



A Systematic Review on Musculoskeletal Disorders among Workers in Unorganized Sector

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Abstract

Musculoskeletal Disorders (MSDs) are a group of medical conditions that affect the musculoskeletal systems, which include muscles, tendons, ligaments, and nerves, that support the body and allow movement. In the context of workers in the unorganized sector, due to the nature of their profession, MSDs are expected, which often involve repetitive motions, heavy lifting, awkward postures, and other physical demands. Loss of money, decreased productivity, and a decline in quality of life are all possible consequences for the workers. Therefore, it is crucial to prevent and manage MSD among workers in the unorganized sector such as improving working conditions, providing training on safe work practices, and promoting early detection and treatment of MSD. The study aims to identify the variables that affect informal worker's quality of life. The researcher gathered the available data and suggested a few guidelines. The condition of employees may be improved with certain adjustments to the workplace, work tools, worker health, work duties, and work management.

Keywords: Musculoskeletal Disorder, Repetitive Work, Unorganized Sector, Working Posture

1. Introduction

A group of inherited genetic diseases known as Musculoskeletal Disorders (MSDs) gradually weaken the muscles, resulting in a growing degree of disability. Since MSD is a progressive disorder, it deteriorates over time. The most common occupational health problem is musculoskeletal disorders, which cause the most disability and compensation days¹. "Job-related musculoskeletal disorders" refer to conditions resulting from repetitive strain, overuse, or cumulative trauma. The most common symptoms of these muscle, tendon, or nerve illnesses are pain, discomfort, or tingling in a particular body part. Vibration, temperature, and ergonomic exposure are examples of environmental elements in physical work². Workers in this unorganized sector work a lot of hours for a pitiful wage, have no employment guarantee or social

insurance, and live in substandard conditions³. Workers in the unorganized sector may include street vendors, domestic workers, construction workers, agricultural workers, sewing machine operators, sanitation workers, chikankari workers in small-scale manufacturing, household labour, and other informal workers who do not have formal contracts or job security. These employees are vulnerable to the onset of MSDs because they frequently experience unstable working situations a lack of social protection, and restricted access to health care. Exposure to ergonomics can occur through workstation positioning, repetitive motions, and the use of tools that have been linked to MSDs. Disorders of the musculoskeletal system can happen in any job. Work-related Musculoskeletal Disorders (WMSDs) have been linked to heavy lifting, strenuous activity, uncomfortable posture, Repetition, and whole-body vibration in epidemiology institutions⁴.

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2. Review of Relevant Studies

2.1 Postural Discomfort

Physical discomfort, agony, or disquiet brought on by extended or improper bodily positions or postures is referred to as postural discomfort. It is frequently linked to Musculoskeletal Diseases, which are injuries brought on by overuse, poor ergonomics, or incorrect body alignment when engaging in different tasks. The neck, shoulders, back, wrists, and hips are just a few of the body regions where postural pain can show up.

Various studies, including those by Kiran *et al.*⁵, Pandey & Kiran⁶, Devi & Kiran¹⁰, Gangwar and Kiran¹², Ghosh *et al.*,¹³ Singh *et al.*⁷, and Ajayeoba *et al.*⁹, have found that workers who spend long hours in awkward positions often experience postural discomfort. This discomfort could cause pain in various parts of the body, including the upper and lower arms, mid and lower back, and buttocks. Similarly, Ajayeoba *et al.*⁹. The area of the lower back was the most frequently reported source of discomfort among workers. Further, Pandey and Kiran⁶ reported that some workers experienced severe leg pain, while Ghosh *et al.*¹³ and Devi and Kiran¹⁰ found that eye

Table 1. Studies based on postural discomfort

Author and year	Title	Objective	Method and Sample Size	Finding
Kiran <i>et al.</i> ⁵	Postural discomfort and MSD among the agricultural workers in Faizabad District	To find out MD among agricultural workers while working in the field.	150 workers were randomly selected. Corlett and Bishop's scale is used.	The upper back, upper arms, mid-back, lower back, and buttocks were revealed to be the locations that felt the most discomfort.
Pandey and Kiran ⁶	Postural Discomfort and MSD among Painters	to assess the degree of physical discomfort brought on by the workplace.	52 male painters between the ages of 19 and 75. It uses the Kromers body discomfort scale.	The work of painters created severe and long-lasting health risks.
Singh and Katyan ⁷	WMSDs among Chikankari Workers in Lucknow (U.P.)	The current study's goal is to evaluate the MD that Chikankari workers experience as a result of their employment.	Twenty home- based chikankari workers and twenty canter- based chikankari workers were chosen from purposefully chosen renowned chicken areas.	The result shows that 50% of respondents did not report having any musculoskeletal pain or discomfort, yet they avoided or abstained from participating in routine activities as a result. Compared to home-based employees, centre-based workers indicated the most significant percentage of self-reported MD.
Dev <i>et al.</i> ⁸	Analysis of WMSDs and ergonomics posture assessment of welders in the unorganized sector: a study in Jalandhar	For this study, welders working in unorganized industrial facilities in Jalandhar, India, were examined for their risk factors for developing WMSDs and postural discomfort.	A cross-sectional study of 60 welders working at industrial sites beside roadways was done. WMSDs from the preceding year were examined using the Nordic Musculoskeletal Questionnaire (NMQ).	According to the study, WMSDs and factors including age, BMI, and job experience are significantly correlated. Additionally, welders are more likely to acquire WMSDs, thus it is crucial to adjust their working postures to lower this risk.
Ajayeoba <i>et al.</i> ⁹	Assessment of (MSDs) in Workers in Selected Metalworking Micro- Enterprises (MMEs) in South-Western Nigeria.	To determine each worker's degree of MSD risk, the working positions of the workers' postures were observed.	In Southwestern Nigeria, nine MMEs participated in this study. In this study, information was gathered from 66 personnel in the foundry, machining, and welding units, including blacksmiths machinists, and welders.	In this study, information was gathered from 66 personnel in the foundry, machining, and welding units, including 18 blacksmiths, 18 machinists, and 30 welders.

Table 1. Continued

Devi and Kiran ¹⁰	Prevalence of MSDs among unorganized workers concerning Lucknow city	To find out how widespread musculoskeletal issues are illnesses in various body regions of workers	Cross-sectional study. The study used a survey research approach with a sample size of 500 employees, or 100 employees each employee.	MSDs was highest (80%, 70%, 47%) among employees in the construction, sanitary, and brick kilns sectors, whereas the highest rates of eye discomfort were reported by (93%) of ornamental workers and 73% chikankari artisan.
Sarkar <i>et al.</i> ¹¹	Examination of Postures and frequency of MSDs among manual workers in Calcutta, India	The postures employed when handling large items and the incidence of MSDs among Manual Material Handling (MMH) personnel in employees.	100 MMH employees participated and were selected by cross-sectional study.	The position that proved the most detrimental was holding a large load overhead. The likelihood of experiencing neck and lower back discomfort rose by 4.555 and 4.527 respectively while carrying more than 120 kg.
Gangwar and Kiran ¹²	Postural Discomfort among sanitation workers.	Researchers looked at Lucknow district sanitation employees' postural pain.	180 respondents (90 males, 90 females) were interviewed from academic institutions, hospitals, and public spaces.	The results show that sanitation workers experienced significant pain in various parts of their bodies due to their posture.
Ghosh <i>et al.</i> ¹³	WMSDs: An Occupational Disorder that Affects Indian Goldsmiths.	This study's objective is to uncover occupational disorders that affect Indian goldsmiths.	The researchers randomly selected 120 male goldsmiths from the Davangere region of Karnataka for the study.	found the majority of employees suffered from occupational disorders such as neck, shoulder, wrist, and lower back discomfort (80%, 20%, 45%, and 75%, respectively), as well as eye problems like irritation (30%) and burning feeling (70%). Additionally, they work in dangerous positions.

problems such as irritation and burning sensation were common among Goldsmiths and Chikankari workers. On the other hand, Singh *et al.*⁷ reported that Chikankari workers who performed fine artwork while sitting in a static position for extended periods may experience discomfort in their eyes, elbows, wrists, shoulders, neck, lower back, and knees.

2.2 Work-Related Musculoskeletal Disorders (WMSDs)

WMSDs are a serious employment health issue since they can make it difficult for someone to do their work well and they can also be painful and uncomfortable.

Several studies, including those conducted by Mekonnen *et al.*¹⁸, Nath *et al.*¹⁹, Poochada *et al.*¹⁴, Rohilla *et al.*²⁰ and Mukherjee²¹, have concluded that MSDs are linked to repetitive tasks, awkward postures, forceful movements, and other physical stressors that

are commonly present in different work environments. Research on work-related MSDs is essential to comprehend their causes, risk factors, prevention, and management techniques to enhance the well-being and health of employees. According to Poochada *et al.*¹⁴, Almost all of the employees at various plantations reported experiencing mild (60.48%), moderate (23.04%), and severe (13.92%) levels of MSDs, with the highest levels among employees on cassava, vegetable, and sugarcane fields, the knees/calves (22.40%), lower back (21.44%), and shoulders (19.68%) were the most common. Nath *et al.*, revealed that 93.3% of workers had severe wrist discomfort that interfered with daily tasks. A majority of workers in various plantations reported experiencing mild (60.48%), moderate (23.04%), and severe (13.92%) levels of MSDs among those who work on sugarcane, vegetable, and cassava farms. Nath *et al.*¹⁹ revealed that high wrist discomfort affected 93.3% of workers, making daily tasks

Table 2. The studies based on work-related musculoskeletal disorders

Author and year	Title	Objective	Method and Sample Size	Finding
Poochadda <i>et al.</i> ¹⁴	MSD among farmworkers participating in different farming activities in upper north-eastern Thailand.	The prevalence of musculoskeletal pain in Thailand.	Cross-sectional study. 889 cultivating agriculturalists were selected randomly.	The MD that was discovered among persons engaged in agricultural activity affected numerous different body parts.
Das <i>et al.</i> ¹⁵	Risk Factors associated with WMSD among floor-sitting precision handicraft workers.	To ascertain the incidence of WMSD among precision handicraft workers who sit on the floor.	Among the 334 handicraft workers investigated who engaged in different precision procedures were chosen using the survey approach.	the vast majority of individuals indicated a high prevalence of MSDs. Knee (54.7%), lower back (74.8%), and neck (61.6%) were the locations with the highest concentration of cases. A greater education level decreases the risk of MSDs.
Jebaraj <i>et al.</i> ¹⁶	among female domestic employees, the prevalence and risk factors for MSD related to the workplace	To ascertain the frequency or occurrence of WMSD among Bengaluru's female domestic workers (FDWs) employed in private houses.	a cross-sectional FDW of 408 randomly chosen individuals with a comparison group	Domestic workers have higher prevalence rates of (WMSDs) in the neck, shoulder, elbow, upper back, and ankle compared to non-domestic employees.
Kumari & Kiran ¹⁷	Ergonomics hazards among rag pickers in India: an analytical study	The study's goal was to pinpoint the ergonomic risks that rag pickers faced at work.	The sample was chosen using a multi-stage random sampling process. Sixty rag pickers from Lucknow City participated in pilot research to find out how common musculoskeletal issues are among rag pickers.	According to research, rag pickers report back pain in their hands (43%), feet (47%), upper back (52.5%), and lower back (65%). Compared to younger rag pickers, older rag pickers (ages 55 to 65) reported more knee and back pain and discomfort.
Mekonnen <i>et al.</i> ¹⁸	Work-related MSD among informal sectors of hairdressers in Ethiopia.	The frequency of MD among hairdressers in Oromia Special	652 hairdressers were selected by systematic random sampling. The study is cross-sectional.	The shoulder, neck, and lower back areas showed the highest occurrence rates.
Nath <i>et al.</i> ¹⁹	Prevalence of Musculoskeletal Disorder among Stone Polishing Workers Using Stone Polishing Devices in Unorganized Sector of Guwahati	The current study seeks to provide some preventive advice based on the incidence of WMSDs among stone-polishing personnel.	A group of thirty male stone polishers were selected from Guwahati city in Assam. NMQ which took into account data on the nature of the work and job stress, was used to conduct an extensive study on discomfort feelings.	The results of the study contribute to our understanding of the physical discomfort experienced by stone polishing employees as a result of their work-related uncomfortable posture, repetitive motion, force application, and extended load handling.

Table 2. (Continued)

Mehta <i>et al.</i> ²⁰	A Study on WMSDs among Sewing Machine Operators.	To research sewing machine workers' demographic profiles. to evaluate the layout of the workstation and work organization. musculoskeletal issues and occupational health issues to be discovered.	The sample size for this study was 60, which was further split into male and female respondents, with 28 male and 32 female respondents. Purposive sampling was the method used for sampling.	The study's findings indicate the majority of respondents (23.4%) reported experiencing knee discomfort, followed by those who had lower back pain (20%) and neck pain (18.4%). Due to their constant use of their legs to operate the machine, the majority of people are affected by Knee discomfort.
Mukherjee <i>et al.</i> ²¹	Assessment of WMSDs among House Maids of Kolkata, India	To evaluate the incidence of WMSDs among Kolkata's housemaids.	Using a random sample technique, 94 housemaids (between the ages of 20 and 60) employed in various domestic tasks for at least three years were selected for this study from various areas of Kolkata, India.	The study found varying degrees of discomfort in several body regions. Different age groups' pain levels and locations varied, with a strong correlation between daily activities and employment experiences.
Kanniappan <i>et al.</i> ²²	Prevalence of MSDs among Sewing Machine Workers in a Leather Industry.	The study's main goal is to determine how common musculoskeletal symptoms are among leather industry sewing machine operators.	100 participants were selected for non-experimental research using inclusion and exclusion criteria. NMQ was used to analyse musculoskeletal pain.	88% of people who work with sewing machines reported having lower back discomfort in the preceding 12 months, according to statistical data. 82% of them also reported knee and lower back discomfort over the same period, preventing them from engaging in typical activities, and 86% did so during the preceding seven days.
Mikrani, <i>et al.</i> ²³	signs of the musculoskeletal system in brick kiln workers in the Kathmandu valley	To investigate the musculoskeletal problems among Kathmandu Valley bricklayers.	200 workers were selected randomly. A cross-sectional study and an NMQ are used.	For the exposed group, the shoulders were the first area of concern, followed by the lower back, knee, and neck.
Maduagwu <i>et al.</i> ²⁴	WMSDs among Self-Employed Sewing Machine Operators in Maiduguri, Nigeria	The purpose of this study was to evaluate the prevalence of (WMSDs), risk factors, and coping mechanisms among independent sewing machine workers.	219 samples were selected via a close-ended structured questionnaire.	The majority of responders with WMSDs accurately identified the risk factors for this disease. This suggests that if adequate ergonomic measures were offered to this group, they may do so without difficulty.
Inbaraj <i>et al.</i> ²⁵	Prevalence of MSDs among brick kiln workers in Rural Southern India.	To determine the MSDs among brick kiln workers in Rural southern India.	This cross-sectional research, which included 310 brick kiln employees, was carried out in unorganized brick kiln businesses in villages in Tamil Nadu's Vellore region.	Employees of long-term brick kilns who maintain a specific posture for protracted periods have severe MSDs that interfere with daily activities and reduce job satisfaction. Health education on regular posture change and the establishment and oversight of rules among unorganized firms are suggested as ways to lower the morbidity from musculoskeletal illnesses.

Table 2. (Continued)

Qutubudd in <i>et al.</i> ²⁶	An ergonomi c study of WMSD risks in Indian Saw Mills	To assess the occupational health and safety issues that Indian sawmill workers may face.	110 people were selected randomly they engaged in various tasks.	Despite being quite large and employing thousands of people, tiny, disorganized saw mills lack ergonomics planning and methodologies. Workers are at a moderate to high risk of developing MSD due to their work.
Sahu <i>et al.</i> ²⁷	The ergonomic evaluation ofWMSD among constructi on labourers working in unorgani zed sectors in West Bengal, India	To assess the frequency of WMSD among construction workers in West Bengal's unorganized sectors from an ergonomic perspective.	To learn more about musculoskeletal symptoms including pain in various body areas, 140 male and 90 female construction workers.	According to the results of using the NMQ and BPD scale, both male and female labourers had shockingly high rates of pain in numerous body locations, notably low back pain.

difficult. According to Mukherjee²¹, low back pain is the most common form of pain across all body parts. The location and degree of discomfort varied with age group and were strongly correlated with job experience and daily working hours. The intensity of pain also fluctuated throughout the day, including during work, downtime, and sleep. Same as Mehta *et al.*,²⁰ found that the majority of participants suffered from knee, lower back, and neck pain due to operating machines for extended periods.

2.3 Body Pain

Body discomfort can be caused by MSDs. Numerous symptoms, including discomfort, stiffness, weakness, and restricted range of motion, can be brought on by these conditions.

According to a study conducted by Mekonnen *et al.*,²⁹ tailors often experience musculoskeletal pain in their neck shoulder, or both. The study also found that a physically stressful work environment, such as insufficient lighting, was significantly associated with neck and shoulder pain. Interestingly, the study found no difference in prevalence between male and female respondents. According to a study by Nguyen *et al.*,²⁸ lower back pain was the most frequently reported, followed by neck and shoulder pain. The study also found that age was significantly associated with persistent musculoskeletal pain and that female workers had a higher risk of persistent disorders.

2.4 Health and Age

Several variables, including genetics, way of life, and ageing naturally, can have an impact on musculoskeletal problems. Here, I'll discuss how age and health might affect musculoskeletal disorders: Our bodies naturally experience various changes some of which may have an impact on the musculoskeletal system. These modifications include muscle mass reduction, bone density loss, joint wear and tear, and reduced flexibility. As we age, certain medical illnesses and way of life decisions might increase the risk and severity of musculoskeletal disorders.

A study conducted by Santoso *et al.*,³¹ found that a noise intensity of 86.90 dB is linked to musculoskeletal conditions. The study suggests that people working in noisy environments experience higher blood pressure and more fatigue in the central nervous system, compared to those working in peaceful areas. To protect oneself while working, it is recommended to use earplugs as personal protective equipment. Hebbal *et al.*³². Additionally, it was shown that employees' age is strongly correlated with neck and lower back pain, with the worst pain being felt in the legs and causing the greatest suffering in the lower back. Therefore, it's important to focus on training employees before their employment to minimize MSDs, ensuring a healthy workforce that contributes to high productivity and gains.

Table 3. The studies based on body pain related to MSDs

Author and year	Title	Objective	Method and Sample Size	Finding
Nguyen <i>et al.</i> ²⁸	Musculoskeletal pain and work-related risk factors among waste collectors in Hanoi, Vietnam: A cross-sectional study	This study's objective was to investigate the risk variables for chronic musculoskeletal pain among workers in Hanoi, Vietnam.	468 WCs were examined using a cross-sectional survey in 2017. Data were gathered using the Rebrov Musculoskeletal Pain Questionnaire and a survey on demographics and working circumstances.	According to reports, the lower back, neck, and shoulders were the areas most often impacted. Age was substantially linked to the probability of chronic musculoskeletal pain.
Mekonnen <i>et al.</i> ²⁹	Physical Environmental and Occupational Factors Inducing Work-related Neck and Shoulder Pains among Self-employed Tailors of Informal Sectors in Ethiopia, 2019	A study looked into the causes of neck and shoulder discomfort in self-employed tailors.	It used a cross-sectional survey among 422 tailors chosen using a rigorous random sample approach. NMQ was utilized to assess shoulder and/or neck discomfort.	The findings also showed that 72.1 and 68.3 percent of individuals, respectively, reported experiencing neck and shoulder discomfort. Ethiopian labour rules and regulations do not apply to self-employed people, notably those in the informal economy such as tailors.

Table 4. The studies based on health and age-related MSDs

Author and year	Title	Objective	Method and Sample Size	Finding
Russeng <i>et al.</i> ³⁰	The Effect of Age and Workload on Work Posture toward Musculoskeletal Disorders Complain on Loading and Unloading Workers	This study examined how age, workload, and work posture affect loading and unloading personnel, both directly and indirectly.	For the study, 140 respondents were randomly selected using a cross-sectional analytical observation method.	Through work posture, a significant indirect relationship between age and complaints of MSDs was also discovered. Additionally, intermediate impairment is where low back pain complaints are most prevalent.
Santoso <i>et al.</i> ³¹	Analysis of Determinates of MSD and Life Quality of Informal Workers (Indonesia)	To determine the standard of living for informal labourers.	In a cross-sectional design, 123 informal workers were selected by accidental sampling	86–90 dB of noise intensity associated with musculoskeletal.
Hebbal <i>et al.</i> ³²	WMSD among the women workers in ginning mills of Dharwad Taluka.	An investigation of the frequency of WMSD among female employees at ginning mills.	The study was conducted at three ginning mills in the Dharwad taluka of Karnataka in the 2016- 2017 academic year. 30 female employees from each ginning mill were chosen at random to participate in the study.	The result showed that the age of the employees was substantially correlated with pain in the neck and lower back.

3. Based on the Review, Musculoskeletal Disorders among Workers in Unorganized Sectors can be Reduced by Incorporating Required Modifications in the Workplace, Workstation, Work Equipment used, etc

Workplace- To reduce the likelihood of accidents at work, safety measures should be routinely reviewed for work-related injuries. To keep an eye on the working conditions, labour department representatives should routinely visit building sites. By providing adequate lighting or lowering the possibility of slip injuries while workers are performing manual handling, efforts should be made to increase the quality of the workplace and reduce the risk of harm.

Work equipment- The tools a worker uses should be ergonomically created to lessen the amount of force needed to complete a task. Building firms should embrace a higher degree of industrialized production and the usage of assembling methods for prefabricated modules. When necessary for the task, mechanical assistance must be made available.

Improve working Conditions in the unorganized sector should be required to provide safe and healthy working conditions for their employees. This includes ensuring proper ventilation, adequate lighting, and appropriate equipment for the job.

Provide Training and skill development in the unorganized sector often lack the skills and training needed to improve their productivity and earn higher wages.

Governments and NGOs can help by providing training programs and skill development opportunities for workers in the unorganized sector.

Raise Awareness- Finally, increasing public support for policies and programs that enhance workplace conditions can be achieved through raising knowledge of the difficulties experienced by workers in the unorganized sector. Media, campaigns, public education initiatives, and community outreach programs can all fall under this category.

4. Conclusion

Musculoskeletal disorder is a complex condition that poses significant challenges for workers in the unorganized sector. To address these challenges, there needs to be greater awareness and education about the condition as well as support from employees and policymakers to ensure that workers with muscular dystrophy have access to the medical care and support, they need to manage their condition and maintain their livelihood.

Workers in the unorganized sector may not be well-informed on muscular dystrophy, including its causes, symptoms, and treatment, according to the review article. Workers in this industry may not receive an accurate diagnosis or manage the condition properly as a result of a lack of awareness.

The review paper makes the case that certain occupational risk factors, such as repeated heavy lifting, extended standing or sitting, and exposure to hazardous chemicals, play a vital role in the onset or progression of MSDs in workers. Lack of access to healthcare facilities, such as diagnostic testing, specialized treatment, and rehabilitation services, may present difficulties for workers in the unorganized sector, which delays the diagnosis and management of muscular dystrophy. The impacted workers in this industry may experience worse health outcomes as a result.

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