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PREVALENCE OF PIRIFORMIS TIGHTNESS IN PREGNANT WOMEN

Original Research

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ABSTRACT

Background: Piriformis tightness is a musculoskeletal condition often leading to pain, discomfort, and functional limitations. It frequently arises from prolonged sitting and biomechanical stress, which may progress to piriformis syndrome and associated low back pain. During pregnancy, physiological and postural changes further predispose women to this condition, yet limited research has addressed its prevalence and contributing factors in this population.

Objective: To determine the prevalence of piriformis tightness among pregnant women in their third trimester and assess its association with age, gravida status, job type, and working hours.

Methods: This descriptive cross-sectional study included 186 pregnant women aged 20–40 years in their third trimester, recruited from Hamida Trust Hospital (Kotla) using non-probability convenience sampling. Participants were screened based on inclusion and exclusion criteria, and piriformis tightness was assessed using the piriformis stretch test. Demographic information, including age, gravida, job status, working hours, and exercise during pregnancy, was documented. Data analysis was performed using SPSS version 23, with frequency tests and chi-square analysis for significance.

Results: Piriformis tightness was present in 51.1% (95/186) of participants. Prevalence was highest among women aged 27–33 years (53.2%), with age showing a highly significant association ($p<0.001$). Multigravida women exhibited a prevalence of 63.98%, compared to 10.75% in primigravida women. Tightness was observed in 25.81% of working women and 25.27% of housewives. Working hours showed no significant correlation with piriformis tightness ($p=0.226$). Participants working 6–8 hours daily demonstrated a higher prevalence (21.06%) compared to those working fewer than 6 hours (12.43%) or more than 8 hours (17.84%).

Conclusion: Age and gravida were significant factors influencing piriformis tightness, with the highest prevalence in women aged 27–33 years and multigravida participants. While working women showed slightly higher prevalence rates, no direct correlation was observed between working hours and piriformis tightness.

Keywords: Gravidity, Piriformis muscle tightness, Piriformis syndrome, Piriformis stretch test, Pregnancy, Prevalence, Third trimester.

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INTRODUCTION

Piriformis tightness is a significant contributor to pain, discomfort, and functional limitations, particularly in pregnancy. The physiological and biomechanical transformations occurring during pregnancy, including weight gain, postural alterations, joint laxity, and changes in musculotendinous strength, predispose women to musculoskeletal challenges (1). These adaptations, while crucial for accommodating fetal development, place considerable stress on the musculoskeletal system, particularly in the pelvis and lower extremities, leading to conditions like piriformis syndrome. Pregnancy is characterized by distinct trimesters, each associated with unique physical and biomechanical shifts that progressively affect musculoskeletal function (2). The piriformis muscle, originating from the anterior sacrum and sacroiliac joint and inserting on the greater trochanter, is innervated primarily by the ventral rami of S1 and S2. It serves as an external rotator of the femur in hip extension and a weak abductor in flexion. Tightness in the piriformis muscle can entrap the sciatic and pudendal nerves, leading to significant discomfort and impaired mobility (3). This entrapment is exacerbated by repetitive stress during the gait cycle's stance phase, where internal hip rotation places excessive strain on the piriformis muscle. Overuse, hypertrophy, and gait abnormalities increase its susceptibility to injury, contributing to leg length discrepancies and functional limitations (4).

Pregnancy-related weight gain and hormonal changes further amplify these risks. Weight distribution, including fetal, placental, and amniotic components, combined with ligament laxity caused by relaxin and progesterone, disrupt the biomechanical equilibrium. Joint hypermobility, reduced abdominal muscle contraction, and a shifted center of gravity exacerbate the strain on the pelvis and lumbar spine, heightening the likelihood of joint and ligament injuries (5). Sciatic nerve symptoms arising from piriformis tightness can mimic other conditions like spinal stenosis, complicating accurate diagnosis. Distinguishing features often include dermatomal pain patterns, with L5 and S1 dermatomes commonly implicated (6). Diagnostic approaches emphasize physical examination techniques such as the FAIR test, palpation of the piriformis, and functional tests like the Beatty and Freiberg tests. These evaluations highlight muscle tenderness, increased tension, and restricted range of motion (7). Imaging and block injections are invaluable in confirming diagnoses and tailoring treatment strategies. The prevalence of piriformis syndrome, reported between 6% and 36%, underscores its clinical significance, particularly in females due to anatomical and biomechanical variations (7).

Management strategies prioritize conservative approaches, including rest, muscle relaxants, NSAIDs, physical therapy, and targeted exercises to alleviate tension and improve mobility. In refractory cases, advanced interventions such as steroid injections or, rarely, surgical decompression may be necessary. However, surgical outcomes remain unpredictable, necessitating cautious patient selection (9, 10). The objective of this study is to evaluate the prevalence of piriformis tightness among pregnant women, elucidating the associated risk factors, clinical presentations, and diagnostic challenges. By advancing understanding in this area, the study aims to inform preventive strategies and optimize management protocols for affected individuals.

METHODS

This study employed a descriptive cross-sectional survey design, conducted over a four-month duration following the approval of the synopsis. The data were collected at Hamida Tajamal Trust Hospital (Kotla) using a non-probability convenience sampling technique. The sample size of 186 participants was determined using a standard statistical formula, where Z1−α/2Z_{1-\alpha/2}Z1−α/2 represented the standard normal variant for the level of significance, PPP denoted the expected proportion based on previous studies, and ddd was the absolute error or precision (set at 0.05). Participants were selected based on inclusion and exclusion criteria. Women aged 20 to 40 years in their third trimester of pregnancy were included in the study (11, 12). Exclusion criteria were set to avoid confounding factors, which included individuals with a history of trauma in the sacroiliac or gluteal regions (13), previous spinal surgery (13), and pathological conditions such as spinal stenosis, hip fractures, or hip arthritis (13). These criteria ensured a homogenous population relevant to the research objective.

After obtaining ethical approval and written consent from the hospital administration and participants, data collection commenced. Each participant was informed about the study's purpose and methodology to ensure clarity and voluntary participation. Demographic data were collected before the assessment to establish baseline characteristics. The piriformis stretch test was employed to evaluate the presence of piriformis tightness. This validated and reliable diagnostic test involved placing the participant in a side-lying position at the table's edge. The upper leg was brought to 60 degrees of hip flexion with the knee flexed and the lower leg fully extended. The pelvis was stabilized with one hand while downward pressure was applied to the knee. A positive test was indicated by reported soreness in the buttock area.

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RESULTS

The results of the study provided an in-depth analysis of the demographic, clinical, and activity-related characteristics of the participants. The mean age of the participants was 28.21 ± 4.238 years. The distribution of age groups showed that 53.2% of participants were aged 27–33 years, while 33.9% were aged 20–26 years, and 12.9% were aged 34–40 years. Among the participants, 40.3% reported working 6 to 8 hours daily, 31.7% worked more than 8 hours, and 28% worked less than 6 hours. Regarding obstetric history, 64% of the participants were multigravida, while 36% were primigravida. In terms of previous delivery mode, 39.8% had undergone a cesarean section, 24.7% had experienced natural vaginal deliveries, and 35.5% reported no prior deliveries. The study population was evenly split in job status, with 50.5% being housewives and 49.5% working women. A slight majority (52.7%) did not engage in exercise during pregnancy, while 47.3% reported regular exercise.

Table 1: Demographic Characteristics and Work-related Variables of Pregnant Women

VARIABLES		**n (%)**
Age of patient (Year)	20 to 26	63(33.39%)
	27 to 33	99(53.2%)
	34to 40	24(12.9%)
Working hours	Less then 6 hours	52(28%)
	6 to 8 hours	75(40.3%)
	More than 8 hours	59(31.7%)
Previous mode of delivery	No previous delivery	66(35.5%)
	Natural vaginal delivery	46(24.7%)
	Cesarean section	74(39.8%)

The clinical assessment using the piriformis test revealed that 51.1% of the participants tested positive for piriformis tightness, while 48.9% tested negative. This indicates that piriformis tightness was present in a slight majority of third-trimester pregnant women included in the study. Data analysis revealed further trends, such as a higher prevalence of piriformis tightness among multigravida women and those with sedentary lifestyles or prolonged working hours. These findings highlight potential associations between lifestyle factors, obstetric history, and musculoskeletal conditions during pregnancy. The study, however, did not explore factors such as BMI or its potential relationship with piriformis tightness, nor did it analyze other relevant lifestyle or clinical variables such as physical activity intensity or duration. Addressing these aspects could provide a more comprehensive understanding of the contributing factors to piriformis tightness in pregnant women.

Table 2: Pregnancy History, Lifestyle Factors, and Piriformis Test Results of Participants

VARIABLES		**n (%)**
Number of pregnancies	Primigravida	67(36%)
	Multigravida	119(64%)
Job status	Worker	92(49.5%)
	Housewife	94(50.5%)
Exercise in pregnancy	No	98(52.7%)
	Yes	88(47.3%)
Piriformis test	No	91(48.9%)
	Yes	95(51.1%)
	Total	186(100%)

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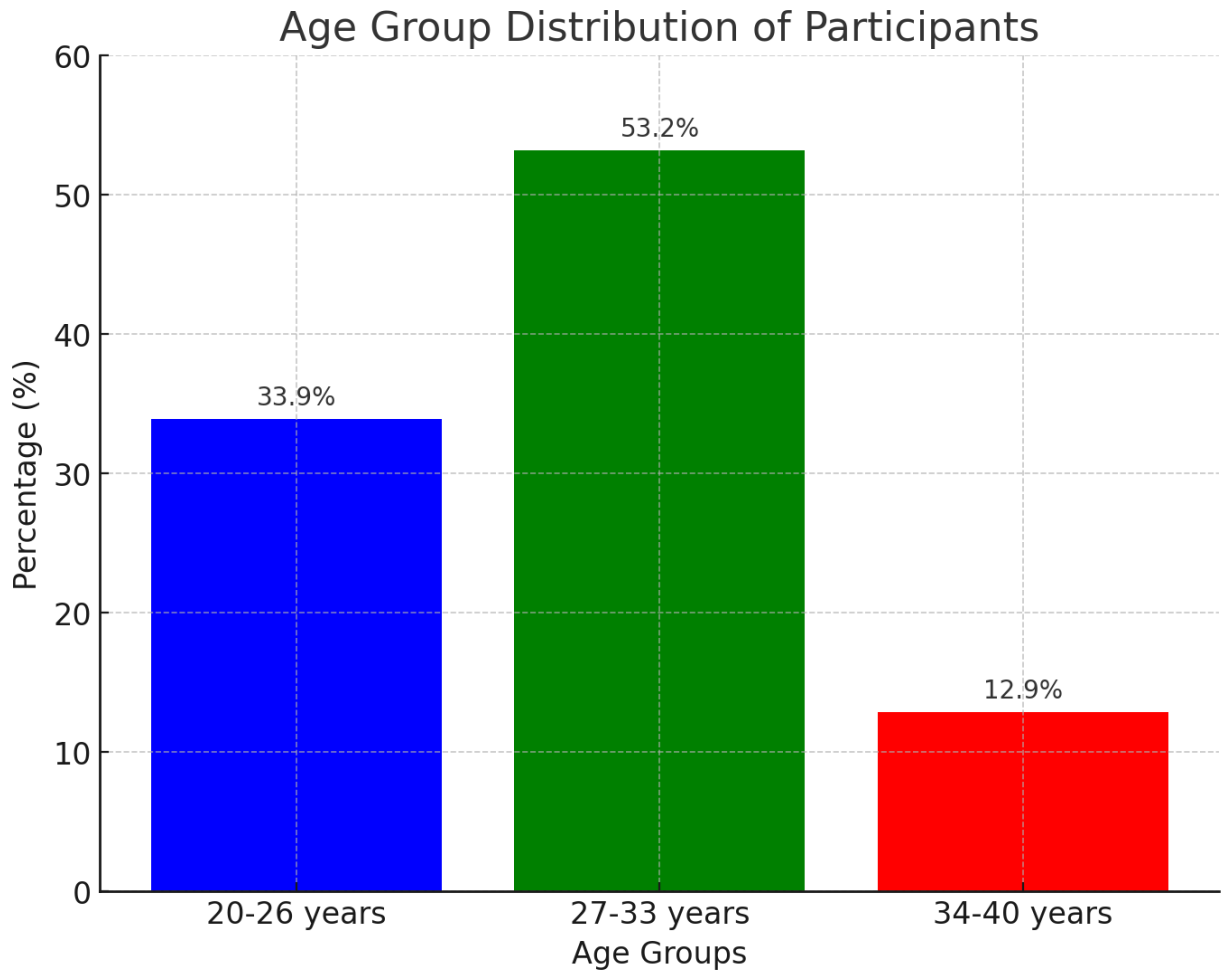

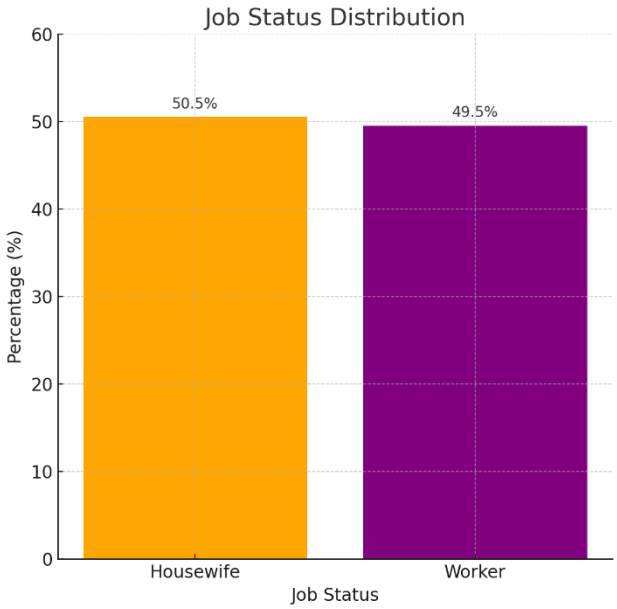

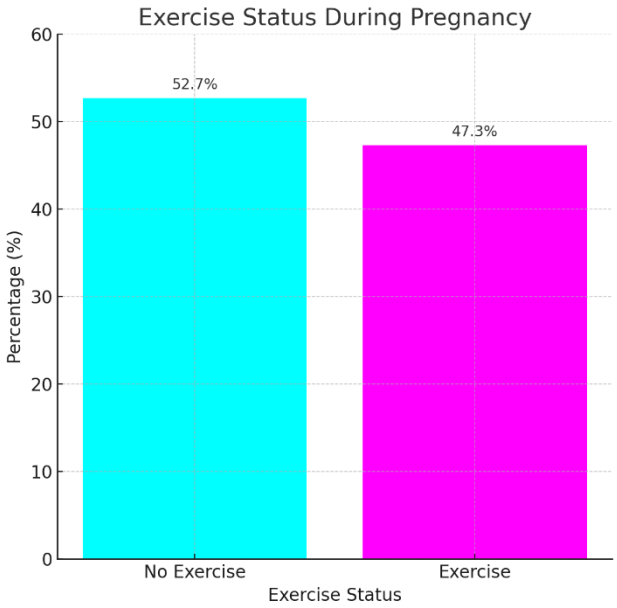

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DISCUSSION

This study investigated the frequency of piriformis tightness among pregnant women in their third trimester, focusing on age, occupational factors, and lifestyle contributors. The results highlighted a significant correlation between age and piriformis tightness, with women aged 27 to 33 years demonstrating the highest prevalence. This finding aligns with previous research by Malika Mondal et al., which emphasized a higher frequency of piriformis tightness during the third decade of life (3). The lowest prevalence was observed in participants aged 20 to 26 years, followed by those aged 34 to 40 years, suggesting that physiological changes during the late second and early third decades of life might predispose individuals to this condition. A comparison with the findings of Shah SIH et al., who reported a higher prevalence of piriformis syndrome among women in their fourth decade, suggests that the age distribution of affected individuals may vary depending on population characteristics and study settings (7). This divergence underscores the potential influence of demographic, occupational, and biomechanical factors in shaping the epidemiology of piriformis tightness, particularly in pregnancy.

The study observed that pregnant women working 6 to 8 hours daily exhibited a higher likelihood of piriformis tightness (21.08%) compared to those working fewer than 6 hours (12.43%) or more than 8 hours (17.84%). Despite this trend, no statistically significant association was identified between working hours and the condition (P=0.226). This finding suggests that prolonged sitting or standing, common in occupations requiring extended periods of static posture, may contribute to muscle tightness. These results align with previous observations by DC Saidoff, who reported a link between extended sitting and increased risk of piriformis tightness (15). The occupational distribution of piriformis tightness in this study was nearly equal between housewives (25.27%) and workers (25.81%), reflecting the influence of non-occupational factors such as physical inactivity and pregnancy-induced biomechanical changes. Earlier research from a tertiary care hospital in Lahore demonstrated a similar occupational impact, reporting prevalence rates of piriformis tightness in professional doctors, accountants, professors, and housewives at varying levels (14). The findings highlight the multifactorial nature of piriformis tightness, with both occupational and non-occupational factors playing critical roles.

The study's strengths include its focus on a specific population of third-trimester pregnant women, offering targeted insights into this high-risk group. The use of validated diagnostic tools ensures reliability in assessing piriformis tightness. However, certain limitations should be acknowledged. The reliance on a convenience sampling method and the study's single-center design may limit the generalizability of findings. Additionally, the absence of data on confounding factors such as body mass index (BMI), physical activity levels, and prior musculoskeletal conditions restricts a comprehensive understanding of potential risk factors. Overall, this study contributes valuable insights into the prevalence and associated factors of piriformis tightness in pregnant women. By emphasizing the interplay of age, occupational factors, and pregnancy-specific biomechanical changes, it underscores the need for preventive strategies and tailored interventions to mitigate musculoskeletal challenges during pregnancy. Further multicenter studies with larger, more diverse populations are recommended to validate and expand upon these findings.

CONCLUSION

This study concluded that piriformis muscle tension is a significant concern among pregnant women, influenced by factors such as age and the number of pregnancies. Women in their late twenties to early thirties and those with multiple pregnancies appeared more susceptible to developing this condition. While working women reported higher levels of discomfort, no direct correlation was observed between working hours and piriformis tightness. These findings highlight the importance of adopting preventive measures, including maintaining proper posture, strengthening abductor muscles, and incorporating modifications to walking habits, to alleviate and manage the risk of piriformis tightness during pregnancy.

Author	Contribution
Nimra Nadeem	Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Validation, Supervision
Azka Yaseen	Methodology, Investigation, Data Curation, Writing - Review & Editing
Afshan Shaheen	Investigation, Data Curation, Formal Analysis, Software
Gohar Rehman	Software, Validation, Writing - Original Draft
Nida Tariq	Formal Analysis, Writing - Review & Editing
Hafiza Rabia Irshad	Writing - Review & Editing, Assistance with Data Curation
Gulbashra Shaban	Formal Analysis, Writing - Review & Editing
Amisha Qamar	Writing - Review & Editing, Assistance with Data Curation

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