Prevalence of Piriformis Tightness with Relevance of Sitting Duration in Bankers

Vaishnavi S Desai[1], S. Anand[2]

[1]Final year student, Faculty of Physiotherapy, KIMS "Deemed To Be University" Karad, Maharashtra, India,
[2]HOD and Professor, Department of Community Health Sciences, Faculty of Physiotherapy, KIMS "Deemed To Be University " Karad, Maharashtra, India

Abstract

Objectives: Piriformis tightness is one of the potential cause of pain, discomfort and dysfunction in community. However the ergonomic risk factors, pain (type, intensity, precipitating factors), physical anthropometrics specific to piriformis tightness were unclear. Hence the attempt was made to find the data and trends in piriformis tightness and it prevalence in bankers.

Methodology: Study was conducted by approaching 36 banks in Karad taluka. Total 260 subjects (M:162;F:98) were included in the study who were assessed for there piriformis tightness by piriformis stretch test. There demographic data, no. of working years, pain (type, intensity, precipitating factor), chair height, chair width, cushion support were also documented.

Result: Prevalence of piriformis tightness in bankers was 51.92%. Out of 135(M:93; F:42) bankers having tightness, 44 were having only right side involved, 22 were having left side involved and 69 were having bilateral tightness. Prevalence was more in people with BMI between 25-29kg/m^2 (pre-obese) and in fourth decade of life

Conclusion: Out of 260 subjects 135(51.92%) bankers were having piriformis tightness. There is increasing risk of getting piriformis tightness with increasing BMI, Age. There is not significant relation between the chair height Chair weight and Cushion support on the chair and the piriformis tightness. There was increasing pain in sitting position(after maintaining for long time) and is relieved by rest.

Key Words: *Demographic data, ergonomic risk factor, physical anthropometrics. piriformis stretch test, Piriformis tightness, precipitating factor, physical anthropometrics.*

Introduction

Technology and physical activity are inversely proportional to each other that is as the technology progresses physical activity decreases which turn out to be the reason for sedentariness.[1] People are spending most of the time in the environment which make them confined of sit at one place like in home, work place.[2,3] Sedentary life style comes hand in hand with poor health and mortality.[4]

According to survey, in India the average working time of bankers is 6-7 hours per day , so from this we come to know that bankers are at high risk to get musculoskeletal problems related to sedentary lifestyle. Sitting constantly for 6-7 hours per day means sitting is forward flexion position of sagittal plane which can lead to muscle imbalance. One of the most common condition resulting due to physical inactivity is LBP. 52.4% bankers suffer from LBP.[5] It is documented that 6.5% LBP worldwide is due to Piriformis tightness.[6]

The three joint muscle below gluteal muscle is piriformis.[7] It is one of the important and powerful

Correspondence:
Dr. S.Anandh
Department of community health sciences,
Faculty of Physiotherapy, KIMS "Deemed To Be University" Karad, Maharashtra, India, Pin:415110
Phone Number- 8446667257
Email id: vaishnavidesai13@gmail.com

muscles in the pelvis.[8] If the hip flexion is 60^0 or less than it act as external rotator and above 60^0 it acts as internal rotator.[9] It is reported that during sitting position piriformis muscle is constantly under low grade contraction.[10] Piriformis Syndrome is a neuromuscular disorder that take place when sciatic nerve is pinched and inflamed by piriformis muscle.[7] This causes pain, altered sensations in buttocks all the way of sciatic nerve course from low back to thigh and down the leg.[7] The pain location described by the patient is vague, the describe pain as is the hip, tailbone, buttocks and groin or radiating down back the leg.[7]

According to one survey conducted on patient in Adam malik General hospital , Quality of life correlates with the intensity of pain in patient with low back pain especially on the grounds of physical funtion, liitation due to emotional problems, vitality, social function and feeling of pain and general health.[11]

Types of Piriformis Syndrome:[12]

1. Primary Piriformis Syndrome
2. Secondary Piriformis Syndrome

Primary Piriformis Syndrome has an anatomic cause, such as a split piriformis muscle, split sciatic nerve or an anamolus sciatic nerve path.[12]

Secondary Piriformis syndrome occurs as a result of [12] :

1. precipitating cause,
2. macrotrauma
3. microtrauma
4. ischemic mass effect
5. local ischemia

Physical findings of Piriformis Syndrome[13] :

1. Tenderness over the sciatic notch
2. Isolated atrophy of gluteus maximus ani chronic stage
3. Dysesthesia in the posterior aspect of thigh
4. Tenderness over the rectal wall

Signs specific to piriformis syndrome are[12]:

1. External rotation of the hip
2. Tenderness of the piriformis muscle found on external palpation
3. Anterior rotation of the scrum on ipsilateral side
4. Anterior rotation of the scrum leads to compensatory rotation of lower lumbar vertebrae in opposite side

Delayed Diagnosis of piriformis tightness may lead to pathological conditions of the sciatic nerve, chronic somatic dysfunction and compensatory changes and it may cause pain, paraesthesia, hyperesthesia and muscle weakness. In extreme cases, misdiagnosis of piriformis syndrome-related back pain with “sciatica” as prolapsed intervertebral disc may lead to unnecessary surgery. Prevalence of piriformis tightness with relevance with sitting duration is scarce in the literatures. Therefore the present study to find the prevalence of piriformis tightness with relevance to the sitting duration is necessary so the proper corrective and preventive measures can be taken In time which may reduce the rate of low back pain because of piriformis tightness.

Methadology

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. Individuals were approached and those fulfilling the inclusion criteria were selected. Total 260 (M:162; F:98) individuals were selected. The procedure was explained and written informed consent was taken from those willing to participate.

Demographic information of the subjects was taken. The individuals were explained about the purpose of the study. Also, they were informed about the procedure. Each of them was assessed for the Piriformis tightness using Piriformis stretch test. Piriformis stretch test was performed with the patient positioned in supine, the tested leg was placed in flexion at hip and knee so that the foot of the tested leg rests on the table lateral to the contralateral knee (the tested leg was crossed over the straight non- tested leg. The angle of hip flexion was maintained at 60°. It was ensured by measuring goniometer Therapist was standing beside the plinth at the test side to stabilize the no-tested side ASIS by one hand to prevent the pelvic motion during the test. The knee of the test side was pit in to adduction, to place stretch on the piriformis muscle. If the adduction ROM

was limited and the patient recorded discomfort posterior to the tested greater trochanter tested side piriformis was considered tight (positive). Pain assessment was done by the Visual Analogue Scale (VAS) which is taken of Rest and On Activity. Chair width and chair height was measured of each subject using inch tape, presence or absence of cushion was noted.

Data was documented and statistical analysis was done

Data Presentation, Analysis And Interpretation:

1. Right side Piriformis Tightness in the study

Piriformis tightness	Frequency	Percent
Absent	147	56.5
Present	113	43.5
Total	260	100

Table no 1: Right side Piriformis tightness

Interpretation: From this table it is clear that out of 260 bank employees assessed, 113 that is 43.5% bank employees had right side piriformis tightness and 147 that is 56.5% bank employees were negative piriformis stretch test.

2.Left side Piriformis tightness in the study:

Prevalence	Frequency	Percent
Absent	169	65
Present	91	35
Total	260	100

Table no. 2: left side piriformis tightness

Interpretation: From this table it is clear that out of 260 bank employees assessed, 91 that is 35% bank employees had piriformis tightness and 169 that is 65% bank employees were negative on piriformis stretch test.

3. Association between Age and Left Side by Piriformis Stretch Test:

Age	Piriformis Stretch Test		Total	Chi-square	p-value	Relative Risk
	Left					
	Absent	Percent				
46 and above	62(24%)	62(24%)	124(48%)	22.2	<0.0001	0.6355
30.00 - 45.00	107(41%)	29(11%)	136(52%)			
Total	169(65%)	91(35%)	260(100%)			

Table no. 3: Association between Age and Left Side by Piriformis Stretch Test.

Interpretation: According to graph it is clear that out of 91 bank employees with positive left side piriformis test, 29 employee that is 11% were in the age group of 31-45 years and 62 employees that is 32% were in the age group of 46 and above. Association between this two variables was calculated by the Pearson Chi-square test whish found out to be 22.2 with the p-value of <0.0001 which is a significant value.

4.Association between Age and right Side by Piriformis Stretch Test.

Age	Piriformis Stretch Test		Total	Chi-square	p-value	Relative Risk
	Right					
	Absent	Percent				
46 and above	47(18%)	77(30%)	124(48%)	32.068	<0.0001	0.5155
31- 45	100(38%)	36(14%)	136(52%)			
Total	147(56%)	113(44%)	260(100%)			

Table no. 4: Association between Age and right Side by Piriformis Stretch Test.

Interpretation: According to table it is clear that out of 113 bank employees with positive right side piriformis test, 36 employee that is 14% were in the age group of 31-45 years and 77 employees that is 30% were in the age group of 46 and above. Association between this two variables was calculated by the Pearson Chi-square test whish found out to be 32.068 with the p-value of <0.0001 which is a significant value.

5. **Association between Pain due to piriformis tightness and BMI**

BMI	Present	Absent	Chi-square	p-value
18-24.9	57	97	33.157	<0.0001
25-29.9	76	29		
≥ 30	2	0		

Table no.5: Association between Pain due to piriformis tightness and BMI

Interpretation: According to the above table out of 135 bank employees with pain because of piriformis tightness 57 subject were of BMI 18-24.9 (normal), 76 were of BMI 25-29.9 (pre-obese) and 2 subject were of BMI above 30 (obese). Association of BMI and Pain due to Piriformis tightness was calculated by Chi-square test which found out to be 33.157 with the p-value of <0.0001 which is significant.

6.Association between Gender and Pain due to piriformis tightness:

Gender	PAIN		Total	Chi-square	p-value
	Absent	Present			
Females	56	42	98	5.179	0.023
Males	69	93	162		
Total	125	135	260		

Table no. 6: Association between Gender and Pain due to piriformis tightness:

Interpretation: From the above table out of 135 bank employees present with pain due to piriformis tightness 93 subject were females and 42 were males. Association between gender and pain due to piriformis tightness was calculated by the Chi-square test which found out to be 5.179 with the p-value of 0.023 which is significant

7.Association between Age and Pain Due to piriformis tightness:

Age	PAIN		Total	Chi-square	p-value
	Absent	Present			
46.00+	29	95	124	59.869	<0.0001
31.00 - 45.00	96	40	125		
Total	125	135	260		

Table no. 7: Association between Age and Pain Due to piriformis tightness:

Interpretation: From the above table out of 135 bank employees present with pain due to piriformis tightness 40 subject were in the age group of 31-45 years and 95 were in the age group above 46 years. Association between age and pain due to piriformis tightness was calculated by the Chi-square test which found out to be 59.869 with the p-value of <0.001 which is significant.

Resullt

In this study, 260 (M:162; F:98) bank employees were taken. It was found that 135 bank employees had piriformis tightness out of which 44 subjects had only right side tightness of piriformis muscle, 22 subjects were having tightness if left side piriformis muscle and 69 subject had bilateral piriformis tightness. Prevalence of piriformis tightness in bankers was found out to be 51.92%`

The study stated that there is significant risk of having piriformis tightness as the age increases as most of the subjects with positive piriformis stretch test were in have the age above 45years. The reason for this might be the more amount of time spent in sitting positions.

All the subjects with positive piriformis stretch test were screened for the pain patterns at rest and on activity by the use of VAS scale. The average pain on rest of the subject present with piriformis tightness which was calculated on VAS scale was 5.5cms and the average pain on activity of subjects positive with piriformis stretch test is 1.82 cm.

The study also documented other demographic variable of the subjects such as the BMI and gender. The study also stated that BMI and piriformis tightness are directly proportional to each other that is as the BMI increases the risk of getting piriformis tightness also increases and this is clear as most of the subjects (76 subjects) with piriformis tightness were in the BMI category of 25-29.9 (pre-obese).

The risk of piriformis tightness is more in males than in females. From the study is it also clear that as the working years of the bankers increases the chances of them getting piriformis tightness are high.

Now talking about the ergonomic risk factors, from this study we get to know that there is not a significant relation between the chair height, chair width and the cushion support on the chair of the sedentary and piriformis tightness.

According to the study there is 51% prevalence of piriformis tightness in the bankers which if not treated can compress the sciatic nerve passing just beneath the muscle which will lead to piriformis syndrome which has variety of disturbing symptoms like radiating pain from the buttock to the back of the thigh with the association of the tingling sensation.

So to prevent the tightness of this small triangular muscle of the buttock it is necessary to implement stretching and change in activity so that it will not strain the piriformis muscle much.

Conclusion

On the basis of the result of the study, it was concluded that there is prevalence of 51.92% of piriformis tightness in bankers. There is increases in risk of getting piriformis tight with increase in BMI, with male gander, with increases in age. And there is not any significant relation between the chair height, chair width, and the cushion support on the chair and the piriformis tightness.

Conflicts of Interest: There were no conflicts of interest in this study

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

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