



Prevalence of back pain among agricultural workers and preventive strategies

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Abstract

Background: This study's objectives were to ascertain the prevalence of low back pain (LBP) among agricultural workers, pinpoint related psychosocial and sociodemographic risk factors, and assess the efficacy of self-management and rehabilitation techniques in lowering pain and disability.

Methodology: 25 people between the ages of 30 and 60 who reported having LBP and gave their agreement to participate were included in the study, which was carried out in Garhi Samastpur, Sector-150, Noida. Face-to-face interviews were used to get a thorough history of symptoms, and the Oswestry Disability Index (ODI) was used to gauge their severity. As part of the intervention, participants learned about posture correction, ergonomics, and physiotherapy-based exercises. After two weeks, ODI scores were re-evaluated to track changes in functional ability and pain intensity.

Result: All 25 participants completed the study. The mean Oswestry Disability Index (ODI) score reduced from 48.88 ± 12.21 before intervention to 26.88 ± 8.89 after two weeks, showing a mean improvement of 22 points. Initially, most participants were in the severe or crippled disability categories, whereas post-intervention the majority shifted to moderate or minimal disability levels. These findings indicate a clear reduction in pain and functional limitation following the self-management and rehabilitation program.

Conclusions: The study demonstrates the significance of including education, ergonomic interventions, and rehabilitation programs in rural areas and indicates that lower back pain (LBP) is a very common occupational health problem among agricultural workers. To address the psychological and physical causes of LBP, biopsychosocial approach is advised because it treats a patient holistically by addressing physical symptoms, psychological factors, and social influences together to improve recovery and overall function.

Keywords: Low back pain, agricultural workers, prevalence, ergonomic training, rehabilitation, psychosocial factors, self-management and oswestry disability index

Introduction

One of the main causes of disability in the globe and a significant public health concern is low back pain (LBP). It is described as pain or discomfort that is localized above the inferior gluteal folds and below the costal border, with or without accompanying leg pain. LBP is thought to affect around 500 million people worldwide at any one moment, making it the leading cause of years lived with disability (YLDs) in the majority of nations (Shivakumar *et al.* 2024)^[5]. LBP routinely ranks among the leading causes of disability-adjusted life years (DALYs) in the Global Burden of Disease (GBD) study, outpacing several chronic illnesses (Hurwitz *et al.* 2018).

Low back pain in Occupational Settings

LBP is more common among people who work in physically demanding jobs including manual labour, construction, and agriculture. Agricultural workers are disproportionately impacted since their jobs frequently require lifting large objects, extended trunk flexion, repetitive bending, awkward postures, and whole-body vibration from equipment and machinery (Fathallah 2010; Shivakumar *et al.* 2024)^[5]. Additionally, agricultural labour is frequently seasonal, resulting in extended workdays with

little opportunity for relaxation during the busiest times for planting and harvesting. The incidence and chronicity of LBP are influenced by these biomechanical stresses as well as the lack of access to healthcare services in rural areas (Masson Palacios *et al.* 2025)^[4].

According to meta-analyses, LBP affects 21% to 63% of agricultural workers in low- and middle-income countries (LMICs) each year; in certain communities, the prevalence is higher than 70% (Shivakumar *et al.* 2024)^[5]. Compared to high-income nations where mechanization has lessened physical strain, these rates are significantly higher. For instance, research conducted in the US and Ireland shows that 12-month prevalence rates among farmers range from 30 to 47% (Osborne *et al.* 2012).

Economic and Social Implications

LBP has a substantial financial cost that includes both direct (medical consultations, medication, and rehabilitation) and indirect (lost productivity, absenteeism, and presenters) expenses. The effects can be severe in rural areas where agriculture is the only source of income, leading people to cut back on their working hours or give up farming, which could jeopardize household income and food security (Masson Palacios *et al.* 2025)^[4].

Risk Factors and Predictors

Biomechanical exposures (frequent bending, lifting more than 10 kg, kneeling), sociodemographic factors (age, sex, low education level, years of work experience), lifestyle factors (obesity, smoking, physical inactivity), and psychosocial components (perceived stress, poor mental health, job dissatisfaction) are all multifactorial risk factors for lower back pain (LBP) (Shivakumar *et al.* 2024; Masson Palacios *et al.* 2025) [4, 5]. People with secondary education are 70% less likely to report LBP than those with only primary schooling, indicating that education level has emerged as a significant predictor (Masson Palacios *et al.* 2025) [4]. This could indicate that those with higher levels of education are more knowledgeable about ergonomics and safer work practices.

Importance of Studying Rural Populations

There is little epidemiological data from rural LMIC settings, particularly Latin America, despite the prevalence of LBP worldwide. Ecuador, a lower-middle-income nation, is mostly dependent on agriculture, with a sizable majority of its rural populace working as manual farmers (World Bank Group 2023). The impact of LBP is exacerbated in rural populations due to low mechanization, poor access to healthcare, and economic fragility (Masson Palacios *et al.* 2025) [4]. Designing locally appropriate preventative tactics and rehabilitative interventions requires an understanding of the prevalence, determinants, and effects of LBP in various contexts.

Review of literature

Shivakumar *et al.* (2024) [5], LBP is the most often reported musculoskeletal ailment (MSD) among agricultural workers in low- and middle-income countries (LMICs). The annual prevalence of LBP varied from 21% to 63%, with some studies reporting numbers above 70%, according to their comprehensive review and meta-analysis. Long-term bending, repetitive lifting, and persistent awkward postures during farming tasks were the authors' explanations for this high incidence.

Masson Palacios *et al.* (2025) [4], examined LBP predictors among rural Ecuadorian farmers in Loja. They discovered that 78.6% of individuals had experienced LBP in the preceding 12 months, which is a far higher prevalence rate than in high-income nations. Farmers who had completed secondary education had a 70.5% decreased risk of suffering LBP, according to the study, which found that education level was a statistically significant protective factor. Although self-perceived poor health and bad mood were strongly connected with higher LBP risk, no significant relationships were detected with body mass index (BMI), smoking, or hours worked.

Osborne *et al.* (2012), also looked into LBP in farming communities and found that 30–47% of agricultural labourers in high-income nations suffer with LBP every year. According to their findings, the lower prevalence rates in high-income nations compared to LMICs may be explained by mechanization and availability to healthcare.

Ganesh *et al.* (2016) [3], assessed the efficacy of a rehabilitation program for Indian agricultural labourers that included physical treatment, exercise, and ergonomic education. Their results supported the superiority of active

rehabilitation over passive therapy methods like rest, showing notable decreases in pain intensity as well as increases in work capability and quality of life.

Lee *et al.* (2022), self-management measures include employing cognitive-behavioral techniques, maintaining regular physical activity, and practicing proper posture can assist people manage chronic LBP and prevent recurrence. In a similar vein, Bombak (2013) emphasized the significance of psychosocial aspects, demonstrating how poor mental health and perceived stress can worsen pain perception and increase recovery time.

Objectives

1. To determine the prevalence of low back pain (LBP) among agricultural workers.
2. To evaluate evidence-based rehabilitation and self-management strategies.
3. To identify key sociodemographic, biomechanical, and psychosocial risk factors associated with LBP in farming populations.

Methodology

The study was conducted in Garhi Samastpur, Sector-150, Noida, to determine the prevalence of low back pain among agricultural workers and to evaluate preventive strategies. Agricultural workers aged 30–60 years who were actively engaged in farming activities and willing to participate were included in the study. Individuals with recent trauma, spinal surgery, or serious systemic illness were excluded.

Data were collected through face-to-face interviews using a structured questionnaire to record demographic details, occupational characteristics, work duration, posture habits, and psychosocial factors. The presence and severity of low back pain were assessed using a standardized history format and the Oswestry Disability Index (ODI), which was calculated as a percentage score to quantify disability level. After baseline assessment, participants received education on preventive strategies, including proper posture during farming activities, ergonomic modifications of work techniques, safe lifting methods, and physiotherapy-based exercises for strengthening and flexibility. Participants were instructed to follow these recommendations regularly. After two weeks, ODI scores were reassessed and feedback was collected to evaluate changes in pain and functional ability as well as the effectiveness of the preventive intervention.

Data description

A Total of 25 subjects were included in this study.

The Oswestry Disability Index (ODI) is a standardized, condition-specific questionnaire used to assess pain intensity and functional disability in individuals with low back pain. It evaluates how back pain affects daily activities such as personal care, lifting, walking, sitting, standing, sleeping, social life, and traveling, making it a reliable tool for both clinical assessment and research purposes.

A structured demographic and occupational assessment form was also used to collect information on age, gender, work type, duration of agricultural activity, and posture-related habits. This tool helps identify potential risk factors and provides background data for analysing the prevalence of low back pain and the effectiveness of preventive strategies.

MAP and VISIT



Venue- Village Garhi Smastpur, Noida, Uttar Pradesh
Proof of visit
First visit on 26th July 2025





Second visit on 11th August 2025



Serial No.	Age	Gender	Occupation (Agricultural Worker)	Pre-ODI Score (%)	Post-ODI Score (%)	Disability Category (Pre)	Disability Category (Post)
1	35	M	Yes	48	22	Severe Disability	Moderate Disability
2	42	F	Yes	52	26	Severe Disability	Moderate Disability
3	29	M	Yes	36	18	Moderate Disability	Minimal Disability
4	50	M	Yes	60	34	Severe Disability	Moderate Disability
5	46	F	Yes	44	24	Severe Disability	Moderate Disability
6	38	M	Yes	40	20	Moderate Disability	Minimal Disability
7	55	M	Yes	64	38	Crippled	Moderate Disability

8	33	F	Yes	32	16	Moderate Disability	Minimal Disability
9	41	M	Yes	56	30	Severe Disability	Moderate Disability
10	47	F	Yes	48	28	Severe Disability	Moderate Disability
11	36	M	Yes	34	18	Moderate Disability	Minimal Disability
12	52	M	Yes	62	36	Crippled	Moderate Disability
13	45	F	Yes	50	26	Severe Disability	Moderate Disability
14	39	M	Yes	42	22	Severe Disability	Moderate Disability
15	58	M	Yes	68	40	Crippled	Moderate Disability
16	31	F	Yes	30	14	Moderate Disability	Minimal Disability
17	44	M	Yes	46	24	Severe Disability	Moderate Disability
18	49	F	Yes	54	32	Severe Disability	Moderate Disability
19	37	M	Yes	38	20	Moderate Disability	Minimal Disability
20	53	M	Yes	66	42	Crippled	Severe Disability
21	34	F	Yes	28	12	Moderate Disability	Minimal Disability
22	48	M	Yes	58	34	Severe Disability	Moderate Disability
23	40	F	Yes	44	22	Severe Disability	Moderate Disability
24	56	M	Yes	70	44	Crippled	Severe Disability
25	43	M	Yes	52	30	Severe Disability	Moderate Disability

Result

Given Data

ODI Total Scores (in %) for 25 participants were recorded pre-intervention and post-intervention.

Inference - ODI

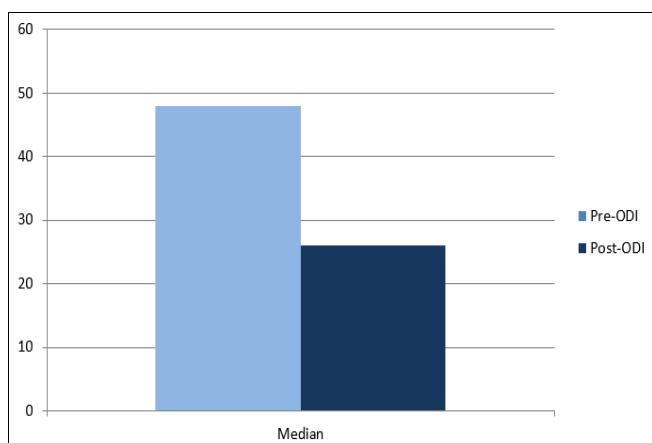
The paired *t* test statistic value 28.72 is significant. *P* = 0.000; *p* < 0.01

This shows that the median ODI values differ significantly between pre- and post-intervention.

Descriptive Statistics

	Pre-ODI	Post-ODI
Median	48.0	26.0

Median value 48.0 in the pre-test reduced to 26.0 in the post-test.

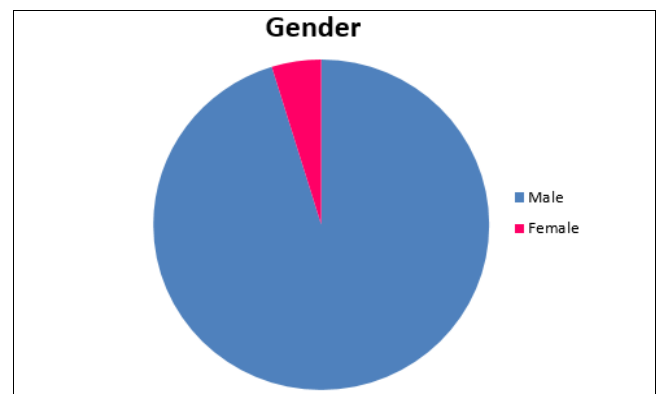


The bar graph clearly shows a substantial reduction in median ODI score after intervention, indicating improvement in disability status.

Interpretation

The median pre-intervention ODI score was 48.0, while the post-intervention median decreased to 26.0. The mean scores also reduced from 48.88 to 26.88, indicating marked

improvement in pain and functional disability following the intervention.



This Pie chart pie shows that in total 25 participants. Out of 25 participants, 16 (64%) were males and 9 (36%) were females, indicating a higher proportion of male agricultural workers in the study sample.

Discussion

The present community-based project was undertaken to determine the prevalence of low back pain among agricultural workers and evaluate the effectiveness of preventive and rehabilitation strategies. The findings indicate that low back pain is highly prevalent among agricultural workers, which is consistent with existing evidence that physically demanding occupations involving repetitive bending, heavy lifting, and prolonged awkward postures increase spinal stress and musculoskeletal strain. The dataset shows that most participants initially had moderate to severe disability levels, highlighting the significant functional burden experienced by this population.

After implementation of the intervention program consisting of posture correction, ergonomic education, and physiotherapy exercises, there was a statistically significant reduction in ODI scores. Both mean and median values improved markedly, and many participants shifted from severe or crippled disability categories to moderate or minimal disability levels. This improvement suggests that structured self-management and rehabilitation strategies can effectively reduce pain and enhance functional capacity even within a short duration.

These results support previous research indicating that active rehabilitation approaches are more effective than passive treatment in reducing pain and improving work ability in agricultural workers. Educational interventions likely enhanced awareness about safe work techniques, reduced mechanical strain, and improved posture habits, thereby decreasing spinal load. Furthermore, the inclusion of psychosocial considerations aligns with the biopsychosocial model, which recognizes that psychological stress, beliefs, and social factors influence pain perception and recovery.

However, certain limitations must be considered. The study involved a relatively small sample size from a single rural location, which may limit generalizability. The intervention duration was short, so long-term effects could not be assessed. Future studies with larger populations, longer follow-up, and controlled designs are recommended to validate these findings and strengthen evidence for community-based preventive programs.

Conclusion

The study demonstrates that low back pain is a common occupational health problem among agricultural workers and can significantly affect functional ability. The findings show that simple, cost-effective interventions such as ergonomic education, posture correction, and physiotherapy-based exercises can substantially reduce disability levels. Implementing structured preventive and rehabilitation programs in rural communities may therefore play an important role in improving workers' health, productivity, and quality of life.

Summary

This study investigated the prevalence of low back pain among agricultural workers aged 30-60 years and evaluated the effectiveness of preventive strategies. Twenty-five participants were assessed using demographic data and the Oswestry Disability Index before and after a two-week intervention. Results showed a significant reduction in disability scores, with mean ODI values decreasing from 48.88 to 26.88 and median scores from 48.0 to 26.0. Most participants shifted from higher disability categories to lower ones after intervention.

Overall, the findings highlight the importance of early screening, education, and rehabilitation in rural agricultural populations. Incorporating preventive physiotherapy programs and ergonomic training can help reduce pain, prevent chronic disability, and promote long-term musculoskeletal health among agricultural workers.

References

- Dunleavy K, Radunovich HL, Beneciuk JM, Hu B, Yang Y, Blythe JM, *et al.* Self-Management Strategies for Low Back Pain Among Horticulture Workers: Protocol for a Type II Hybrid Effectiveness-Implementation Study. *JMIR research protocols*,2025:14:e64817. <https://doi.org/10.2196/64817>
- Dunleavy K, Radunovich HL, Beneciuk JM, Hu B, Yang Y, Blythe JM, *et al.* Self-Management Strategies for Low Back Pain Among Horticulture Workers: Protocol for a Type II Hybrid Effectiveness-Implementation Study. *JMIR Res Protoc*,2025:14:e64817.
- Ganesh S, Chhabra D, Kumari N. The effectiveness of rehabilitation on pain-free farming in agriculture workers with low back pain in India. *Work*,2016:55:399-411.
- Masson Palacios I, Vinueza-Fernandez I, Iñiguez-Jimenez S-O, Grijalva MJ, Bates BR. Predictors of Low Back Pain Risk Among Farmers in Rural Communities of Loja, Ecuador. *International Journal of Environmental Research and Public Health*,2025:22:885.
- Shivakumar M, Welsh V, Bajpai R, *et al.* Musculoskeletal disorders and pain in agricultural workers in Low- and Middle-Income Countries: A systematic review and meta-analysis. *Rheumatology International*,2024:44:235-247.