

The frequency of Piriformis tightness and its association with Low Back Pain due to prolonged sitting among the bankers in Pakistan

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Abstract- Objective: To study the frequency of piriformis tightness and its association with low back pain due to prolonged sitting among the bankers of Pakistan.

Methodology: This cross sectional study was conducted on the bankers of Sialkot including Muslim Commercial Bank, Habib Bank Limited, Bank of Punjab, Allied Bank Limited, United Bank Limited, Faisal Bank, Meezan Bank Habib, Metro bank, Habib Soneri Bank. Data was collected on the basis of inclusion and exclusion criteria from the bankers of Sialkot, Pakistan. Piriformis tightness was assessed using seated piriformis stretch test.

Results: The frequency of Piriformis tightness among bankers is found high. Results showed that total 200 sample size, 147(73.5%) participants tested positive for piriformis stretch test while 53(26.5%) tested negative for piriformis stretch test. P value is less than 0.05 means the increase in frequency of piriformis tightness and its association with low back pain due to prolonged sitting among the bankers of Pakistan. The study shows the incidence of Piriformis Tightness was highest in Habib bank limited (31.5%) who had 6-8 hours of sitting employment experience.

Conclusion: The prevalence of Piriformis Tightness and its association with prolonged sitting among bankers of Sialkot is high. However this prevalence can be minimized if proper guidance regarding ergonomics, resting duration between working hours is given.

Keywords: Piriformis Tightness, Low Back Pain, Prolonged Sitting, Piriformis Stretch test, Postural change.

I. INTRODUCTION

Piriformis muscle is the most superficial of the deep gluteal muscles and has a flat shape. Piriformis arises from the outer the sacral surface of the pelvis between the first and fourth pelvic sacral foramina, the margin of the sciatic foramen, and the surface of the sacrotuberous ligament. A circular tendon connects it to the trochanter of the femur, in some of the people it is combined with the obturator internus muscle and gemilli muscles (Islam et al., 2022). It is a muscle of gluteal region and it lies deep to gluteus maximus. This muscle belongs to the six short external rotators of the hip. It is a powerful muscle and it also plays important role in the posture maintenance in pelvis area (Anderson & Vilella, 2020). The piriformis muscle tightness may be caused due to the prolonged sitting. It usually starts with the pain, tingling or numbness in the buttocks as a result of sciatic nerve being compressed. Piriformis muscle tightness

might be caused due to the vigorous exercise or accident. Most of the patients feel buttock pain, feels internal rotation, hip flexion, and adduction of the same side of the leg are all challenging and painful. Pain and paresthesia in the posterior of the thigh are caused by sciatic nerve compression (Alghadir et al., 2019). Muscle spasm is a clinical symptom and also the palpation over greater trochanter. Sausage formed mass in buttock occurs in some patients due to the compression of piriformis muscle (Haleem et al., 2021). Nerve branches from L5, S1, and S2 innervate the piriformis muscle. Low back pain is a major worry all over the world and it is becoming worse by the day, owing to the aging population and the expanding global population. It affects people of all ages and is typically caused by sedentary professions, smoking, obesity and occasional socioeconomic popularity. Prevalence of low back pain in association with piriformis tightness: Low back pain is fairly frequent and has a negative impact on functioning capacities in both children and adult person. The piriformis muscle is the most common source of low back pain owing to tension. Piriformis muscle tension is a common cause of low back pain that goes undiagnosed. The prevalence of piriformis tightness in low back pain ranges from 5 to 35%. The piriformis is an external rotator, a weak abductor, and a weak flexor of the hip and it offers postural stability while standing and ambulation. We may say that the piriformis muscle stays active in every sitting posture, whether high or cross sitting (Haleem et al., 2021). It was discovered that sitting in a chair for eight hours or more increases the possibilities of developing back muscle stiffness and puts strain on the joints that remain in a continuous posture for so long. Occupations that require prolonged sitting on a chair, such as computer professionals, contact center workers, musicians, office workers, and drivers have a higher risk of causing piriformis muscle tightness (Mohanty & Pattnaik, 2017) on the sciatic nerve, which runs beneath it in the majority of people. The impact of prolonged sitting on low back pain Sitting, especially extended sitting is a known risk factor for developing low back pain. Postural type alterations such as flattening of the lumbar lordotic curve with extended increased sitting duration and chronic muscle deconditioning lower levels of activation produces muscle fatigue with sustained low loading in static postures are among the other ideas (Vassalou et al., 2018). More study on muscular exhaustion and postural variables that may contribute to the development of discomfort is needed to understand why discomfort arises (Baker et al., 2018; Mubashir et al., 2020)

II. METHODS

Total 200 participants were selected from the private banks of Sialkot, Pakistan. Male subjects who are doing prolonged sitting jobs 8 – 10 hours having age 25 – 60 years with no history of accidents were included in the study. Whereas subjects with history of surgery and any serious disease of spine, pelvis, femur and sacroiliac joint were excluded. Demographic data of the bankers were taken. Piriformis tightness was evaluated using seated piriformis stretch test. The patient was in sitting position on the edge of assessment couch. The hip flexed up to 90 degree of the testing leg and the knee was locked in extension. Therapist was sitting in front of the subject at the test side. The subject was asked to grasp the pouch for trunk and hip flexion (Mondal et al., 2017). NPRS was used to evaluate the pain experienced by the bankers during working hours. The NPRS (Numeric Pain Rating Scale) is a segmented numeric rating scale in which the subject chooses a whole number (0-10 integers) that best represents the severity of his pain. NPRS 0 indicates no pain, 1-3 indicates mild pain, 4-6 indicates moderate pain, 7-9 indicates severe pain, and 10 indicates extremely severe pain (Alghadir et al., 2019; Hrvatin & Puh, 2021; MB). The external range of motion was assessed by Goniometer. Before assessing the subjects, there was a warm up session of 10 minutes and all these measurements should be performed under therapist supervisor (Pradip et al., 2018).

III. RESULTS

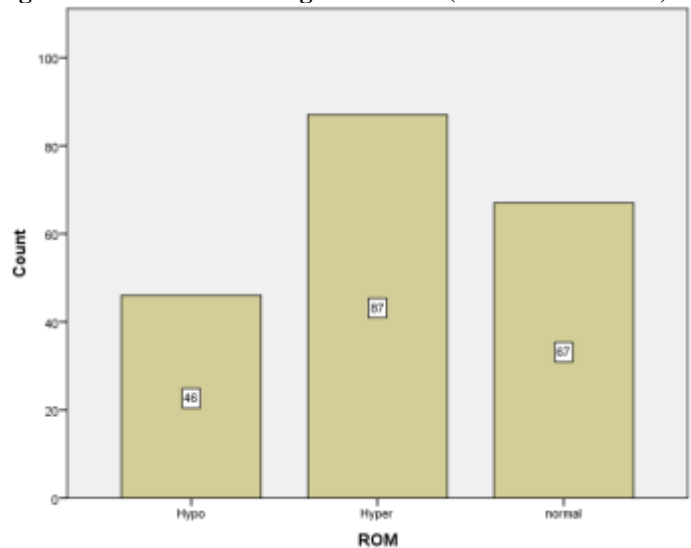
Results had been obtained by analyzing the data collected from 200 office workers from different private banks of Sialkot, Pakistan (HBL, UBL, MCB, Soneri Bank, Bank Alfalah). Total ten questions were asked and one special test was performed on participants in sitting position. Results were analyzed by SPSS. Results are mentioned in the form of Bar Charts, Pie Charts, Histogram and Cross Tabulations. We present the data in both graphical and numerical forms. The prevalence rate of piriformis tightness is quite high. Out of 200 sample size, 147(73.5%) participants tested positive for Piriformis Stretch test while 53(26.5%) tested negative for Piriformis Stretch test with P-value <0.000 which is statistically significant. The Prevalence rate of RM (22.5%) is more vulnerable than other designations BM (10.5%), OM (15.5%), SM1 (5.0%), SM2 (3.5), Cashier (10.0%), FM (14.5%) and RO (18.5%). The study revealed that the prevalence of piriformis tightness is most frequent in HBL (31.5%). This is due to daily 6-8 hours sitting employment experience, most of the participants were obese, above the age of 35 years. There is a whole team of workers, therefore all bank employees execute their own job from a continual sitting posture and cannot change positions for an extended amount of time.

Table 1: Diagnostic Test:

Diagnostic test	Variables	N (%)	Chi square value	P-value
Seated Piriformis stretch test (N 200)	Positive	73.5	28.297	0.000
	Negative	26.5		

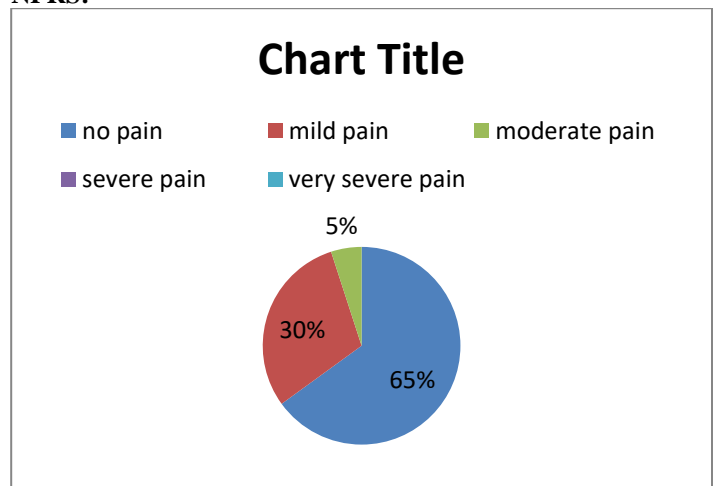
This table shows the result of diagnostic test. Out of 200 participants, 73.5 % participants have positive test, 26.5% participants have negative test and Chi square test is used to show relationship between these two. As p value is less than 0.05 means the increase in frequency of piriformis tightness and its association with low back pain due to prolonged sitting among the bankers of Pakistan.

Figure 1: Bar chart of Range of motion (External Rotation)



This Bar chart shows the mean range of motion on x axis and frequency along y axis and shows the mobility of the external rotation of the hip movement. Out of 200 participants, 46 have hypo mobility, 87 have hyper mobility while 57 lies in normal range.

Figure 2: Pie chart of Pain distribution according to the NPRS:



This pie chart shows the percentage of pain distribution according to the NPRS. Out of 200 participants, 65% participants have very no pain, 30% participants have mild pain and 5% participants have moderate pain.

Table 2: The association between prolonged sitting and radiating pain:

Severity of Pain	Prolonged Sitting					Total	P Value
	No Pain	Mild Pain	Moderate Pain	Severe Pain	Very Severe Pain		
No Pain	128	0	0	0	0	128	0.000
Mild Pain	0	58	0	0	0	58	
Moderate Pain	0	0	10	0	0	10	
Severe Pain	0	0	0	3	0	3	
Very Severe Pain	0	0	0	0	1	1	
Total	128	58	10	3	1	200	

This cross table shows the association between prolonged sitting and radiating pain. Chi square test is used to show relationship between these two questions. As p value is less than 0.05 means there is associations. Out of 200 participants, 128 participants have no pain, and only 1 participant very severe pain. Thus this cross table also explains that maximum participants have no pain with piriformis tightness.

IV. DISCUSSION:

This research was conducted among Sialkot bankers to determine the incidence of piriformis tightness and its association with low back pain caused by extended sitting. The study's goal was to determine the prevalence of piriformis tightness among Sialkot bankers. Habib Bank Limited, United Bank Limited, Muslim Commercial Bank, Soneri Bank, and Bank Alfalah Shahabpura Sialkot provided data. The study's participants were bankers ranging in age from 25 to 60 years old. Bank employees are more likely to have piriformis tightness due to their prolonged 6-8 hour sitting jobs, which causes piriformis muscle tightness and low back discomfort, which can progress to piriformis syndrome. Because the piriformis muscle is highly stimulated in the sitting posture, it is more prone to shortening and weakening. External rotation is the major important action of the piriformis muscle, and males were generally seated with open legs, allowing the external rotator of the hip to easily tighten. (Desai & Anand, 2020; Mubashir et al., 2020; Probst et al., 2019). Several studies on piriformis tightness and piriformis syndrome have been conducted in Pakistan. Samriaz Mughal conducted a study in 2021 to check the prevalence of piriformis tightness due to long sitting hours in Faisalabad bankers. This study found that 65.4% had piriformis stretch test results that were positive and evidence of piriformis tightness among them (Nazir, S, Asmat & Saeed, 2022). In 2022, Atta Muhammad did a study on the prevalence of piriformis muscle tightness among undergraduate medical students, and this study found that 85.3 percent of those with positive piriformis tightness were from the physical therapy program (Muhammad et al., 2022). In our current study it is found that Piriformis muscle tension was noted in 73.5% of the

patients. This is a large muscle that can cause discomfort and soreness in the lower back while sitting for an extended period of time. A correct ergonomic setup, regular rest, stretching, and strengthening exercises can all help to reduce a small degree of physiological and psychological burden on the body.

V. LIMITATIONS:

Risk factors was not measured which may leads to piriformis tightness. Sample size was small and data was collected from a limited area.

VI. RECOMMENDATIONS:

Further study should studied the Causes and Risk factors that lead to piriformis tightness and advocated to develop awareness and preventive strategies to overcome the piriformis tightness.

VII. CONCLUSION:

The study results concluded that the piriformis tightness among bankers was found 73.5%, it indicated that the frequency rate of piriformis tightness is quite high among bankers with having 6-8 hours prolonged sitting posture are more likely to affected with piriformis tightness. Most of the participants affected with piriformis tightness is from HBL bank. So, this kind of population should follow the precautionary measures that are postural education specially in sitting position and maintain active lifestyle with walking and exercises etc. to avoid the piriformis tightness that is further leads to piriformis syndrome.

VIII.CONFLICT OF INTEREST: There was no conflict of interest.

IX.FINANCIAL STATEMENT: No fundings were given by any authorities; it was a project thesis of Doctor of Physical Therapy Undergraduate program.

X.DATA AVAILABILITY: Data will be provided on the demand by corresponding author.

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