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Prevalence Of Piriformis Syndrome In Housekeeping Staff

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ABSTRACT

Background: In the area of glutes, the piriformis muscle plays vital for hip rotation and stability. Jobs involving long periods of standing and physically demanding work causes syndrome and fatigue due to sustained pressure. Piriformis syndrome, pressurizes sciatic nerve, drastically causing pain, uneasiness, and restricted movement. This results in chronic musculoskeletal strain and impact productivity and overall well-being.

Methods: Housekeeping staff having significant clinical features underwent evaluation of NPRS, examining tightness by seated piriformis stretch test and buttock pain by FAIR test were recorded. Age, years of experience and duration of work was taken into consideration. Patients with back surgery, trauma, arthritis and spinal deformities were excluded.

Result: In this study 80 participants, higher prevalence of piriformis syndrome was observed in participants aged 25- 45 years, with mean age 34.83 (±6.09). The NPRS indicated that 62.5% had mild pain at rest, while 46.25% reported severe pain during movement. 61.25% subjects resulted positive for seated Piriformis Stretch test and FAIR Test, with a higher percentage of females (71.19%) testing positive compared to males (33.33%).

Conclusion Patients daily lives are greatly affected by hip discomfort, as many find it difficult to carry out fundamental activities because of the pain. The elevated occurrence of affirmative Seated Piriformis and FAIR test outcomes piriformis syndrome. The considerable pain underscore the necessity for enhanced management approaches. Investigating gender differences and the root causes of hip discomfort in greater depth would assist in more effectively customizing treatments.

Keywords: *Piriformis Syndrome, prolong standing, bending and overload, housekeeping staff, NPRS, seated piriformis stretch test, FAIR test.*

1. INTRODUCTION

Human body has biggest nerve -The sciatic nerve, branching from sacral plexus and arises from L4-S4 spinal nerves that transfers sensory and motor functions. The nerve from pelvis through the larger sciatic foramen, supplies to the lower limbs' innervations. Anatomical changes in the gluteal space encompass nerve divisions and is related with the piriformis muscle. [(1)]. Piriformis is tiny pyramidal shaped deep muscle located in gluteal area [(2)]. During walking and standing, muscle functions as an external rotator, weak abductor, and weak flexor of the hip, ensuring balanced posture· Tightness in this muscle entraps the sciatic and pudendal nerves, causing pain and restricted movement. Stress during the gait cycle's stance phase, where internal hip rotation puts undue tension on the piriformis muscle, worsens the entrapment [(3)]. The most typical four symptoms include buttock pain, sciatica exacerbation, external discomfort, pain exacerbated by muscle tension inducing movements [(5)]. Piriformis overload often results from tight adductors inhibiting the G-med and G-max. This weakness, also seen in L5 radiculopathy or disc herniation, causes the piriformis to compensate, tightening as it takes over the role of the weakened abductors. [(6)] The most common is regional and/or radiating gluteal pain based on the location of sciatic nerves, which

frequently resembles actual lumbar spinal sciatica affecting piriformis. Walking, lying on the afflicted side, rising up from a sitting posture, and kneeling the pain worse [7].

Biomechanics include movements providing postural stability during ambulation and standing. When hip flexion is Piriformis is 60º or less piriformis muscle function as external rotators while its role changes when hip flexion is greater than 60°, hip internal rotation occurs [8]. The primary role of external rotations of hip, it lifts and rotates hip joint away from midline of body transfers of body weight is facilitated from one foot to another as balance is maintained. Hip undergoes unnecessary adduction and internal rotation during high eccentric load on weight loading activities. Shortening of muscle tighter than muscle issues to lifestyle, poor posture in obese, sitting and standing. Musculature tension or abnormality hinders sciatic nerve distress by piriformis muscle [9]. The sciatic nerve, which passes beneath the piriformis in 80% of people, can experience pressure when its diameter is reduced. This compression, often caused by the piriformis muscle's overextension and eccentric demand during functional activities, is linked to weak gluteus muscles. As a result, the hip undergoes excessive adduction and internal rotation, leading to sciatic nerve irritation. [10]. Hyper lordosis has undue strain on spine as the muscle joining lumbar to hip can become tight. The postural muscle as piriformis tends to become hypertonic, weak, and shortened in length [11]. During entire gait cycle, more prone due to pressure to enlarge muscle bulk. When there is an increase in internal rotation or adduction, as occurs when there is a leg length disparity, a gait abnormality may make this more noticeable. [12] Contracted piriformis occurs by lower lumbar vertebrae compensated by rotating anteriorly in the opposite direction in most cases of piriformis syndrome [13]. Piriformis syndrome affects people of various physical activity levels and vocations, with the most common age range being 30 to 49 years old. Robinson (1947) identified features -history of pain in SI joint, local injury, and extends along sciatic nerve, causing difficulty walking, stooping, or lifting (Fishman et al., 2002) [14]. Muscle tightness results from the tremendous strain placed on the muscles and joints by repetitive, stressful training loads [15].

For companies, industries, and communities at large, cleaners offer a crucial service. Labor-intensive cleaning chores are usually characterized by static muscular loads, primarily including standing, back twisting and bending as well as continuous, high-force hand and arm movements. Performing tasks like moving or lifting furniture, wiping, scrubbing, rinsing, cleansing, disinfecting, scouring, buffing and vacuuming, undergo bad postures for both dynamic and static muscle actions [16]. Long durations of standing or sitting, which are typical in jobs demanding a lot of fixed posture, might worsen muscular tension, according to research [17]. Daily tasks like prolonged standing, bending over, and picking up objects can be linked to careers as housewives and field workers. Long-term limb stiffness from this condition may lead to poor muscle coordination, which in turn can cause injury to the piriformis muscle. [18] . People who have piriformis syndrome typically have profound hip discomfort that is restricted to the back of the hip and is made worse by sitting, standing, or moving about. [19]. According to Travell and Simons, the weight-bearing activities of piriformis muscle limits excessive axial endorotation connected to hip load and hip posture while walking. The non-weight-bearing leg is axial exorotation of the femur with the hip extended and hip abduction in 90° flexion. The muscle enhances an oblique tension on the sacrum. The muscle plane is near to the frontal plane and forms an angle of about 30° with the SIJ plane (Mitchell, 1965) [20]. Activities like extended walking or standing on one leg with inadequate trunk control might increase the biomechanical compensatory load on the spine. Excessive strain on the lumbopelvic-hip area can lead to over-activation of local hip muscles, especially the piriformis. In the context of LBP, increased coactivated gluteus muscle mass correlates with increased piriformis thickness, consistent with previous research. [21]. Factors influencing PS such as gender, age, height and genetic relation are non-modifiable one while increased BMI, employment status, trauma, lifestyle, and health problems related to modifiable factors [16]. About 6% to 18% of people with low back discomfort have been found to have piriformis syndrome. People of various vocations and levels of activity PS affecting in 4th and 5th decades of life mostly common in young girls [21]. Housekeeping duties involve cleaning tasks include washing windows, walls, ceilings, bending and stooping to sanitize toilets, bathtubs, and sinks, maintaining flooring with mopping, replenishing toiletries, sweeping, and dusting, mopping etc. Lower back strain was the most frequent issue, especially for those working in unnatural postures. Research highlights risk factors for musculoskeletal health, such as heavy workload, repetitive motion, job speed, and lack of proper organizational measures. [23]. As prolonged work postures, extreme movements, and excessive force can cause tissue overload and injury to musculoskeletal structures. Consequently, MSP has a greater impact when many risk variables are incorporated in a single job [24]. Workers exposed to heavy lifting, awkward postures, and whole-body vibration show a strong link to sciatica or piriformis syndrome (PS). Repeated leg movements during lifting, combined with weak hip abduction and tight adduction, lead to compensatory contractions that strain and shorten the muscle. Characterized by hypertrophy of the piriformis due to decreased hip complexity, lumbopelvic stability, and muscle control. [25]

METHODOLOGY: An Observational Cross sectional study conducted at Kolhapur of Housekeeping staff study population: 5 Sample size :80 using convenient sampling method for a duration of 1.5 years. Subjects fulfilling the criteria were selected for study **inclusion criteria** all genders of 30 to 45 age with work experience more than 2 years, standing for 7 to 8 hours of work, **exclusion criteria:** patient having back or lower limb surgery, trauma, diagnosed cases of rheumatoid arthritis, osteoarthritis of spine or hips, spinal deformity.

PROCEDURE This study was an observational study with selection of housekeeping staff, Inclusion and exclusion criteria

were considered. The study protocol was presented for approval at institutional ethical committee and protocol committee of D. Y. Patil Education Society, deemed to be university Kolhapur and D.Y. Patil College of Physiotherapy, Kolhapur and Ethical approval was granted by the committee. The observational study titled "To study prevalence of Piriformis Syndrome in Housekeeping Staff" was conducted in the Kolhapur region. Potential subjects with an explanation of the study's purpose. Written consent was obtained from those willing to participate. Participants for the study were recruited from colleges and hospitals across the Kolhapur region. They underwent assessments using the numeric pain rating scale, FAIR test and seated piriformis stretch test. The study focused on housekeeping staff, including both male and female individuals aged between 30 to 45 years, who had been actively engaged in dusting, cleaning and moping etc for atleast two years and more. These participants experiencing significant features for more than 8 hours. The study was explained to subjects, and written consent was obtained from all participants. Demographic data including name, age, and gender were collected using a standardized data collection sheet. The Numeric Pain Rating Scale (NPRS), Seated Piriformis Stretch Test and FAIR Test having marked sensitivity and specificity were recorded on a data collection sheet for all 80 participants. Subsequently, a master chart was prepared, containing participant numbers, gender, NPRS scores, Seated Piriformis Stretch Test and FAIR test. Seated Piriformis Stretch Test: The Piriformis muscle stretch is performed with the subject on a sidelying or seated position, with the affected side up. With the hip flexed at 90 degrees, the examiner with one hand on the knee adducts the flexed hip while retracting the ilium with the other hand. This movement will produce an almost isolated stretch of the piriformis muscle FAIR Test: The FAIR test is performed with the patient in a lateral recumbent position, with the affected side up, the hip flexed to an angle of 60º, and the knee flexed to an angle of 60º to 90º. While stabilizing the hip, the examiner internally rotates and hip adducts by applying downward pressure to the knee. Alternatively, the FAIR test can be performed with the patient supine or seated, knee and hip flexed, and hip medially rotated, while the patient resists examiner attempts to externally rotate and abduct the hip. The FAIR test result is positive if sciatic symptoms are recreated. The statistical analysis utilized appropriate biostatistical tools and was conducted using the master chart data. This analysis aimed to calculate the prevalence of piriformis syndrome in housekeeping staff. According to NPRS score, Seated Piriformis Stretch Test and FAIR test. Finally, study declared the results, discussion and conclusion.

Fig no.1 Evaluating NPRS

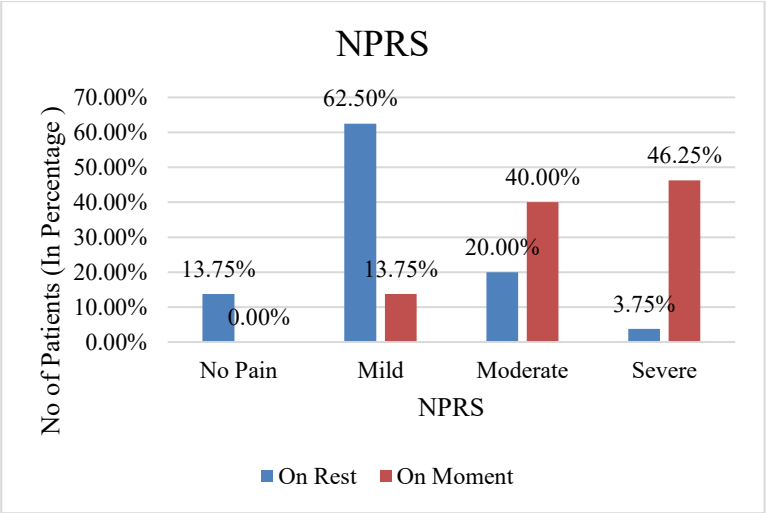
Fig. 2 Assessing FAIR test and Seated Piriformis Stretch Test.

2. RESULTS

A total 80 participants, 21 males and 59 females working as Housekeeping staff were selected for the study from various College and Hospitals in and around Kolhapur region. Age of participants were 30 to 45 years with mean age 34.83 (±6.09) years. The participants considering inclusion and exclusion criteria. In our study involving housekeeping staff who have been standing for 8 or more hours daily for at least two years, we found a high prevalence of piriformis syndrome. Using the Seated Piriformis and FAIR tests, 61.25% of participants tested positive for both. Notably, a higher proportion of females (71.19%) tested positive compared to males (33.33%).

NUMERICAL PAIN RATING SCALE:

The Numerical Pain Rating Scale (NPRS) was used to assess the intensity of the pain. The majority of patients (62.5%) reported minor pain when at rest, but a significant percentage (46.25%) reported severe pain when moving.



Graph. 1 Bar Graph Representing Pain Severity.

SEATED PIRIFORMIS STRETCH TEST:

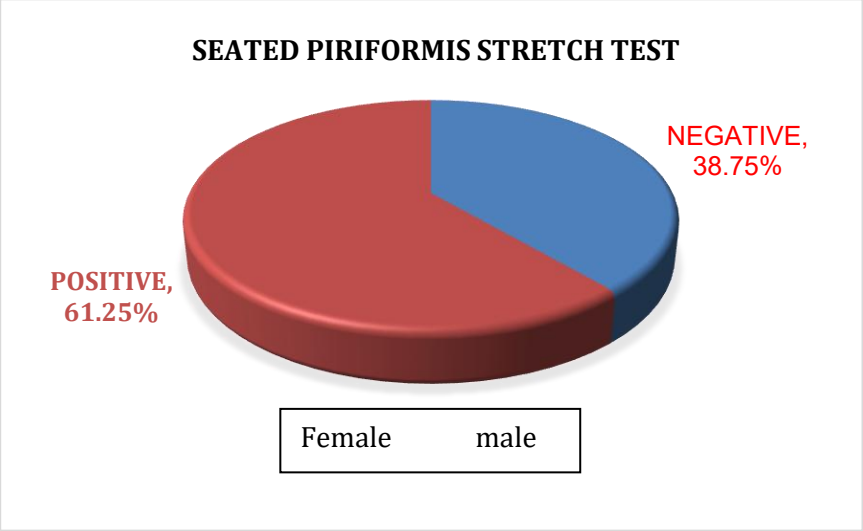
61.25% of patients tested positive on the Seated Piriformis Stretch Test, with a larger proportion of females (71.19%) than males (33.33%).

SEATED PRIFORMIS TEST	Number of Patients (n)	Percentage (%)
NEGATIVE	31	38.75%
POSITIVE	49	61.25%
Grand Total	80	100.00%

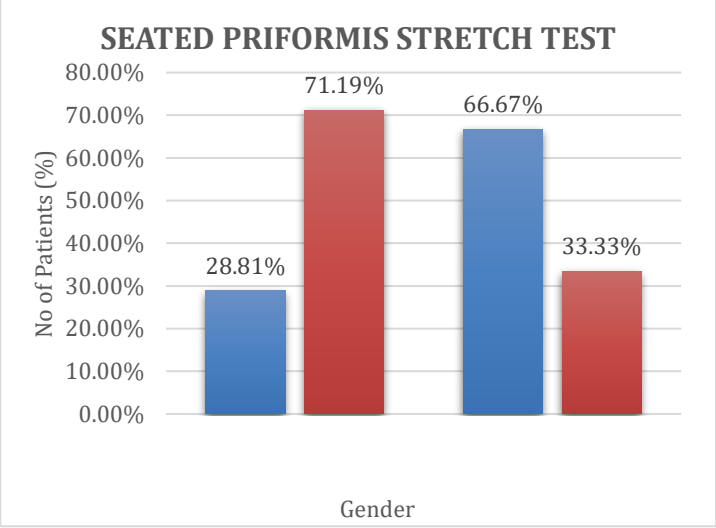
Table .1 Seated Piriformis Stretch Test Interpretation.

Table .2 Seated Piriformis Stretch test – Gender Differences

SEATED PRIFORMIS TEST	Female		Male	
	Number of Patients (n)	Percentage (%)	Number of Patients (n)	Percentage (%)
NEAGTIVE	17	28.81%	14	66.67%
POSITIVE	42	71.19%	7	33.33%
Grand Total	59	100.00%	21	100.00%



Graph. 2 Pie Chart of Seated Piriformis Stretch Test



Graph. 3 Bar graph of Seated Piriformis Stretch Test – Gender Differences.

FAIR TEST:

61.25% of patients had positive results from the FAIR Test, with females (71.19%) demonstrating most positive outcomes than males (33.33%).

Graph. 4 Pie Chart representing FAIR Test.

FAIR TEST	Female		Male	
	Number of Patients (n)	Percentage (%)	Number of Patients (n)	Percentage (%)
NEGATIVE	17	28.81%	14	66.67%
POSITIVE	42	71.19%	7	33.33%
Grand Total	59	100.00%	21	100.00%

Table. 4 FAIR Test –Gender Differences.

3. DISCUSSION

PS denotes a condition where the piriformis muscle, situated deep within the buttocks close to the hip joint, tightens and leads to discomfort or pain. This muscle is crucial for lower body movement, especially in pelvic stabilization and assisting with hip rotation. [26] [3]

In the study of Boyajian et.al considered clinical symptoms with an osteopathic approach in Piriformis Syndrome. It executed symptoms including pain with sitting, standing or lying longer than 15 -20 mins, pain and/or paresthesia radiating from sacrum through gluteal to thigh (posterior aspect) and no pain above knee, difficulty in walking, weakness or numbness etc. Signs are tenderness in SI joint, greater sciatic notch and piriformis muscle, weakness etc. [4]

Study by Ali. et al suggested prevalence rate in general population estimate range between 0.2% and 6% condition. Further stated the most affected age group between 25- 45 years [3] Piriformis syndrome affects people of various physical activity levels and vocations, with the most common age range being 30 to 49 years old. [14] So, in our research we targeted the age group of 30- 45 years as of work experience having atleast 2 or more years and both genders included in our study.

In our study as above clinical features and causes Piriformis muscle is affected by prolong standing workloads, thus hereby no further research has been done. So this study offers Piriformis Syndrome due to long duration of ambulation, bending, climbing, carrying loads by Housekeeping staff. In previous Study of Musculoskeletal Disorder among Housekeeping Staff in Hotel Industry by author Swapnil Parmar et. al concluded the study by 25% participants having musculoskeletal disorders with work experience of 2-5 years (58%) result showed maximum participants with Low back pain (60%) calf muscles and knee joint (30%) and only calf muscles (10%) [26]. Zakia F. et al study resulted that the housekeeping staff's most frequently

recorded complaint was from the lower back area (95%), followed by the upper back (75%), knee and neck (40%) and other. more significant low back pain is observed in this population. Tight muscle alters the motor control program leading to muscular imbalances [6]. Prevalence of PS suggested the majority of people having low back discomfort having tight piriformis muscle. Frequency ranging from 5% to 36% as indicated higher rates in women than men. [3] The people considering frequency of PS with LBP was only 18.3%, respectively [11]. In our study the population of housekeeping staff is a specific occupational group that often has loading standing mobilitywork.

Muhammad Mubasir et. al in the article of Association of Lowback Pain with PMT in University students suggested Piriformis acts as external rotators, weak abductors and weak flexors for postural stability during standing and ambulation. Piriformis muscle, when hip flexion is 60º or less it acts as external rotators while the function changes when angle of hip flexion is greater than 60°, so that it becomes an internal rotator of the hip[8] A study involving 2,910 outpatient cases of lower backache or hip pain and sciatica found that 182 participants (6.25%) showed piriformis muscle tight, as confirmed by a piriformis stretch test.[16].A more recent study of 251 patients with sciatica found that 181 (72%) exhibited tightness in the piriformis muscle during the stretch test, while 70 participants (27.9%) had no evidence of tightness[18]. According to authors in "Prevalence and Factors associated with Musculoskeletal pain in Hospital cleaning workers" suggested prolong work postures, excessive movements and forces causes tissue overload and injury mainly spine [24]. Therefore, in our study prolong standing housekeeping staff was diagnosed with piriformis Syndrome commonly in females. Evaluating among housekeeping staff is crucial for grasping musculoskeletal disorders in the workforce and can point out job-related hazards and ways to avert them. The housekeeping staff represents a particular occupational group that frequently endures work necessitates repetitive movements, extended periods of standing, bending, and lifting. Such activities may play a role in the emergence of musculoskeletal issues, which can considerably affect individuals' daily functioning and overall quality of life.

In our study we assessed subjects gathering demographic information and used NPRS scale to investigate pain and its severity, and for confirmation seated Piriformis muscle stretch test for tightness and buttock pain and FAIR test to rule out sciatic/gluteal pain.

According to NPRS scale to measure mild, moderate and severe The study indicates a distinct change in pain levels between the at rest and during movements conditions. While 62.5% mild pain at rest, only 13.75% during activity; however, moderate pain increases to 40% and severe pain to 46.25% during movement. In both conditions, every patient reports experiencing pain. Some actions exacerbate their discomfort and insufficient physical activity could impede recovery. The Seated Piriformis Test results show that 61.25% of the 80 participants tested positive, indicating a prevalence of piriformis syndrome. Gender differences 71.19% of females testing positive compared 33.33% of males, suggesting that females are more likely to experience piriformis-related issues. Similarly, the FAIR test results show 61.25% of patients testing positive. These findings highlight a higher among females.

4. CONCLUSION

The data highlights the considerable effect of hip discomfort on patients' everyday lives, as many individuals suffer from pain and discomfort and struggle to carry out their daily activities. The elevated occurrence of affirmative test outcomes (Seated Piriformis and FAIR tests) indicates that musculoskeletal and joint dysfunctions, like piriformis syndrome, are prevalent within the sample. The limited engagement in daily exercise and the considerable pain experience particularly during movement underscore the necessity for enhanced approaches to pain management and rehabilitation. Furthermore, investigating gender disparities in test outcomes could prove advantageous for ensuring that treatment methods are suitably customized. It might also be necessary to conduct additional research into the root causes of hip discomfort and the best methods for enhancing mobility and alleviating pain.

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