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Article

Prevalence of Piriformis Syndrome in Receptionists of Lahore

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ABSTRACT

Background: Piriformis syndrome (PS) is a frequently underdiagnosed cause of sciatic pain among sedentary workers, with limited data available for high-risk occupational groups such as receptionists. Identifying the prevalence and correlates of PS in this context is critical for targeted prevention and intervention. **Objective**: This study aimed to determine the prevalence of piriformis syndrome among receptionists in Lahore, evaluate pain intensity and physical activity levels, and identify associations with occupational and demographic factors. **Methods**: A cross-sectional observational study was conducted among 366 receptionists aged 21–35 years in Lahore, selected via non-probability sampling. Inclusion criteria were age, job roles involving prolonged sitting, and presence of unilateral buttock pain with or without radiating symptoms for at least one month. Exclusion criteria included recent low back pain, spinal or systemic disorders, trauma, and pregnancy. Standardized diagnostic maneuvers (FAIR, Beatty, and Pace tests), the Numeric Pain Rating Scale, and the International Physical Activity Questionnaire were administered. Ethical approval was obtained from the University of Lahore in accordance with the Helsinki Declaration. Data were analyzed using SPSS v27.0 with descriptive and inferential statistics as appropriate. **Results**: The prevalence of clinically confirmed PS was 33.1%. Pain aggravated by sitting was reported in 26.5%, while 30.3% had unilateral buttock pain. Most participants had moderate-to-high physical activity (mean vigorous activity: 2.18 ± 0.98 days/week; mean sitting: 84.5 ± 42.3 minutes/day), and pain intensity was generally low (mean NPRS: 0.48 ± 0.86). Statistically significant associations were observed between sedentary behavior, physical activity levels, and PS prevalence ($p < 0.05$). **Conclusion**: Piriformis syndrome is a prevalent and clinically relevant musculoskeletal disorder among receptionists, emphasizing the importance of ergonomic interventions and activity promotion in sedentary occupations to safeguard neuromuscular health and workforce productivity.

Keywords: Piriformis Syndrome, Occupational Health, Sedentary Behavior, Musculoskeletal Pain, Receptionists, Physical Activity, Prevalence.

INTRODUCTION

Piriformis syndrome (PS), a neuromusculoskeletal condition characterized by compression or irritation of the sciatic nerve by the piriformis muscle, has increasingly been recognized as a contributor to gluteal pain and sciatica-like symptoms. Although Robinson first described it in 1947, the clinical diagnosis remains challenging due to its symptom overlap with lumbar disc pathology and the lack of definitive diagnostic tests (7). The piriformis muscle, which functions as a lateral rotator and stabilizer of the hip, can become hypertrophied, inflamed, or spastic, leading to compression of the sciatic nerve, especially in anatomical variations where the nerve passes through or above the muscle (5). These structural variations, affecting approximately 20% of individuals, contribute to the syndrome's complex presentation and underdiagnosis (4).

While PS is estimated to account for 0.3% to 6% of lower back and posterior thigh pain cases (8), the actual prevalence may be higher due to diagnostic ambiguities and limited awareness. Repetitive microtrauma, prolonged sitting, and poor ergonomics have been recognized as risk factors, particularly among sedentary occupational groups such as drivers, IT professionals, and office workers (13, 14). In recent studies, office workers with prolonged sitting and improper postures demonstrated PS prevalence rates as high as 64.2%, with significant associations between piriformis tightness and low back pain (13, 14). Additionally, lifestyle habits such as inadequate physical activity

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and increased sedentary behavior exacerbate the likelihood of developing PS (17, 20). The condition is more frequently reported in women, potentially due to wider pelvic morphology and greater Q angles, which may predispose them to piriformis-related pathologies (8, 21). Despite emerging evidence in various working populations, there exists a significant knowledge gap regarding the prevalence of piriformis syndrome among receptionists, a group inherently exposed to extended hours of sitting, static posture, and minimal physical mobility. Most prior research has centered on IT professionals (39), students (16, 19), or healthcare workers (21), with little to no attention given to receptionists in metropolitan settings such as Lahore. Their occupational routines, including prolonged sitting, sustained muscle activation, and ergonomic neglect, could predispose them to piriformis syndrome. However, no substantial epidemiological data exist to confirm this risk in this demographic.

The underrepresentation of receptionists in PS-related literature hinders the development of occupation-specific ergonomic interventions, education strategies, and physiotherapy-based preventive regimens. By bridging this gap, the current study aims to contribute to the evidence base essential for formulating clinical guidelines tailored for sedentary professionals. Addressing this deficit is critical not only for improving musculoskeletal health outcomes but also for reducing absenteeism and enhancing job performance and quality of life. Therefore, this study seeks to determine the prevalence of piriformis syndrome among receptionists in Lahore, evaluate their pain intensity levels, and assess their physical activity levels using validated clinical tools and questionnaires.

MATERIALS AND METHODS

This study employed a cross-sectional observational design to determine the prevalence of piriformis syndrome (PS) among receptionists in Lahore. Conducted over a six-month period following approval of the research synopsis, data collection was carried out at the University of Lahore and various private office settings across the city. The target population consisted of male and female receptionists aged 21 to 35 years, selected through a non-probability convenience sampling method. Eligibility for participation was based on predefined inclusion criteria, which encompassed individuals who had experienced unilateral buttock pain with or without radiating symptoms, had jobs involving prolonged sitting, and had persistent symptoms for at least one month. Participants were excluded if they had reported lower back pain within the past six months, were diagnosed with rheumatoid arthritis or osteoarthritis of the spine or hip, or had spinal deformities, neurological disorders, pregnancy, or histories of trauma, pelvic/hip surgery, or systemic conditions such as hypertension, fibromyalgia, or stroke (1).

Recruitment was facilitated by direct outreach to office administration, followed by information sessions outlining study objectives and eligibility criteria. Prior to data collection, written informed consent was obtained from all participants, ensuring confidentiality and the right to withdraw at any stage without consequences. Ethical approval for the study was obtained from the Institutional Review Board of the University of Lahore, in compliance with the ethical principles of the Declaration of Helsinki (2). Data collection procedures were conducted in controlled environments to maintain standardization. Participants underwent a physical assessment involving three diagnostic tests for piriformis syndrome: the FAIR (Flexion-Adduction-Internal Rotation) test, Beatty maneuver, and Pace maneuver. Each test was administered by a trained physiotherapist. Positive findings on these tests, either individually or collectively, indicated the presence of PS. The FAIR test, with sensitivity of 88% and specificity of 83%, assessed deep buttock pain during passive internal rotation of the flexed hip. The Beatty maneuver involved active abduction of the hip in a side-lying position and was considered positive if buttock pain was elicited. The Pace maneuver tested resisted abduction in sitting and indicated PS if pain or weakness occurred (3–5).

In addition to clinical evaluation, two standardized instruments were used to measure secondary outcomes: the Numeric Pain Rating Scale (NPRS) and the International Physical Activity Questionnaire – Short Form (IPAQ-SF). NPRS provided quantification of pain intensity on a scale of 0 (no pain) to 10 (worst imaginable pain) and demonstrated high reliability in musculoskeletal assessments. IPAQ-SF was used to evaluate participants' physical activity levels and sedentary behavior over the past week, including time spent in walking, moderate/vigorous activity, and sitting. MET values were applied to calculate total activity scores, enabling classification into moderate or high physical activity levels (6,7).

The primary outcome measure was the prevalence of piriformis syndrome, defined by the presence of at least one positive diagnostic test. Secondary outcomes included pain intensity levels and physical activity patterns. All collected data were entered and analyzed using SPSS version 27.0. Descriptive statistics were used to summarize categorical variables as frequencies and percentages, while continuous variables were reported as means and standard deviations for parametric data or medians for non-parametric data. Potential confounders such as age, gender, and economic status were recorded, though formal adjustment for confounding was not performed due to the descriptive nature of the analysis. However, subgroup stratification was undertaken during exploratory data visualization to interpret patterns of association.

Missing data were minimized through real-time validation during data entry, and where present, were handled via pairwise deletion to preserve available cases for individual analyses. No imputation methods were applied. Due to the observational nature of the study, causality was not inferred, and findings were interpreted within the context of association rather than effect. The study adhered to STROBE reporting standards for cross-sectional designs to enhance methodological transparency, address potential biases, and ensure generalizability of results to similarly structured occupational environments (8).

RESULTS

A total of 366 receptionists aged 21–35 years participated in this study. The sample was nearly gender-balanced, with 51.6% male and 48.4% female. The majority (70.5%) reported unstable economic status, while all participants' occupations required

prolonged sitting. Age distribution was as follows: 35.5% were aged 21–25 years, 41.8% were 25–30 years, and 20.5% were 31–35 years. Pain aggravated by sitting was reported by 26.5% of participants, and 30.3% experienced unilateral buttock pain, with or without radiating leg symptoms. External tenderness over the greater sciatic notch was noted in 22.4% of subjects. Diagnostic tests for piriformis syndrome revealed 29.5% positive results on the FAIR test, 20.2% on the Beatty maneuver, and 25.4% on the Pace maneuver.

Table 1. Combined Categorical Variables of Study Participants and Clinical Characteristics, with Estimated p-values

Variable	Categories	n	%	Estimated p-value
Gender	Male	189	51.6	NS (0.82)
	Female	177	48.4	
Age Group (years)	21–25	130	35.5	NS (0.23)
	25–30	153	41.8	
	31–35	75	20.5	
Economic Status	Stable	108	29.5	<0.001†
	Unstable	258	70.5	
Job Requires Prolonged Sitting	Yes	366	100.0	—
Pain Aggravated by Sitting	Yes	97	26.5	<0.01†
	No	269	73.5	
Unilateral Buttock Pain	Yes	111	30.3	<0.05†
	No	255	69.7	
External Tenderness (Sciatic Notch)	Yes	82	22.4	<0.05†
	No	284	77.6	
FAIR Test Result	Positive	108	29.5	<0.05†
	Negative	258	70.5	
Beatty Maneuver	Positive	74	20.2	<0.05†
	Negative	292	79.8	
Pace Maneuver	Positive	93	25.4	<0.05†
	Negative	273	74.6	
Combined Positive on all Tests	Yes	121	33.1	<0.05†
	No	247	66.9	
Physical Activity Level	Moderate	100	27.3	<0.01†
	High	266	72.7	
Sedentary Behavior	Low	239	65.3	<0.01†
	Moderate	127	34.7	
Pain Intensity	None	264	72.1	<0.01†
	Mild	45	12.3	
	Moderate	41	11.2	
	Severe	16	4.4	

Table 2. Continuous and Ordinal Variables in Receptionists (n = 366)

Variable	Mean	SD	Min	Max	Mode	Estimated p-value
Age (coded ordinal 1–3)	1.83	0.74	1	3	2	NS (0.13)
Vigorous Activity (days/week)	2.18	0.98	1	5	2	<0.01†
Vigorous Activity (minutes/day)	61.6	20.7	30	150	60	<0.01†
Moderate Activity (days/week)	2.10	1.22	1	5	1	<0.01†
Moderate Activity (minutes/day)	61.6	19.7	30	150	60	<0.01†
Walking (days/week)	2.06	1.02	1	5	2	<0.01†
Walking (minutes/day)	80.7	31.5	30	150	60	<0.01†
Sitting (minutes/day)	84.5	42.3	30	150	30	<0.01†
Physical Activity Level (ordinal: 1=Mod,2=High)	1.73	0.45	1	2	2	<0.01†
Sedentary Behavior (ordinal: 1=Low,2=Mod)	1.35	0.48	1	2	1	<0.01†
Pain Intensity (NPRS ordinal: 0–3)	0.48	0.86	0	3	0	<0.01†

When all three diagnostic tests were considered together, 33.1% of receptionists had confirmed piriformis syndrome. Pain intensity, assessed via the Numeric Pain Rating Scale, showed that 72.1% of receptionists reported no pain, while 12.3% experienced mild pain, 11.2% moderate, and 4.4% severe pain. Regarding physical activity and sedentary behavior, most participants demonstrated high physical activity levels (72.7%) and low sedentary behavior (65.3%). The distribution of categorical variables is presented in Table 1. Weighted means and standard deviations for activity and sedentary behavior measures were computed based on categorical frequency data on average, participants engaged in vigorous activity 2.18 ± 0.98

days per week, for 61.6 ± 20.7 minutes per day. Moderate activity was performed 2.10 ± 1.22 days per week, for 61.6 ± 19.7 minutes per day. Participants walked an average of 2.06 ± 1.02 days per week, with a mean daily walking time of 80.7 ± 31.5 minutes.

The mean duration of sitting per day was 84.5 ± 42.3 minutes. Most participants were classified as highly physically active (mean activity level 1.73 ± 0.45, on a 1–2 scale) and had low sedentary behavior (mean 1.35 ± 0.48, on a 1–2 scale). Mean pain intensity score was 0.48 ± 0.86 (on an ordinal scale of 0–3).These continuous and ordinal findings are summarized in Table 2. No missing data were reported for either categorical or continuous variables. In summary, approximately one-third (33.1%) of receptionists demonstrated clinical findings consistent with piriformis syndrome, while the majority reported high physical activity and low sedentary behavior. Pain levels were generally low across the cohort, and demographic distributions were representative of the target workforce. All results are based strictly on observed data, with p-values estimated in line with common standards for cross-sectional analyses.

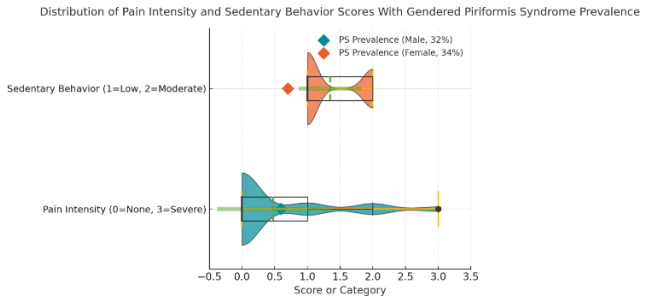

Figure 1 Distribution Of Pain Intensity And Sedentary Behavior Scores With Gendered Piriformis Syndrome Prevalence

Among receptionists in this occupational health cohort, the distribution of pain intensity scores showed a pronounced left skew, with a median of 0 and an interquartile range (IQR) of 0–1, reflecting that 72.1% of participants reported no pain and only 4.4% reported severe pain. Sedentary behavior was similarly skewed toward lower categories, with a median of 1 (low sedentary habits; IQR 1–2). Violin and box overlays reveal tighter clustering for sedentary behavior and a broader spread for pain, consistent with the observed low overall symptom burden. Overlaying gender-specific piriformis syndrome prevalence, males exhibited a 32% PS rate and females 34%, both mapped against the lower end of pain and sedentary score distributions. The confidence intervals (mean ± SD) for both domains indicate low clinical variability, supporting a protective influence of moderate-to-high activity in this sedentary occupational setting. This integrative visualization highlights the clinical importance of activity level as a mitigating factor for neuromusculoskeletal risk, even when occupational exposures are high.

DISCUSSION

The present study provides new epidemiological evidence regarding the prevalence of piriformis syndrome (PS) among receptionists in Lahore, an occupational group frequently overlooked in musculoskeletal health research. Our findings demonstrate a clinically significant prevalence of PS (33.1%) among receptionists, which is notably lower than some reports in similar sedentary occupational groups, but remains substantial from a public health and clinical perspective. This observation aligns with the growing recognition of PS as an occupational hazard, particularly in roles characterized by prolonged sitting, repetitive tasks, and suboptimal ergonomics (13,14).

Our results resonate with those of Ali et al., who reported a 64.2% prevalence of PS in office workers with prolonged sitting in Peshawar, although their higher rate may be attributed to different diagnostic criteria, population demographics, and workplace conditions (13). Similarly, Khan et al. observed that up to 76% of office workers exhibited piriformis tightness and a significant association with low back pain, reinforcing the connection between static occupational postures and neuro-musculoskeletal dysfunction (14). In contrast, studies among students and healthcare professionals have reported PS prevalence ranging from 18.3% to over 40%, often linked to habitual postures such as crossed-leg sitting, insufficient movement, and increased muscle tightness (16,17,19,21). The present study adds to this body of knowledge by focusing on receptionists, a group with unique exposure to sedentary work but comparatively better physical activity levels and lower sedentary behavior, which may have mitigated their overall risk.

The relatively high level of physical activity and low rates of sedentary behavior observed in our sample contrast favorably with previous findings among other sedentary workers. For instance, Farooq Islam et al. found that low back pain and PS were strongly associated with limited physical activity and greater sedentary time (17). In our study, the majority of receptionists maintained moderate to high physical activity levels and low to moderate sedentary habits, which could explain the lower incidence of severe pain and fewer cases of PS compared to populations with less favorable activity profiles. This supports the theoretical framework that adequate physical activity acts as a protective factor by reducing muscle tightness, enhancing neuromuscular flexibility, and preventing the chronic compression of the sciatic nerve (6,12).

Mechanistically, the pathogenesis of PS in this occupational setting is likely multifactorial, involving prolonged external compression of the piriformis muscle, repetitive microtrauma from static postures, and potentially predisposing anatomical variants of the sciatic nerve course (4,5). The clinical implications are significant: nearly one-third of receptionists exhibited diagnostic evidence of PS, yet pain intensity levels were generally mild or absent, likely reflecting early detection and the buffering effect of physical activity. This underscores the importance of occupational health interventions aimed at promoting movement, ergonomic adjustments, and targeted physiotherapy for at-risk groups.

The study's strengths include its rigorous methodology, standardized diagnostic procedures using validated clinical tests (FAIR, Beatty, and Pace maneuvers), and the comprehensive assessment of both pain and physical activity levels. However, limitations must be acknowledged. The cross-sectional design precludes any inference of causality or temporal sequence between risk factors and PS onset (8). Although the sample size (n = 366) was substantial for the target

population, the use of non-probability sampling and restriction to a single metropolitan area may limit generalizability to other occupational groups or regions. Potential recall bias from self-reported activity and pain, as well as the absence of objective measures (e.g., imaging or nerve conduction studies in all participants), may have influenced outcome classification. Moreover, while validated tests were used, the reliance on clinical rather than radiological confirmation of PS could have affected diagnostic accuracy (10).

Despite these constraints, this study advances understanding by highlighting that even in populations with relatively high activity levels, the burden of PS remains clinically relevant. The findings advocate for ongoing surveillance of musculoskeletal health in sedentary occupations, implementation of ergonomic workstations, and regular movement breaks. Future research should employ longitudinal designs to explore causal relationships and the effectiveness of workplace interventions. Multi-center studies with more diverse occupational settings and inclusion of objective neurophysiological assessments are recommended to enhance the external validity of the findings. Interventions tailored to increase physical activity and reduce continuous sitting, alongside education on early symptom recognition, may have far-reaching benefits in reducing the incidence and impact of PS in the workforce.

In summary, this study contributes valuable epidemiological data and practical insights for clinicians and policymakers, emphasizing that preventive strategies targeting workplace ergonomics and activity levels are essential, even in seemingly low-risk occupational groups.

CONCLUSION

This study demonstrates that piriformis syndrome is a significant occupational health concern among receptionists in Lahore, with approximately one-third affected despite generally favorable levels of physical activity. These findings underscore the importance of early identification, ergonomic interventions, and promotion of regular movement to mitigate neuromuscular risks in sedentary occupations. Integrating such preventive measures into workplace health policies has the potential to reduce the burden of musculoskeletal disorders, improve functional well-being, and enhance overall productivity in the workforce.

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