The Egyptian Journal of Hospital Medicine (January 2024) Vol. 94, Page 545-549

Prevalence of Mechanical Low Back Pain among Field Farmers in Giza-Egypt

Manar Ahmed Wahba[(1)]*, Omaima MA Kattabei[(2)], Magda Gaid Sedhom[(2)]
[(1)] Physiotherapy Department, Al-Hwamdia Hospitalm,
[(2)] Basic Science Department, Faculty of Physical Therapy, Cairo University, Egypt
***Corresponding author:** Manar Ahmed Wahba,**Email:** mohamedfathyyy50@gmail.com**, Mobile:** +201021019665

ABSTRACT

Background: Low back pain (LBP) is prevalent among people's musculoskeletal systems, particularly among farmers. Furthermore, it frequently results in missed pay and significant medical bills. **Aim**: The purpose of this research was to find out how prevalent mechanical LBP among Egyptian farmers during transplanting process in Giza and to determine the association between number of working years and mechanical LBP in farmers of Giza, Egypt.

Subjects and Methods: A cross-sectional survey of 270 farmers was undertaken. Their ages ranged from 18 to 60. Face-to-face interviews were used to gather data. The intensity of pain, degree of functional impairment, and lumbar range of motion were assessed via the Visual Analogue Scale (VAS), Oswestry Disability Index (ODI), and lumbar flexibility test. In addition to measuring scales, anthropometry, personal and vocational history were gathered.

Results: The prevalence of mechanical LBP in farmers was 65.6% among the 270 farmers studied and there was a substantial association between mechanical LBP and working years ($P=0.001$) as with increasing the farming years there was an increase in incidence of mechanical LBP. **Conclusions**: Farmers exhibit a substantially elevated occurrence of mechanical low back pain and experience functional limitations as a consequence of this condition.

Keywords: Farmers, Prevalence, Low back pain, Flexibility, Oswestry Disability Index, and Visual Analogue Scale.

INTRODUCTION

Agriculture is an essential sector of every country's economy and export. Farming is a significant employment. Because of technical advancements, agricultural production in wealthy countries is now easier than in the past. However, agricultural technology application is restricted in poor nations. As a result, farmers in developing nations, such as Myanmar, Laos, as well as Thailand, depend on conventional techniques including physical labor. Many physical chores, as transplanting and seeding, are involved in farming. Consequently, it is unsurprising that farmers experience a high prevalence of work-related musculoskeletal problems [(1)].

LBP is a prevalent health issue caused by manual labor [(2,3)], particularly in farmers [(4,5)]**.** The literature indicates that LBP is common among farmers, particularly in underdeveloped nations. Multiple studies have identified a high prevalence of LBP among those engaged in farming activities. In Thailand, for example, statistics indicate that the frequency of LBP in farmers ranges between 56% and 73.1% [(6)].

The causes of LBP can be categorized into three categories. Personal characteristics including their age, body mass index (BMI), exercise, alcohol intake, as well as smoking are included in the first category [(7,8)]. Anxiety, depression, somatization, stress, dissatisfaction with work, poor body perception, as well as low self-esteem are all psychosocial variables [(9,10)]. Physical occupational variables, activities such as repetitive movement, strenuous lifting, unfavorable body positions, and vibration belong to the third category [(11)]**.**

The current evidence simply suggests that occupational variables, particularly working postures, are the primary causes of LBP [(12)]**.** Consequently, the occurrence of LBP has been found to be most prevalent in the farming transplantation technique due to the physically demanding and exhausting nature of manual transplanting.

There is a lot of complexity to the transplanting process. From a chronological standpoint, it is closely connected to plowing, harrowing, and gathering saplings in the primary field. Transplanting requires the act of standing upright in a flooded field as well as bending over to carefully plant the seedlings in the soil at regular intervals over a prolonged duration. As a result, the transplantation procedure requires hazardous postures for example extended stooping as well as repetitive twisting. As a result, it usually affects the low back region, causing pain. Working postures while transplanting is widely recognized to be associated to LBP; regardless, every farmer has their unique requirements, which might be seen as elements beyond of their control. Factors that have been associated to LBP include hours worked per week, intensity of work, stress levels, as well as prior work experience [(13,14)].

Because episodes of LBP are often short, numerous farmers might decide against seeking healthcare services. LBP is generally alleviated after one month, according to research. However, recent studies have indicated that LBP can last for a duration of six months or more and often reoccurs within a span of one year [(15)]**.**

This study was conducted:

- To investigate the prevalence of mechanical LBP in Egyptian farmers during transplanting process in Giza.
- To determine the association between number of working years and mechanical LBP in farmers of Giza, Egypt.

Received:15/08/2023
Accepted:15/10/2023

SUBJECTS AND METHODS

Two hundreds and seventy farmers participated in this study. They were between the ages of 18 and 60.

Ethical considerations:

Every participant signed a consent form to participate in this study. The study was carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki). The study was approved by ethical committee of Cairo University (No:P.T.REC/012/005042).

Farmers using agricultural machines in Giza-Egypt, farmers with any previous back surgery, spondylosis or disc lesions (herniation, prolapse) by X-Ray, Neuromuscular disease like multiple sclerosis, farmers with spondylolisthesis, hip arthrosis by X-Ray, farmers with congenital musculoskeletal deformity and working years less than 1 year were excluded.

Methods

Sample was classified into 3 equal groups, 90 each, according to working years as following:

- Group I: Agricultural practitioners with less than ten years of experience.
- Group II: Agricultural practitioners with ten to twenty years of experience in agriculture.
- Group III: Agricultural practitioners with over two decades of experience.

Data of medical history and first examination were acquired directly from participants at baseline to determine whether the inclusion criteria were available in the participants. First, the subject's weight and height were assessed, as well as working hours and biomechanical parameters (weight push and pull and posture).

Pain was examined by using VAS. The scale is a continuous data analysis tool consisting of a 10-centimeter line spanning from 0 (indicating no pain) to 10 (indicating maximum pain). Participants were directed to designate their degree of pain by making a mark along the line (Appendix II) [16].

The ODI was employed for evaluating a patient's functional restrictions. This tool is genuine as well as dependable. The assessment includes ten multiple-choice questions related to back discomfort. For each of the six statements, the subject chose the one that best described his discomfort; greater scores denoted more severe pain (Appendix III). Translated and validated ODI for measuring LBP in the Arab population [17] was used.

- Scores (0-20%) a very slight disability.
- Scores (20%-40%) moderate.
- Scores (40%-60%) severe.
- Scores (60%-80%) crippled.
- Scores (80%-100%) subjects are restricted to bed rest.

The range of motion (ROM) in the lumbar spine was measured via tape, which is a flexible valid tool for accurate measurements [18]**.** Lumbar flexion, side bending, as well as rotation ROM measurements were taken using tape.

For lumbar flexion we used the fingertip-to-floor method: Some writers have supported the fingertip-to-floor approach to test spine flexion rapidly and reproducibly. The fingertip-to-floor approach varies from the Schober method and its variations in that it does not collect measures directly across the lumbar spine. The patient merely leans forward, and a tape measure is utilized to determine the distance from the tip of the middle finger to the floor, first with the patient standing upright and then laterally flexing the spine. The distance traveled from upright standing to lateral flexion is referred to as the range of lateral flexion**.**

For rotation, the lateral point of the ipsilateral acromion and the greater trochanter of the contralateral femur were used to quantify rotation in the thoracolumbar spine using a tape measure**.**

Statistical procedures

Descriptive statistics of mean, standard deviation, frequencies, percentages and confidence interval (CI) were utilized in presenting the subjects demographic and measured data. Chi-square test was utilized to examine associations between LBP prevalence with subject characteristics. Logistic regression analysis was used in determining the variables that can predict LBP among the participants. Pearson correlation coefficient was used to investigate the correlation between VAS, ODI and flexibility. One way ANOVA was conducted to compare VAS, ODI and flexibility between groups. The level of significance for all statistical tests was set at $p < 0.05$. All statistical measures were performed through the statistical package for social studies (SPSS) version 25 for windows.

RESULTS

General characteristics of the subjects:

As presented in **table (1),** there was substantial difference among the three groups regarding the mean values of age. However, there was no substantial difference among them regarding the mean values of BMI.

Table 1. General characteristics of participants among three groups.

Subject characteristic	Group A (90 farmers)	Group B (90 farmers)	Group C (90 farmers)	F-value	p-value
Age (years)	23.7 ± 3.8	37.5 ± 4.1	51.6 ± 3.8	1138	<0.001
BMI (kg/m²)	21.5 ± 2.2	22.3 ± 2.3	21.7 ± 2.4	2.8	0.058

Data are expressed as mean ± standard deviation.

Prevalence of mechanical LBP in field farmers:

The prevalence of mechanical LBP in field farmers was 65.6%. The highest prevalence of the mechanical LBP was present in subjects with more than 20 working years (Table 2).

Table 2. Prevalence of mechanical LBP among field farmers and Association between mechanical LBP and working years.

Working years	Prevalence of mechanical LBP (%)	95% CI
Total sample	177 (65.6%)	59.70-70.97%
Less than 10 years	20 (22.2%)	14.87-31.85%
From 10-20 years	74 (82.2%)	73.06-88.75%
More than 20 years	83 (92.2%)	84.81-96.18

Working years	Prevalence of mechanical LBP		χ^2 value	p – value
	Yes	No		
Less than 10 years	20 (22.2%)	70 (77.8%)	114.26	<0.001
From 10-20 years	74 (82.2%)	16 (17.8%)		
More than 20 years	83 (92.2%)	7 (7.8%)		

CI: Confidence interval, χ^2: Chi- squared value.

- Association between mechanical LBP and working years:

There was a substantial association between mechanical LBP and working years. There was a substantial increased prevalence of mechanical LBP in subjects with more than 20 years compared with subjects with less than 10 working years and subjects with 10-20 working years **(table 2).**

Correlation among VAS, ODI as well as flexibility:

VAS was significantly correlated with distance of right bending, left bending, left rotation as well as with ODI **(Table 3).**

Table 3. Correlation of VAS with flexibility and ODI:

	Distance (cm)	r value	p value
VAS	**Flexion**	0.019	0.801
	Right bending	0.199	0.008
	Left bending	0.191	0.011
	Right rotation	0.132	0.079
	Left rotation	0.225	0.003
	ODI	0.605	0.001

VAS: Visual Analogue Scale, ODI: Oswestry Disability Index, r value: Pearson correlation coefficient.

Correlation between ODI and flexibility:

ODI was significantly correlated with distance of flexion, right bending, left bending, and left rotation **(Table 4).**

Table 4. Correlation between ODI and flexibility:

	Distance (cm)	r value	p value
ODI	**Flexion**	0.185	0.014
	Right bending	0.252	0.001
	Left bending	0.331	0.001
	Right rotation	0.102	0.176
	Left rotation	0.165	0.028

ODI: Oswestry Disability Index, r value: Pearson correlation.

- Comparison of VAS between groups (less than 10 years, 10-20 working years and more than 20 working years):

VAS significantly increased in group II compared to group I, and in group III compared to groups I and II **(Table 5).**

Table 5. Comparison of mean values of VAS among groups I, II and III:

Multiple comparison		
	MD	p- value
Group I vs II	-4.54	<0.001
Group I vs III	-7.55	<0.001
Group II vs III	-3.01	<0.001

MD: Mean difference

- Comparison of ODI between groups (less than 10 years, 10-20 working years and more than 20 working years):

There was a substantial difference in means of ODI among the three groups. There was a substantial increase in ODI of group II contrasted with that of group I. There was a substantial increase in ODI of group III contrasted with that of group I and group II **(Table 6)**.

Table 6. Comparison of mean values of ODI among groups I, II as well as III:

ODI			F-value	p-value
Mean±SD				
Group I	Group II	Group III		
1.73 ± 3.34	13.37 ± 7.74	20.88 ± 8.50	175.24	<0.001

Multiple comparison		
	MD	p- value
Group I vs II	-11.64	<0.001
Group I vs III	-19.15	<0.001
Group II vs III	-7.51	<0.001

SD: Standard deviation, MD: Mean difference.

DISCUSSION

The study found a high prevalence of mechanical LBP among all farmers, which is similar to what was found in Thai rubber farmers [19] and north eastern Nigeria [20] and similar to what was found in rural Thailand [6], but higher than what was found in Jeju [21].

The current study found a relatively high prevalence (65.6%) of LBP in all farmers. Previous research has found a higher prevalence of LBP in occupations with high excessive loads or poor working postures, such as those experienced by industrial workers, vehicle drivers, and farmers, than in other manual workers due to job intensity and poor working postures [15]. The new study's findings support prior findings, indicating that LBP is a prevalent and worrisome health issue for farmers. The current study's increased prevalence might be due to data collection taking place during the transplanting period.

This study discovered a link between overweight/obesity and a greater prevalence of LBP among the participants. This is consistent with the findings of several investigations. Musculoskeletal discomfort becomes more common as weight increases. Obesity has been identified as a risk factor for a variety of musculoskeletal issues, including LBP, hip, and knee difficulties [22]. Obesity has been demonstrated to be a risk factor for LBP, which may be explained by the fact that gaining weight exerts strain on the spinal parts [23].

The findings also revealed a link between farming working years and mechanical low back pain, with an increase in the incidence of mechanical low back pain among farmers, with the highest percentage found in those who worked for more than 20 years of farming, which was supported by the study **Szeto and Lam** [24].

This is the first research to look at the association between VAS, ODI, and flexibility in farmers. It was discovered that when VAS increases, the range of lumbar flexion and right side rotation are unaffected, but right and left side bending and left rotation decrease. And it was discovered that when ODI increased, the range of lumbar flexion, right and left side bending, and left rotation decreased, while right side rotation did not.

This study evaluated VAS, ODI, and flexibility among three groups based on working years. It was discovered that ODI and VAS had the greatest variation in group three, who worked for more than 20 years.

Lumbar flexion and right rotation are unaffected, and there is no difference in right and left side bending between groups one and two with working years less than 10 years and between 10 and 20 years, but decrease in group three. Left rotation has the greatest range in group three, followed by group two and finally group one.

According to the current study's findings, the role of education and training in ergonomic and biomechanical principles is critical in keeping workers safe and reducing musculoskeletal disorders, as well as teaching the proper ways to perform work activities and tasks, modifying them, or suggesting adaptive equipment and tools.

CONCLUSION AND RECOMMENDATIONS:

CONCLUSION

According to the findings, LBP is so frequent musculoskeletal issue among farmers in Giza, Egypt, and there is a substantial association between years of farming and LBP. As a result, the importance of implementing preventative measures and counseling cannot be overstated.

RECOMMENDATIONS

The current study's findings suggest that the following recommendations be considered:

- Appropriate ergonomic treatments or measures, such as workplace and equipment design, as well as therapy for existing LBP, should be implemented to lower the prevalence of LBP among farmers.
- Farmers' ergonomics should be improved to lower the occurrence of LBP among medical staff personnel.
- Identifying the precise cause of the intra-professional difference in differing prevalence outcomes across nations should be started.
- Good preventative strategies should be used by all healthcare practitioners, such as organizing adequate rest intervals, educational programs to teach good body mechanics, and smoking cessation programs for staff members.
- Regular exercise and minimizing psychological demands as much as possible are suggested.

- **Sources of funding:** Funding institutions in the public, commercial, or nonprofit sectors did not award a specific grant for this research.
- **Conflicts of interest:** There are no conflicts of interest, according to the authors.

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