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Musculoskeletal Disorders Among Agricultural Workers: An Occupational Health Concern

*Sundara Keerthana, Sunil Shirwal, Tanuja Naik, Bandari Sathwik Yadav, Harshavany A K and Pavan
Department of Farm Machinery and Power Engineering, University of Agricultural Sciences, Raichur, Karnataka, India
*Corresponding Author's email: keerthanasundara264@gmail.com

The agriculture sector continues to provide some of the largest employment opportunities across the globe, accounting for about 1.3 billion people-almost half of the global workforce. In countries like India, this sector continues to provide more than a quarter of the total employment. Though economically important, agriculture has been identified as one of the most physically intensive forms of labour, and several scientific studies indicate a high risk of musculoskeletal disorders (MSD) among farm workers. These are a group of diseases that affect the muscles, tendons, joints and spinal cord, generally due to repetitive movement, awkward posture and excessive workload. Several recent studies carried out in India, Iran and other agricultural countries have provided a detailed perspective into the scope of the problem and how it can be prevented. This article uses four such scientific studies to explore musculoskeletal disorders among farm workers.

Prevalence and Affected Body Regions

The evidence shows a consistent pattern across different regions and crop types: agricultural workers most often experience issues in the lower back, knees, shoulders, neck and wrists.

Temporary (Acute) Musculoskeletal Disorders

Temporary MSDs result from a single overexertion or short-term repetitive strain, and the pain typically eases once the body rests and recovers. Common types and their associated pain include:

- **Muscle strain/soreness**-dull, aching pain in the lower back, shoulders or legs after heavy lifting or prolonged bending
- **Mild ligament sprains**-sharp but short-lived pain in the wrist, ankle or knee from sudden twists or awkward movements
- **Acute tendonitis**-localized, burning pain in the wrist, elbow or shoulder from short bursts of repetitive gripping or twisting
- **Transient joint stiffness**-tightness and mild discomfort after prolonged squatting, kneeling or awkward posture during tasks like weeding or harvesting
- **Mild bursitis**-tenderness and swelling around the knee or elbow from repeated kneeling or leaning on hard surfaces

These pains are usually described as dull or aching rather than severe. Most resolve once the triggering activity stops. A study of agricultural workers found most farmers described dull, aching pain rather than sharp acute pain. The majority found relief simply by discontinuing the activity.

Permanent (Chronic) Musculoskeletal Disorders

Permanent MSDs develop from years of repeated strain that the body never fully recovers from, leading to lasting structural damage. Common types and their associated pain include:

- **Osteoarthritis (hip and knee)**- persistent, deep joint pain that worsens with movement and doesn't fully resolve with rest
- **Chronic low back pain**-ongoing dull or sharp pain, often radiating into the hips or legs, common among those doing repetitive heavy lifting or prolonged awkward postures (e.g., tractor drivers)
- **Degenerative disc disease**-chronic, sometimes radiating nerve-related pain (sciatica-like) from spinal disc wear
- **Hand-arm vibration syndrome**-persistent tingling, numbness and aching in the hands/forearms from long-term exposure to vibrating machinery
- **Chronic tendon damage (tendinosis)**-long-lasting, dull pain in the shoulder or wrist that flares with activity
- **Carpal tunnel syndrome (nerve compression)**-numbness, tingling and burning pain in the wrist and fingers from repetitive hand motion

A systematic review of 65 studies conducted across 18 countries, encompassing crops such as rice, rubber, tea, sugarcane and olives, found that the lower back was reported as an affected site in 74% of studies, the highest proportion among all body regions. Following this, complaints affected the shoulder (63%), wrist and hand (62%), neck (57%) and upper back (45%). The knee, elbow, ankle, hip and finger regions were also implicated, albeit to a comparatively lesser extent. This evidence is supported by field-based studies as well. A study conducted on 472 farmers working on rice, potato and groundnut farming in West Bengal, India, found that a large percentage of the labourers were experiencing musculoskeletal pain, with the lower back region being the most commonly afflicted body part was the lower back region, followed by the knees, shoulders and necks. It was observed that females exhibited more symptoms than males, owing to their additional domestic workload. Another study based on a sample of 377 agricultural labourers in Iran, which included rice, vegetables and greenhouse farmers, indicated that 86% of the respondents had experienced musculoskeletal pain in the past year, with 72.6% experiencing pain in three or more body parts at once. In this case as well, the most commonly affected body part was the lower back, accounting for 75% of participants, followed by the knees, upper back and neck.

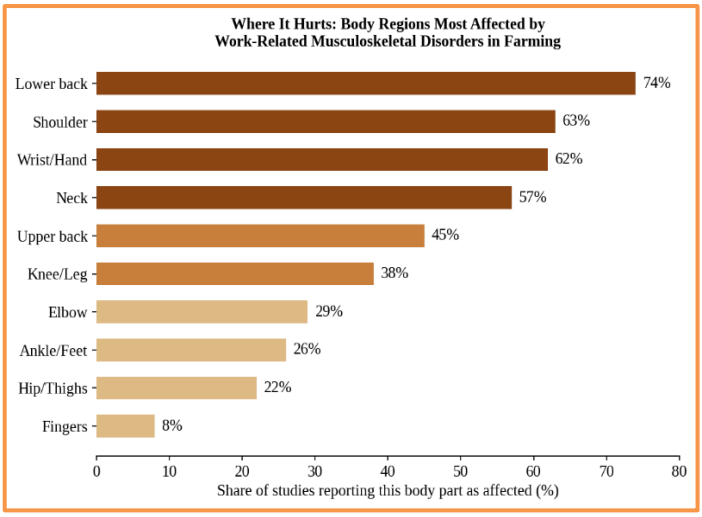

Figure 1: Proportion of studies reporting musculoskeletal disorders by body region.

Occupational Risk Factors

Agricultural workers face severe musculoskeletal risks driven by physical and operational factors.

- **Awkward and static posture:** Various activities like weeding, transplanting, sowing and harvesting usually involve long periods of time spent in positions like bending, twisting and squatting. Applying the Rapid Entire Body Assessment (REBA), one study on Indian farmers revealed that the activities of weeding, spading, sowing and harvesting fell under the category where corrective action is required without delay. Carrying, threshing and winnowing were assessed as "high risk."
- **Repetitive movement:** Many agricultural tasks involve repeating the same motion over extended periods. The Assessment of Repetitive Tasks (ART) tool found that both rice

and potato farming involved a "high" level of repetitive exposure, warranting intervention.

- **Manual material handling:** Manual lifting and carrying of produce, feed and water containers impose a considerable cumulative load on the spine and joints, particularly in the absence of mechanical aids such as carts or trolleys.
- **Extended working hours and monotony:** In the West Bengal study, 90% of respondents identified prolonged working hours as a significant source of physical strain, while 87.5% cited the repetitive and monotonous nature of the work. Approximately 71% reported working under time pressure and 83% indicated that they continued working despite pain, largely due to concerns over lost income.
- **Individual Risk Factors:** Risk accumulates over time-more years in farming, age over 40 and higher Body Mass Index (BMI) are strongly linked to persistent back, neck and knee issues.

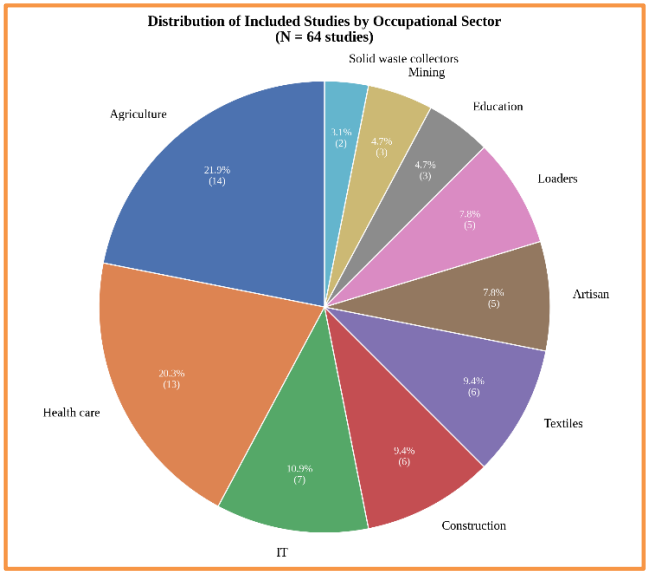

Figure 2: Occupational representation across 64 studies included in the meta-analysis of work-related musculoskeletal disorders in India.

Regional and Crop-Specific Findings

Musculoskeletal disorders in farming aren't uniform-their nature and severity shift with the specific task and production system involved.

A broad review comparing healthcare, farming, industrial, and computer-based occupations found that 60–92% of farmers had at least one musculoskeletal disorder, most often knee and hip osteoarthritis, alongside reduced bone density from sustained physical strain and, in some regions, poor nutrition.

Task design made a clear difference. Dairy workers milking in traditional stooped, squatting postures showed far more knee strain than those working in modern elevated parlours. Fruit growers, who spend hours reaching overhead to harvest, showed elevated rates of rotator cuff damage and hand arthritis-with women in this group working even longer hours than men during peak season.

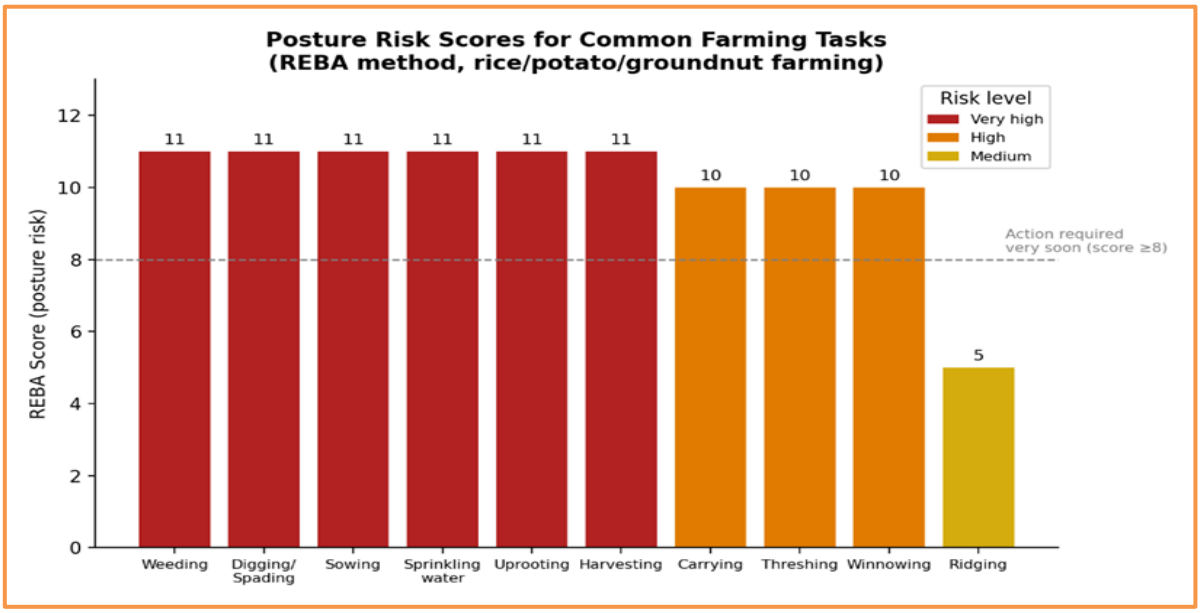

Figure 3: REBA posture-risk scores for common farming tasks in rice, potato, and groundnut cultivation.

Rice cultivation stood out as especially punishing. Across India, Thailand, and Iran, the combination of stooped transplanting, repetitive harvesting motions, and manual carrying was consistently linked to serious back and knee problems. One Thai study found knee impairment in nearly 80% of rice farmers, with matching damage to the hamstring and quadriceps muscles. A posture-scoring study in Iran drove the point home: rice, vegetable, and greenhouse workers averaged 6.7 out of a possible 7 on a standard ergonomic risk scale-signalling that most of the workforce needs immediate corrective action. Rice farmers scored worst of all.

Psychosocial Contributing Factors

The evidence shows that physical strain alone doesn't tell the whole story. Job satisfaction, income, and time pressure each independently raised the risk of musculoskeletal symptoms. In the Iranian study, low job satisfaction was linked to neck and low back pain, and workers who felt rushed were nearly six times more likely to report upper back problems than those who didn't. This suggests that fixing posture and tools alone won't be enough. Real prevention has to also tackle the economic pressures behind the pain-piece-rate pay and a lack of proper rest that push workers to skip the breaks and safer postures they need.

Conclusion

The physical demands inherent to agricultural work cannot be eliminated; however, the accumulated evidence from multiple countries and cropping systems demonstrates that a substantial proportion of musculoskeletal morbidity among farm workers is preventable. Ergonomically informed tool design, improved task organisation, appropriate mechanisation and attention to the psychosocial conditions of agricultural labour together offer a credible pathway toward reducing the incidence of chronic pain, functional impairment, and premature attrition from farm work. Given the scale of the global agricultural workforce, the adoption of such measures carries significant implications for both individual wellbeing and agricultural productivity.

References

1. Das, B. (2023). Work-related musculoskeletal disorders in agriculture: Ergonomics risk assessment and its prevention among Indian farmers. *Work*, **76**(1): 225-241.
2. Dianat, I., Afshari, D., Sarmasti, N., Sangdeh, M. S., and Azaddel, R. (2020). Work posture, working conditions and musculoskeletal outcomes in agricultural workers. *International Journal of Industrial Ergonomics*, **77**:102941.
3. Mishra, S., Avinash, G., Kundu, M. G., Verma, J., Sheth, A., and Dutta, A. (2024). Work-related musculoskeletal disorders among various occupational workers in India: a systematic review and meta-analysis. *Journal of Occupational Health*, **67**(1), uiae077.
4. Varghese, A., and Panicker, V. V. (2022). Impact of musculoskeletal disorders on various agricultural operations: a systematic review. *Sādhanā*, **47**(1): 46.