

## Musculoskeletal Discomforts Among Female Agricultural Workers: A Cross-Sectional Study In Rural West Bengal, India

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<p><b>Keywords:</b> Agricultural workers; Musculoskeletal discomforts; Quality of Life; Rural women</p>	<p><b>ABSTRACT</b></p> <p><b>Introduction:</b> Musculoskeletal discomforts (MSDs) and Quality of Life (QoL) are solely connected to each other. It has been rising as a global phenomenon between workers of different fields. This study was carried out to the prevalence of MSDs and its impact on QoL among rural women.</p> <p><b>Material and Methods:</b> This cross-sectional study among 114 females (57 agricultural workers and 57 housewives) in rural West Bengal, India. Data was collected using standardized Nordic Musculoskeletal and WHOQOL-BREF questionnaires.</p> <p><b>Results:</b> Statistical analyses showed that agricultural workers had a significantly higher prevalence of MSDs than housewives. These women showed much higher odds of pain in the upper back (OR=6.12; p&lt;0.01), low back (OR=5.99; p&lt;0.05), elbows (OR=5.99; p&lt;0.01) and especially the hips/thighs (OR=21.86; p&lt;0.001). Prevalence of MSDs was linked to a significantly lower QoL. Participants with MSDs reported significant lesser physical, psychological and environmental health (p&lt;0.001).</p> <p><b>Conclusion:</b> This study revealed that female agricultural workers are at high risk for work-related MSDs which severely reduces their overall QoL.</p>
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### INTRODUCTION

Agriculture is a most essential industry of India. It plays a crucial role in India's economy [1]. In India, more than fifty percent of the population are engaged in agriculture and related jobs and a great number of females are involved in this field [2]. Agriculture is one of the most hazardous, physically demanding and stressors sectors of occupation in the working world [1,3]. In India, agriculture relies heavily on manual labour and is less technologically advanced. Activities including seeding, harvesting, cutting, and weeding impose significant physical stress on musculoskeletal system of the agricultural workers. The most common physical hazards and stressors faced by the agricultural workers are lifting and moving heavyweight materials, frequently perform tasks while bending at the waist, often work in awkward posture, risk of accidents involving machinery and mechanical tasks, work under conditions involving whole-body vibration [4]. Entire body parts of the agricultural workers are engaged in this type of work, resulting the occurrence of musculoskeletal disorders/discomforts (MSDs) such as traumatic injuries, soft-tissue damage, and degenerative joint conditions affecting the hands, knees, and hips are commonly found among farmers. [5].

Female agricultural workers use to face a double burden for their working activities to fulfil socioeconomic needs. It is increasing their risk of MSDs drastically [6]. These musculoskeletal problems are not just an issue of physical health. They are the key cause of chronic pain, reduce work capacity, and significantly harm a person's overall QoL. It is affecting their physical, psychological, and social well-being [7]. There are different literatures in this field though the impact of MSDs on the QoL of female agricultural workers in India remains unexplored. This study aims to report the prevalence of MSDs and its influence on the QoL among female agricultural workers in rural West Bengal in India.

## **MATERIAL AND METHODS**

### **Study design and participants:**

This cross-sectional study was conducted among 114 rural women (agricultural workers: 57 and house wife: 57) living in the rural areas of Burdwan District and Howrah District of West Bengal, India during January 2022 to April 2022.

### **Socioeconomic status:**

The socioeconomic status of the participants was determined by using modified Kuppuswamy Socioeconomic status scales [8].

### **Musculoskeletal disorders:**

The Musculoskeletal disorders among the participants were assessed by using the standard Nordic questionnaires for the analysis of musculoskeletal symptoms developed by Kuorinka et al. [9].

### **Quality of life (QoL):**

QoL of the participants were evaluated using the WHOQOL-BREF developed by WHO [10].

### **Statistical analysis:**

Statistical Package for the Social Sciences (SPSS version 25.0) was used to do statistical analyses. Socio-demographic characteristics of the participants are shown as mean  $\pm$  SD, and frequencies [N (%)]. An independent samples t-test was done to compare the mean QoL scores between participants categorized by the MSDs. Chi-square ( $\chi^2$ ) test was done to find out the association between occupation and the prevalence of MSDs. The strength of this association was computed using cross tabulations and presented with Odds Ratios (OR) with 95% confidence intervals (CI). Statistically significance was considered with  $p < 0.05$ .

## **RESULTS**

### **Socio-Demographic and Economic Profile of Participants**

We included 114 women (57 agricultural workers and 57 housewives) in this study. The participants had low levels of formal education. Nearly half (46.49%) of the participants had only a primary school certificate. 12.28% had completed high school or higher education but 28.07% participants were illiterate. Socio-economic profile revealed that the families of these women had a low average monthly income. 35.96% of the women had monthly family income of Rs. 7,887/- to Rs. 13,160/-. According to Kuppuswamy's socioeconomic classification [8], 84.21% belonged to the "Upper Middle" class and the rest of the participants (15.79%) belongs to the "Lower middle and "Upper lower" classes (Table 1).

### **Prevalence of MSDs by Occupation**

This study underscores significant link between a woman's occupation MSDs faced by them. Agricultural workers reported a higher prevalence of pain across all body sites compared to housewives.

Agricultural workers were nearly 22 times higher odds to experience discomforts in the hips and thighs than housewives (OR=21.857;  $\chi^2=15.555$ ;  $p < 0.001$ ). They also showed a significantly higher prevalence of pain in the upper back, elbows, low back, and ankles/feet (Table 2). While low back pain was common in both groups, it was significantly high in 87.72% of agricultural workers compared to 54.39% of housewives with higher odds (OR=5.991;  $\chi^2=15.396$ ;  $p < 0.001$ ). Figure 1 shows the occupational influence of the scores and prevalence of the MSDs.

**Table 1: Socio-demographic-economic characteristics of the participants**

Parameters	Mean±SD / N (%)
<b>Age (years)</b>	37.04±10.33
18-35 years	61 (53.51)
36-59 years	53 (46.49)
<b>Education</b>	
Intermediate or post high school diploma	2 (1.75)
High school certificate	12 (10.53)
Middle school certificate	15 (13.16)
Primary school certificate	53 (46.49)
Illiterate	32 (28.07)
<b>Occupation</b>	
Agricultural Female Workers	57 (50.00)
Housewife	57 (50.00)
<b>Monthly income of Family (Rs.)</b>	15201.75±8470.86
26,355-52,733	10 (8.77)
19,759-26,354	22 (19.30)
13,161-19,758	26 (22.81)
7,887-13,160	41 (35.96)
2,641-7,886	15 (13.16)
<b>Socioeconomic class</b>	
Upper middle	9 (7.89)
Lower middle	9 (7.89)
Upper lower	96 (84.21)

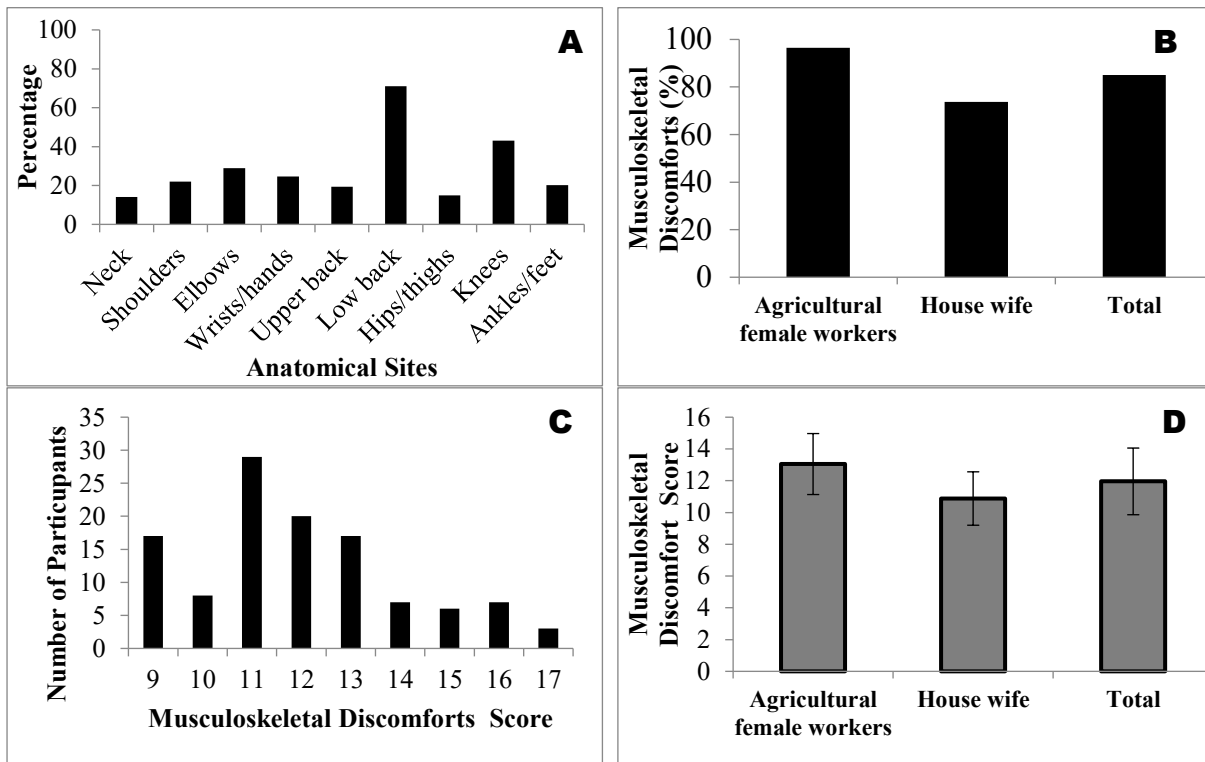
**Impact of MSDs on Quality of Life**

An assessment of QoL across four major domains (viz physical health, psychological well-being, social relationships and environmental) indicated variations in scores. The QoL scores were 62.03 for physical health, 56.38 for psychological well-being, 71.94 for social relations, and 49.86 for the environmental domain (Fig 2).

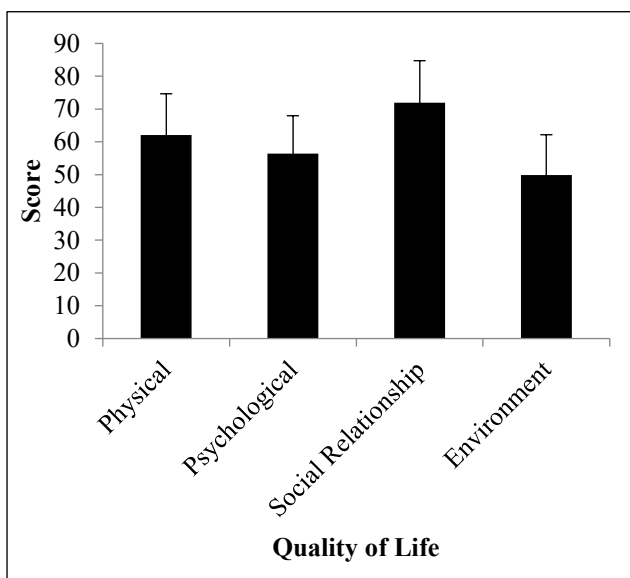
**Table 2: Relation of occupation with the prevalence of MSDs across different anatomical sites**

Anatomical Sites	Agricultural Female Workers	Housewife	OR	$\chi^2$
Neck	11 (19.30)	05 (08.77)	2.487	2.617
Shoulders	14 (24.56)	11 (19.30)	1.362	0.416
Elbows	26 (45.61)	07 (12.28)	5.991	15.396***
Wrists/hands	20 (35.09)	08 (14.04)	3.311	6.817**
Upper back	18 (31.58)	04 (07.02)	6.115	11.040***
Low back	50 (87.72)	31 (54.39)	5.991	15.396***
Hips/thighs	16 (28.07)	01 (01.75)	21.857	15.555***
Knees	31 (54.39)	18 (31.58)	2.583	6.049*
Ankles/feet	19 (33.33)	04 (07.02)	6.625	12.255***

Significant level as \*\*\*p<0.001; \*\*p<0.01; \*p<0.05



**Fig1: Influence of occupation on the score and prevalence of MSDs.** (A) MSDs across different anatomical sites. (B) Influence of occupation on the prevalence of MSDs. (C) Distribution of the participants based on scores of MSDs. (D) Influence of occupation on the mean scores of MSDs.



**Fig 2: Mean scores of four major domains of quality of life among the participants**

This investigation shows that MSDs had a significant influence on QoL of the participants. Physical health score of the participants facing MSDs was significantly lower ( $60.24 \pm 12.21$ ;  $p < 0.001$ ). Psychological, social and environmental QoL are shown in table 3. Psychological and environmental QoL were statistically significantly lower among agricultural worker women than the house wives, but no statistical association was found in case of social QoL.

**Table 3: Influence of musculoskeletal discomforts on the quality of life**

Quality of life	Musculoskeletal discomfort		t
	Yes	No	
Physical	60.24±12.21	72.24±10.04	3.828***
Psychological	55.03±11.57	64.06±8.21	3.078**
Social relationships	71.21±12.23	76.12±15.27	1.468
Environment	48.13±11.96	59.71±9.50	3.782***

\*\*\*p<0.001; \*\*p<0.01

## DISCUSSION

The major findings of this study states that female agricultural workers in rural West Bengal experience a significant burden of MSDs, lowering their QoL. Prevalence of pain in different anatomical sites among agricultural workers is much higher supported previous studies [11,12]. This is also supporting with other studies which have reported a higher prevalence of low back and knee pain among agricultural workers due to prolonged bending, heavy lifting, and repetitive tasks [1,13]. The remarkably high odds of hip and thigh pain (OR=21.86; p<0.001) among workers is particularly striking and may be linked to tasks like squatting for weeding or transplanting, which are common in Indian agriculture [14].

The results strongly suggested that the presence of MSDs has a negative impact on multiple domains of QoL. The significantly lower scores in the physical health domain for participants with MSDs are expected, as pain and discomfort directly limit physical functioning and capacity for work [7]. The lower psychological scores suggest that chronic musculoskeletal pain is also associated with mental distress, possibly including symptoms of depression and anxiety, which is a well-documented relationship in chronic pain conditions [15].

Furthermore, the lowest scores were observed in the environmental health domain for those with MSDs. This domain includes aspects like financial resources, physical safety, and participation in recreation. The low scores here could reflect the economic hardship caused by reduced work capacity due to pain, as well as limited access to healthcare and leisure activities in their living environment [16]. This study underscores that social relationships were the only domain of QoL which was not significantly affected. This was probably because social structures and family ties in rural communities remain strong. It provides a buffer against the social isolation that can sometimes accompany chronic health problems [17].

This study concludes with clear evidence that the physically exhausting occupation of agriculture influences women to a high rate of MSDs. It gradually diminishes their physical, psychological, and environmental quality of life. There is an urgent need for ergonomic interventions, such as training in proper lifting techniques and the design of improved, woman-friendly tools, to reduce the musculoskeletal load on these workers [18]. Improving their working conditions is essential not only for their physical health but also for their overall well-being and quality of life.

## AUTHOR'S CONTRIBUTION

All authors contributed to the literature review, design, data collection and analysis, drafting the manuscript, read and approved the final manuscript.

## CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this study.

## FINANCIAL DISCLOSURE

No financial interests related to the material of this manuscript have been declared.

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