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Prevalence of Piriformis tightness among IT Professionals

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Abstract:
Objectives: The prevalence of musculoskeletal disorders in the workplace, particularly among Information technology (IT) professionals, is a growing concern. Piriformis tightness is characterized by the compression or irritation of the Piriformis muscle in the gluteal region, is one such disorder that affects a significant number of IT professionals. Hence, this study was done to find the prevalence of Piriformis tightness among IT Professionals.
Methodology: The study was conducted on a total of 213 participants (Male: 101; Female: 112). The participants were assessed for Piriformis tightness by Piriformis stretch test. Their demographic data such as name, age, gender, height and weight was collected and documented.
Result: Prevalence of piriformis tightness in IT Professionals was found out to be 80.28 %. It was found that 171 IT Professionals had Piriformis tightness out of which 147 subjects had right sided piriformis tightness and 144 subjects were having left sided piriformis tightness.
Conclusion: Out of 213 participants 171(80.28%) IT Professionals were having Piriformis tightness. It was found that there is an increasing risk of getting Piriformis tightness with increasing Age, weight and BMI. There was no significant association between height and Piriformis tightness.

Keywords: Piriformis Stretch test, musculoskeletal disorders, information technology professionals, prevalence

Introduction

The piriformis is a flat, pear-shaped muscle located in the gluteal region. It is one of the six external rotator of the hip present in the gluteal region. It courses parallel to the posterior margin of the gluteus medius, deep to the gluteus maximus. The piriformis muscle originates from several anatomical locations such as the anterior surface of the lateral process of the sacrum, the spinal region of the gluteal muscles, and the superior surface of the ilium near the margin of the greater sciatic notch and the capsule of the adjacent sacroiliac joint. The muscle passes from the pelvis to the gluteal region by passing through the greater sciatic notch and inserts on the medial side of the superior aspect of the greater trochanter of the femur. The tendon of the piriformis muscle joins the tendons of the obturator internus and the inferior and superior gemellus before inserting on the femur.[7] **[11]**Occupational diseases and disorders are widely seen as societal issues. Various studies have shown that pain in various regions of the musculoskeletal systems is one of the leading causes of absence from work. Work-related musculoskeletal illnesses are caused by cumulative trauma disorders induced by long-term exposure to stressful biomechanical and social-psychological agents in workplaces in both developed and developing countries.[1] According to a study, more than three-fourth of IT professionals in India suffer from work-related musculoskeletal ailments.[2] One of the most common condition resulting due to physical inactivity is Low back pain. It is documented that 6.5% LBP worldwide is due to Piriformis tightness.[3] Subsequently, the adult and elderly population, particularly those who lead sedentary lifestyles, are sensitive to Low Back Discomfort and Piriformis tightness, and may experience radiating or localised pain over the Piriformis muscle region.It is possible that the symptoms are the result of prolonged sitting, poor body mechanics, or unsupportive chair ergonomics.[4] Workers who perform static work or duties that require repetitive motions, sustained poor posture, and poor environmental circumstances are at a significant risk of developing work-related musculoskeletal illnesses.[5] Poorly constructed computer ergonomics is another key element in the development of musculoskeletal issues.[6] Pain in various regions of the musculoskeletal systems is the most common complaint in workplaces in both developed and developing countries.[12] An increase in job-related musculoskeletal problems can reduce the quality and quantity of labour, as well as the individual's well-being.[5] Piriformis is one of the most powerful muscle in the pelvis. It acts as an external rotator and internal rotator. It has been noted that the Piriformis muscle is continually under low grade contraction while sitting. This causes pain and altered sensations in buttocks. 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.[3] The literature on the prevalence of Piriformis tightness and its relationship to sitting duration is limited. As a result, the current study is required to determine the prevalence of

Piriformis tightness in relation to sitting duration so that appropriate corrective and preventive measures can be implemented in time, potentially lowering the rate of low back pain due to Piriformis tightness.

Methodology

A observational study was conducted using convenient sampling on 213 IT Professionals in Bangalore. The study subjects were selected based on the inclusion criteria were IT Professionals working for a minimum of 8 hours in sitting and the individual must be working in the profession for a minimum of 1 year was included. Individuals with history of back surgery or lower limb surgery ,trauma to back or lower extremity ,low back pain within the last six months ,diagnosed cases of rheumatoid arthritis or osteoarthritis of the spine or hips ,spinal deformity ,tightness of tensor fascia latae ,neurological disease ,any history of cardiovascular diseases such as hypertension and females with pregnancy were excluded in the study.The purpose and procedure of the study was explained to the study subjects. Informed consent was taken and general demographic data like age , gender, height, weight was obtained from the individuals followed by Piriformis stretch test was performed. After collecting data form the population, the data was tabulated and statistical analysis was done.

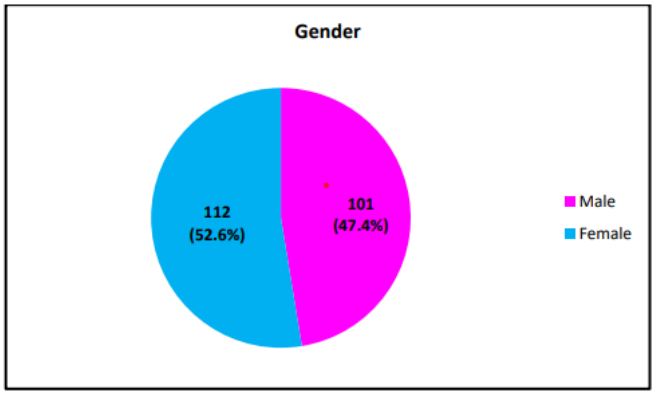


Fig 1

Table 1:

(n = 213)		Frequency	%
Gender	Male	101	47.4
	Female	112	52.6

The above table represents the frequency of the male and the female subjects. Out of 213 study subjects 101 (47.4%) are male and 110 (52.6%) are female.

Table 2:

	Range	Mean	S.D.
Age (Years)	24 to 57	37.7	8.9
Height (Cm)	142 to 185	166.6	8.0
Weight (Kg)	46 to 95	65.2	10.2
BMI (Kg/M^2)	16.5 to 36.2	23.5	3.5

The mean age of the study subjects is 37.7 ± 8.9(SD) years. The mean height of the study subjects is 166.6 ± 8.0(SD) Cm. The mean weight of the study subjects is 65.2 ± 10.2(SD) Kg. The mean Body Mass Index of the study subjects is 23.5 ± 3.5(SD) Kg/M2

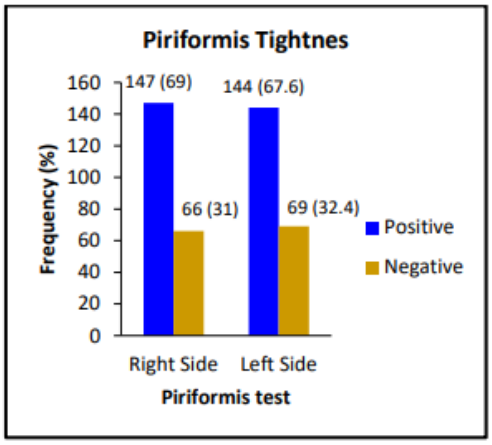


Fig 2

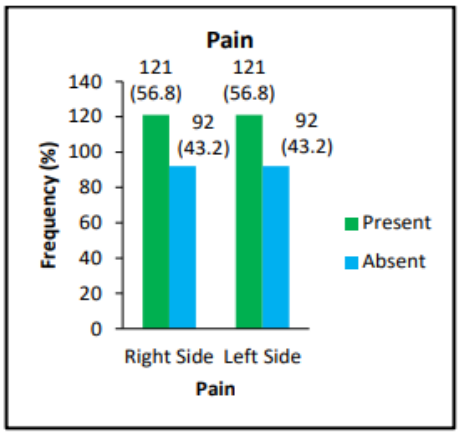


Fig 3

Table 3:

		Right Side		Left Side	
		n	%	n	%
Piriformis test	Positive	147	69	144	67.6
	Negative	66	31	69	32.4
Pain	Present	121	56.8	121	56.8
	Absent	92	43.2	92	43.2

Out of 213 study subjects 147 (69%) had Right sided Piriformis Tightness. Out of 213 study subjects 144 (67.6%) had Left sided Piriformis Tightness. Out of 213 study subjects 121 (56.8%) experienced pain due to Piriformis tightness

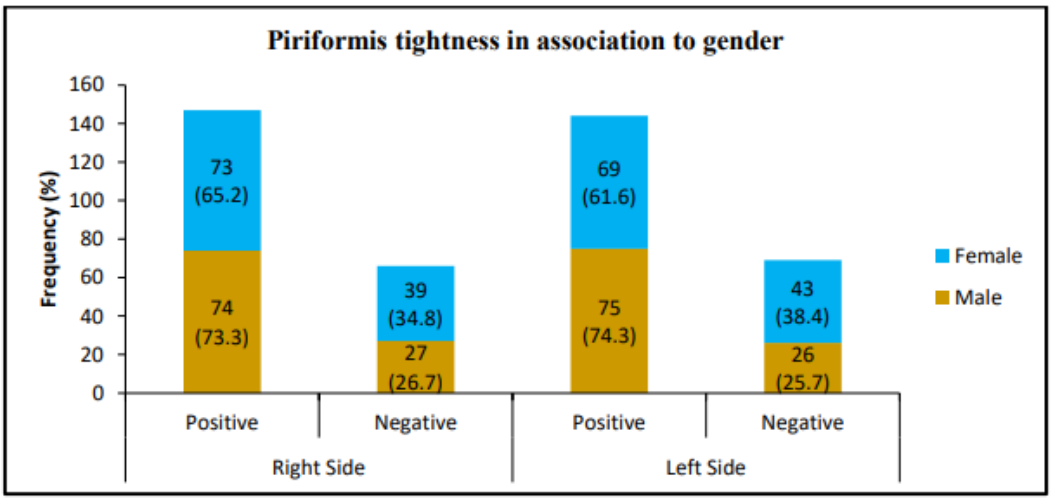


Fig 4

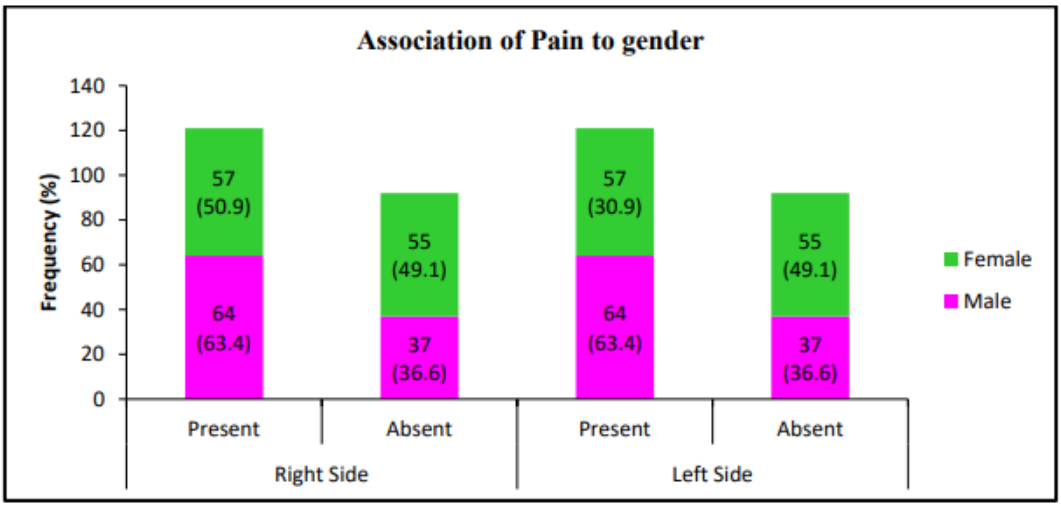


Fig 5

Table 4: Comparison of Piriformis test and pain according to gender

		Gender				Chi square	p value
		Male		Female			
		n	%	n	%		
Piriformis test (Right Side)	Positive	74	73.3	73	65.2	1.63	0.202
	Negative	27	26.7	39	34.8		
Pain (Right Side)	Present	64	63.4	57	50.9	3.37	0.066
	Absent	37	36.6	55	49.1		
Piriformis test (Left Side)	Positive	75	74.3	69	61.6	3.88	0.049*
	Negative	26	25.7	43	38.4		
Pain (Left Side)	Present	64	63.4	57	50.9	3.37	0.066
	Absent	37	36.6	55	49.1		

(* Significant)

The Chi square test was used to compare Piriformis test and pain according to gender. There was a difference ($p < 0.05$) in Piriformis test (Left Side) according to gender. [Table – 4]

According to the above table the p-value of Piriformis tightness on the right side is 0.202 which is statistically not significant. The p-value of the pain due to Piriformis tightness on the right side is 0.066 which is statistically not significant. The p-value of Piriformis tightness on the left side is 0.049 which is statistically significant. The p-value of the pain due to Piriformis tightness on the left side is 0.066 which is statistically not significant

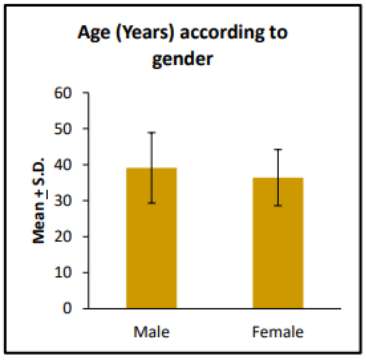
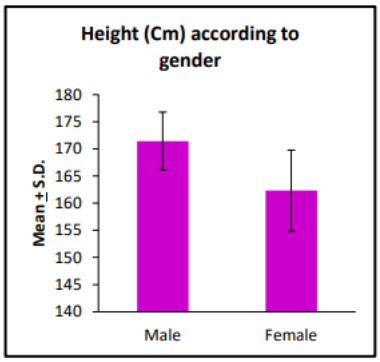


Fig 6



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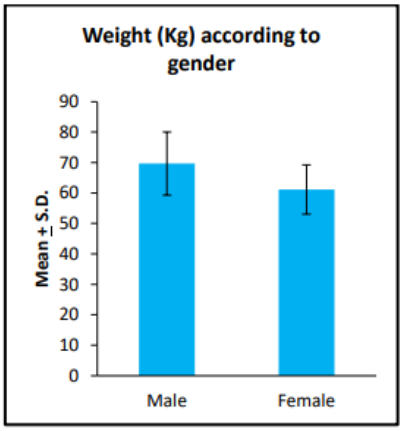

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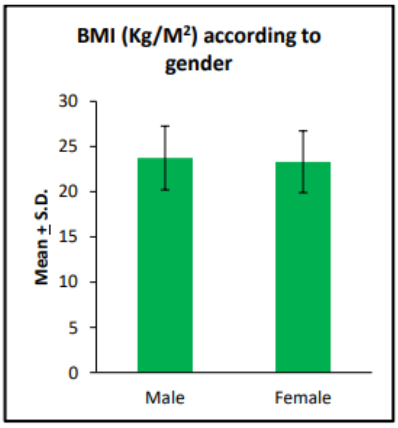
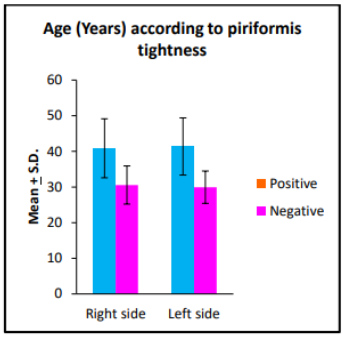


Fig 9

Table 5: Comparison of age, height, weight and BMI according to gender

	Gender	Mean	S.D.	"t"	p value
Age (Years)	Male	39.1	9.8	2.24	0.026*
	Female	36.4	7.8		
Height (Cm)	Male	171.4	5.4	10.11	< 0.001*
	Female	162.3	7.5		
Weight (Kg)	Male	69.7	10.4	6.75	< 0.001*
	Female	61.1	8.1		
BMI (Kg/M^2)	Male	23.7	3.5	0.93	0.356
	Female	23.3	3.4		

According to the above table the p-value of the comparison between Piriformis tightness with age and gender is 0.026which is statistically significant. The p-value of the comparison between Piriformis tightness with height and gender is less than 0.001 which is statistically significant. The p-value of the comparison between Piriformis tightness with weight and gender is less than 0.001 which is statistically significant. The p-value of the comparison between Piriformis tightness with Body Mass Index and gender is 0.356 which is statistically not significant.



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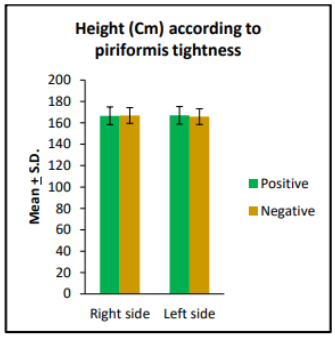

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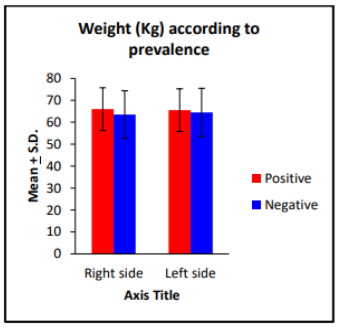

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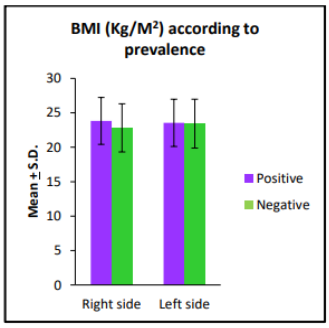


Fig 13

Table 6: Comparison of age, height, weight and BMI according to Piriformis test

	Piriformis test	Right side				Left side			
		Mean	S.D.	"t"	p value	Mean	S.D.	"t"	p value
Age (Years)	Positive	40.9	8.3	9.26	< 0.001*	41.4	8.0	10.99	< 0.001*
	Negative	30.6	5.4			29.9	4.5		
Height (Cm)	Positive	166.5	8.2	-0.24	0.812	167.0	8.2	0.98	0.330
	Negative	166.8	7.3			165.9	7.3		
Weight (Kg)	Positive	66.0	9.8	1.65	0.101	65.5	9.7	0.71	0.482
	Negative	63.5	10.9			64.5	11.0		
BMI (Kg/M^2)	Positive	23.8	3.4	2.01	0.046*	23.6	3.4	0.24	0.810
	Negative	22.8	3.5			23.4	3.5		

("t" = Independent sample "t" test; * Significant)

The Independent sample "t" test was used to compare age, height, weight and BMI according to Piriformis test. There was a difference ($p < 0.05$) in age (Both right and left sides) and BMI (Right side) according to Piriformis test. [Table – 6]

According to the above table the p-value of the comparison of Piriformis tightness with age and right side is less than 0.001 which is statistically significant. The p-value of the comparison of Piriformis tightness with age and left side is less than 0.001 which is statistically significant. The p-value of the comparison of Piriformis tightness with height and right side is 0.812 which is statistically not significant. The p-value of the comparison of Piriformis tightness with height and left side is 0.330 which is statistically not significant. The p-value of the comparison of Piriformis tightness with weight and right side is 0.101 which is statistically not significant. The p-value of the comparison of Piriformis tightness with weight and left side is 0.482 which is statistically not significant. The p-value of the comparison of Piriformis tightness with BMI and right side is 0.046 which is statistically significant. The p-value of the comparison of Piriformis tightness with BMI and left side is 0.810 which is statistically not significant.

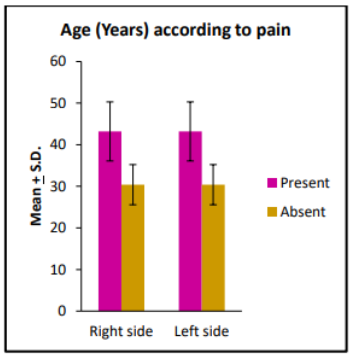
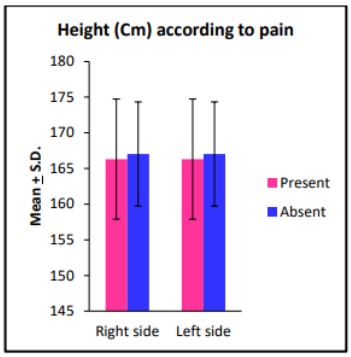


Fig 14



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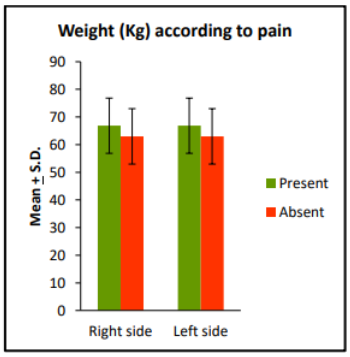

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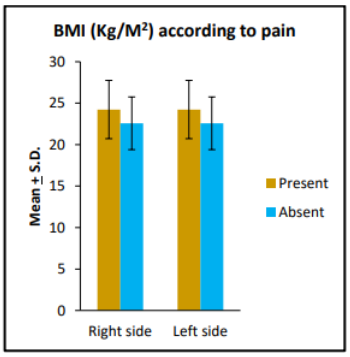

Fig 17

Table 7: Comparison of age, height, weight and BMI according to pain

	Pain	Right side				Left side			
		Mean	S.D.	"t"	p value	Mean	S.D.	"t"	p value
Age (Years)	Present	43.2	7.1	14.89	< 0.001*	43.2	7.1	14.89	< 0.001*
	Absent	30.4	4.8			30.4	4.8		
Height (Cm)	Present	166.3	8.4	-0.65	0.515	166.3	8.4	-0.65	0.515
	Absent	167.0	7.3			167.0	7.3		
Weight (Kg)	Present	66.9	10.0	2.80	0.006*	66.9	10.0	2.80	0.006*
	Absent	63.0	10.0			63.0	10.0		
BMI (Kg/M^2)	Present	24.2	3.5	3.56	< 0.001*	24.2	3.5	3.56	< 0.001*
	Absent	22.6	3.2			22.6	3.2		

According to the above table the p-value of the comparison of pain due to Piriformis tightness with age and right side is less than 0.001 which is statistically significant. The p-value of the comparison of pain due to Piriformis tightness with age and left side is less than 0.001 which is statistically significant. The p-value of the comparison of pain due to Piriformis tightness with height and right side is 0.515 which is statistically not significant. The p-value of the comparison of pain due to Piriformis tightness with height and left side is 0.515 which is statistically not significant. The p-value of the comparison of pain due to Piriformis tightness with weight and right side is 0.006 which is statistically significant. The p-value of the comparison of pain due to Piriformis tightness with weight and left side is 0.006 which is statistically significant. The p-value of the comparison of pain due to Piriformis tightness with BMI and right side is less than 0.001 which is statistically significant. The p-value of the comparison of pain due to Piriformis tightness with BMI and left side is less than 0.001 which is statistically significant.

Results

In this study, 213 (M: 101; F: 112) IT Professionals had taken part. It was found that 171 IT Professionals had Piriformis tightness out of which 147 subjects had right sided piriformis tightness and 144 subjects were having left sided piriformis tightness. Prevalence of piriformis tightness in IT Professionals was found out to be 80.28 %. The mean age (in years) of the study subjects is 37.7 ± 8.9(SD). The mean height (in Cm) of the study subjects is 166.6 ± 8.0(SD). The mean weight (in Kg) of the study subjects is 65.2 ± 10.2(SD). The mean Body Mass Index (Kg/M2) of the study subjects is 23.5 ± 3.5(SD). Out of 213 study subjects 121 (56.8%) experienced pain due to Piriformis tightness. According to the study, there is a significant risk of Piriformis tightness as people age. The cause might be long periods of sitting. The study also recorded additional demographic information about the participants, including their gender and BMI. The study also found a direct correlation between BMI and Piriformis tightness, meaning that as BMI raises, so does the likelihood of developing Piriformis tightness. It is also evident from the study that Males are at a higher risk of developing Piriformis tightness compared to females. According to the study there is 80.28% prevalence of Piriformis tightness among IT Professionals which if not treated can lead to Piriformis syndrome due to the compression of the sciatic nerve which runs beneath the Piriformis muscle. Therefore, it is vital to perform stretching and some physical activity so as to not strain the Piriformis muscle in order to prevent the stiffness.

Discussion

The findings of this study highlights the prevalence of piriformis tightness among IT professionals and shed light on its associated risk factors. The study included a total of 213 IT professionals, with a slightly higher number of females (112) than males (101). Out of the participants, 171 (80.28%) were found to have piriformis tightness. One interesting observation from this study is the significant correlation between age and the risk of piriformis tightness. As individuals age, they become more susceptible to developing piriformis tightness. This finding aligns with previous research that suggests age-related changes in muscle flexibility and increased sedentary behavior may contribute to the development of muscle tightness and stiffness.[14] Moreover, prolonged sitting, which is common among IT professionals, can further exacerbate this condition. Therefore, it is crucial for individuals, particularly those in sedentary occupations, to engage in regular stretching exercises and physical activities to prevent piriformis muscle stiffness and associated complications. Another important finding of this study is the correlation between body mass index (BMI) and piriformis tightness. The study revealed a direct relationship between higher BMI and the likelihood of developing piriformis tightness. This finding is consistent with previous research that has identified obesity as a risk factor for musculoskeletal disorders, including piriformis syndrome [15]. Increased weight puts additional strain on the musculoskeletal system, potentially leading to muscle imbalances and tightness. Therefore, maintaining a healthy BMI through regular exercise and a balanced diet may help reduce the risk of piriformis tightness. [35] Gender differences were also observed in this study, with males being at a higher risk of developing piriformis tightness compared to females. This finding is consistent with previous studies that have reported a higher prevalence of piriformis syndrome in males [15.] The exact reasons behind this gender difference remain unclear and may involve factors such as anatomical variations, hormonal differences, and variations in physical activity levels between genders. Further research is warranted to explore these gender-specific risk factors in more detail. It is worth noting that piriformis tightness can potentially progress to piriformis syndrome, a condition characterized by compression of the sciatic nerve by the piriformis muscle. This compression can lead to symptoms such as buttock pain, radiating leg pain, and numbness. If left untreated, piriformis syndrome can significantly impact an individual's quality of life and daily functioning.

Therefore, early detection and appropriate management of piriformis tightness are crucial in preventing the development of piriformis syndrome. To conclude, this study emphasizes the high prevalence of piriformis tightness among IT professionals and highlights the importance of addressing this condition to prevent potential complications. The findings indicate that age, prolonged sitting, higher BMI, and gender are significant risk factors associated with piriformis tightness. Incorporating regular stretching exercises, maintaining a healthy BMI, and promoting a physically active lifestyle are essential strategies for preventing and managing piriformis tightness among IT professionals and individuals in sedentary occupations.

Conclusion

Out of 213 participants 171(80.28%) IT Professionals were having Piriformis tightness. It was found that there is an increasing risk of getting Piriformis tightness with increasing Age, weight and BMI. There was no significant association between height of the individuals and Piriformis tightness.

Reference

1. Naik MS, Shah DrDN. Prevalence of tightness in hip joint muscles in middlekhel journal [Internet]. International Journal of Physical Education, Sports and Health 2022; 2022 [cited 2023 Oct 15].Available from: https://www.kheljournal.com/archives/2022/vol9issue3/PartB/9-3-35-574.pdf
2. [cited 2022 Jun 25]. Available from: http://file:///C:/Users/admin/Downloads/ojsadmin,+138.pdf
3. Mughal S, Ahmad M, Malik K bin. Prevalence of piriformis tightness due to long hours sitting among bankers of Faisalabad City [Internet]. Independent Journal Of Allied Health Sciences; 2020 [cited 2023 Oct 15]. Available from: http://ijahs.com.pk/index.php/ijahs/article/view/110
4. Hajibabaei M, Noroozi MV. Prevalence of musculoskeletal disorders among office workers [Internet]. Brieflands; 2015 [cited 2023 Oct 15]. Available from: https://brieflands.com/articles/jjhs-15012.html
5. Ali KRAR, A S, R R, U A. Knowledge and practices of Ergonomics in computer users [Internet]. U.S. National Library of Medicine; 2012 [cited 2023 Oct 16]. Available from: https://pubmed.ncbi.nlm.nih.gov/22764450/
6. Chang C, Jeno SH, Varacallo M. Anatomy, bony pelvis and lower limb: Piriformis muscle [Internet]. 2022 [cited 2023 Oct 15]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK519497/
7. HD M, BR K, IJ P, RL M. Diagnostic accuracy of clinical tests for sciatic nerve entrapment in the gluteal region [Internet]. U.S. National Library of Medicine; 2014 [cited 2023 Oct 16]. Available from: https://pubmed.ncbi.nlm.nih.gov/24217716/
8. Mondal M, Das S. Prevalence of piriformis tightness in healthy sedentary individuals: A ... [Internet]. International Journal of Health Sciences and Research; 2017 [cited 2023 Oct 15]. Available from: https://www.researchgate.net/publication/318318389_Prevalence_of_Piriformis_Tightness_in_Healthy_Sedentary_Individuals_A_Cross-Sectional_Study
9. Hicks B, Lam J, Varacallo M. Piriformis syndrome - StatPearls - NCBI Bookshelf [Internet]. National Library Of Medicine; 2023 [cited 2023 Oct 15]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK448172/
10. Gulzar K, Islam F, Thakur AR, Shaheen M, Ashar MS, Shahzab S. Prevalence of piriformis tightness in sciatic patients: Prevalence of piriformis tightness in sciatic patients [Internet]. 2022 [cited 2023 Oct 16]. Available from: https://pakistanbmj.com/journal/index.php/pbmj/article/view/383
11. Tanveer F, Shahid S. Frequency of piriformis tightness in professionals middle aged women [Internet]. Rawal Medical Journal; 2018 [cited 2023 Oct 16]. Available from: https://www.bibliomed.org/?mno=263558
12. Dahiya T. Incidence of piriformis tightness and to determine correlation with ... [Internet]. 2022 [cited 2023 Oct 15]. Available from: https://www.researchgate.net/publication/361942106_Incidence_of_Piriformis_Tightness_and_to_determine_correlation_with_gluteus_medius_weakness_in_Indian_IT_-_Professionals_A_cross_sectional_study/fulltext/637ebeba54eb5f547cfbc9cf/Incidence-of-Piriformis-Tightness-and-to-determine-correlation-with-gluteus-medius-weakness-in-Indian-IT-Professionals-A-cross-sectional-study.pdf
13. Wilkinson DJ, Piasecki M, Atherton PJ. The age-related loss of skeletal muscle mass and function: Measurement and physiology of muscle fibre atrophy and muscle fibre loss in humans [Internet]. U.S. National Library of Medicine; 2018 [cited 2023 Oct 15]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6202460/
14. JB S, RA de, HC de V. Injection therapy for subacute and chronic low back pain: An updated Cochrane Review [Internet]. U.S. National Library of Medicine; 2020 [cited 2023 Oct 16]. Available from: https://pubmed.ncbi.nlm.nih.gov/19127161/