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PREVALENCE OF SACRO-ILIAC JOINT DYSFUNCTION AND ITS ASSOCIATION WITH LOW BACK PAIN AND RELATED FUNCTIONAL DISABILITIES AMONG DAIRY FARMERS

Original Research

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ABSTRACT

Background: Sacroiliac joint dysfunction (SIJD) is a significant contributor to low back pain (LBP), often leading to functional disabilities that affect daily activities. Dairy farmers are particularly vulnerable due to the physical demands, repetitive tasks, and prolonged postural stresses inherent in their occupation. These factors contribute to a heightened risk of musculoskeletal disorders, with SIJD being a key factor influencing LBP and its associated functional impairments.

Objective: To assess the prevalence of sacroiliac joint dysfunction and its association with low back pain and related functional disabilities among dairy farmers.

Methods: This cross-sectional survey was conducted from April 28, 2024, to May 15, 2024, at dairy farms registered with the Pakistan Agriculture and Dairy Farmers Association (PADFA). The sample comprised 75 male participants aged 20–50 years, with at least one year of work experience and a minimum of six daily working hours. Purposive sampling was used to select 65 participants with LBP and 10 without. Data were collected using validated tools, including the Numeric Pain Rating Scale, the Urdu version of the Oswestry Disability Index, and the 5-Test Cluster of Laslett for SIJD diagnosis. Statistical analysis was performed using SPSS version 29 to determine associations between LBP, SIJD, and functional disabilities.

Results: Of the 75 participants, 65 (86.7%) reported LBP, and 19 of these (29.2%) were diagnosed with SIJD. Among all participants, SIJD prevalence was 25.3%. Functional disability scores among those with LBP revealed the highest impact in pain intensity (67.7%) and lifting tasks (32.3%), with minimal impact on personal care and employment. Statistically significant associations were found between LBP and SIJD ($p = 0.048$), LBP and functional disabilities ($p = 0.000$), and SIJD and functional disabilities ($p = 0.019$).

Conclusion: Sacroiliac joint dysfunction was highly prevalent among dairy farmers with low back pain, significantly contributing to related functional disabilities. The findings emphasize the need for targeted ergonomic interventions and preventive measures to address occupational risk factors.

Keywords: Dairy farmers, Functional disabilities, Low back pain, Musculoskeletal disorders, Occupational health, Sacroiliac joint dysfunction, Work-related injuries.

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INTRODUCTION

Low back pain (LBP) is a globally prevalent musculoskeletal condition, affecting an estimated 9.4% of the population and significantly impacting daily life and productivity. The World Health Organization estimates that 70% of individuals in industrialized nations will experience non-specific LBP at some point, with the condition peaking between the ages of 35 to 55 and increasing with advancing age (1, 2). This pervasive health issue has profound socio-economic implications, leading to significant disability, absenteeism, and reduced quality of life. In Pakistan, the burden of LBP is considerable, with its incidence ranging widely and often resulting in complications such as lumbar radiculopathy (3). Factors such as education level, job dissatisfaction, psychological stress, and ergonomics are commonly associated with the development and exacerbation of LBP (4, 5).

The consequences of LBP extend beyond physical discomfort, encompassing severe limitations in physiological, psychological, and social functions. Its impact on daily activities, including essential tasks like cooking, bathing, and walking, often results in reduced community participation and impaired social connections (6). Furthermore, LBP significantly affects occupational performance, contributing to missed workdays and economic losses, thereby straining both individual households and broader socio-economic systems (7). Chronic LBP, in particular, is a leading cause of disability, with functional impairments reported in up to 80% of affected individuals. These impairments are typically measured using standardized tools such as the Oswestry Disability Index and the Oswestry Low Back Pain Questionnaire, which assess limitations in areas such as personal care, work, travel, and social life (4, 8, 9).

The etiology of LBP is multifactorial, with structural defects involving skeletal components, discs, and joints, as well as narrowing of the spinal canal, often contributing to its onset. Among these, sacroiliac joint (SIJ) dysfunction stands out as a significant cause, frequently referred to as posterior pelvic joint pain. The sacroiliac joint, a bilateral C-shaped joint connecting the ilia, provides critical support for pelvic muscles and ligaments. Dysfunction in this joint can result in inflammation, pathogenic invasion, and pain, often radiating to the buttocks, groin, posterior thigh, and lower leg (10-12). SIJ dysfunction is estimated to affect 15%-30% of LBP patients, particularly in cases where spinal examinations are inconclusive.

Occupational settings, such as dairy farming, pose unique risks for the development of LBP and related disorders due to the physical demands of tasks like milking, feeding, and cleaning. Dairy farming, a high-risk occupation, often involves repetitive and ergonomically challenging motions, leading to musculoskeletal injuries, including those affecting the lower back (13). Workers frequently report pain in the knees, neck, and lower back, with specific subgroups like cowshed and fodder workers showing higher prevalence rates (14, 15). Risk factors such as age, gender, body mass index, smoking habits, workday length, and inadequate rest breaks further contribute to the high incidence of musculoskeletal disorders in this population (16). These ailments not only impair individual health but also result in increased disability rates, reduced workforce efficiency, and elevated production costs, highlighting the critical need for effective ergonomic interventions (17).

Given the significant association between occupational hazards in dairy farming and the prevalence of sacroiliac joint dysfunction and LBP, this study aims to investigate the extent of SIJ dysfunction among dairy farmers and its impact on related functional disabilities. By understanding these relationships, the research seeks to provide evidence-based recommendations to mitigate risks and improve the occupational health of this vulnerable population.

METHODS

A cross-sectional survey-based study was conducted on a purposive sample of 75 male dairy farmers aged 20 to 50 years, selected from farms registered with the Pakistan Dairy Farmers Association (PADFA) in Faisalabad. Inclusion criteria required participants to be free from diagnosed systemic conditions such as diabetes, spondyloarthritis, and osteoarthritis to minimize confounding factors. Data collection involved structured interviews conducted using a validated screening questionnaire, the Numeric Pain Rating Scale (NPRS), the Urdu version of the Oswestry Disability Index (ODI-U), and the 5-Test Cluster of Laslett for diagnosing sacroiliac joint dysfunction (SIJD). Ethical approval was obtained from the institutional review board of the University of Faisalabad, and signed consent was secured from the Secretary-General of PADFA to ensure compliance with ethical standards.

A three-member research team collected the data to maintain accuracy and reduce inter-observer variability. Anthropometric measurements, including participants' height and weight, were recorded to calculate body mass index (BMI), ensuring consistency in demographic profiling. The participants' demographic and occupational characteristics, such as work experience and daily working hours, were also documented.

Statistical analysis was performed using SPSS version 29. Descriptive statistics, including means, standard deviations, and frequencies, were calculated to provide a comprehensive overview of the participants' demographic and clinical characteristics. Associations between low back pain (LBP), SIJD, and related functional disabilities were analyzed using cross-tabulation and chi-square tests. Exact significance values were calculated where applicable to confirm statistical relevance. Additionally, potential limitations, such as cells with expected counts less than five in chi-square tests, were addressed to ensure the robustness of the statistical findings.

RESULTS

The study revealed important insights into the demographics, prevalence, and associations of low back pain (LBP), sacroiliac joint dysfunction (SIJD), and related functional disabilities among dairy farmers. Among the 75 participants, the mean age was 34.44 ± 9.68 years, with ages ranging from 21 to 50 years. The mean work experience was 11.5 ± 8.30 years, spanning a range of 1 to 30 years, while daily working hours averaged 9.67 ± 2.08, ranging between 6 and 14 hours. Anthropometric data showed a mean height of 167.67 ± 6.11 cm (range: 152–183 cm), weight of 65.79 ± 12.27 kg (range: 49–110 kg), and body mass index (BMI) of 23.35 ± 3.62 (range: 18–36). This comprehensive profiling of participants establishes the baseline characteristics crucial for understanding the sample's occupational and physical demands.

The findings demonstrated a high prevalence of LBP, with 86.7% of participants reporting its presence, while 13.3% had no such complaints. Among those with LBP, 28.8% were diagnosed with SIJD, whereas 69.7% tested negative. Functional disability related to LBP was evaluated using the Oswestry Disability Index (ODI-U), revealing that 66.7% of LBP cases experienced no disability, while 31.8% reported mild disability. None of the participants exhibited moderate, severe, or complete disability, suggesting a limited but notable impact on functionality. A statistically significant association ($p = 0.048$) was observed between LBP and SIJD, underscoring the interrelation of these conditions.

Further analysis highlighted a significant association between LBP and functional disabilities as assessed by the ODI ($p = 0.000$). Additionally, a statistically significant relationship was identified between SIJD and ODI-related functional disabilities ($p = 0.019$). These findings emphasize the role of SIJD in exacerbating LBP-related functional limitations. The results align with the study's objective of exploring the prevalence and impact of SIJD and LBP in occupational settings like dairy farming. However, further exploration into specific ergonomic factors contributing to SIJD and targeted interventions remains an essential area for additional research to enhance preventive strategies.

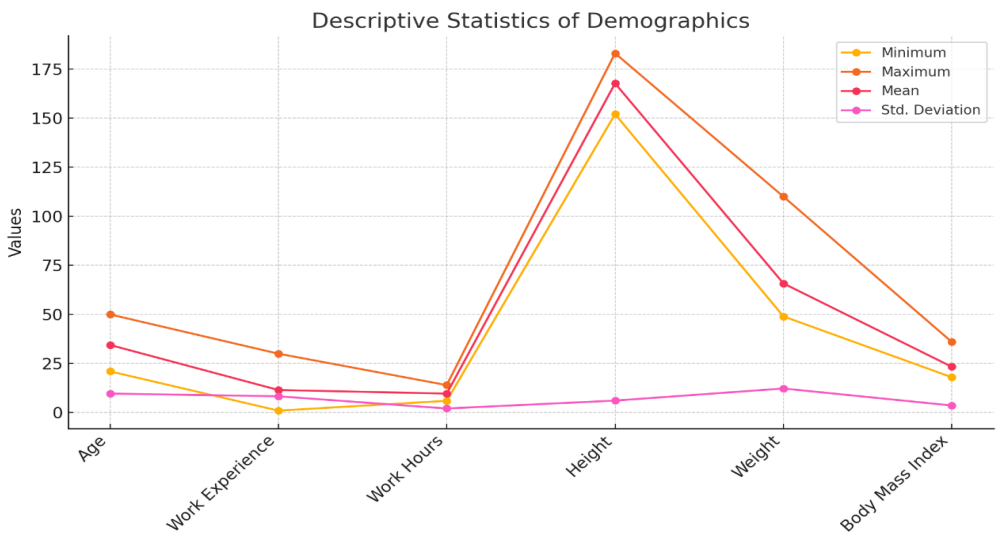

Figure 1 Descriptive Statistics of Demographics

The chart illustrates the descriptive statistics for demographics among 75 participants, showing age (mean = 34.44 ± 9.68 years, range: 21–50 years), work experience (mean = 11.5 ± 8.30 years, range: 1–30 years), and daily work hours (mean = 9.67 ± 2.08 hours, range: 6–14 hours). Anthropometric data reveal a mean height of 167.67 ± 6.11 cm (range: 152–183 cm), mean weight of 65.79 ± 12.27 kg (range: 49–110 kg), and mean BMI of 23.35 ± 3.62 (range: 18–36). This data provides a comprehensive snapshot of the sample's physical and occupational characteristics.

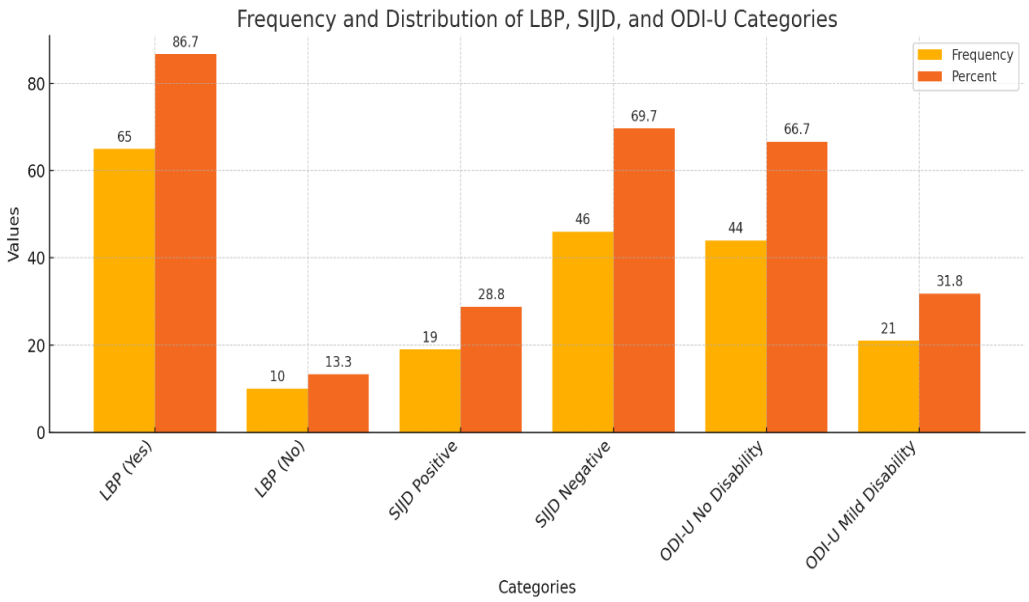

Figure 2 Frequency and Distribution of LBP, SIJD, and ODI-U Categories

The chart displays the frequency and percentage distribution across key categories. Among the participants, 86.7% reported experiencing low back pain (LBP), while 13.3% did not. Within those with LBP, 28.8% tested positive for sacroiliac joint dysfunction (SIJD), whereas 69.7% were negative. Regarding functional disability, 66.7% of participants with LBP reported no disability (ODI-U), while 31.8% experienced mild disability. These distributions highlight the significant prevalence of LBP, its association with SIJD, and the varying levels of functional impact among affected individuals.

Table 1 Association between LBP and SIJD

Cross-tab					
			Sacroiliac Joint Dysfunction		Total
			Positive	Negative	
Low Back Pain	Yes	Count	19	46	65
		Expected Count	16.5	48.5	65.0
	No	Count	0	10	10
		Expected Count	2.5	7.5	10.0
Total		Count	19	56	75
		Expected Count	19.0	56.0	75.0

Chi-Square Tests						
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	
Pearson Chi-Square	3.915a	1	.048			
Continuity Correctionb	2.522	1	.112			
Likelihood Ratio	6.348	1	.012			
Fisher's Exact Test				.057	.043	
N of Valid Cases	75					

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.53.

b. Computed only for a 2x2 table

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The association between low back pain (LBP) and sacroiliac joint dysfunction (SIJD) was analyzed among 75 participants. Of the 65 participants with LBP, 19 (29.2%) were diagnosed with SIJD, while 46 (70.8%) tested negative. None of the 10 participants without LBP had SIJD. Statistical analysis showed a significant association between LBP and SIJD with a Pearson chi-square value of 3.915 ($p = 0.048$). These findings highlight the role of SIJD in contributing to LBP among dairy farmers.

Table 2 Association between LBP and ODI

Cross-tab													
			Oswestry Disability Index										Total
			0	1	2	3	4	5	6	7	8	9	10	
Low Back Pain	Yes	Count	8	11	13	7	5	5	4	4	3	3	2	65
		Expected Count	15.6	9.5	11.3	6.1	4.3	4.3	3.5	3.5	2.6	2.6	1.7	65.0
	No	Count	10	0	0	0	0	0	0	0	0	0	0	10
		Expected Count	2.4	1.5	1.7	.9	.7	.7	.5	.5	.4	.4	.3	10.0
Total		Count	18	11	13	7	5	5	4	4	3	3	2	75
		Expected Count	18.0	11.0	13.0	7.0	5.0	5.0	4.0	4.0	3.0	3.0	2.0	75.0

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	36.538a	10	.000
Likelihood Ratio	34.171	10	.000
N of Valid Cases	75		

a. 18 cells (81.8%) have expected count less than 5. The minimum expected count is .27.

The association between low back pain (LBP) and functional disability, measured by the Oswestry Disability Index (ODI), was analyzed among 75 participants. Among 65 participants with LBP, 67.7% reported no disability, while 32.3% experienced mild disability. Functional scores revealed the highest impact in categories such as pain intensity and lifting. The Pearson chi-square test indicated a highly significant association between LBP and ODI scores ($\chi^2 = 36.538$, $p = 0.000$), confirming the impact of LBP on functional limitations.

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Table 3 Association between SIJD and ODI

Cross-tab					
			Sacroiliac Joint Dysfunction		Total
			Positive	Negative	
Oswestry Disability Index	0	Count	0	18	18
		Expected Count	4.6	13.4	18.0
	1	Count	2	9	11
		Expected Count	2.8	8.2	11.0
	2	Count	3	10	13
		Expected Count	3.3	9.7	13.0
	3	Count	2	5	7
		Expected Count	1.8	5.2	7.0
	4	Count	0	5	5
		Expected Count	1.3	3.7	5.0
	5	Count	3	2	5
		Expected Count	1.3	3.7	5.0
	6	Count	3	1	4
		Expected Count	1.0	3.0	4.0
	7	Count	2	2	4
		Expected Count	1.0	3.0	4.0
	8	Count	1	2	3
		Expected Count	.8	2.2	3.0
	9	Count	2	1	3
		Expected Count	.8	2.2	3.0
	10	Count	1	1	2
		Expected Count	.5	1.5	2.0
Total		Count	19	56	75
		Expected Count	19.0	56.0	75.0

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	21.309a	10	.019
Likelihood Ratio	24.858	10	.006
Linear-by-Linear Association	13.185	1	.000
N of Valid Cases	75		

The relationship between sacroiliac joint dysfunction (SIJD) and functional disability, measured by the Oswestry Disability Index (ODI), was analyzed among 75 participants. Among 19 participants with SIJD, functional disability ranged from mild to moderate, with the highest scores reported in pain intensity and lifting tasks. In contrast, 56 participants without SIJD predominantly reported no or minimal disability. A statistically significant association was found between SIJD and ODI scores ($\chi^2 = 21.309$, $p = 0.019$), highlighting the impact of SIJD on functional limitations.

DISCUSSION

The findings of this study highlight a strong association between occupational factors and the prevalence of low back pain (LBP) and sacroiliac joint dysfunction (SIJD) among dairy farmers. Variables such as a working experience of 11–12 years, daily working hours of 9–10 hours, and postural patterns including squatting and standing were identified as significant contributors. These findings align with existing literature, including Buisseret et al. (2024), which reported a high prevalence of musculoskeletal discomfort in the lumbar spine and other regions among dairy workers. Similarly, Gurnani et al. (2022) identified occupation-specific factors, such as posture and

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duration of activity, as key determinants of musculoskeletal disorders (MSDs), emphasizing the importance of ergonomic considerations in this labor-intensive occupation.

Demographic factors were also identified as critical contributors, with the study noting that participants with an average age of 35 years, height of 168 cm, weight between 61–66 kg, and BMI in the range of 21–23 demonstrated higher susceptibility to LBP and SIJD. These findings align with Gurnani et al. (2022), who reported similar anthropometric characteristics as risk factors for MSDs. Mishra et al. (2020) also observed that workers aged 28–35 experienced the highest prevalence of LBP. This demographic vulnerability underscores the need for targeted preventive strategies in occupational health for dairy workers. Additionally, the study's finding of a high prevalence of LBP (86.7%) resonates with Mishra et al. (2020), who identified lower back pain as one of the most common MSDs among dairy workers, alongside other conditions such as neck and knee pain.

The study demonstrated that SIJD accounted for 29.2% of cases among those with LBP and 25.3% of the total participants, emphasizing its significant contribution to the LBP burden. These findings are consistent with Barros et al. (2019), who reported that SIJD is implicated in 15% to 30% of LBP cases and discussed minimally invasive therapeutic options. Functional impairments associated with LBP and SIJD were predominantly mild, with significant effects on pain intensity and lifting, while impacts on personal care and employment were minimal. These results align with Fullwood et al. (2019), who highlighted LBP's influence on daily functioning, labor capability, and reproductive health, mediated by factors such as fear-avoidance beliefs and psychological deconditioning.

The study's strengths lie in its focused examination of a high-risk occupational group and the use of validated tools such as the Oswestry Disability Index. However, limitations include the small sample size, exclusive focus on manual dairy farmers, and the absence of the gold standard diagnostic method for SIJD, namely image-guided intra-articular injection. Future research should address these limitations and explore broader occupational variables, ergonomic interventions, and longitudinal outcomes to develop more comprehensive preventive strategies and therapeutic approaches.

CONCLUSION

This study concludes that sacroiliac joint dysfunction and low back pain, along with their associated functional disabilities, are highly prevalent among dairy farmers, largely influenced by occupational factors. Key contributors include prolonged working hours, physically demanding postures such as squatting and standing, extended work experience, and an active occupational lifestyle. While demographic factors such as age, weight, height, and BMI showed limited influence on the prevalence of these conditions, the nature of occupational demands played a pivotal role. These findings underscore the critical need for targeted ergonomic interventions and preventive strategies to mitigate the impact of occupational risk factors and improve the health and functional well-being of this vulnerable population.

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AUTHOR CONTRIBUTIONS

Author	Contribution
Maryam Farooq	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Arash Bashir	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Tayyab Hussain	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
M Saad Sarwar	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
M Noman Zafar	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Aroma Munir	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Menahil Ahmed	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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