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Work-Related Musculoskeletal Disorders among Self-employed Sewing Machine Operators in Maiduguri, Nigeria

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Abstract

Background: Globally, studies on prevalence of WMSDs focused mainly on populations in organized industrial sectors and professions.

Purpose: This study was therefore designed to determine the prevalence of WMSDs, risk factors and coping strategies for this disorder among self-employed sewing machine operators in Maiduguri, Nigeria.

Method: Close-ended structured questionnaire, drafted and modified from the short version of the standardized Nordic Musculoskeletal Questionnaire (NMQ) for investigating work-related musculoskeletal symptoms in working populations was used for the study. Copies of this questionnaire were administered on willing and volunteer self-employed sewing machine operators in Maiduguri using a non-probability sampling of convenience technique.

Results: Two hundred and nineteen copies of the questionnaire out of 247 administered were duly completed and retrieved. Ninety five out of the 219 respondents reported WMSDs, giving a prevalence of 43.4%. Mean and age range in years of the respondents were 30.03 ± 11.99 and 11-72 respectively. Majority (81.2%) of the respondents was in the age range of 11-40 years and males accounted for 63.9%. Weak significant association ($p<0.05$; $p=0.042$) in prevalence of WMSDs existed among the age groups. Lower back (41.7%) and neck (34.7%) were the most affected body parts.

Conclusion: Majority of the respondents suffering from WMSDs were able to identify correctly the risk factors of this condition. This implies that this population may easily adjust to proper ergonomic measures if introduced to them.

Keywords: Organized industrial sectors and professions; Coping strategies; Self-employed sewing machine operators; Nordic musculoskeletal questionnaire

Introduction

Musculoskeletal injuries or disorders (MSDs) as the name implies covers a variety of inflammatory and degenerative conditions that cause pain and discomfort in the musculoskeletal system, and its surrounding neurovascular structures [1]. Work-related musculoskeletal disorders (WMSDs) in other hand are musculoskeletal injuries sustained from work related events [2]. The etiology of work-related musculoskeletal disorder (WMSD) ranges from forceful or repetitive movements to poor working postures or environments, and it affects any joint and muscle compartment in the body [3]. Kuorinka et al. [3] observed that individuals affected with this condition most often complain of joint and muscle tenderness, aches, pain, stiffness and swelling. da Costa and Vieira [4] reported that excessive repetition, awkward posture and heavy lifting are the major biomechanical risk factors of WMSDs.

The commonest risk factors among sewing machine operators are adaptation of awkward posture due to poorly designed seating devices that lack adjustable seat heights and back rests, and repetitive nature of sewing machine operators' tasks such as pedaling, and extreme flexion of the trunk and neck [5,6]. A survey of sewing machine operators in Ibadan Southwest Nigeria by Akanbi and Ikemefuna [5] found that the workstations of the sewing machine operators, especially the sitting devices, were of various types and designs without consideration to ergonomic requirements. Every sewing machine operator surveyed used foot-operated sewing machine with the machine serving as work table.

Scholars from different countries had reported prevalence of WMSDs among sewing machine operators. Afonso et al. [7] estimated 76% prevalent rate of WMSDs among sewing machine operators in Portugal. Wrist/hand (42%), neck (32%) low back (30%) and shoulders (23%) were the most affected body parts. In Denmark, Kaegaard and Andersen [8] reported prevalence of 15% and 5.8% for myofascial pain syndrome and rotator cuff tendinitis respectively among sewing machine operators. The prevalence of moderate to severe musculoskeletal pain in the neck/shoulder region and distal upper extremity were 24% and 16% respectively among sewing machine operators in Los Angeles [9]. A result of a study on ergonomics issues among sewing machine operators in the textile manufacturing industry in Botswana revealed a high prevalence of WMSDs [6]. These scholars .concluded that back, neck and shoulder discomfort were highly prevalent among the sewing machine operators surveyed.

In Nigeria, studies on prevalence of WMSDs among sewing machine operators are not easily available for referencing. A survey

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study on sewing machine operators in Ibadan Southwest Nigeria was conducted by Akanbi and Ikemefuna [5]. These authors assessed the sewing machine operators' workspace (i.e. sewing machine, chair and surrounding workplace), and not the prevalence of WMSDs. The only published and available study on prevalence of WMSDs among sewing machine operators was conducted in Lagos, Nigeria by Akodu et al. [10]. Akodu and colleagues [10] reported 92.0% prevalent rate among this population, with the low back (78.6%) being the most affected body part.

Other studies [11-16] in Nigeria on prevalence of WMSDs focused on other populations, mainly in organized industrial sectors and professions. This preference to conduct studies in organized industrial sectors and professions may not be peculiar to Nigerian scholars alone. Globally, prevalence studies on WMSDs among the self employed seem to be relegated to the background, apart from few on hair dressers [17-19]. Based on the aforementioned statements and the specific work activities of sewing machine operators, as well as dearth of literature on WMSDs on this population in Nigeria; this study was designed to determine the prevalence of WMSDs in sewing machine operators, the most frequently affected body parts, risk factors and coping strategies for WMSDs among self employed sewing machine operators in Maiduguri, Nigeria.

Materials and Methods

A close-ended structured questionnaire, drafted and modified from the short version of the standardized Nordic Musculoskeletal Questionnaire (NMQ) for investigating work-related musculoskeletal symptoms in working populations [3] was used in this study. Previous studies [11,13,15,16] in Nigeria had validated and utilized this modified version, and found it suitable for Nigerian environment and culture. Research and Ethics Committee of the University of Maiduguri Teaching Hospital gave approval for this cross-sectional survey study. Respondents signed or thumb printed informed consent forms. We explained the objectives and benefits of the study to the respondents, and the procedures for completing the questionnaire. We also informed them that the information obtained would be used strictly for research purposes, and implored them to duly complete the questionnaire. Copies of this questionnaire were administered on willing and volunteer self employed sewing machine operators residing in Maiduguri as at the time of the study using a non probability sampling of convenience technique. Participants who could not read or/and understand English Language completed translated Hausa Language version of this questionnaire. An expert in Hausa Language who lectures at the Department of Languages and Linguistics, University of Maiduguri, Nigeria made this translation. BPM (one of the authors), who is fluent in Hausa and English Languages administered the Hausa version of the questionnaire.

The questionnaire comprised two parts:

The first part was meant for socio-demographic characteristics of the respondents. The second comprised questions on prevalence, risk factors and coping strategies of WMSDs. Questions on prevalence portrayed a portrait of human structure with nine body parts as follows: neck, shoulders, upper back, lower back, elbows, wrists/hands, thighs, knees and ankles. This structure was meant for a table that demands a 'yes' or 'no' response for each body part to three questions pertaining to 12 months prevalence, seven day prevalence and any disability during the last year (annual disability). The items on risk factors described features that could lead to WMSDs. Originally, these items were 15, but for the purpose of this study, four items that were not relevant to the population (self-employed sewing machine operators) under study were expunged. These items were: "attending to a large number of customers in a day", "incorrect computer workshop stations", "work scheduling" and "demanding/stressful job description and work function". Among those retained were: "performing the same tasks over and over", "not a enough breaks rest during the day," "working in awkward or cramped positions". The responses to these items were rated on "not important", "minimally important", "moderately important" and "significantly important". The items on coping strategies were nine and covered statements that the participants with WMSDs thought might assuage their symptoms. Examples of these responses were: "I get someone else to help me carryout my work/functions", "I change my sitting/standing posture regularly when carrying out my functions", "I pause regularly so I can stretch", "I select work/functions that will not aggravate/provoke my discomfort". The respondents were required to respond as follows: "almost always", "sometimes" or "almost never." Statistical Package for Social Sciences (SPSS) version 17 was used for data evaluation. Descriptive statistic of percentages and frequency counts summarized the socio-demographics of the participants, and prevalence of WMSDs. Pearson Chi square was employed to determine any association between prevalence of WMSDs and socio-demographics of the respondents. Significant level was pegged at 0.05.

Results

Two hundred and forty seven copies of the standardized Nordic Musculoskeletal Questionnaire (NMQ) were administered to the respondents. Two hundred and nineteen copies were duly completed and returned, yielding a response rate of about 89%. Ninety five out of the 219 respondents reported WMSDs, giving a prevalence of 43.4%. The mean and age range in years of the respondents were 30.03 ± 11.99 and 11-72 respectively. Majority 81.2% of the respondents were in the age range of 11-40 years and males accounted for 63.9%. The years of working experience for most (37.4%) was between one and five years (Table 1). Table 2 presents the prevalence of WMSDs among the respondents based on sociodemographic variables. The associations between prevalence of WMSDs and socio-demographic variables are shown in Table 3. Table 4 illustrates 12 month and seven day prevalence, and annual disability of WMSDs in each body part. Tables 5 and 6 represent responses to causative risk factors of WMSDs and coping strategies adopted.

Discussion

The mean and age range in years of the respondents were 30.03 ± 11.99 and 11-72 respectively. This infers that the majority of the respondent in this survey were within younger age group as depicted in (Table 1). The prevalence of WMSDs in the respondents between the age group of 11 and 40 years was 82%. Pearson X^2 revealed a weak significant association among the age groups. There had been contradictory reports on the association between WMSDs and age among sewing machine operators. Afonso et al. [7] reported increased prevalence of WMSDs among sewing machine operators in younger age group. Aghili et al. [20] found association between the prevalence of WMSDs and increasing age of sewing machine operators. Other studies [16,21] had reported high prevalence of WMSDs among younger workers. Inexperience [16,21], increased workload, lack of skill and knowledge [16] had been incriminated as factors that may be responsible for high prevalence of WMSDs among younger workers.

Male sewing machine operators were in preponderance over their female counterparts. This male bias in terms of freedom to work outside the homes and participation in studies is in tandem with previous

Variables	Frequency (219)	Percentages (100)
Age group (years)		
11-25	89	40.6
26-40	89	40.6
41-55	29	13.3
56-70	11	5.0
≥71	1	0.5
Gender		
Male	140	63.9
Female	79	36.1
Working experience(years)		
1-5	82	37.4
6-10	47	21.5
11-15	27	12.3
>15	63	28.8

Table 1: Socio-demographics of the respondents.

Variables	Frequency (n=219)	Respondents with WMSDs within variable (n=95)	Prevalence of WMSD within each variable	Chi Square statistic	p value
Age group (years)					
11-25	89	43	48.3	13.386	0.042*
26-40	89	30	33.7	-	-
41-55	29	13	44.8	-	-
56-70	11	8	72.7	-	-
≥71	1	1	100.0	-	-
Gender					
Male	140	68	48.6	17.034	0.019*
Female	79	27	34.2		
Working experience (years)					
1-5	82	38	46.3	2.925	0.582
6-10	47	17	20.7	-	-
11-15	27	11	40.7	-	-
>15	63	29	46.0	-	-

Table 2: Prevalence of WMSDs among the respondents based on variables.

Variables	Frequency (n=219)	Respondents with WMSDs within variable (n=95)	Prevalence of WMSD within each variable	Chi Square statistic	p value
Age group (years)					
11-25	89	43	48.3	13.386	0.042*
26-40	89	30	33.7	-	-
41-55	29	13	44.8	-	-
56-70	11	8	72.7	-	-
≥71	1	1	100.0	-	-
Gender					
Male	140	68	48.6	17.034	0.019*
Female	79	27	34.2		
Working experience (years)					
1-5	82	38	46.3	2.925	0.582
6-10	47	17	20.7	-	-
11-15	27	11	40.7	-	-
>15	63	29	46.0	-	-

*Significant difference at p<0.05.

Table 3: Associations between prevalence of WMSDs and socio-demographic variables.

studies [16,22,23] conducted in this part of Nigeria. Contrary to the findings of past studies [20,24,25], this present study found higher prevalence of WMSDs among male respondents than the females. This could be attributed to the lower number of female respondents which was almost half of that of the males.

The lower back and neck accounting for 41.7% and 34.7% respectively, and the shoulder and upper back constituting 26.4% each were the most affected body parts based on annual prevalence This

Body part affected by WMSD	Previous 12 months n (%)	Previous 7 days n (%)	Annual Disability n (%)
Neck			
No	62(65.3)	71(74.7)	92(96.8)
Yes	33(34.7)	24(25.3)	3(3.2)
Shoulder			
No	70(73.7)	77(81.1)	88(92.6)
Yes	25(26.4)	18(19.0)	7(7.4)
Elbow			
No	82(86.3)	87(91.6)	90(94.7)
Yes	13(13.8)	8(8.5)	5(5.3)
Wrist/hand			
No	75(79.8)	77(81.1)	88(92.6)
Yes	19(20.2)	18(18.9)	7(7.4)
Upper back			
No	70(73.7)	81(85.3)	85(89.5)
Yes	25(26.3)	14(14.7)	10(10.5)
Lower back			
No	56(58.3)	65(68.4)	85(89.5)
Yes	40(41.7)	30(31.6)	10(10.5)
One or both hip/thighs/buttock			
No	72(75.8)	76(80.0)	90(94.7)
Yes	23(24.2)	19(20.0)	5(5.3)
One or both knee			
No	75(98.9)	76(80.0)	93(97.9)
Yes	20(21.1)	19(20.0)	2(2.1)
One or both ankle/feet			
No	75(79.8)	83(87.4)	90(94.7)
Yes	19(20.2)	12(12.6)	5(5.3)

Table 4: Twelve months and seven day prevalence, and annual disability of WMSDs in each body part.

finding agrees with those of previous studies. Afonso et al. [7] reported that neck (32%), low back (30%) and shoulders (23%) were the most affected body parts among sewing machine operators in Portugal. Neck/shoulder (24%) was the most affected region among sewing machine operators in Los Angeles [9]. In Botswana, Sealetsa and Thatcher [6] observed that back, neck and shoulder discomfort were highly prevalent among the sewing machine operators. Akodu et al. [10] reported the low back (78.6%) as the most affected body part. This consistency findings by this study and others on high prevalent rates of WMDSs in the neck, shoulders and lower back among sewing machine operators may not be unconnected with awkward posture due to poorly designed seating devices and repetitive tasks involved in sewing such as pedaling, and extreme flexion of the trunk and neck [5,6]. It could also be attributed to poorly designed workstations without consideration to adequate ergonomic requirements.

The prevalent rate (43.4%) of WMSDs found in this study is quite lower than those of previous findings that estimated 76% [7] and 92% [10] prevalent rates. This may be as a result of differences in environment and urbanization. Sewing machine operators in developed countries and more urbanized areas may be exposed to greater stressful work environment and higher workloads. Another reason could be that some sewing machine operators might have left Maiduguri because of the present insurgency. A result of a study on ergonomics issues among sewing machine operators in the textile manufacturing industry in Botswana revealed a high prevalence of WMSDs [6].

Our respondents suffering from WMSDs were able to identify the following as the most important risk factors for their conditions:

Body part affected by WMSD	Previous 12 months n (%)	Previous 7 days n (%)	Annual disability n (%)
Neck			
No	62(65.3)	71(74.7)	92(96.8)
Yes	33(34.7)	24(25.3)	3(3.2)
Shoulder			
No	70(73.7)	77(81.1)	88(92.6)
Yes	25(26.4)	18(19.0)	7(7.4)
Elbow			
No	82(86.3)	87(91.6)	90(94.7)
Yes	13(13.8)	8(8.5)	5(5.3)
Wrist/hand			
No	75(79.8)	77(81.1)	88(92.6)
Yes	19(20.2)	18(18.9)	7(7.4)
Upper back			
No	70(73.7)	81(85.3)	85(89.5)
Yes	25(26.3)	14(14.7)	10(10.5)
Lower back			
No	56(58.3)	65(68.4)	85(89.5)
Yes	40(41.7)	30(31.6)	10(10.5)
One or both hip/thighs/buttock			
No	72(75.8)	76(80.0)	90(94.7)
Yes	23(24.2)	19(20.0)	5(5.3)
One or both knee			
No	75(98.9)	76(80.0)	93(97.9)
Yes	20(21.1)	19(20.0)	2(2.1)
One or both ankle/feet			
No	75(79.8)	83(87.4)	90(94.7)
Yes	19(20.2)	12(12.6)	5(5.3)

Table 5: Risk factors for WMSDs.

Strategies	Almost always	Sometimes	Almost never
I get someone else to carry out my work/functions	23(24.2)	33(34.7)	39(41.1)
I change my sitting/standing posture regularly when carrying out my functions	48(50.5)	32(33.7)	15(15.8)
I pause regularly so I can stretch	54(56.8)	35(36.9)	6(6.3)
I adjust my sit	49(51.6)	36(37.9)	10(10.5)
I select work/functions that will not aggravate my discomfort	21(22.1)	32(33.7)	42(44.2)
I stop the work if it aggravate my discomfort	24(25.3)	33(34.7)	38(40.0)
I take a break from the work for a day	20(21.1)	27(28.4)	48(50.5)
I take a break from work for a couple of days	16(16.8)	26(27.4)	53(55.8)
I seek medical attention	58(61.0)	17(17.9)	20(21.1)

Table 6: Coping strategies for WMSD.

"continuing to work when injured or hurt", "working in awkward positions", "working in same position for long periods" and "inadequate training on injury prevention". It could be that these respondents continue to sew even when injured in order to meet up with their daily needs since they are self employed, and presently there is no social security in Nigeria to take care of those that may need help. For the affected respondents to correctly identify the most significant risk factors for developing WMSDs entails that they could easily adjust if proper ergonomic measures are put in place for them. Most of the

respondents with WMSDs did not consider taking a break from work as coping strategies. This could also be related to the above reasons, because they perceive they need to continue working to be able to fend for themselves and their families, especially in our environment where extended family system is sacrosanct.

Limitation

Our sample size for this survey might not have been a true reflection of the population under study. Most residents in Maiduguri left the town because of the current insurgency in the Northeastern Nigeria. This mass exodus might have affected the result of the study, since some sewing machine operators might have left Maiduguri.

Conclusion

The ability of the majority of the respondents suffering from WMSDs to correctly identify the risk factors, infers that they may easily adjust if proper ergonomic measures are introduced to them. Hence, education on the awareness of occupational health hazards in work environments is necessary.

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