

# Prevalence of Musculoskeletal Disorders (msds) Among Farmers of District Vehari, Punjab, Pakistan

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## Highlights:

- Study was conducted to check the prevalence of musculoskeletal disorders (MSDs) and Work-related Musculoskeletal disorder (WMSDs) in the farmers of district Vehari, Punjab, Pakistan
- Shoulder joints were found as the most vulnerable body part for the prevalence of MSDs and/or WMSDs.
- Farmers who worked for the duration of eight hours in their field were found more susceptible to develop any MSDs and/or WMSDs.

## Abstract:

Farming is widely considered a physically arduous profession that places farmers at the potential risk of developing musculoskeletal disorders (MSDs) and/or work-related musculoskeletal disorders (WMSDs).

## Objective:

The present study was aimed to determine the prevalent frequency of musculoskeletal disorders (MSDs) and/or work-related musculoskeletal disorders (WMSDs) among the agricultural workers of district Vehari, Punjab, Pakistan.

## Methods:

The study was a cross-sectional analytical interview-based study conducted on 376 farmers of district Vehari, Pakistan. A questionnaire-based interview was conducted on male farmworkers, aged between 18 to 63 and having a minimum of one-year working duration in the fields. The prevalent frequency distribution and percentages of the acquired data were calculated.

The crosstab were formed to calculate the statistical results.

## Results:

The response rate of the current study was cent percent. All the farmers, included in the study, reported for the MSDs and/or WMSDs in at least anyone of the body parts. Maximum prevalent frequency of MSDs was reported for the shoulders (61.4%). The least cases of MSDs and/or WMSDs were, however, reported for the wrist joints (2.1%). It was also found that highest prevalence of MSDs and/or WMSDs was found in the farmers who work for eight hours 214 (56.9%) followed by six hours 135(35.9%) and four hours 27 (7.2%) in the field. The highest frequency of MSDs and/or WMSDs, however, was reported in the farmers upto the age of thirty five, fifty, and sixty three as 158 (42%), 134(35.6%), and 84 (22.3%), respectively.

## Conclusions:

The study concluded that the most prevalent frequency of MSDs and WMSDs was reported for the farmers who work for eight hours in the fields. High frequency of MSDs was reported for the shoulders (61.4%).

## Keywords:

Shoulder pain, Musculoskeletal disorder, Neck pain, Work-Related Musculoskeletal disorder.

## Introduction:

Farming is widely considered a physically arduous profession that places farmers at the potential risk of developing musculoskeletal disorders (MSDs) and/or work-related musculoskeletal disorders (WMSDs).<sup>1-3</sup> Farmworkers are at considerable potential risk of developing musculoskeletal disorders (MSDs)

*i.e.* Osteoarthritis (OA), upper limb and neck complaints, hand-arm vibration syndrome (HAVS), and low back pain (LBP).<sup>1</sup> Musculoskeletal disorder is an extensive group of disorders that involves damage to tendons, ligaments, muscles, peripheral nerves, joints, vertebral discs, cartilage, supporting vessels, and bones.<sup>6</sup> Work-related musculoskeletal disorder (WMSD) which is widely known as Cumulative Trauma Disorder (CTD) is a subtype of MSDs which is characterized based on aggravated working situations. Repeated micro-traumas in addition to wear and tear events are responsible for the development of MSDs and/or WMSDs. Acute and critical events are not responsible for the disorder, hence WMSDs are also termed repetitive strain injury (RSI), occupational overuse syndrome, or repetitive motion traumas (RMTs).<sup>7</sup> A herniated disc, tendinitis, epicondylitis, Reynaud's syndrome, and trigger finger are frequent examples of MSDs and/or WMSDs. Several physical workplace postures have been found as contributing risk factors for the development of WMSDs *i.e.* compression, repetition, posture, force, duration, temperature, and vibration.<sup>6</sup> Exposure of farmers to the risk factors may result in reduced blood flow, compression, elongation, muscular tears or strains, wear or tear of ligaments, tendons, and nerves. These actual environmental, physical, workplace and personal hazard factors if persist for sufficient magnitude, frequency, and duration may cause MSDs and/or WMSDs. Moreover, certain personal physical risk factors *i.e.* age, gender, working techniques, hobbies, pre-existing medical issues, organizational factors, and physical conditioning may either contribute to the development or further exacerbation of the pre-existing WMSDs conditions.<sup>3</sup> The MSDs have been reported to affect the population involved in various tedious occupations which may include IT professionals, dental and healthcare professionals, laborers, and farmers engaged in substantial heavy manual work for longer durations of time, MSDs influence a large

number of individuals worldwide. It is widely known as the common reason for physical disability and persistent extremity pain. Moreover, in addition to their actual physical impacts, MSDs influence the psychosocial status of people and affect their families and careers.<sup>10</sup> A study of 15 European nations indicated agriculture as one of the highly physical and laborious tasks as it exposes farmers to actual physical loads.<sup>11</sup> Such physical hazards include their exposure to heavyweights by carrying and lifting them, work with frequently flexed trunks, risk of slipping and falling on uneven walkways, exposure to hand tools and farm vehicles, and accidents risks from the unpredictable actions of livestock.<sup>12</sup> A study entailed that persistence of musculoskeletal disorder was found 51% higher in Swedish farmers than non-farmers.<sup>13</sup> A Southeast Kansas based study indicated almost 60% of farmers reported farm-work related symptoms of musculoskeletal disorder.<sup>14</sup> Current research considers various epidemiological evidence and gathers significant data regarding the development of MSDs and WMSDs in the field workers of Vehari, Punjab, Pakistan.

### Methods:

Three hundred and seventy-six (376) patients were recruited using nonprobability, convenient sampling. The sample size of the current study was estimated by using the population prevalence formula<sup>12</sup> and estimating the prevalence of musculoskeletal disorders as 55.0%<sup>13</sup> at a 5% margin of error and 95% confidence level. The data was collected from April to December 20220. The current analytical cross-sectional study has been conducted purposively at district Vehari. The reasons include the distinct share of this district in the production and extraction of cotton-seed oil in the country. It has also been widely known as the city of Cotton. As the city has been considered to home the dozens of cotton and sugar-cane processing factories, cottonseed-oil manufacturing plants Inclusion criteria for musculoskeletal patients were: male;

farmworkers, aged between 18 to 63; and having a minimum of one-year working duration were included.<sup>15,16</sup> The protocol of this study was approved by the ethical committee. All participants provided their informed and written consent. The questionnaire survey was designed to include the following discrete sections *i.e.* sociodemographic factors, ages of farmers, working hours, and prevalence of musculoskeletal disorders. The information was gathered on the prevalence of lower back pain (LBP), upper back pain (UBP), Shoulder, elbow, knee, hip, and ankle pain by directly questioning the farmworkers. Data collection involved the oral acquisition of information along with the visual assessment and observations regarding the presence or absence of musculoskeletal disorders among farmers. Data collection was followed by the exclusion of any incomplete, incorrect, and inappropriate data. The data was also evaluated to interpret any void of consistency. Each oral interview took almost of 20-30 minutes. Only accurate and corrected data were analyzed by using SPSS version 25.

### Results:

A total of 376 farmers were interviewed and assessed for the prevalence of musculoskeletal disorders. All participants were male. The data was divided into three distinct sections based on the ages of farmers. The results were also analyzed based on the working hours used by the farmers to work in their fields. The prevalence of various types of musculoskeletal disorders was acquired, assessed, and recorded based on provided information and direct observations. The various types of musculoskeletal disorders included in the questionnaire are upper back pain (UBP), lower back pain (LBP), neck, shoulder, elbow, wrist, hip, knee, and feet ankle pain. The results indicated the prevalent frequencies of musculoskeletal disorders as 158 (42.0%), 134 (35.6%), and 86 (22.3%) for the age variables of 18-35, 36-50, and 51-84 years of farmworkers, respectively (Table 1). Working hour (h) wise prevalence of the musculoskeletal disorder

among farmers indicated the maximum frequency of 214 (56.9%) for 8 hours. However, the respective maximum frequencies of 231 (61.4%), 107 (28.5%), 104 (27.7%), 86 (22.9%), 60 (16.0%), 58 (15.4%) 23 (6.1%), 16 (4.3%), and 8 (2.1%) were noted for shoulder, lower back pain (LBP), knee, neck, upper back pain (UBP), ankle pain, elbow, hip, and wrist pain among farmers of Vehari, Punjab, Pakistan (Table 2). We found no significant increase in the percentile frequency of musculoskeletal disorders (MSD) as the age advances among farmworkers. The highest prevalence of MSDs was found in the age bracket of 18-35 years and lowest in the age bracket of 51-63 years. MSDs were found significant ( $\chi^2 = 11.120$ ,  $p = 0.01$ ) for the ages of farmers (Table 3). The most commonly affected body part was shoulder, whereas the wrist was found as the least affected body part of farmers suffering from the MSDs and WMSDs. Prevalence of MSDs was found significant for affecting shoulder ( $\chi^2 = 127.884$ ,  $p = 0.000$ ), followed by lower back ( $\chi^2 = 139.050$ ,  $p = 0.000$ ), knee ( $\chi^2 = 198.361$ ,  $p = 0.000$ ), neck ( $\chi^2 = 219.152$ ,  $p = 0.000$ ), upper back ( $\chi^2 = 102.988$ ,  $p = 0.000$ ), ankle ( $\chi^2 = 56.797$ ,  $p = 0.000$ ), elbow ( $\chi^2 = 18.813$ ,  $p = 0.000$ ), hip ( $\chi^2 = 6.902$ ,  $p = 0.032$ ), and wrist ( $\chi^2 = 3.622$ ,  $p = 0.163$ ) with respect to the age variables among farmworkers (Table 4).

	Yes	No
Variable	Frequency (%)	Frequency (%)
Age of participant		
18-35	158 (42)	
36-50	134 (35.6)	
51-63	84 (22.3)	
Neck pain	87 (22.9)	290 (27.1)
Shoulder pain	231 (61.4)	145 (38.6)
Wrist pain	8 (2.1)	368 (97.9)
Upper back pain	60 (16.0)	316 (84)
Lower back pain	107 (28.5)	269 (71.5)
Hip pain	16 (4.3)	360 (95.7)
Elbow pain	23 (6.1)	253 (93.9)
Knee pain	104 (27.7)	272 (72.3)
Ankle pain	58 (15.4)	318 (84.6)

Table 1: Association between the age of farmers and prevalence frequency of Musculoskeletal



## injuries or disorders

	Yes	No
Variable	Frequency (%)	Frequency (%)
Working hour		
4 h	27 (7.2)	
6 h	135 (35.9)	
8 h	214 (56.9)	
Neck pain	87 (22.9)	290 (77.1)
Shoulder pain	231 (61.4)	145 (38.6)
Wrist pain	8 (2.1)	368(97.9)
Upper back pain	60 (16)	316 (84)
Lower back pain	107 (28.5)	269 (71.5)
Hip pain	16 (4.3)	360 (95.7)
Elbow pain	23 (6.1)	253 (93.9)
Knee pain	104 (27.7)	272 (72.3)
Ankle pain	58 (15.4)	318 (84.6)

**Table 2:** Association between the duration of working hours (h) and the prevalence frequency of musculoskeletal injuries or disorders

			$\chi^2$ -value	P-value
Variable	Yes	No	11.12	0.01
Age groups				
18-35	158	218		
36-50	134	242		
51-63	84	292		
Neck pain	87	289	21.91	0.01
Shoulder pain	231	145	127.88	0.01
Wrist pain	8	368	3.62	0.16
Upper back pain	60	316	102.98	0.01
Lower back pain	107	269	139.05	0.01
Hip pain	16	360	6.90	0.03
Elbow pain	32	344	18.81	0.01
Knee pain	104	272	198.36	0.01
Ankle pain	58	318	56.79	0.01

**Table 3:** Chi-square analysis of prevalent frequencies of musculoskeletal disorder with respect to the age of participants

			$\chi^2$ -value	P-value
Variable	Yes	No	9.11	0.05
Working time				
4 h	27	349		
6 h	135	241		
8 h	214	162		
Neck pain	87	289	4.09	0.39
Shoulder pain	231	145	20.97	0.01
Wrist pain	8	368	0.63	0.72
Upper back pain	60	316	0.19	0.09
Lower back pain	107	269	2.73	0.03
Hip pain	16	360	6.49	0.04
Elbow pain	22	353	1.86	0.04
Knee pain	104	272	3.98	0.14
Ankle pain	58	318	1.59	0.44

**Table 4:** Chi-square analysis of prevalent frequencies of musculoskeletal disorder with respect to the working hours

### Discussion:

Our findings of MSDs prevalence are similar to the cross-sectional study of Kim et. al (2019) which found 25% of farmers suffering from elbow pain, 60% vibration of hand, osteoarthritis, disability in arms, shoulder, and hand was observed. The study also found the frequency of associated risk factors for MSDs such as working hours ( $\beta=0.95$ ,  $P=0.001$ ) working depression ( $\beta=6.75$ ,  $P<0.001$ ).<sup>16</sup> The study design, duration, population size, inclusion and exclusion criteria observed by the present study are in correspondence to another Bangladesh-based study conducted by Sarkar et. al (2016) in which 77% of farmers had developed MSDs and a significant association ( $P<0.005$ ) was found between the age, working days, and working years for the development of MSDs and WMSDs.<sup>17</sup> The seriousness of musculoskeletal disorder examined by the present study are in correspondence to another study conducted by Jiskani et. al (2020) in pakistan through a self-regulated poll to explore the impact of psychosocial factors on the coal diggers. The outcomes demonstrated that diggers face moderate to serious dangers of MSDs. The lower back, knee and elbow were found as the most

regularly exposed joints suffering from the musculoskeletal disorders. The main psychosocial factors which were involved in expanding the danger of developing MSDs include control at the workplace and job demands.<sup>18</sup> Our results revealed the frequency of developing pain in shoulder joints 231 (61.4%) as the maximum noted frequency amongst the farmers of the area under study. Current findings are thus in line to the findings of another study in which 50%, 19 %, 21% and 6% of the participants were found suffering from the low back pain, upper back pain, shoulder pain, and foot pain, respectively. Some fundamental clinical manifestations reported by the study reported by Khan *et. al* (2017) revealed that pain was more often reported in the joints of neck (96%), shoulder (90%), hips (44%), knees (34%) and lower leg/feet (20%).<sup>19</sup> These findings are far greater than the values put forward by our studies. Similar to our findings it has been found by another Thailand based study reported by Sombatsawat *et al.*, (2019) in which MSDs injuries were reported by all of the rice farmers at least in anyone of their body parts or joints. This study also found very high prevalence of musculoskeletal disorders (MSDs) in lower back area, neck and shoulders as 86.5, 85.9, and 80.7 percent, respectively in these parts and joints of the body.<sup>16</sup> The MSDs injuries reported in the body parts are similar to the findings as reported by our study. The study draws calls for the immediate attention of occupational health and safety services (OHSAS) for farmworkers. It also calls for the implementation of adequate agricultural practices which involve the size selection of various agricultural equipment, load carrying appliances, and proper working postures.

### Conclusions:

Current cross-sectional interview-based study was aimed at exploring the prevalent frequency of musculoskeletal injuries and/or disorder among the farmers of district Vehari, Punjab, Pakistan. It is concluded that highest prevalence of MSDs and/or WMSDs was found in the

farmers who work for eight hours. The highest frequency of MSDs and/or WMSDs, however, was reported in the farmers upto the age of thirty five. All farmers included in the present study reported in affirmation for the presence of musculoskeletal disorders (MSDs) in at least anyone of the body parts.

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