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Prevalence And Profile Of Work-Related Musculoskeletal Disorders Among Peasant Farmers In A Rural Community In South-Western Nigeria

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ABSTRACT

Background and objective: Rural Farmers, representing a significant proportion of workers in Africa, are more likely to suffer from work related musculoskeletal disorders (WMSDs) than other types of health hazards due to high level of manual labour involved in farming. Till date, there is paucity of studies on prevalence of WMSDs among rural farmers in Africa. This study investigated the prevalence and profile of WMSDs among farmers in a rural community in South-western Nigeria. Materials and Methods: Based on the World Health Organization (WHO) guidelines for conducting community surveys, this study recruited community farmers from Gudugbu village, Oyo State, Nigeria using the multistage sampling technique. An adapted questionnaire from the Nordic musculoskeletal questionnaire was used as the survey instrument. Data collected on demographics, lifetime, 12 months and past 7 days prevalence, and pattern of WMSDs among the farmers was analyzed using descriptive statistics. Results: Majority of farmers have experienced WMSDs at least once in their lifetime (99.5%) and in the past 12 months (99.5%). As reported by the farmers, the neck (66.7%), shoulder (60.2%) and low-back (49.1%) were the most affected body parts over a 12-month prevalence period. The past 7 days prevalence for WMSDs was 56%. Conclusion: Reports of WMSDs are common among Nigerian peasant farmers employed in Gudugbu Village, South West, Nigeria, with the neck, shoulders and low-back being the most commonly injured body parts. Preventive programmes are recommended in order to reduce rate of WMSDs and promote productivity.

Keywords: Work-related musculoskeletal disorders, prevalence, farmers, Gudugbu, Nigeria

INTRODUCTION

Musculoskeletal Disorders (MSDs) are described as pain or discomfort experienced as a consequence of injuries or damages to the soft tissues, and supporting structures such as the intervertebral disc; and bones [1,2]. Although, MSDs are of multifactorial aetiology, they are mostly recognized and reported as work-related

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illnesses [1, 3, 4]. Regardless of numerous literature on MSDs, causal associations between its occurrence and work-related factors remain the subject of debate [1, 5]. This is because it is often difficult to discriminate between Work-related Musculoskeletal Disorders (WMSDs) and MSDs since their consequences, in response to work demands, may be similar [4]. However, based on its multifactorial aetiology, the World Health Organization (WHO) has characterized MSDs as work-related rather than occupational [5].

Several studies have investigated WMSDs among various occupational groups ranging from white collar professionals to blue collar workers [6-11]. Most studies reported higher prevalence of WMSDs among blue-collar workers whose jobs require high level of physical tasks and work activities such as manual handling, lifting or carrying of heavy loads or equipment, use of vibrating tools, awkward postures and repetitive forced motions [8-14]. Advances in technology in the developed countries among certain occupations have drastic minimize workers exposure to high level of physical tasks. However, empirical and anecdotal evidence show that farming in the developing countries are most commonly not mechanized and still involves excessive manual tasks and heavy workloads. Farming in Africa is largely subsistent, self-sufficient and on small scale level and it is usually practiced with crude implement and methods [15, 16]. Therefore, labour-intensive farming as practiced in most countries in Africa is a risk factor for agriculturally related MSDs. In spite of the fact that farmers in the rural communities represent a significant proportion of blue collar workers in Africa, there is still paucity of studies on prevalence of WMSDs among them. The objective of this study was to assess the prevalence and pattern of WMSDs among peasant farmers in a rural community in South-western Nigeria.

MATERIALS AND METHODS

Study Design: This was a community based cross-sectional survey on prevalence and pattern of MSDs among full time peasant farmers who were residents of Gudugbu Oyo, Nigeria.

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Sampling Method and Study Setting: The multistage random sampling method was used in this study. In the first stage of sampling, Oyo state was randomly selected from the six states that made up the South-Western Nigeria namely Ekiti, Lagos, Ogun, Ondo, Osun and Oyo. In view of the fact that rural settlements in Nigeria are fast urbanizing with a majority in transition into semi-urban communities, communities that are typically rural in Oyo state were purposively selected and listed. Gudugbu was randomly selected from the list of the rural communities.

Gudugbu village is located in Oyo East Local Government and it is the catchment village for the neighbouring communities. The village houses the only school and health centre in the area. The villagers consist majorly of Oyo speaking Yoruba indigenes and also some non-indigenes as Igbo, Abasa, Egede, and Togolese people among others. Gudugbu is made up of twelve hamlets under the control of the Baale of Gudugbu (i.e. the village chief). Mixed cropping involving cassava and maize are dominantly practiced in this study setting. Legumes and vegetables are often planted in the mixed cropping practices among the farmers. Men are involved in manual hoeing and ridge making preparatory for planting during the raining season, while both men and women are usually involved in planting. However, the women are prominently involved in farm mulching, produce transporting and storage tasks. Women are also involved in the processing of cassava and maize into garri and pap which are part of the staple food in the community. Women more than men are involved in load (farm produce) carriage and transportation that involves trekking long distance due to bad and/or lack of road networks as other forms of transportation such as bicycling are scarce. Unlike the Eastern part of Nigeria, cycling is not a common means of transportation in the study setting and it is not in the culture for the women folk to ride bicycles or, worst still, motorbikes. Consequently, farm produce are often carried on the head over long distances before the point where motor vehicles transportation are available.

Using the WHO [17] guidelines for conducting surveys in rural communities, eight out of the twelve hamlets of which Gudugbu

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community is consisted were randomly chosen. In each enumerated area, nine houses were selected at random. In order to prevent over sourcing each unit, a maximum of three full -time consenting peasant farmers no less than eighteen years of age, currently involved in farming were recruited. In a case where less number of farmers required (3 out of every 9 houses) were present in each enumerated area, such areas were expanded and additional houses were randomly selected to make up for the lacunar. All eligible and consenting peasant farmers were recruited until about twenty-seven participants were surveyed in each hamlet.

Exclusion Criteria: Individuals who were no longer active in farming, who were involved in other occupations that could also predispose to WMSDs (for instance commercial driving, automobile mechanics or bricklayers), or who had other conditions (such as rheumatoid arthritis and diabetes mellitus) were excluded from the study.

Instrument and Data Collection: A two-section questionnaire adapted from the Nordic musculoskeletal questionnaire [18] was used as the survey instrument in this study. Section A - sought information on the socio – demographics (age [in years], gender, marital status [single, married, separated], religion [Christianity, Islam, Others], educational qualification [primary, secondary, tertiary, none], ethnicity and monthly income [<N7, 500, N7, 500-N15, 000, >N15, 000) of the respondents while section B sought information on WMSDs profile and pattern among the respondents. Respondents were asked if they have had any WMSDs in the last 12 months and last 7 days which were believed to be work-related and had prevented normal activity. Questionnaire items measuring WMSDs included: Have you ever experienced a work-related pain, ache, discomfort, or injury that lasted for more than three days and prevented normal activity in your body?, If you answered 'Yes', was your experience of pain, ache, discomfort, or injury within the last 12 months?, If 'Yes', indicate the part(s) of your body where you experienced pain, ache, discomfort, or injury.

The symptom-survey segment of questionnaire allows for multiple choice

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responses of musculoskeletal disorders affecting nine body areas. These are neck, shoulders, upper back, elbows/forearm, low back, wrist/hands/thumb, hips/thighs, knees and ankles/feet. Other questions included: Are you experiencing a work-related pain, ache, discomfort, or injury in any part(s) of your body right now? If 'Yes', rate your present pain, ache or discomfort on this scale of 0 (no pain) to 10 (most severe pain).

0	1	2	3	4	5	6	7	8	9	10

Twenty out of the 250 peasant farmers invited to participate in the study declined participation. Although questionnaires were administered on the 230 workers (92% response rate), 216 copies were completely filled and used in the final analysis. Data were collected by two graduate field assistants over a three-month period and between 7:00 and 9:00 a.m. week days when the respondents could be met at home. Ethical approval for this study was obtained from the Ethics and Research Committee of the Institute of Public Health, Obafemi Awolowo University, Ile-Ife, Nigeria. All respondents gave informed consent for participation in the study.

Data analyses

Data were summarized using the descriptive statistics of mean, standard deviation and percentages. Inferential analysis of Chi – square was used to test association between positive history of WMSDs and demographic variables. Chi-Square test results for demographic variables having cells with zero prevalence levels were considered inappropriate and were not presented. The data analysis was carried out using SPSS 16.0 version software (SPSS Inc., Chicago, Illinois, USA).

RESULTS

The mean age of the respondents was 41.2 (SD=16) years. Table 1 shows the demographic characteristics of the respondents. The respondents were mostly married (180 (83.3%), of Yoruba tribe (167 (77.3%), Islamic faith (167 (77.3%)), and with no formal

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education (134 (62%) and mostly with a personal monthly income less than N7500 (171 (79.2%)).

Most of the workers experienced WMSDs, which lasted for more than three days, at least once in their lifetime (99.5%) and in the past 12 months (99.5%).The lifetime and 12-month prevalence of WMSDs that lasted for more than three days was 99.5% respectively (table 2). Chi – square test of association between positive history of WMSD and demographic variables is presented in table 3. There was no significant association between a positive history of WMSDs and the socio-demographic factors ($p>0.05$). Table 4 shows the gender-specific prevalence and pattern of 12-month and current prevalence of WMSDs. The pattern for 12-month prevalence shows that the neck 144 (66.7%), shoulder 130 (60.2%) and the low-back 106 (49.1%) were the most affected body parts. The past 7 days prevalence for WMSDs was 56% (121). The current pain prevalence of WMSDs by body parts show that the low-back (49 (22.7%)), the shoulders (23 (10.7%)) and the knees 22 (10.2%) were the most affected body parts. However, no specific gender pattern was observed in the prevalence of WMSDs. The mean past 7 days pain intensity was 3.2±1.3 on a 10-point rating scale.

DISCUSSION

Farming is classified by the International Standard Classification of Occupations under group 9 which covers workers whose tasks include digging and shovelling; loading and unloading; raking and pitching hay; watering and weeding; picking fruit and other crops; feeding, watering and grooming animals [19]. High level of manual labour, the use of crude implement and the use of outdated farming methods are common among rural farmers in Nigeria [20-22]. These aforementioned work characteristics endanger such farmers to WMSDs. This study describes survey results for MSDs among peasant farmers in a rural Nigerian setting. A very high prevalence of WMSDs was observed which implies a high-risk population given the hazardous nature of agricultural work. The farmers in this study are largely subsistent as they live on less than N7500 (i.e. about US$45)

personal monthly income which is lower than the current minimum wage of N18000 (i.e. US$108.8) in Nigeria [23].

In this study, majority of the study sample had WMSDs at least once in their lifetime (99.5%) and also in the past 12 months (99.5%). The lifetime and 12-month prevalence of WMSDs obtained in this study is higher than 90.6% and 76.9% reported in a systematic review among farmers [24]. Osborne et al [24] in a review of 24 studies investigated the prevalence and the most common regional distribution of MSDs among farmers. They concluded that the prevalence of MSDs in farmers is greater than in non-farmer populations. However, studies on prevalence of MSDS among farmers from the developed countries [24] where farming is largely mechanized may not be comparable with those from the developing countries. Further, variations also exists in the farming practices and workplace exposures between these two regions Although data was not collected on workplace exposures to WMSDs, it is not impossible that the higher prevalence of WMSDs in this study may as a result of high level of manual labour involved in farming in rural communities. The use of short-handle farm implements and sturdy cutlasses is common among the farmers in this region [22]. The use of such crude implements may in turn result in increased prevalence of WMSDs among such farm workers. Although, mechanization does not totally eliminate the need for manual labour, however, applying the science of ergonomics to farm work, improvement in task organizational skills and periodic training programmes are needed among rural African farmers. Specific studies on WMSDs in rural African settings have reported varying prevalence ranging from 40% [25], 72.4% [26] to 80.0% [27]. The prevalence disparity in the previous studies could be attributed to a lack of uniformity in the explanations of WMSDs, sampling techniques, differences in the study populations, and farming methods. It is important to note that two of these previous studies [25, 26] focussed only on LBP while the last was directed towards musculoskeletal pain.

The results from this study indicated that the neck, shoulder and then low-back were the

worst hit body regions by WMSDs in the past 12 months. This observed pattern is contrary to majority of studies that found the low back to have the highest frequency of affectation by WMSDs among farmers [20, 24, 26, 28-31]. The preponderance of the neck and shoulder by WMSDs than the low back in this study may be associated with an anecdotal observation that involved carrying farm produce and other loads on the head that is rampant among the farmers in Gudugbu village. Carriage of heavy loads on the head has been reported to cause a change in the alignment of the neck producing strain of cervical joints and soft tissues as well as imbalanced muscle performance [32]. Carriage of heavy loads on the head can cause pain in cervical, thoracic and shoulder joints [33]. The effect of load carriage on the head combined with the toll of manual farming may therefore make the neck and shoulders more susceptible to WMSDs among the farmers in this study. Other studies have showed that load carriage on the head had significant negative impact on posture and gait parameters [34-36]. However, this explanation for higher rate of neck and shoulder pain compared with low-back pain is a verdant area for future study.

This study found a past 7 days prevalence of 56% for any WMSDs. This implies that one out of every two farmers had work-related pain or discomfort as at the time of the survey. The magnitude of both lifetime and past 7 days prevalence of WMSDs in this study corroborates previous submissions that MSDs are the most common occupational hazards and illnesses for labour-intensive farmers [37-43]. This high prevalence of WMSDs is a *sine qua non* of three main agriculture-related risk factors which are lifting and carrying heavy loads (over 50 lb); sustained awkward posturing or repeated bending or stoop; and very repetitive manual hand work [39, 44, 45]. However, the pattern of affectation of WMSDs by body parts in the past 7days revealed that the low-back, the shoulders and the knees were the most affected. This finding correlates with the results of most studies that found the low back to have the highest frequency of affectation by WMSDs [20, 24, 27].

In addition, as shown by the mean past 7 days work-related pain intensity of 3.2±1.3,

this study found pain or discomfort resulting from WMSDs to be mild. The reason for this report of mild intensity is unknown. Considering the labour-intensive nature of farming in the study population, reporting a pain intensity of 3 on a 10-point scale seems paradoxical. However, objectifying the magnitude of pain and determining the nexus between the experience and expression of pain remains a clinical enigma [46, 47].

Limitations

The quantitative approach employed in this study may have limited other valuable insights on peculiar causes and implications of WMSDs that might have been elucidated from a mixed design. However, the finding of this study showed that the gender-specific roles seem not to influence the pattern of lifetime and current WMSDs among the farmers as no specific pattern was observed between male and female. Furthermore, a potential limitation of this study is its self-report nature. This is because this study investigated the occurrence of WMSDs at lifetime and 12 months periods which could also lead to some degree of misclassification due to recall bias. This may result in over-reporting or under-reporting of the work-related musculoskeletal symptoms. It is also possible that some of the farmers perceived their MSDs as WMSDs regardless of whether they were caused by work or not. Adegoke et al [4] submitted that “work may only be a contributory factor in the aetiology of MSDs among workers and that it may be difficult to distinguish between WMSDs and musculoskeletal disorders since their consequences in response to work demands may be similar”. Further, asides face and content validation, the Yoruba translated version of the NMQ that the researchers administered on unlearned farmers, did not undergo further psychometric testing.

CONCLUSION: MSDs are common among Nigerian peasant farmers with the neck, shoulders and low-back being the most commonly injured body parts. Mechanization of rural farming and other preventive programmes are recommended in order to reduce rate of MSDs and promote productivity.

Conflict of Interests

We declare no conflict of interests.

Authors' Contributions

CEM conceived the idea for this study, participated in data collection, conducted analysis and interpretation of data and prepared the final manuscript for publication. TLA participated in the design of methodology and data collection and drafted the manuscript. RAA, OOA, OSO, and OU developed the study's methodology and drafted the manuscript. All authors read and approved the final manuscript

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Table 1: Socio-demographic Characteristics of Surveyed Farmers in Gudugbu Village (N=216)

Variable	Frequency	Percentage (%)
Age		
<25yrs	38	17.6
25-34yrs	36	16.7
35-44yrs	57	26.4
45-54yrs	38	17.6
55-64yrs	18	8.3
>65yrs	29	13.4
Gender		
Male	108	50.0
Female	108	50.0
Marital Status		
Single	34	15.7
Married	180	83.3
Separated	2	0.9
Religion		
Islam	167	77.3
Christianity	41	19.0
Others	8	3.7
Educational qualification		
Primary	42	19.4
Secondary	38	17.6
Tertiary	2	0.9
None	134	62.0
Ethnicity		
Yoruba	166	76.9
Igbo	5	2.3
Togolese	15	6.9
Others	30	13.9
Monthly Income		
<N7500	171	79.2
N7500-N15000	34	15.7
>N15000	11	5.1

Key: N means Naira. N165.50 at the time of the study was equivalent to $1

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Table 2: Prevalence of Musculoskeletal Pain (MSDS) among surveyed farmers in Gudugbu village (N=216)

Variable	Frequency	Percentage (%)
MSDs Lifetime		
Yes	215	99.5
No	1	0.5
MSDs 12months		
Yes	215	99.5
No	1	0.5
Current pain		
Yes	121	56.0
No	95	44.0

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Table 3: Chi – square test of association between positive history of WMSD and demographic variables

	Yes (n=215)	No (n=1)	X^2	p-value
Age group				
18-25 years	37(17.2%)	1(100.0%)		
25-34 years	36(16.7%)	0(0.0%)		
35-44 years	57(26.5%)	0(0.0%)		
45-54 years	38(16.3%)	00.0%)		
55-64 years	18(8.4%)	0(0.0%)		
> 65 years	29(13.5%)	0(0.0%)		
Sex				
Male	108(50.2%)	0(0.0%)		
Female	107(49.8%)	1(100.0%)		
Marital status				
Single	34(15.8%)	1(100.0%)		
Married	179(83.3%)	0(0.0%)		
Separated	2(0.93%)	0(0.0%)		
Religion				
Islam	166(77.2%)	1(100.0%)		
Christianity	41(19.1%)	0(0.0%)		
Traditional worship	1(0.46%)	0(0.0%)		
Others	7(40%)	0(0.0%)		
Education				
No education	135(62.8%)	1(100.0%)		
Primary	41(19.1%)	0(0.0%)		
Secondary	37(17.2%)	0(0.0%)		
Tertiary	2(0.93%)	0(0.0%)		
Ethnicity				
Yoruba	166(77.2%)	1(100.0%)		
Igbo	4 (1.86%)	0(0.0%)		
Togolese	15(6.98%)	0(0.0%)		
others	30(14.0%)	0(0.0%)		
Income				
<N7500	166(77.2%)	1(27.3%)	4.680	0.197
N7500- N15000	4 (1.86%)	0(9.1%)		
N15000-N50000	15(6.98%)	0(63.6%)		

Key: N means Naira. N165.50 at the time of the study was equivalent to $1

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Table 4: Gender-specific prevalence and pattern of Musculoskeletal Pain (MSDs) among the respondents (N=216)

Variable	Gender		
	Male	Female	All respondents
	n(CI)	n(CI)	n(%)
Past 12-months (n=215)			
Thumb	4(0.1370-0.7880)	5(0.2120-0.8630)	9 (4.1)
Upper back	31(0.3456-0.5966)	35(0.4034-0.6544)	66(30.6)
Elbow/Forearm 7	(0.0959-0.4110)	24(0.5890-0.9041)	31(14.4)
Wrist/Hand	8(0.2465-0.7535)	8(0.2465-0.7535)	16(7.5)
Low-back	63(0.4946-0.6887)	43(0.3113-0.5054)	106(49.1)
Hip/Thigh	18(0.5630-0.9254)	5(0.0746-0.4370)	23(10.7)
Knees	11(0.2978-0.7429)	10(0.2571-0.7022)	21(9.7)
Ankles	1(0.0126-0.9874)	1(0.0126-0.9874)	2 (0.9)
Neck	71(0.4088-0.5776)	73(0.4224-0.5912)	144(66.7)
Shoulder	58(0.3590-0.5358)	72(0.4642-0.6410)	130(60.2)
Past 7 days pain Pattern (n=121)			
Neck	12(0.4099-0.8666)	6(0.1334-0.5901)	18 (8.3)
Shoulder	8(0.1638-0.5727)	15(0.4273-0.8362)	23(10.7)
Upper back	9(0.4822-0.9772)	2(0.0228-0.5178)	11(5.1)
Elbow/Forearm 1	(0.0063-0.8059)	3(0.1941-0.9937)	4 (1.8)
Wrist/Hand	2(0.0943-0.9916)	1(0.0084-0.9057)	3(1.4)
Low-back	24(0.3442-0.6366)	25(0.3634-0.6558)	49(22.7)
Thumb	0(0.000-0.5218)	5(0.4782-1.000)	5(2.4)
Hip/Thighs	4(0.1216-0.7376)	6(0.2624-0.8784)	10(4.6)
Knees	11(0.2822-0.7178)	11(0.2822-0.7178)	22(10.2)
Ankles	3(0.2924-1.000)	0(0.000-0.7076)	3(1.4)

Note: The pattern of MSDS was on multi-choice basis as a respondent may indicate more than one body site.
CI = 95% Confidence Interval