorders. He further established that Patient-handling tasks often involve motions that challenge a health workers' body such as twisting, bending, stretching, reaching and other awkward postures. The most frequent causes of back pain and other injuries among health workers are lifting and moving patients (patient transfers), bathing, dressing and feeding patients.

According to Yasobant and Rajkumar (2014), musculoskeletal disorders (MSDs) in the workplace have a huge impact representing the second largest cause of short-term or temporary work disability after the common cold, and also responsible for morbidity in many working populations and are known as an important occupational problem with increasing compensation and health costs, reduced productivity, and lower quality of life. As illustrated in this present study on the effect of work-related musculoskeletal disorder on the respondents, it was revealed that high percentage of the respondents (63.3%) is very likely to seek medical care. As established in David (2005) research work, WMSDs are reported to significantly have impact on quality of life, cause loss of work time or absenteeism. In this study, more than a third 58(34.5%) acknowledged that they will likely have a restricted work while less than a third 50(29.8%) said they will likely take sick leave. On the contrary, 68.6% are very unlikely to change career entirely and 58.6% are very unlikely to go on study or sabbatical leave. Development of WMSD will definitely lead to redundancy and presenteesim as workers may try to avoid pain by having restricted work. This leads to low productivity and waste.

The Personal or individual risk factors can impact the likelihood for occurrence of a WMSD according to McCauley Bush (2011). Therefore, this study also depicts some association of individual demographic variables that are significant with WMSDs. These factors vary depending on the study but may include age and gender.

The age of the respondent in this study shows a significant p-value of 0.010, which means that there is a relationship between age and ever experienced WMSDs. The gender as a variable in this study is not significant, which did not corroborate with McCauley Bush (2011) study that women are more affected with WMSDs than men. Reason may be because of the nature of the study setting being an Orthopaedic hospital where most of the health worker job involved physical activities that may predispose the worker to WMSD.

In order to reduce WMSDs, certain coping strategies should be adopted. The most respondents in the study (50%) were of the view that they will always modify the patient's position and their position to reduce pain as a coping strategy followed by those (46.2%) that have their choice of always getting someone else to help them handle a heavy patient. It is very easy to adopt the view strategy mentioned by the respondent because manual lift, adjustment and assisting of patients is one of the most obtainable in major cases in the hospital setting. Getting help in handling heavy patients (50.4%), modification of nursing procedures in order to avoid re-injury (45.4%), and modifying patient's/nurse position (40.3%) were the top three coping strategies as identified by the work of Tinubu et al. (2010).

Conclusion

It has become evident that healthcare workers are exposed to threats to WMSDs in the performance of their duties. In the study, it is evident that the common musculoskeletal disorders among the health workers are pain at the lower back (50.5%), shoulder (25.2%), neck (21.0%), knee (20.5%) and ankle feet (20.5%). The study put the occupational life prevalence at 80%, with an incidence rate of 69% and a point prevalence of 42.20%.

While addressing the topic on risk factors, working in awkward and cramped position ranked the highest (73.3%) as a major problem or risk factor that contributes to WMSDs followed by working in the same positions for long periods like standing, bending, sitting or kneeling which was rated 71.4% as major risk. This can be as a result that most of these health workers spend long period of hours attending to more number of patients per day. An association was also established between profession and prevalence of WMSDs, with health attendants ranking highest as most affected.

The Occupational Safety and Health Administration, OSHA (2013) article has indicated that healthcare is growing at a higher rate, and this level of growth is putting healthcare workers at risk of workplace-related injuries. At the same time, the risk of WMSDs is being increased by an aging workforce while the prevalence is 80% in the study, and those at a higher risk of the injuries are the physiotherapist, technicians/attendants and

nurses.

REFERENCES

- Adegoke B, Akodu A, Oyeyemi A (2008). Work-related musculoskeletal disorders among Nigerian Physiotherapists. *BMC Musculoskelet. Disord.* 9:112. doi: 10.1186/1471-2474-9-112.
- Alexopoulos EC, Burdorf A, Kalokerinou A (2006). A comparative analysis on musculoskeletal disorders between Greek and Dutch nursing personnel. *Int. Arch. Occup. Environ. Health* 79:82-88.
- Amosu AM, Degun AM, Atulomah NOS, Olanrewju MF and Aderibigbe KA (2011). The level of knowledge regarding occupational hazards among Nurses in Abeokuta, Ogun State, Nigeria. *Curr. Res. J. Biol. Sci.* 3(6):586-590 ISSN: 2041-0778. Maxwell Scientific
- Campo M, Weiser S, Koenig K, Nordin M (2008). Work-related musculoskeletal disorders in physical therapists: A prospective cohort study with 1-year follow-up. *Phys. Ther.* 88:608-19. [PMC free article] [PubMed]
- David G (2005). Ergonomic methods for assessing exposure to risk factors for work-related musculoskeletal disorders. *Occup. Med. Lond.* 55:190-9. doi:10.5271/sjweh.1494.
- Delive A, Ulusoy M, Ulusoy MF (2003). Investigation of factors influencing burnout level in the professional and private lives of nurses. *Int. J. Nurs. Stud.* 40(8):807-827.
- Ganiyu SO, Olabode JA, Stanley MM, Muhammad I (2015). Patterns of occurrence of work-related musculoskeletal disorders and its correlation with ergonomic hazards among health care professionals. *Niger. J. Exp. Clin. Biosci.* 3(1):18-23.
- Josephson V (2008). Workplace stressors, ways of coping and demographic characteristics as predictors of physical and mental health of Japanese hospital nurses. *Int. J. Nurs. Stud.* 40(8):709-764.
- Mbada CE, Obembe AO, Alade BS, Adedoyin RA, Johnson OE, Soremi OO (2012). Work-related musculoskeletal disorders among health workers in a Nigerian Teaching Hospital. *TAF Prev. Med. Bull.* 11(5):583-588. doi:10.5455/pmb.1-1320331223
- McCauley Bush P (2011). *Ergonomics: Foundational Principles Applications and Technologies an Ergonomics Textbook*; CRC Press, Taylor and Francis, Boca Raton, FL.
- Middlesworth M (2016). A Step-by-Step Guide to the REBA Assessment Tool. *Ergonomics Plus*. Retrieve from: <http://ergo-plus.com/reba-assessmenttoolguide/>
- Mohase N, Khumalo J (2014). Job satisfaction in the healthcare services in South Africa: Case of MPH. *Mediterr. J. Soc. Sci.* 5(3):94-102. DOI: 10.5901/mjss.2014.v5n3p94.
- Rambabu T, Suneetha K (2014). Prevalence of work related musculoskeletal disorders among physicians, surgeons and dentists: A Comparative Study. *Ann. Med. Health Sci. Res.* 4(4):578-582.
- Salik Y, Özcan A (2007). Work-related musculoskeletal disorders: A survey of physical therapists in Izmir-Turkey. *BMC Musculoskelet. Disord.* 5:27. doi: 10.1186/1471-2474-5-27.
- Scott CR (2006). Communication, social support and burnout: A brief literature review. *Micro Organizational Communication Theory Res. New Left Rev.* 83:3-24.
- Smith M, Roy T (2007). Authentic leader creating healthy work environments for nursing practice. *Am. J. Critic. Care* 15:256-267. Southern Africa (ICOH Special issue): 56-60.
- Thornton L, Barr A, Stuart-Buttle C (2008). Perceived musculoskeletal symptoms among dental students in the clinic work environment. *Ergonomics* 51:573-86.
- Tinubu B, Mbada C, Oyeyemi A, Fabunmi A (2010). Work-related musculoskeletal disorders among Nurses in Ibadan, South-west Nigeria: a cross-sectional survey doi: 10.1186/1471-2474-11-12
- Yasobant S, Rajkumar P (2014). Work-related musculoskeletal injuries among health workers: A cross-sectional assessment of risk factors in tertiary hospital, India. *Indian J. Occup. Environ. Med.* 18(2):75-81. doi: 10.4103/0019-5278.146896