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The Prevalence and Causes of Musculoskeletal Pain among Farmers in the Volta Region of Ghana: A Cross Sectional Study

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Abstract

Musculoskeletal pain (MSK) disorder is considered one of the prime causes of severe long-term pain and physical disabilities acquired globally. Ghanaians especially, farmers have to go through vigorous physical farm activities to achieve desired output of farm activities. In the Volta Region, MSK pain has ranked among the top three reported cases at the Ho Teaching Hospital. Whilst, the quantum of reported cases is known, and treated at the hospital, the actual causes are not. Coupled with the fact that prevalence and probably the causes would differ from profession to profession the proposed research is aimed at addressing this among farmers. The overall goal of the study was to determine the prevalence and causes of MSK pain among farmers in the Volta Region of Ghana. 212 farmers were randomly selected for the study. Cross-sectional surveys were carried out to obtain the demographic and socio-economic status of the patients consenting to participate in the studies. Both, qualitative and quantitative statistical methods were employed to determine any association between the farming methods, tools used and the type of MSK pains. The most prevalent locations of MSK pain among farmers were the lower back, upper back, right and left knees. The possible causes of MSK pain reported by farmers in the Volta Region were by walking or by other transportation (riding bicycles and motorbikes) or using implements such as cutlass, hoe and spraying machine.

Keywords: *Ghana, Farmers, Farming practices, Lower Back Pain, Disability-Adjusted Life Years, Work-related Musculoskeletal Disorder, Musculoskeletal pains.*

Introduction

Musculoskeletal (MSK) pain comprises a host of heterogeneous categories of pain of musculoskeletal origin. Being a common cause of disability and distress, MSK pain is a hallmark of a generalized group of disorders termed Musculoskeletal Disorders (MSDs) and is regarded as one of the prime causes of severe long-term pain and physical disabilities acquired globally. MSD symptoms originate from a variety of body locations including the neck, limbs, low back, and joints; and may create chronic widespread pain. Though these disorders arise from varying causes such as poor health habits, poor rest and recovery, poor nutrition, fitness and hydration, a major proportion originate from the work setting. Such a category of MSDs is termed Work-related musculoskeletal disorders (WRMSDs) and is

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defined as pain of inflammatory or degenerative disorders that mainly come as a result of work-related activities or its associated environment [1].

Ghana is a developing country with its agricultural sector fairly lagging in terms of technology and innovation hence characterizing a majority of farmers in the country as small-scale farmers or backyard farmers with a limitation in tools and equipment [2]. This limitation in tools and equipment compels farmers in the country to give vigorous physical work output to attain desired results which in turn makes the farming community very prone to WRMSDs.

Problem Statement

MSK pain is an important public health issue but few researches have been conducted on the Ghanaian population. [3] looked at the causes, trends and severity of MSK injuries in Ghana, which looked at cases reported at the St. Joseph Hospital at Koforidua; Gender differences of chronic MSK problem burden in the elderly Ghanaian population were examined by [4] as part of the SAGE WAVE 1 project on global ageing and adult health. [5] examined the symptoms of MSDs among workers at an informal electronic-waste recycling facility, in Agbogbloshie, Ghana; Others have looked at MSK issues among first-year students in a particular university, long-distance heavy-duty drivers [6], bank workers [7], miners [8] just to mention a few. None has been found to be published for farmers in any part of Ghana. It is therefore important to research MSK pain in farmers in Ghana. This research would help to identify the risk factors for MSK pain in farmers and to develop strategies for prevention and treatment.

Farmers in Ghana use vigorous physical work output to achieve results and this presents issues of MSK pain to their profession.

Significance of the Study: MSDs are among the leading causes of suffering, pain, and disabilities in the workplace [9]. The findings from this study may inform changes in the farmer's environment in Ghana. The study may inform research among Ghanaian farmers as this remains one of the areas that has received little research attention. It might also serve as a crucial foundation for how to protect farmers from the risk of MSDs. This study may serve as a foundation for determining the most effective controls that can be implemented, as a great deal of time and money are spent managing these situations. The government may be able to implement health policies to address the emerging problem of MSDs. Policy changes may be made by the Ministry of Agriculture, the Ministry of Health, and other stakeholders to factor training on how to prevent predisposition to the health risks of MSDs.

Justificatiionn of the study is that the Ho Teaching Hospital (HTH) is the main referral hospital in the Volta Region, based in Ho, the regional capital. Access to unpublished information at the hospital indicates that among the reported cases at HTH from 2015 to 2020, MSK pain is one of the first three. In most years under review, it is the first or second most reported case in a particular year. The other cases are malaria and anemia. In terms of percentages of reported cases in the hospital in 2015 it was 12.76%, in 2016 it was 11.84%, 2017 it was 10.29%, 2018 it was 11.05%, 2019 it was 12.52 and in 2020 it was 10.67%. The new cases of MSK pain reported at the HTH majority are farmers across the years.

The main objectives of the the study is aimed at determining the prevalence and associated causes of MSK pain among farmers in the Volta Region of Ghana. The specific objectives of the study are below:

1. To determine the kind of MSK pain that is prevalent among farmers in the Volta Region.
2. To determine the possible causes of MSK pain among farmers in the Volta Region.
3. To determine whether the age and sex of farmers have any relationship with MSDS.

Conceptual Framework

MSDs result in major losses through missed work days, financial losses due to medical costs, and poor work ethics related to discomfort while at work. According to [9] the costs associated with MSDs range between 13 and 54 billion US Dollars per year. Several studies on MSDs have focused on other professions rather than farmers, making it important to look into the group as it also ranks among the most affected. Most studies have also focused on workloads, stress, and work conditions. These factors are known predictors of MSDs and make this study essential as it would fully concentrate on the topic of MSDs. This study sought to seek to address the health and safety issue of one of the largest groups of workers in Ghana.

Research Questions

Specifically, the study seeks to answer the following research questions:

1. What is the most prevalent location of MSK pain among farmers?
2. What are the possible causes of the MSK pain reported by farmers?

Literature Review

Definition of MSDs

[10] published an assessment of the evidence for WRMSDs in 1997. It was found that routine lifting of large objects, everyday exposure to whole-body vibration, routine overhead work, working with the neck in a chronic flexion position, and performing repetitively forceful tasks are a few examples of work circumstances that may cause WRMSD. This study found compelling evidence linking workplace circumstances to MSDs of the neck, shoulder, elbow, hand, and wrist, as well as the back. Any sort of discomfort to an irreparable, permanently disabled injury affecting the motor organs, muscles, tendons, bones, cartilage, ligaments, and nerves is referred to as MSD. Rheumatoid arthritis (RA), osteoarthritis (OA), low back pain (LBP), neck pain (NP), gout, and arthritis with rheumatoid arthritis (RA) are the five most prevalent ailments. The remaining conditions are grouped under the heading “other MSK disorders.” In terms of disability-adjusted life years (DALYs) and years lost owing to disability globally in 2017, MSD came in first place among all diseases.

Symptoms and Common Examples of WRMSDs

WRMSDs comprise a wide range of inflammatory and degenerative injuries or disorders of the muscles, nerves, tendons, joints, cartilage, spinal discs and supporting vessels associated with exposure to risk factors in the workplace. These disorders inflict pain, discomfort and altered mobility and function at various susceptible body locations including the lower back, upper back, neck, shoulder, knee, hip/thigh, elbow, ankle/feet and wrist as depicted in Figure 1 below. In these major body regions, WRMSDs confer varying degrees of signs and symptoms including pain, muscle fatigue, deformity, reduced range of motion, decreased grip strength, numbness, tingling and loss of function [10].

Common examples of WRMSDs include Tendonitis, tenosynovitis, nerve compression, Raynaud’s syndrome/disease, reflex sympathetic dystrophy, rheumatoid arthritis and cervical radiculopathy. The symptoms of notable examples of these WRMSDs and their corresponding risk factors are summarized in Table 1 below [11].

Table 1. Notable Examples of WRMSDs and their Corresponding Risk Factors and Symptoms. Adapted from [11]

Type of Disorders	Occupational risk factors	Symptoms
Tendonitis/tenosynovitis	Repetitive wrist motions	Pain, weakness, swelling, burning sensation and/or dull ache over the affected area
	Repetitive shoulder motions	
	Sustained hyperextension of arms	
	Prolonged load on shoulders	
Epicondylitis (Elbow tendonitis)	Repeated or forceful rotation of the forearm and bending of the wrist at the same time	Same symptoms as tendonitis
Carpal tunnel syndrome	Repetitive wrist motions	Pain, numbness, tingling, burning sensations, wasting of muscles at the base of the thumb, dry palm
De Quervain's disease	Repetitive hand twisting and forceful gripping	Pain at the base of the thumb
Thoracic outlet syndrome	Prolonged shoulder flexion Extending arms above shoulder height	Pain, numbness, swelling of the hands
	Carrying loads on the shoulder	
Tension neck syndrome	Prolonged restricted posture	Pain

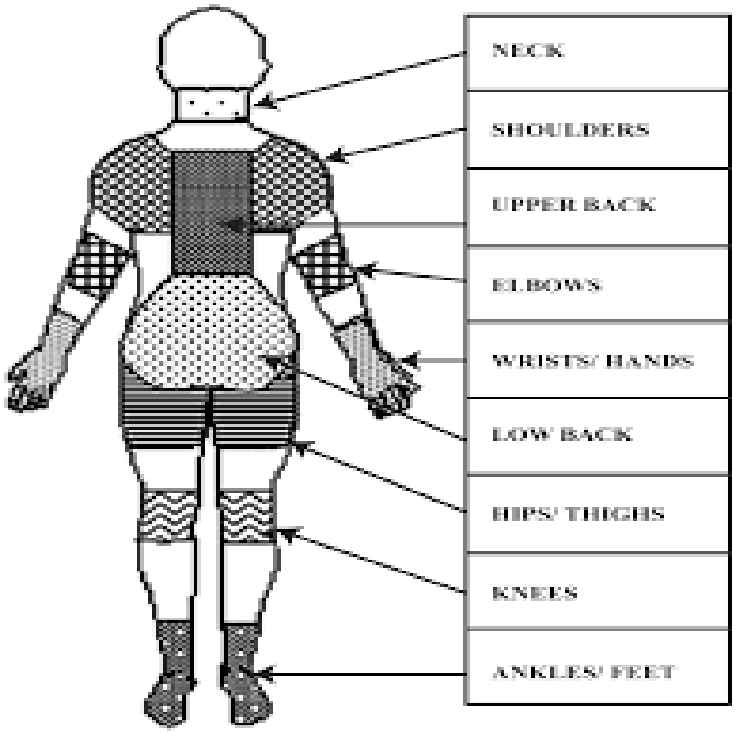

Figure 1. Susceptible Body Regions for MSDs. Adapted from [12]

Global Burden and Epidemiology of WRMSDs

WRMSDs have for decades been regarded as a persistent and important health risk globally. These disorders are ranked second among the most common causes of disability, measured by Years Lived with Disability (YLD). Falling under the category of non-communicable diseases, WRMSDs together with its co diseases

are alarmingly on the rise. In 2016 only, noncommunicable diseases accounted for 61.4% of global Disability-Adjusted Life Years (DALYs) marking a steep rise from 43.9% since 1990 (Hay et al., 2017). The 2016 Global Burden of Disease (GBD) data for noncommunicable diseases highlighted a profound 61.6% significant increase in the burden of disease associated with MSK conditions [13]. These numbers are still on the rise to date highlighting the increased threat that WRMSDs pose on the global front.

Organizations incur large costs as a result of MSK problems due to absenteeism, reduced productivity, and rising medical, disability, and compensation for employees' expenses. The majority of non-fatal injuries and illnesses are not as serious as MSD instances.

Below, common WMSD examples [9] are discussed: CTS, or carpal tunnel syndrome.

According to the U.S. Department of Labour, CTS is a condition of the peripheral nervous system, which consists of nerves and ganglia that are not part of the spinal cord or brain. Carpal tunnel syndrome, which is caused by compression of the median nerve at the wrist, can cause tingling, numbness, weakening, or atrophy of the hand's and fingers' muscles.

1.9 million people may suffer from carpal tunnel syndrome, and between 300,000 and 500,000 procedures are carried out each year to treat it.

In 2001, there were 26,794 CTS instances involving days away from work, according to the Bureau of Labour Statistics. This represents a median absence of 25 days from work, compared to 6 days for all nonfatal injury cases.

Involved workers who were aged 25–54 (84%), female, and white, non-Hispanic (75%).

In 2001, operators, fabricators, labourers and technical, sales, and administrative support workers made up more than 70% of all CTS cases back pain and back injury.

One of the top ten causes of doctor visits is back pain. 5% to 10% of people develop chronic back discomfort.

The Bureau of Labour Statistics recorded 372,683 incidents of back injuries resulting in missed days from work in 2001. Workers aged 25 to 54 (79%), men (64%), and white, non-Hispanic (70%), made up the majority of cases.

Operators, fabricators, and labourers (38%), as well as precision manufacturing, craft, and repair (17%), accounted for more than 54% of back injury cases.

According to the National Arthritis Data Working Group, osteoarthritis affects 27 million persons. Thirteen million persons with hand osteoarthritis and nine million adults with knee osteoarthritis report having symptoms. People are deemed to have symptomatic osteoarthritis if they experience frequent joint pain (e.g., pain on most days in the previous month) and radiographic (e.g., x-ray) evidence of osteoarthritis in that joint, though occasionally this pain may not be caused by arthritis visible on the radiograph. Rheumatoid arthritis and gout are two other types of arthritis. Because it can result from situations related to the job and because it may necessitate worksite modifications for individuals with limits or impairments, arthritis is an issue in the workplace [15].

More than 100 rheumatic diseases and ailments that affect joints, the tissues around the joints, and other connective tissue are together referred to as arthritis. Depending on the particular disease form, there can be differences in the type, level of severity, and location of symptoms. The most frequent reason for disability in the US is arthritis . Nearly 19 million persons with arthritis are limited in their activities. Younger people make up two-thirds of arthritis sufferers [16].

A higher prevalence of arthritis, specifically osteoarthritis, most frequently affecting the knee and/or hip, is linked to some professions. These professions include those in the mining, building, agricultural, and service industries [16]. Physically demanding/heavy labour duties, exposure to vibration, a significant risk of joint or tissue injury, and extended durations spent

working in uncomfortable or unnatural postures like crawling are all common characteristics of these vocations.

The entire cost of treating arthritis-related illnesses in 2003 was $128 billion, consisting of $81 billion in direct costs and $47 billion in indirect costs [16].

People with arthritis-attributable work limits (AAWL) are those whose ability to perform their job is restricted. The National Business Group on Health advises employers to address arthritis by encouraging employees to avoid obesity and providing ergonomically appropriate workplace design16. AAWL affects one in 20 working-age adults (aged 18–64) in the United States, and one in three working-age adults with self-reported, doctor-diagnosed arthritis [16].

People with arthritis can have less pain, increase function, maintain their productivity, and spend less on medical care by receiving an early diagnosis and proper management of their condition. A doctor's consultation and self-management education programs are two examples of appropriate management that can help teach people with arthritis how to manage their arthritis daily. Other crucial self-management strategies for people with arthritis include physical activity and weight loss plans.

The Current Scope of Research on WRMSDs on the Global Front and in Ghana

From diverse global geographical regions, the prevalence of WRMSDs has been reported to be high amongst a wide range of occupations namely health and social services, manufacturing and construction, trade and retail, security services, transport, waste management, sports, hotel and restaurant services, education, entertainment and media, and administration [9]. However, [17] account that, even though these prevalence studies are widespread, WRMSDs remain a challenge and continue to be high mainly because the causation of these disorders is far away from being properly outlined and most research has also failed to focus on the long-term effects of the WRMSDs on individuals with persistent forms of the disease. This in turn has made research on WRMSDs one-sided and not projective enough in fast-tracking the campaign against these disorders. [18] also provide insight into how the focus of WRMDs research and interventions are shifted inequitably towards developed countries leaving low- and middle-income countries to lag in the race against WRMSDs.

The global research on WRMSDs is making great headways but will reach an eminent stall if the approach and scope are not done holistically to suit all countries around the world, especially developing countries such as Ghana. Although the prevalence of WRMSDs varies by region, most previously reviewed studies have found that it is generally high for instance 84% were reported by [19] in South Africa; 78.4% in China [20] among nurses.

The WRMSDs research in Ghana has followed a similar trend as that of the global world. There have been several studies surveying the prevalence and management of WRMSDs from several occupations with notable examples including nurses and student nurses, Ho Teaching Hospital's nurses [21], urban taxi drivers [22], commercial long-distance bus drivers [23], general hospital management [24] and physiotherapists [25]. It can be observed that just like the global community, the research done in Ghana so far has focused on urban or white color jobs which are not fully representative of a developing country like Ghana which equally has a host of rural or local occupations such as backyard and small-scale farming.

This study in effect aims at bridging such a gap by extending the boundaries of WRMSD research in Ghana towards farmers in the Volta Region. This provides an opportunity to assess the risk of WRMSDs using universal standardized tools on Farmers. It also creates an opportunity for research and health workers to focus on research and interventions to mitigate

the risk of WRMSDs and their effect on the QoL of farmers in Ghana.

Materials and Methods

Study Area

The study was conducted in the Ho Teaching Hospital of the Volta Region of Ghana. The region was chosen for the study because of its representative capability for the farming population of Ghana and its convenience for the researcher. The region had urban, peri-urban, and rural areas and also had a large farmer population. Ho Teaching Hospital, at the time of the study, was a referral hospital for the Volta Region of Ghana. The region represented the Southeastern part of Ghana and covered an area of 9,504 square kilometers representing about 4% of the total area of Ghana. The region had an estimated population of 1,649,523 [26].

Research Design

The study used a cross-sectional survey with a descriptive study approach to analyse and present the findings of the study. The design has been chosen because of its relative inexpensiveness, can be conducted within a short period, and the capacity to allow the collection of data on a personal level, allowing the control of possible confounders. The cross-sectional approach requests the data collection is done within a one-time span without the need for a subsequent or future set of data to be collected. The cross-sectional type of data collection also yields to descriptive approach where data captured within a time frame is used to describe the study population as a snapshot event of the prevailing conditions of the study population. In this case, the conditions of the study population are not manipulated for cause-and-effect outcomes but seek to establish to answer the research questions of the study [27].

Study Population

According to the 2021 Population and Housing Census, the majority of people in the Volta Region are engaged in agriculture. The data on the distribution of agricultural households by district and types of agricultural activities undertaken show that out of the 291,224 agricultural households, 271,071 (93.1%) are engaged in crop farming, 1,850 (0.6%) are engaged in tree growing, 11,270 (3.87%) are engaged in livestock rearing, and 557 (0.2%) are engaged in fish farming. The least widespread farming activity in the region is fish farming [26]. The yearly reported cases of musculoskeletal pain are shown in Table 2. The other cases are malaria and anemia. Farmers constitute the majority of the new cases of musculoskeletal pain reported at the HTH.

Table 2. The Annual Proportion of Hospital Cases Reported as Musculoskeletal Pain Between 2015-2020

Year	Percentage of Reported Cases (N)
2015	12.76% (10,961)
2016	11.84% (10,648)
2017	10.29% (10,526)
2018	11.05% (12,790)
2019	12.52% (15,451)
2020	10.67% (8,956)

Sampling Size Calculation

The patients who were newly diagnosed with MSK pain, according to unpublished information, in the year 2020 at the Ho Teaching Hospital were 7,524 whereas a total of 1,432 went for review. Assuming this figure is maintained for 2022, the total number of patients expected at the hospital was 8,956. The region is estimated to have 60% of its population as farmers [28]. Assuming that MSD affects occupations proportionately then it is estimated

that the number of farmers was about 5,374. Putting 5,374 into a sample size calculator, [29], gives 200 participants for a 95% confidence interval and a margin of error of 6.80%.

The values given are based on the formula below:

In terms of the numbers you selected above, the sample size n and margin of error E are given by:

$$x = Z(c/100)^2 r(100-r)$$

$$n = Nx/((N-1)E^2 + x)$$

$$E = \mathrm{Sqrt}[(N-n)x/n(N-1)]$$

Where N is the population size, r is the fraction of responses we are interested in, and $Z(c/100)$ is the critical value for the confidence level c.

Study Subject Selection

The prospective farmer that visits the hospital with MSK pain is consulted at the orthopaedic and pain management clinics. The recruitment of the farmers for inclusion in the study was done by approaching the individual farmers at the point of service or after service for the first contact to identify and possibly consent to take part in the study. Subsequent meetings with the selected individual farmers were arranged according to their convenience for data collection. Approaching the farmers at the orthopaedic and pain management clinic is a measure that would automatically wean out those patients presenting bodily pains for other ailments that would not fall under MSDs.

Convenience sampling was used from the start of recruitment until the sample size is achieved. For those who agree to take part in the study information was collected to know the community where they reside. This enabled farmers from urban, peri-urban and rural areas to be evaluated, as well as their ages and sex to determine if any group is imparted most.

Inclusion and Exclusion Criteria

Inclusion Criteria

1. Consented male and female individuals who are farmers as a profession.
2. Must be at least 18 years of age.
3. Patients who present MSK pain to the orthopaedic department of HTH.

Exclusion Criteria

1. Children and individuals below 18 years of age.
2. Patients who present bodily pains as a result of other ailments, e.g. malaria and typhoid fever.

Construction of Research Instruments

The NMQ was employed to assess the general effects of WRMSDs. The NMQ was developed from a project funded by the Nordic Council of Ministers with the main aim of standardizing an effective tool that assesses the ergonomic aspects of MSDs, especially on the grounds of occupational healthcare. This instrument is standardized and structured in two parts to assess the impact of MSDs on nine anatomical body locations, three each from the lower limb region, upper limb region and the torso region of the body [30]. The MSK-HQ was also employed in this study to assess the effects of WRMSDs specifically on quality of life. The MSK-HQ was recently developed by the UK Primary Care Sciences Research Centre in collaboration with Keele University and the University of Oxford [31].

Many of the referenced studies have used NMQ and MSK-HQ in Ghana and worldwide. The respondents were expected to pick the most appropriate choice for the closed-ended questions whereas the farming conditions questionnaire was open-ended.

Scoring the MSK-HQ and the Other Questionnaires

All of the questions in the MSK-HQ are laid out in the same way, with a small number to the right of each response option box. This associated number, corresponding to the ticked response, is to be used to score the MSK-HQ.

The MSK-HQ is scored on a range of 0-56, with a better score indicating better MSK-HQ health status. To find out the total score, add the

numbers next to the box that the respondent has ticked on the questionnaire form. The total of all of these scores gives the overall result of the MSK-HQ. NMQ was scored similarly. The farming conditions questionnaire was given qualitative analysis.

Data Collection Techniques

The farmers who visit the Ho Teaching Hospital to seek medical attention for musculoskeletal pains were approached to take part in the study. In all, 212 farmers were selected in no particular order for the study. The farmers who reported symptoms of MSDs were identified. Using random numbers, these farmers were contacted and if they consented to take part in the study questionnaires were administered.

The researcher sought the assistance of an orthopedic specialist who trained him and his team on the administration of the structured MSK questionnaires.

Data were collected through the administration of the questionnaires to the respondents who fit within the study criteria and are ready to participate. The demographic and farming conditions questionnaire was pre-tested in about 5-10% of the farmers in another location, to make the necessary modification before the actual administration of the questionnaires. If this is found to be acceptable the rest of the questionnaires were administered to the potential study participants as required. These questionnaires allowed the questions of the research to be answered.

Data Analysis

Data Organization and Cleaning: Before beginning the analysis, it was crucial to organize and clean the data. Checking for missing data, dealing with outliers, recoding variables as appropriate, and maintaining data consistency are some of the duties that were carried out. The data collected were captured onto an MS Excel spreadsheet for data cleaning and editing. The cleaned data was exported to IBM SPSS Version 25 for analysis and reporting.

Descriptive Analysis: To list the important variables in the dataset, descriptive analysis was used first. The computation of metrics like means, medians, standard deviations, frequencies, and percentages was done under this category. The descriptive analysis gave a quick overview of the sample's characteristics and aided in understanding the demographics, and frequency of MSK pain among farmers.

Data Interpretation: Interpretation of the data analysis findings was done in light of the study's goals and hypotheses. The statistical impact, effect sizes, and relationship axes were analyzed. This was to identify the main conclusions and trends that the analysis revealed.

Reporting: The findings were presented clearly and succinctly. To show the findings, the appropriate tables, charts, and graphs were used. This described the statistical analyses that were done and offered an interpretation of the results.

Ethical Considerations

The study was conducted per the Declaration of Helsinki, the Good Clinical Practice, and the applicable laws and regulations in Ghana. Approval was sought and obtained from the Ho Ethical review committee with the reference number (HTH-REC (15) FC_2022). The researcher ensured compliance with all procedures required by the approved study proposal. Written informed consent was sought from each participant before the questionnaires were administered. The researcher explained the nature of the study, its objectives, procedures, risks, potential benefits, and discomfort to each potential participant. Participation was voluntary and participants were told they could with at any time without any consequences affecting their medical treatment or relationship with their doctor.

Results

Socio-demographic Characteristics of the Study Participants

The mean age of participants in the study was 53.8 (±11.9) years, with a range between 20 and

82 years. The majority of the participants (36.3%) were above 60 years and the lowest age group was 20 to 29 years forming 4.2%. The majority of 51.9% were males and 48.1% were females.

The commonest farm type practised among participants were crops, plantation and animal rearing respectively by 198 (93.4%), 12 (5.7%), and 2 (0.9%). Crop farming and animal rearing are done more than other types of farming among the participants. Participants travelled at most 5 km by 207 (93.7%) to farm and spent an average of 5.5 hours ± 2.9 standard, a minimum of 1 hour by 8 (3.8%) and a maximum of 10 hours by 11 (5.2%). Participants worked on an average of 2.4 acres of farm size, a minimum size of 1acre by 126 (59.4%) and a maximum of 10 acres by 1 (0.5%) of the participants

Prevalence and Possible Causes of MSK Pain Among Farmers in the Volta Region

Participants stated the causes of MSK pain relating to some specific farming activities. Findings from Table 3 show that 91 (42.9%) being the minority did not experience MSK pain from transportation, whiles 121 (57.1%), being the majority, experienced MSK pain from travelling by walking (95, 44.8%), by bicycle (12, 5.7%) and motorbike (11, 5.2%). (Among the participants/farmers who reported they experience MSK pains, about 78.5% are those who walk to their farms). In the same manner, 201 (94.8%) majority experienced MSK pain, which could be attributable to the implement they use in farming), Among these, the use of cutlass (86, 40.6%), hoe (76, 35.8%), both cutlass and hoe (23, 10.8%) and spraying machine (13, 6.1%). This finding shows that all the farm implements in one way or the other cause MSK pain among participants, though with a varying degree. The farm activities performed MSK pains include clearing of farmland by 119 (56.1%), use of cutlass and hoe to work by 49 (23.1%), bending to work by 21 (9.9%), and farm spraying by 11 (5.2%) of the participants. As many as 179 (84.4%) of participants did not, while 33 (15.6%) experienced MSK pain from the land level because most of them farm on level land.

Activities leading to the current MSK pain reported at the Hospital were general farming activities for 87 (41%), excessive physical activities for 35 (16.5%), falls relating to non-farming activities for 11 (5.2%), road accidents for 18 (8.4%) among other farming related injuries.

Table 3. Causes of MSK Pain as Perceived by Respondent Farmers

Description	Response	Frequency	%
MSK pain from transportation	Yes	121	57.1
	No	91	42.9
Type of transportation	Walking	95	44.8
	None	91	42.9
	Bicycle	12	5.7
	Motorbike	11	5.2
	Tricycle	1	0.5
	Vehicle	1	0.5
	Walking and the motorbike	1	0.5
MSK by farm implements	Yes	201	94.8
	No	11	5.2
MSK by implement type	Cutlass	86	40.6
	Hoe	76	35.8
	Cutlass and Hoe	23	10.8

	Spraying machine	13	6.1
	None	11	5.2
	Irrigation bucket	1	0.5
	Rake and shovel	1	0.5
	Shovel	1	0.5
MSK from farm procedure	Clearing of farmland	119	56.1
	Use of cutlass and hoe to work	49	23.1
	Bending to do any work	21	9.9
	Spraying farm with a machine	11	5.2
	Planting and harvesting	5	2.4
	No idea	4	1.9
	Walking on the farm	2	0.9
	Carrying farm products	1	0.5
MSK from land level	No	179	84.4
	Yes	33	15.6
Current cause MSK	General farming activities	93	43.4
	Excessive physical activity	35	16.5
	Cannot tell	33	15.6
	Fall-related non-farming activities	11	5.2
	Car accident relating to farm event	9	4.2
	Motorbike accident relating to farm event	9	4.2
	Fall-related farming activities	5	2.4
	Illness	5	2.4
	Old age	4	1.9
	Fracture	3	1.4
	Harvesting	3	1.4
	Stroke	2	0.9
	Cutlass cut on the right foot	1	0.5
Total		212	100.0

The mode of visit to the health facility is shown in Figure 2. The majority of 140 (66.1%) visited on the first point of call, whiles 72 (33.9%) visited on referral from the lower-level facilities.

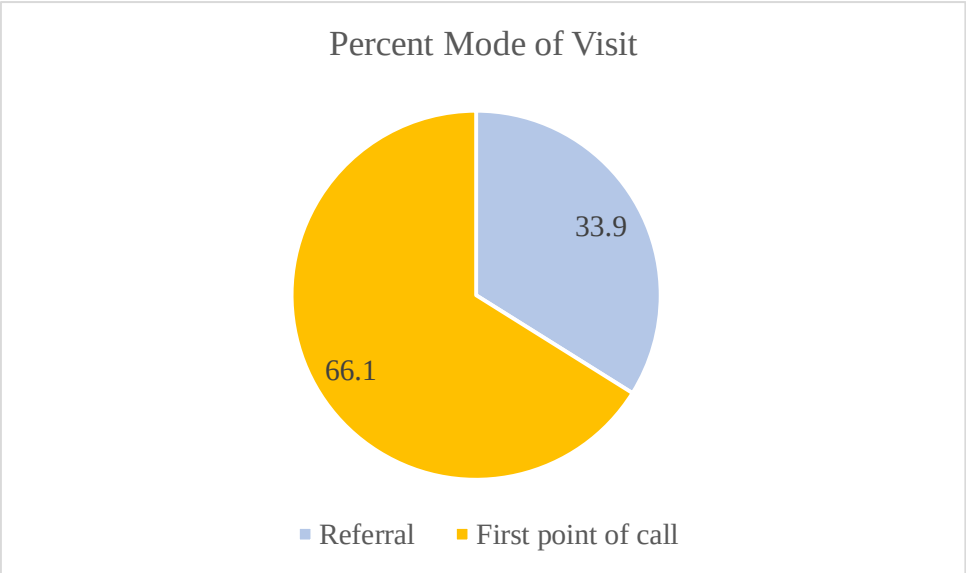

Figure 2. Mode of Visit to Health Facility

Diagnoses of study participants' MSK pains were classified into non-traumatic and direct traumatic diagnoses. Non-traumatic MSK pains were further classified into vertebral, joint, limbs, deformity, inflammation, general and other pains (Table 4).

Table 4. Classification of Doctor's Diagnoses of MSK Pains

Non-traumatic	**Direct Traumatic**
Vertebral Column pain	**Fractures - Of the limbs**
Spondylosis	Vertebrae
Back pain	
Lower back pain	
Lumbago	
Sciatica	
spinal cord pain	
Spondylolisthesis	
Radiculopathy	
Neck pain	
Joint pains	
Osteoarthritis	Malunion of fracture
arthritis	
knee pain	
shoulder	
hip	
elbow	
ankle	
General pains	
General bodily pain	Cutlass cut
Pain in the limbs	
Arms	Dislocation
Forearm	

Thigh	
Leg	
Foot	
Hand	
Deformity	
Scoliosis (thoracic; neuromuscular)	Laceration
Inflammation	
Boil on the thigh	Head injury
Sinusitis	
Others	
Hernia	Open wound
Diabetes	
Spondylosis	
Back pain	

The causes of the MSK pains and the locations at which they occur were also identified among the respondents. The 3 topmost causes of MSK pains were Spondylosis, fractures and Arthritis whereas the topmost locations of MKS pains were general body, knee and waist pains.

Table 5. Frequencies of Doctor's Diagnoses of MSK Pain

Causes			**Location**		
MKK Pain	**Frequency**	**%**	**MSK Pain**	**Frequency**	**%**
Spondylosis	24	28.2	General back	3	3.1
Sciatica	2	2.4	Lower back	7	7.3
Spondylolisthesis	3	3.5	Lumbago	10	10.4
Radiculopathy	3	3.5	Spinal cord	5	5.2
Arthritis	13	15.3	Neck	1	1.0
Scoliosis	3	3.5	Knee	19	19.8
Boil	1	1.2	Waist	15	15.6
Sinusitis	1	1.2	Shoulder	3	3.1
Hernia	1	1.2	Hip	1	1.0
Fractures (vertebra and limbs)	24	28.2	General body	29	30.2
Malunion of fracture	2	2.4	Arm	1	1.0
Cutlass cut	1	1.2	Diabetes	1	1.0
Dislocation	5	5.9	Head injury	1	1.0
Laceration	1	1.2	-	-	-
Open wound	1	1.2	-	-	-
Total	85	100.0	-	96	100

Level of pain, ache and discomfort at specific body locations was assessed using 5-point Likert, never (0), 1-2 last week (1), 3-4 times last week (2), once every day (3) and several times every day (4). The level of pain, ache and discomfort is high with an increase in the code, implying zero (0) means absence and four (4) means the highest level (table 8). Descriptive statistics, with the numerical code, was used to describe the mean, minimum and maximum

pain, ache and discomfort experienced by the participants (table 6). Findings show that;

the level of pain, ache and discomfort experienced at the lower back (mean, 3.8 and SD ± 0.9), right upper arm (mean, 3.7 and SD ± 0.9), left fore-arm (mean, 3.7 and SD ± 0.9), right wrist (mean, 3.7 and SD ± 0.9), left shoulder (mean, 3.6 and SD ± 1.0), left wrist (mean, 3.6 and SD ± 1.0), left lower leg (mean, 3.6 and SD ± 1.1), right shoulder (mean, 3.5 and SD ± 1.0), right fore-arm (mean, 3.5 and SD ± 1.1) and right lower leg (mean, 3.5 and SD ± 1.2), can be as "several times every day".

the level of pain, ache and discomfort experienced at the neck (mean, 3.4 and SD ± 1.0), left thigh (mean, 3.3 and SD ± 1.3), right thigh (mean, 3.2 and SD ± 1.3), left knee (mean, 3.0 and SD ± 1.4), hip/buttocks (mean, 2.9 and SD ± 1.6), right knee (mean, 2.9 and SD ± 1.5), left foot (mean, 2.8 and SD ± 0.8), right foot (mean, 2.7 and SD ± 1.0) and upper back (mean, 2.6 and SD ± 1.6) can be described as "once every day" and;

the level of pain, ache and discomfort experienced in the left upper arm (mean, 1.4 and SD ± 1.6), can be described as "1-2 last week"

Table 6. Descriptive Statistics of the Level of Pain, Ache and Discomfort

Variable	Observation	Mean	SD.	Min	Max
Lower back Pain	178	3.8	1	0	4
Right upper arm	57	3.7	0.89	0	4
Left fore-arm	34	3.7	0.87	0	4
Right wrist	34	3.7	0.86	0	4
Left Shoulder	45	3.6	1.02	0	4
Left wrist	34	3.6	0.98	0	4
Left Lower leg	44	3.6	1.11	0	4
Right shoulder	52	3.5	1.07	0	4
Right fore-arm	48	3.5	1.05	0	4
Right lower leg	44	3.5	1.17	0	4
Neck	69	3.4	1.01	0	4
Left thigh	69	3.3	1.27	0	4
Right thigh	78	3.2	1.31	0	4
Left knee	89	3	1.42	0	4
Hip/buttocks	82	2.9	1.59	0	4
Right knee	93	2.9	1.5	0	4
Left foot	23	2.8	0.75	0	4
Right foot	23	2.7	0.96	0	4
Upper back	116	2.6	1.58	0	4
Left upper arm	40	1.4	1.58	0	4

The distribution of pain location by age group was done by taking counts of participants and their relative percentages that have similar pain locations, as shown in Table 7. The age groups that have the least number of pain location was 20-29 years and the largest number of pain location were 60 and above. The least number of pain locations (0-4) was registered among 123 (58.0%) participants and the largest number of pain locations (20+) was registered among 7 (3.4%). This finding shows that the number of pain location decrease with an increase in the number of participants.

Table 7. Age Group by Grouped Pain Location

Age group	Grouped Pain Location					Total
	0-4	5-9	10-14	15-19	20+	
20-29	4 (1.9%)	3 (1.4%)	1 (0.5%)	1 (0.5%)	1 (0.5%)	10 (4.7%)
30-39	13 (6.1%)	6 (2.8%)	0 (0%)	0 (0%)	0 (0%)	19 (9.0%)
40-49	25 (11.8%)	11 (5.2%)	9 (4.2%)	0 (0%)	0 (0%)	45 (21.2%)
50-59	41 (19.3%)	10 (4.7%)	4 (1.9%)	5 (2.4%)	1 (0.5%)	61 (28.8%)
60+	40 (18.9%)	19 (9.0%)	7 (3.35)	6 (2.8%)	5 (2.4%)	77 (36.3%)
Total	123 (58.0%)	49 (23.1%)	21 (9.9%)	12 (3.3)	7 (3.35)	212 (100%)

Relationship between Age and Sex of Farmers and MSDS

The relationship between the age and sex of participants and the pain, aches and discomfort they suffered were assessed by finding the Pearson correlation. Table 8 shows Pearson correlation statistics that are used to determine the relationship between pairs of variables. Findings show that the *p*-values for the age of participants are larger than the alpha value of 0.05 therefore statistically there is not enough evidence to reject the hypothesis that age and MSD pain (r=0.070, p =0.312), discomfort (r=0.085, p =0.217) and interferences (r=0.074, p =0.282) are independent. It, therefore, implies that there is no significant relationship. This is further confirmed by correlation values less than 0.3, evidence of a weak relationship. The test statistics for the gender of participants and pain (r=0.070, p =0.312), show less statistical evidence to reject the hypothesis that gender and MSD pain are independent, while the test statistics for gender and discomfort (r= -0.085, p =0.027) and interferences (r= -0.148, p =0.03) each shows statistical evidence to reject the hypothesis that gender and discomfort and interference are independent. It therefore implies that there is a significant relationship but the correlations are evidence of a weak and negative relationship.

Table 8. Relationship Between Age and Sex of Farmers, and MSDs

Variables	Statistics	Age at last birthday	Gender
MSD Pain	Pearson Correlation	0.07	-0.121
	Sig. (2-tailed)	0.312	0.079
	N	212	212
Discomfort	Pearson Correlation	0.085	-.152*
	Sig. (2-tailed)	0.217	0.027
	N	212	212
Interference	Pearson Correlation	0.074	-.148*
	Sig. (2-tailed)	0.282	0.031
	N	212	212
*. Correlation is significant at the 0.05 level (2 tailed).			
**. Correlation is significant at the 0.01 level (2-tailed).			

Discussion

Demographic Information

Age and sex are important demographic factors that help explain the characteristics of the populations being studied. The current study involves the causes of MSK pains among farmers, which considers demographic information to play confounding or hidden roles, and mentioning them is therefore very important. In the study of factors that influence WRMSDs among the garage workers of Abossey Okai automobile spare parts market, by [32], the mean age of participants was 33.1 ± 8.5 years, a youthful age with the required physical strength. The Ghana [26] also revealed the 24–44-year age range of employees in the informal sector in the Greater Accra region, confirming the age of an economically viable working population. In the current study, the mean age of participants was 54±11.9, with a modal age group of 60 years and above, confirming the characteristics of rural farming folk [26].

The Kind of MSK Pain That is Prevalent Among Farmers in Volta Region

The prevalence rate of MSDs among the Volta Region farmers who participated in this study was 99.05%, this is higher than the prevalence rate of MSDs among nurses in a similar study in Ho Teaching Hospital, which registered a 94% prevalence rate [21].

Low back pain was the most prevalent pain location as indicated in Table 10 with 178 (83.96%) observations, this outcome is similar to the finding of a study on rice farmers in Iran, where about 81.33% of the rice farmers reported spinal pain in the previous 6 months [33]. This observation is compared to a study among farmers in Colorado, USA, where it was found that 26.2% among participants suffered low back pain [34]. Another study in South Korea had 23.7% of respondents suffering from low back pain [35]. This outturn could be a result of the level of sophistication of the farming process in those countries, USA and South Korea.

In this study most of the farmers use unsophisticated tools, namely cutlass and hoes, which will require a lot of bending in various farming activities, particularly clearing. The next ubiquitous pain location was the upper back. Closely following both lower and upper back pain is right and left knee pains as the commonest pain locations among Volta Region farmers, which could be traced to long walking, squatting and standing. The finding concurs with the results obtained in a study of MSDs among farmers in Thailand, it was found that Knee or calf pains were among top 3 pains locations of MSD [36].

Comparing this observation with a study among athletes in Senegal, there is a sharp contrast with those findings. The top 3 frequent locations of MSK pains were shoulders (40.6%), neck (37.1%) and hips/thigh (34.4%) [37]. This indicates how the farming profession is affected by low back pain and also indicates that every profession has its own set of location of MSK pains,

Causes of MSK Pain Among Farmers in the Volta Region

Generally, lack of mechanization within the farming sector can said to be the underlying cause of MSDs among Volta Region farmers.

The study is compared to that of [32], who evaluated the variables affecting WRMSDs in the Abossey Okai automotive spare parts market garage personnel. Cross-sectional research was used in the study. The participants' mean ages were 33.1 8.5 years and their mean years of work experience were 9.4-6.5 years. WRMSDs were present in 71.6% of subjects, with the low back being the most commonly impacted body area (38.1%). A significant correlation between participant age and WRMSDs was found by the chi-square test (X2 = 13.02; P = 0.001). The Mann-Whitney test (Z = -2.92; p = 0.004) also revealed a relationship between job experience and WRMSDs. WRMSDs were significantly correlated with age (UOR = 2.09; 95% CI = 0.99, 4.43) and job experience (UOR = 1.08; 95% CI

= 1.02, 1.14), according to an unadjusted regression analysis. However, the modified regression analysis reduced the statistical importance of these factors.

Whether the Age and Sex of Farmers Have any Relationship with MSDS

The result suggests a significant association, yet the correlations show a weak and unfavourable connection between sex and age, and MSD. This outcome contradicts the findings of the study that was conducted on nurses at HTH [48], which indicated a strong statistical relationship between age and MSDs. The correlation for age and MSD were not prominent in this study as has been established in many studies because there was no conscious effort to ensure even age distribution of respondents and that fact that all respondents were MSD patients. A recommendation is being made by the researcher to ensure even age distribution of farmers and the conduct in the general population of farmers at the community level to assess that adequately.

Conclusion

This study investigated the prevalence of MSDs among Ghanaian farmers in the Volta region. Lower back pain was the most prevalent pain location, followed by upper back, right and left knee pains, and both feet. Causes included the usage of a cutlass and hoes, as well as rigorous lack of automation in the farming invariably occasions lifting, pushing, and tugging and consequently leading to experiencing MDSs among farmers.

A conscious effort must be put up by the governments both at national and local levels to help farmers mechanize agriculture practices, this will go a long way to reduce manually undertaken activities which have been identified in this study as the causes of MSDs among farmers, and such initiative will invariably reduce the incidence of MSDs within the farming communities.

Orthopedic and physiotherapy services must be made available, and accessible both physically and financially to help farmers deal with MSDs they experience as a result of undertaking their farming activities.

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Conflict of Interest Declaration

The Authors declare that there is no conflict of interest.

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