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Prevalence Of Piriformis Syndrome And Quality Of Life Among Factory Workers

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Abstract

Background: Musculoskeletal disorders represent the most prevalent occupational health problem globally, with factory workers being particularly vulnerable due to prolonged sitting, repetitive movements, and awkward postures. Piriformis syndrome (PS) remains significantly underdiagnosed in occupational settings.

Objective: To find the prevalence of piriformis syndrome and evaluate quality of life among football manufacturing factory workers.

Methods: A cross-sectional study was conducted using non-probability convenience sampling among 197 factory workers aged 25–45 years who reported sitting for 6–9 hours daily. Both male and female workers were included. Individuals with postural deformities (lumbar lordosis or scoliosis), pregnancy, history of total hip replacement, or lumbar radiculopathy were excluded. The clinical provocative tests included the FAIR test, Pace sign, Beatty sign, SLR test, and Freiberg sign. Quality of life was measured using the Short Form-36 (SF-36) Health Survey.

Results: The FAIR test showed the highest positivity rate (77.7%), followed by Pace sign (67.0%), Beatty sign (59.9%), SLR test (53.8%), and Freiberg sign (44.2%). Female workers demonstrated higher positivity rates across most clinical tests than males. SF-36 scores indicated reduced quality of life, with the lowest mean scores in bodily pain (28.9 ± 16.2) and role limitations due to physical health (35.8 ± 21.4).

Conclusion: Piriformis syndrome is highly prevalent among factory workers with prolonged sitting and is associated with significantly impaired quality of life. Workplace ergonomic strategies and early screening are recommended to reduce occupational risk.

Introduction

Musculoskeletal disorders (MSDs) constitute the most prevalent occupational health problem globally, imposing substantial physical, economic, and psychosocial burdens on affected workers and their employers (1-3). Factory workers are particularly vulnerable due to chronic exposure to ergonomic risk factors, including prolonged standing, repetitive movements, awkward postures, and manual handling of heavy loads (1, 2, 4). Studies have reported MSD prevalence rates as high as 63.7% among automobile factory workers (4) and 92% among garment workers (5), with the lower back consistently identified as the most affected body region (1, 2, 4).

Lower back and gluteal pain in occupational settings may frequently be attributable to piriformis syndrome (PS), a neuromuscular disorder characterized by deep gluteal pain radiating to the ipsilateral lower back and posterior thigh due to compression or irritation of the sciatic nerve by the piriformis muscle (6-8). PS accounts for an estimated 5–36% of chronic low back pain cases (9, 10), yet it remains significantly underdiagnosed owing to the absence of validated gold-standard diagnostic criteria and symptom overlap with lumbar radiculopathy and disc herniation (7, 8, 11). Prolonged sitting and standing, sedentary postures, and repetitive physical strain—hallmarks of factory work—have been identified as key contributing factors to piriformis muscle tightness and subsequent syndrome development (12-14). Recent occupational studies have demonstrated PS prevalence rates of 33.1% among receptionists (12) and 43.8% among bankers (14), underscoring the condition's relevance in sedentary and physically demanding occupational groups alike. Among individuals with low back pain, PS prevalence has been reported at 18.3% (10), while prolonged sitting office workers exhibited prevalence as high as 64.2% (15).

The impact of MSDs and chronic pain syndromes on workers' quality of life (QoL) is well documented. Occupational health problems, particularly musculoskeletal pain, significantly compromise physical, psychological, and social well-being (16, 17). Studies among factory populations have demonstrated diminished QoL scores, with cashew factory workers reporting lower psychological health domain scores (16) and metallurgical workers experiencing deterioration in daily functional activities due to chronic lumbar pain (3). PS itself can be debilitating, often refractory to oral medications, and significantly influences overall QoL through persistent pain, functional limitation, and reduced work productivity (6, 15, 18).

Despite growing evidence linking occupational exposures to MSDs and impaired QoL (3, 16), research specifically examining piriformis syndrome prevalence among factory workers remains scarce. This study aims to determine the prevalence of piriformis syndrome and assess quality of life among factory workers, thereby addressing a critical gap in occupational health literature and informing targeted ergonomic and therapeutic interventions.

MATERIALS AND METHODS

This **cross-sectional study** was conducted among workers employed in football manufacturing factories in **Sialkot, Pakistan**. Ethical approval for the study was obtained from the **relevant institutional research ethics committee,** Ref: USKT/FAHS/RECLetter-00085 and the study was completed over a **six-month period following approval**. The participants were recruited using a **non-probability convenience sampling technique** from different factories where workers are commonly exposed to prolonged sitting during occupational tasks.

The **inclusion criteria** consisted of factory workers aged **25–45 years** who reported **sitting between six and nine hours per day** during their work routine. Both **male and female employees** were eligible to participate in the study. Participants with **postural deformities such as lumbar lordosis or scoliosis, pregnancy, history of total hip replacement, or lumbar radiculopathy** were excluded to minimize

potential confounding factors. Based on the eligibility criteria, a total of **197 participants** were included in the study.

Data were collected through clinical assessment and standardized questionnaires. Piriformis syndrome was evaluated using a series of clinical diagnostic tests, including the FAIR (Flexion, Adduction, and Internal Rotation) test, Pace sign, Beatty sign, Straight Leg Raise (SLR) test, and Freiberg sign (1, 2, 4, 5). These provocative tests are well-established diagnostic tools for piriformis syndrome, with the FAIR test demonstrating a sensitivity of 0.88 and specificity of 0.83, and the SLR test showing a specificity of 0.95 (2). In the absence of a gold standard diagnostic criterion, piriformis syndrome was confirmed when at least two provocative tests reproduced buttock pain or sciatic nerve–related symptoms (5, 6). These tests were performed under the supervision of a senior physiotherapist, and the results were recorded as positive or negative (1, 4).

Health-related quality of life was evaluated using the Short Form-36 (SF-36) Health Survey, a validated instrument that measures eight health domains: physical functioning, role limitations due to physical health, bodily pain, general health, vitality, social functioning, role limitations due to emotional problems, and mental health. Each domain is scored on a 0–100 scale, where higher scores indicate better perceived health status (9, 16).

Participants were informed about the **purpose and procedures of the study**, and **written informed consent** was obtained before participation. Demographic information including **age and gender** was recorded prior to the clinical examination and questionnaire administration. All collected data were analyzed using the **Statistical Package for Social Sciences (SPSS) version 27**. Descriptive statistics including **frequencies, percentages, means, and standard deviations** were used to summarize demographic characteristics, clinical test results, and SF-36 domain scores.

RESULTS

There were n = 197 participants included in the study. Among them, n = 123 (62.4%) were male and n = 74 (37.6%) were female. The participants were within the age range of 25–45 years, with a mean age of 34.8 ± 5.7 years.

Regarding age distribution, n = 52 (26.4%) participants were aged 25–30 years, n = 89 (45.2%) were aged 31–37 years, and n = 56 (28.4%) were aged 38–45 years. The majority of participants belonged to the 31–37 years age group.

Table 1: Piriformis Syndrome Clinical Tests

Test	Male		Female		Total	
	Positive n (%)	Negative n (%)	Positive n (%)	Negative n (%)	Positive n (%)	Negative n (%)
FAIR Test	91 (74.0)	32 (26.0)	62 (83.8)	12 (16.2)	153 (77.7)	44 (22.3)
Pace Sign	78 (63.4)	45 (36.6)	54 (73.0)	20 (27.0)	132 (67.0)	65 (33.0)
Beatty Sign	69 (56.1)	54 (43.9)	49 (66.2)	25 (33.8)	118 (59.9)	79 (40.1)
SLR Test	62 (50.4)	61 (49.6)	44 (59.5)	30 (40.5)	106 (53.8)	91 (46.2)
Freiberg Sign	48 (39.0)	75 (61.0)	39 (52.7)	35 (47.3)	87 (44.2)	110 (55.8)

Table 2: SF-36 Domain Scores Summary

SF-36 Domain	Mean Score ± SD	Interpretation
Physical Functioning	42.3 ± 18.7	Significantly impaired
Role Physical	35.8 ± 21.4	Severely limited
Bodily Pain	28.9 ± 16.2	High pain interference
General Health	38.1 ± 14.9	Poor perceived health
Vitality	41.7 ± 19.3	Low energy levels

Social Functioning	39.4 ± 17.8	Social limitations
Role Emotional	44.2 ± 20.1	Emotional difficulties
Mental Health	52.6 ± 15.4	Moderate mental health

DISCUSSION

The present study investigated the prevalence of piriformis syndrome and quality of life among football manufacturing factory workers in Sialkot, Pakistan. The findings reveal a notably high burden of piriformis syndrome in this occupational population, with the FAIR test yielding the highest positivity rate at 77.7%, followed by the Pace sign (67.0%), Beatty sign (59.9%), SLR test (53.8%), and Freiberg sign (44.2%). These results are consistent with the diagnostic hierarchy reported in the literature, where the FAIR test demonstrates superior sensitivity (0.88) and is considered the most reliable provocative maneuver for piriformis syndrome detection (10, 14, 19). The high positivity rates across multiple clinical tests in our factory worker population suggest a substantial prevalence of piriformis syndrome, which aligns with the occupational risk profile of prolonged sitting inherent to football stitching tasks.

Comparatively, the prevalence observed in this study exceeds that reported among receptionists in Lahore (33.1%) (10) and individuals with low back pain in Gujranwala (18.3%) (7), but is broadly comparable to findings among bankers in Sialkot (43.8%) (14) and prolonged sitting office workers in Peshawar (64.2%) Saleem (2026). The relatively higher positivity rates in our factory worker cohort may be attributable to the unique occupational demands of football manufacturing, which requires sustained cross-legged or floor-level sitting for six to nine hours daily, placing continuous compressive stress on the piriformis muscle and sciatic nerve (11-13). Nawaz et al. 2025 demonstrated a significant positive correlation between sitting duration and pain intensity ($r = 0.65$, $p < 0.001$) among university students, with each additional hour of sitting associated with a 1.36-point increase in pain scores(11, 13). Similarly, Nawaz et al., 2025; , Saleem, 2026; identified prolonged sitting exceeding eight hours daily (adjusted OR 2.18) and infrequent breaks (adjusted OR 2.63) as independent predictors of piriformis syndrome among bankers, findings that are directly applicable to the factory work environment examined in our study (12, 14).

A notable gender disparity was observed, with female workers demonstrating consistently higher positivity rates across all clinical tests compared to males—for instance, 83.8% versus 74.0% on the FAIR test and 73.0% versus 63.4% on the Pace sign. This finding corroborates existing literature indicating that piriformis syndrome is more prevalent in women, potentially due to biomechanical differences in pelvic anatomy and wider Q-angles (18, 19). Batool et al., 2025 similarly reported a higher prevalence of piriformis syndrome among female university students, reinforcing the sex-specific vulnerability to this condition (19).

The SF-36 quality of life assessment revealed markedly impaired scores across all eight health domains among the study participants. The bodily pain domain recorded the lowest mean score (28.9 ± 16.2), indicating severe pain interference with daily activities, while role physical limitations (35.8 ± 21.4) and general health perceptions (38.1 ± 14.9) were also profoundly compromised. These findings are consistent with (13, 16), who reported diminished psychological health domain scores (46.93 ± 10.61) among cashew factory workers exposed to occupational health hazards, and with Bakirov et al. who documented significant deterioration in functional activities and quality of life among metallurgical workers with chronic lumbar pain syndromes (5). Ali et al. 2024 & Saleem et al 2026 specifically demonstrated that piriformis syndrome among prolonged sitting office workers resulted in substantial limitations in physical activity and overall quality of life, with 95 out of 148 affected participants reporting functional restrictions(14, 15). Furthermore, Cardim et al.

2024 & Maigur et al 2025 emphasized that piriformis syndrome can significantly affect patients' quality of life through persistent gluteal pain, lower limb weakness, and numbness(8, 17), while Haripriya et al. (2024) described the condition as "debilitating" with significant influence on overall well-being (18).

The moderate mental health score (52.6 ± 15.4), while the highest among all domains, still indicates suboptimal psychological well-being. This is consistent with Maigur et al 2025 (15, 17), who found that occupational health hazards significantly affected multiple QoL domains among factory workers, and with the broader literature linking chronic musculoskeletal pain to psychological distress and reduced social functioning (3, 5, 16). The low social functioning score (39.4 ± 17.8) further suggests that piriformis syndrome-related pain restricts workers' social participation, compounding the overall burden of the condition.

These findings collectively underscore the urgent need for workplace ergonomic interventions, including regular postural breaks, ergonomic seating modifications, and targeted stretching programs for factory workers engaged in prolonged sitting tasks (1, 14, 20). Early clinical screening using validated provocative tests and implementation of preventive physiotherapy programs could substantially reduce piriformis syndrome prevalence and improve quality of life in this vulnerable occupational population (8, 10, 19).

Limitations

This cross-sectional design precludes causal inference between occupational exposure and piriformis syndrome. Convenience sampling limits generalizability, while diagnosis based solely on clinical tests—without confirmatory imaging or electrophysiological studies—may compromise accuracy given no gold standard exists. The study did not account for confounders (BMI, physical activity, psychosocial stress, comorbid conditions). Additionally, SF-36 scores were not compared between PS-positive and negative cohorts. Restriction to a single industry and location (football manufacturing, Sialkot) further limits external validity to other populations and settings.

Conclusion

Piriformis syndrome prevalence is high among football workers in Sialkot, particularly in females. It significantly impairs quality of life across all SF-36 domains, especially bodily pain and physical role. PS is an underrecognized occupational morbidity from prolonged sitting and repetitive tasks.

Recommendations

Implement ergonomic strategies (postural variation, optimized seating, task redesign) to reduce prolonged sitting. Integrate clinical tests into surveillance for early PS detection. Deploy workplace physiotherapy (stretching, strengthening, postural education) for prevention. Develop targeted interventions for female workers given gender disparity. Future research requires longitudinal designs, diverse populations, confirmatory imaging (MRI), and RCTs evaluating intervention efficacy.

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