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PREVALANCE OF ILIOTIBIAL BAND FRICTION SYNDROME IN TREKKERS BY USING NOBLE COMPRESSION TEST

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Abstract:

Introduction: Mountain trekking is a highly popular recreational activity known for its physical and mental benefits. However, it also places significant stress on the lower extremities, particularly on the tibio-femoral and patella-femoral joints. This stress can lead to injuries such as Iliotibial Band Friction Syndrome (ITBFS), which is caused by repetitive friction of the iliotibial band (ITB) against the lateral condyle of the knee. This study focuses on the prevalence and characteristics of ITBFS among trekkers, a condition often exacerbated by walking on uneven surfaces or descending slopes.

Objective: The primary aim is to determine the prevalence of ITBFS in trekkers. Specific objectives include assessing the prevalence of ITBFS among both professional and recreational trekkers using the Noble compression test.

Methodology: A cross-sectional observational study was conducted involving trekkers of varying levels, including professional and recreational participants. The Noble compression test was utilized to diagnose ITBFS. Additional data were collected on the participants' trekking habits, pain experiences, and the impact of ITBFS on their activities.

Results: The study identified a notable prevalence of ITBFS among trekkers. The findings highlighted differences in the prevalence rates between professional and recreational trekkers. Factors such as terrain type, trekking duration, and weight carried were also explored in relation to ITBFS incidence.

Conclusion: This research underscores the importance of recognizing and addressing ITBFS in trekkers. The insights gained can inform targeted interventions and preventive measures to help mitigate the risks associated with this condition, promoting safer and more enjoyable trekking experiences.

Introduction:

Mountain trekking is a popular recreational pursuit that has gained significant attention in recent years. Trekking involves traversing through natural environments such as mountains, forests, and trails and is considered a versatile and meditative activity. Trekkers get to experience different terrains, from walking on narrow ridges and crossing glaciers to climbing rocks and walking through lush green meadows.[1]

This activity is typically characterized by long continuous exercise of low intensity, making it an ideal form of exercise for those seeking to improve their physical fitness and mental well-being.[1]

Iliotibial band is durable non-elastic scleroprotein structure also called as iliotibial tract also it is described as a muscle that crosses more than a one joint overlaps without any discontinuity known as polyarticular muscle.[2]

IT band can increase the risk of injury. Its lateral patellar insertion can cause Iliotibial band friction syndrome (ITBFS) and patellofemoral dysfunction. [2]

Overuse trauma is associated with symptoms on the side of the joint produced by iliotibial band inflammation and is referred to as Iliotibial band syndrome, also known as Iliotibial band friction syndrome.[2]

IT band syndrome is linked with a variety of activities including riding a bike, swimming in deep water and climbing hills. [3]

The phase of gait which starts when the foot initially hit the ground and concludes when the same foot, lifts the ground causes pain and discomfort in people with iliotibial band syndrome.[3]

We also found that players with IT band syndrome had difficulty in squatting and while running on uneven ground, climbing stairs up and down, while hopping as such activities cause repetitive knee flexion and extension.[3]

The iliotibial band (ITB) tightness has been considered a major contributing factor to patellar malalignment due to its potential anatomical influence on the patella position. [4]

The insertion part of the ITB separates into two distinct bands at the knee: the iliotibial tract and the iliopatellar band. [4]

The iliotibial tract, which is the continuation of the ITB, attaches into Gerdy's tubercle on the lateral proximal aspect of the tibia. [4]

The shortness of the ITB increases lateral tracking of the patella. In subjects with ITB tightness, repetitive knee movements increase the relative load on the contacting surfaces between the lateral patellar facet and the lateral femoral condyle, which con- tributes to the development of iliotibial band friction syndrome and patellofemoral pain syndrome. [4]

It would be logical to correlate the presence of weak hip abductors with iliotibial band friction syndrome, since weak abductors might lead to increased hip adduction during the stance phase of gait with a consequent increase strain of the iliotibial band and a greater tendency for it to compress the tissues underneath. It is also logical to link tightness of the ITB with iliotibial band friction syndrome, since presumably a tighter band would lead to greater compression of the underlying tissues with each gait cycle. [5]

Other biomechanical factors that have been linked with iliotibial band friction syndrome include increased landing forces, increased knee internal rotation, low hamstring strength as compared to the quadriceps strength on the same side, and genu recurvatum. [5]

Patients with osteoarthritis of the medial compartment of the knee found a high incidence of iliotibial band friction syndrome. Their model was that reduced medial joint space created a varus knee deformation, thus putting extra tension into the iliotibial band. [5]

Greater trochanteric pain syndrome (previously known as trochanteric bursitis) may also reflect altered biomechanics of the ITB. Pelfert and others have reported the occurrence of ITBFS after repair of the anterior cruciate ligament. [6]

Hiking is typically characterized as a long and continuous exercise of low intensity. Positive effects on the cardiovascular and cardiopulmonary systems, as well as on active and passive structures of the locomotor system, have been reported. However, these positive effects may be reduced by pain and injuries to lower extremity joints and soft tissues during downhill walking. [6]

It is thought that injuries and pain that occur during downhill walking are caused primarily by high loads on the joints of the lower extremities. The knee joint receives higher loads during down- hill walking. compared peak flexion moments in the lower extremity joints during various activities of daily living. [6]

Trekking, while a popular and rewarding outdoor activity, subjects the lower extremities to significant stress. The high compressive forces on the tibio-femoral and patella-femoral joints can lead to various injuries, including ankle sprains, strains, and fractures. One prevalent condition among trekkers is Iliotibial Band Friction Syndrome (ITBFS). This syndrome results from repetitive friction between the iliotibial band and the lateral condyle of the knee, particularly during flexion and extension movements. The risk of ITBFS is exacerbated when walking on uneven surfaces or descending slopes, which increases the strain and compressive forces on the knee. This study aims to explore the prevalence and characteristics of ITBFS among trekkers, emphasizing the need for awareness and targeted interventions to prevent and manage this condition.

Methodology:

This observational study aims to assess the prevalence and characteristics of conditions assessed using the Noble Compression Test among trekkers over a 6-month period. A convenient sample of 100 participants will be recruited from trekking groups and clubs in Pune. The study will focus on individuals who meet the inclusion criteria, including both recreational and professional trekkers, males and females aged 18-40 years, with a minimum trekking experience of 6 months. The Noble Compression Test, a reliable indicator for detecting iliotibial band syndrome and related conditions, will be utilized as the primary outcome measure. Participants will be selected using a convenient sampling technique to ensure a representative sample from the active trekking community in Pune. To facilitate the study, several materials will be used: a plinth for the participants to be examined on, a pen and paper for recording data, and a measuring tape to assist in assessing any relevant physical dimensions. This setup will ensure that all necessary measurements and tests are accurately conducted and recorded. The study area will be confined to Pune, a region with a vibrant trekking community, and will span over six months, providing ample time to collect and analyze the data. Inclusion criteria for participants are broad, encompassing both recreational and professional trekkers, both males and females, within the age range of 18 to 40 years, and requiring that participants have more than six months of trekking experience to ensure they are actively engaged in the activity. Conversely, the exclusion criteria are designed to filter out individuals with neuromuscular disorders, lower extremity deformities, or those experiencing ambulatory difficulties, as these conditions could interfere with the accurate assessment of the Noble Compression Test outcomes. This comprehensive approach aims to provide valuable insights into the prevalence of conditions identified by the Noble Compression Test among trekkers, contributing to a broader understanding of musculoskeletal health and associated risk factors within this active population. By focusing on a specific and active demographic, the study hopes to enhance our knowledge of the musculoskeletal challenges faced by trekkers and inform better practices for prevention and management of related conditions.

Noble Compression Test

Aim of the test: To identify the Iliotibial band friction syndrome.

Patient Position: Patient lies in supine and the knee is flexed to 90° accompanied with hip flexion. The examiner then applies pressure with the thumb to the lateral femoral epicondyle or 1 to 2 cm proximal to it. While the pressure is maintained the patient slowly extends the knee at approximately 30 ° of flexion.

Positive Result: If the patient complains of severe pain over the lateral femoral condyle, a positive test is indicated.

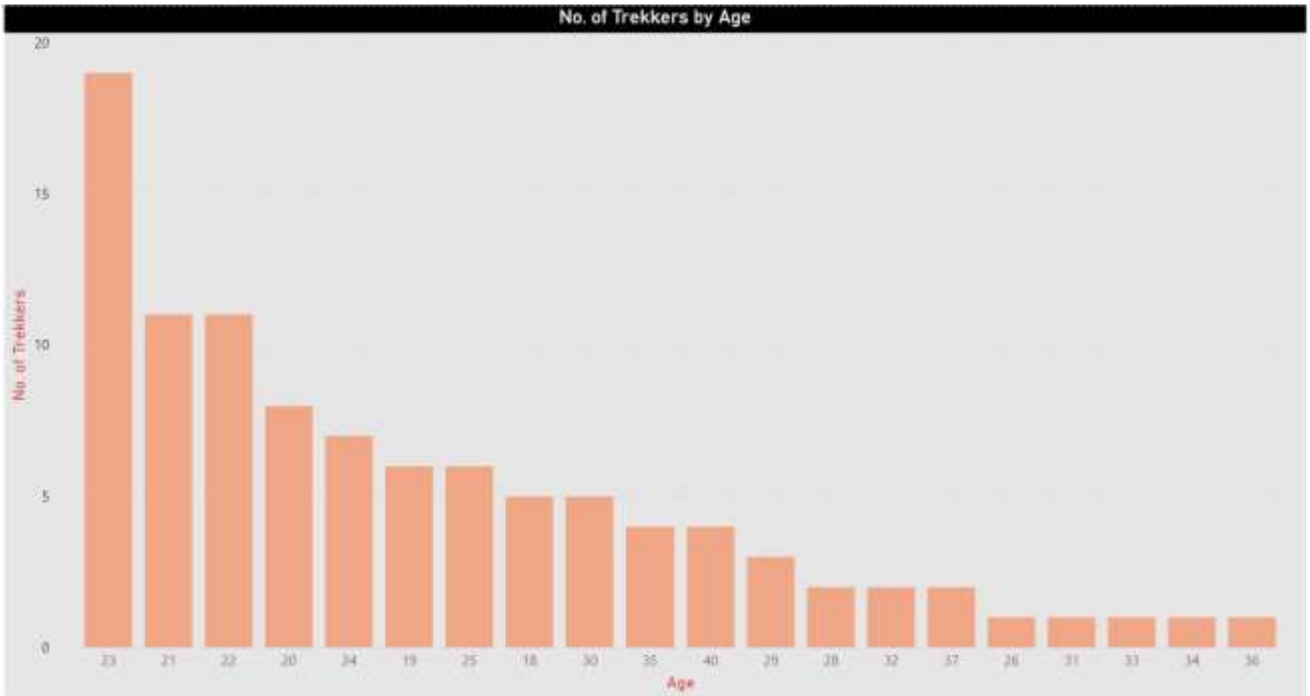
Age wise distribution

DATA ANALYSIS AND INTERPRETATION

Table No: 1

Age	No. of Trekkers
18	5
19	6
20	8
21	11
22	11
23	19
24	7
25	6
26	1
28	2
29	3
30	5
31	1
32	2
33	1
34	1
35	4
36	1
37	2
40	4

Chart No: 1



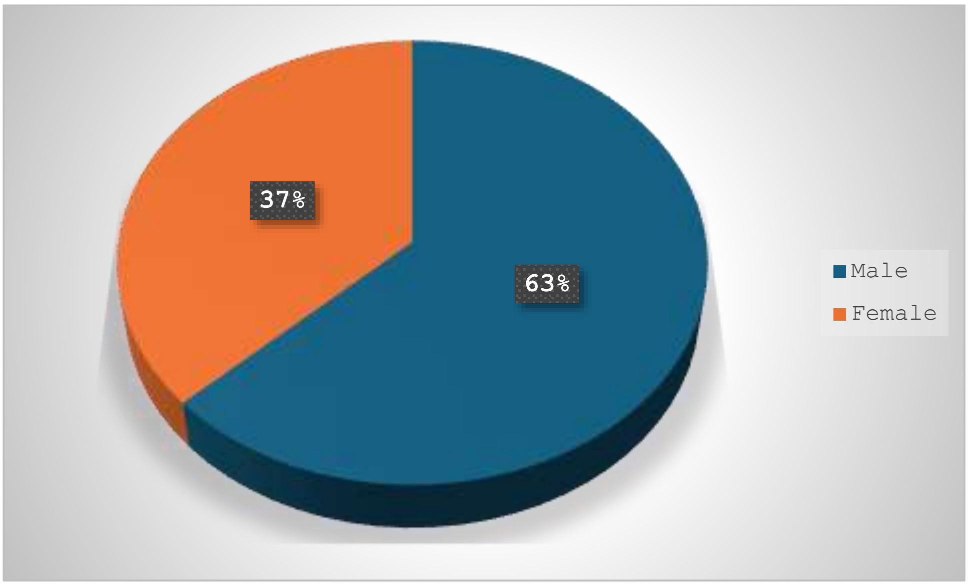
Interpretation: Chart no. 1 shows that Age distribution of trekkers where the x-axis represents Age of trekkers and y-axis represents the number of trekkers.

Gender wise distribution

Table No: 2

Gender	Trekkers
Male	63
Female	37

Chart No: 2



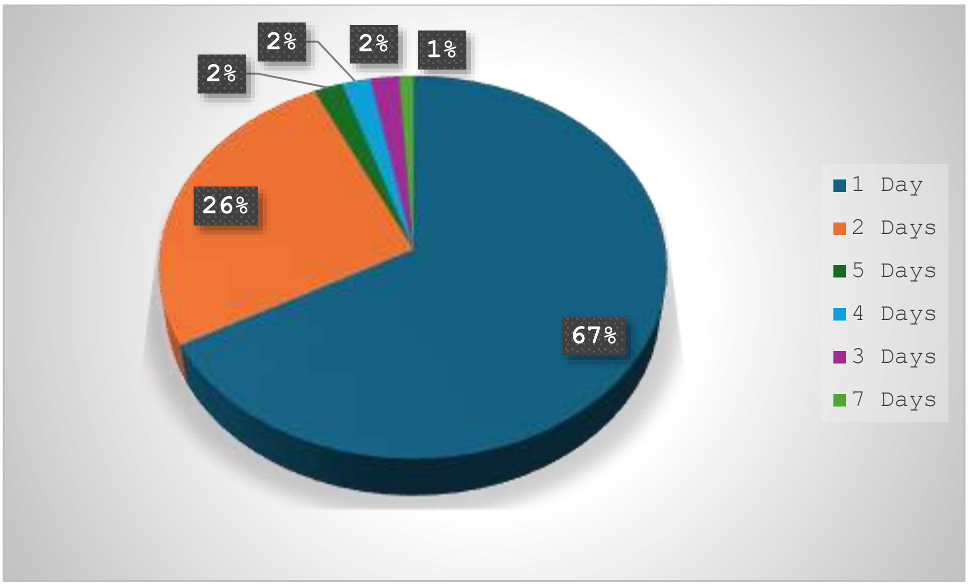
Interpretation : Chart no. 2 shows that Gender distribution of trekkers.

Duration of trekking

Table No: 3

Duration of trek	No. of trekkers
1 Day	67
2 Days	26
3 Days	2
4 Days	2
5 Days	2
7 Days	1

Chart No: 3



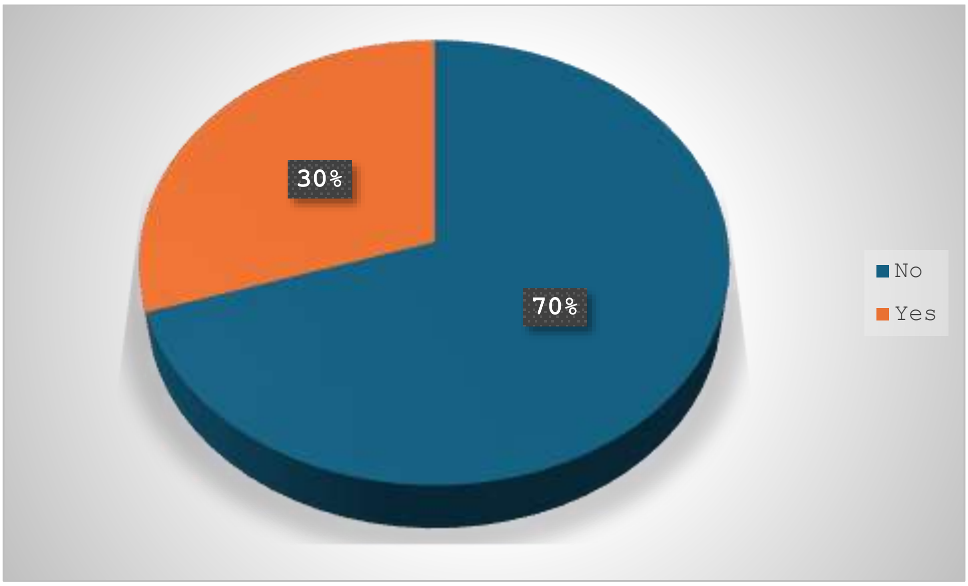
INTERPRETATION- Chart 3 shows that Distribution of Duration of trekkers.

Pain present in trekkers during Trekking

Table No: 4

Pain	No. of trekkers
No	70
Yes	30

Chart No: 4



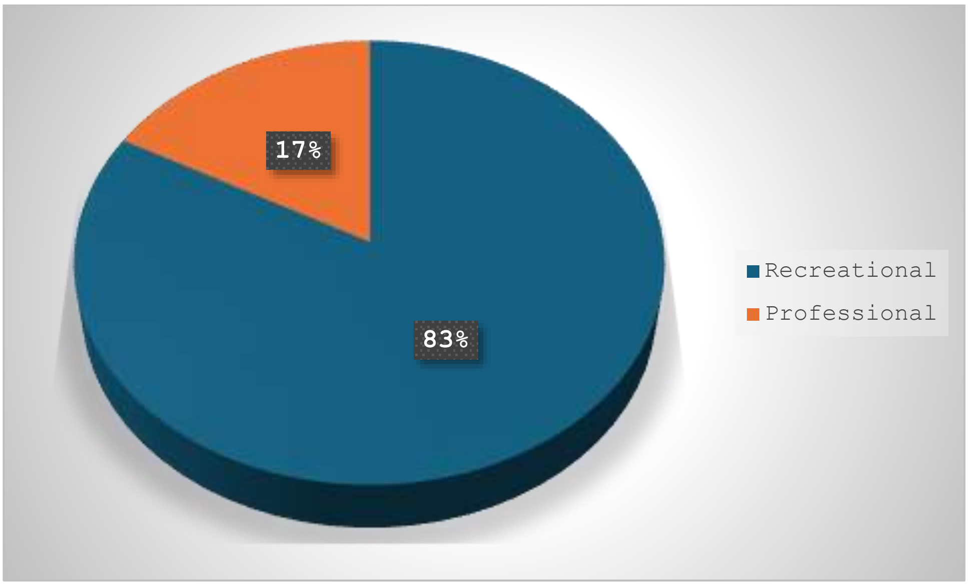
Interpretation: Chart no 4 shows that Pain occurred by No. of Trekkers.

Occupation of the trekkers

Table No: 5

Occupation	No. of Trekkers
Recreational	83
Professional	17

Chart No: 5



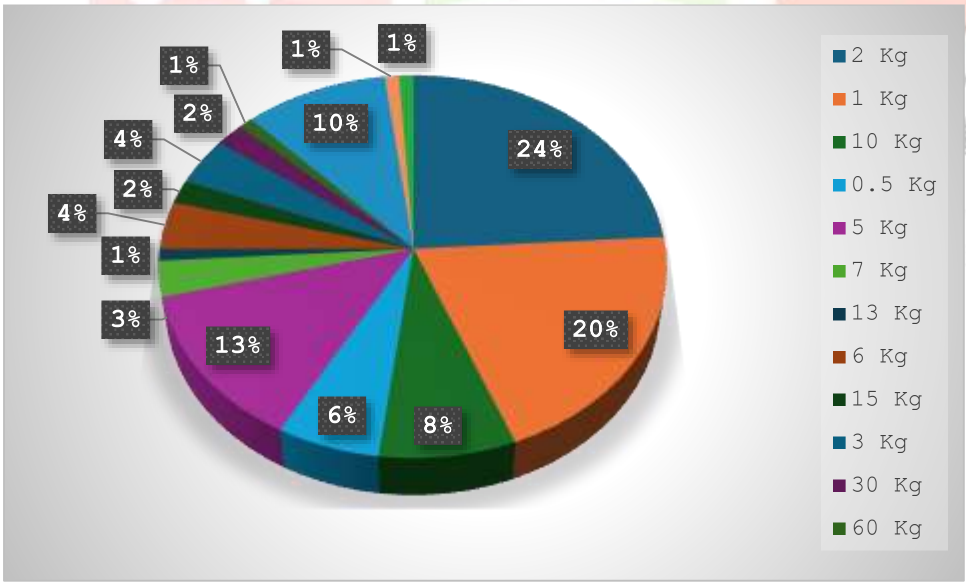
Interpretation: Chart no 5 shows that distribution of trekkers by Recreational and Professional.

Weight Carried during trek by No. of Trekkers

Table No: 6

Weight (in Kg)	Number of Trekkers
0.5	6
1	20
1.5	1
2	24
3	4
4	10
5	13
6	4
7	3
10	8
11	1
13	1
15	2
30	2
60	1

Chart No: 6



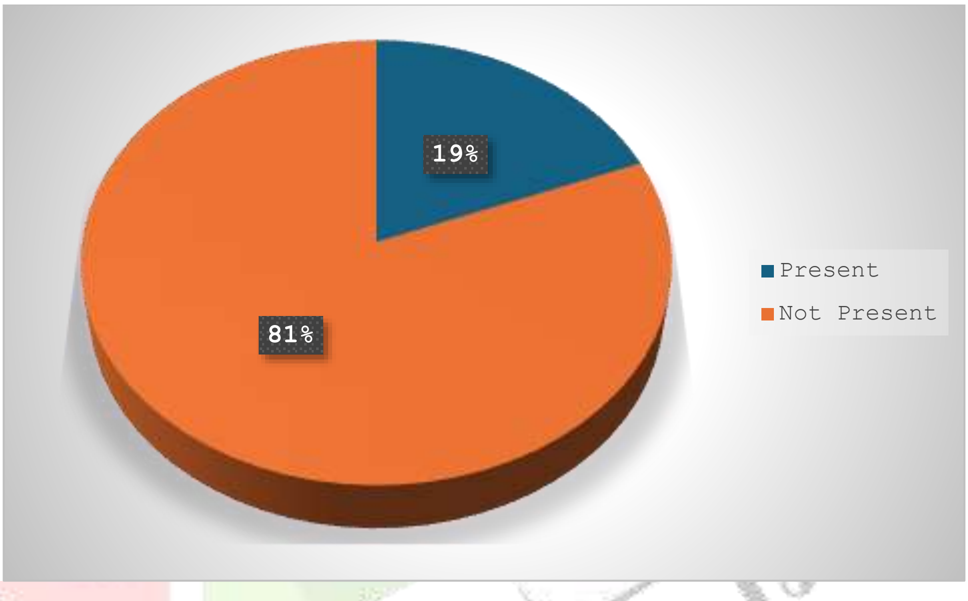
Interpretation: Chart 6 shows that distribution of weight carried by trekkers

ITBFS present in Trekkers

Table No: 7

ITBFS P/N	No. of Trekkers
Present	19
Not Present	81

Chart No: 7



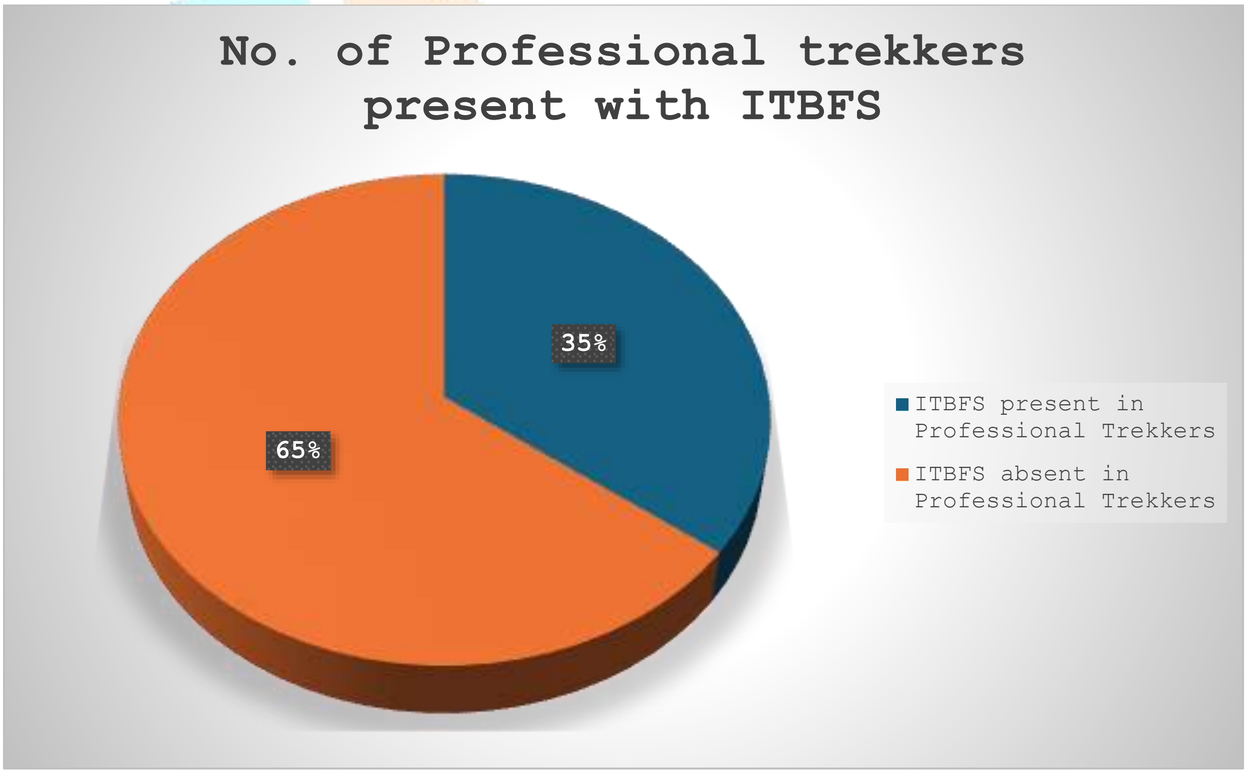
Interpretation: Chart no7 shows that Percentage of trekkers with ITBFS.

Professional Trekkers present with ITBFS

Table No: 8

No. of trekkers	ITBFS
6	Present
11	Not Present

Chart No: 8



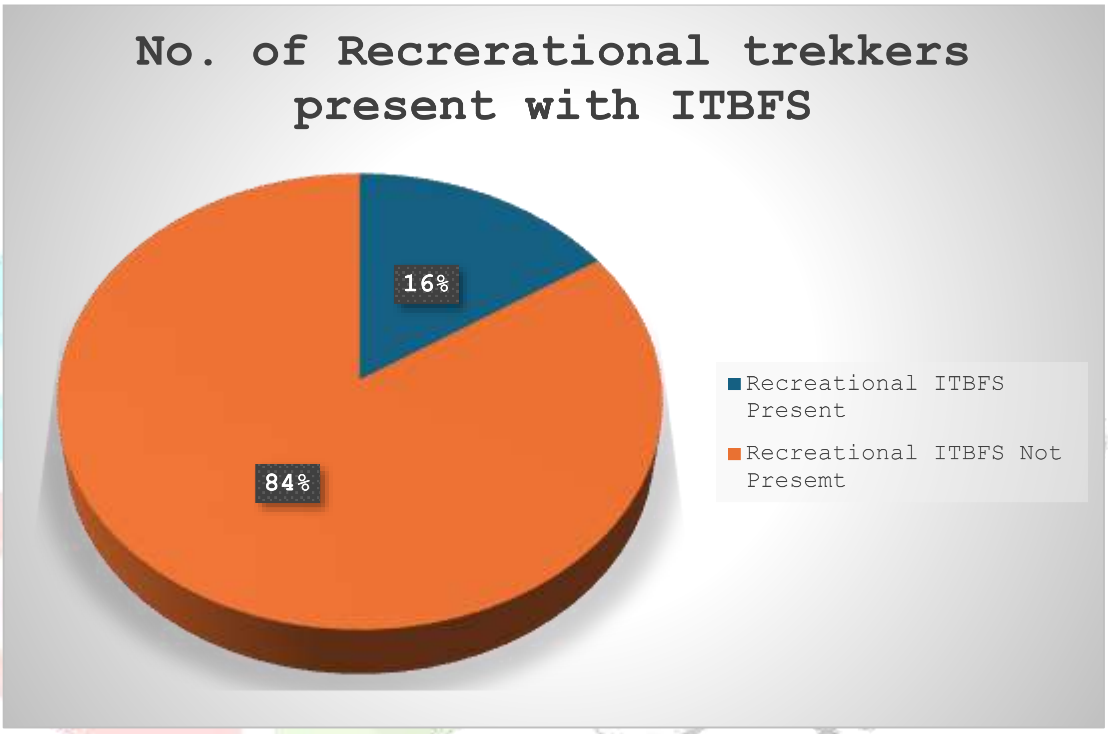
Interpretation: Chart 8 shows that Professional trekkers present with ITBFS

Recreational trekkers present with ITBFS

Table No: 9

No. of trekkers	ITBFS
16	Present
84	Not Present

Chart No: 9



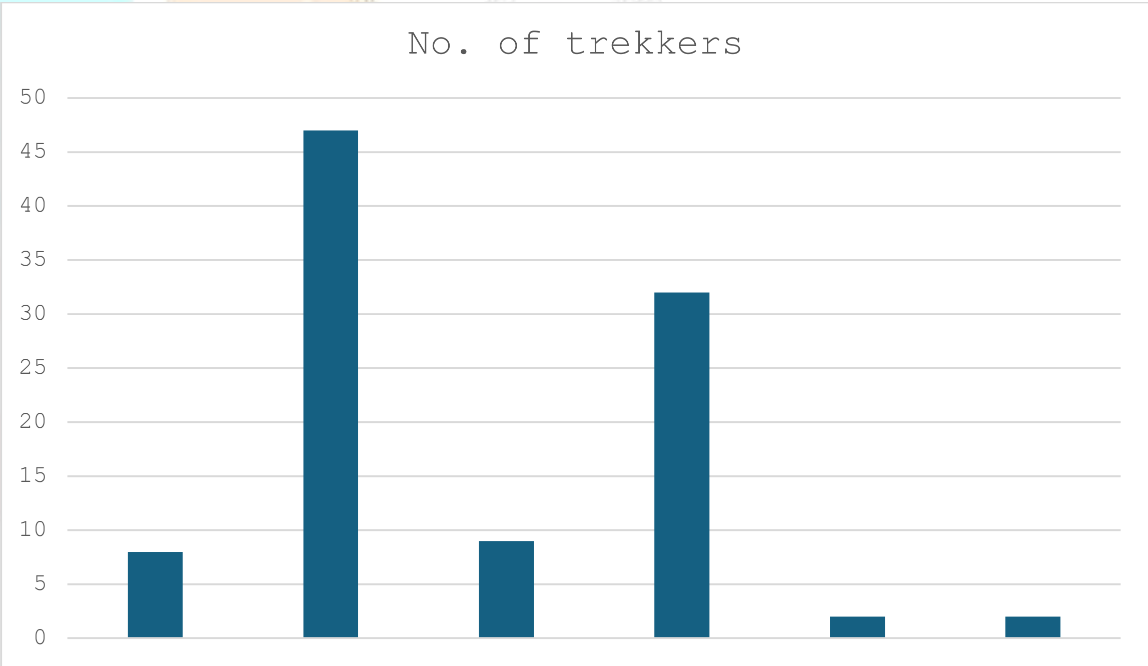
Interpretation: Chart 9 shows that Recreational trekkers present with ITBFS

Distance covered by trekkers & trekkers present with ITBFS.

Table No: 10

Distance	0-15kms	0-15kms	15-30kms	15-30kms	30-45kms	30-45kms
No. of trekkers	8	47	9	32	2	2
ITBFS Present/Not Present	Present	Not Present	Present	Not Present	Present	Not Present

Chart No: 10



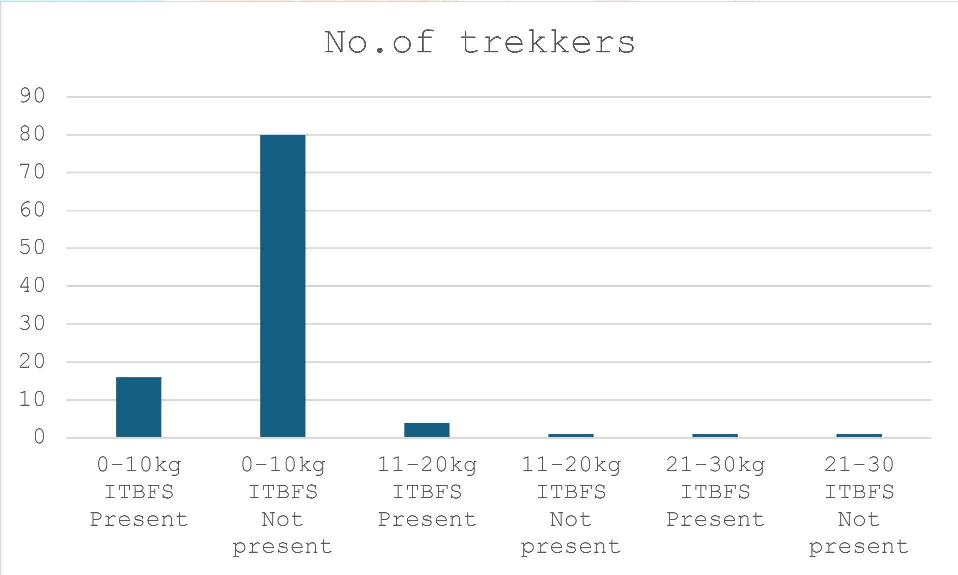
Interpretation: Chart 10 shows that distance covered by trekkers and trekkers present with ITBFS.

Weight carried by trekkers & trekkers present with ITBFS

Table No: 11

Weight	0-10 Kg	0-10 Kg	11-20 Kg	11-20 Kg	21-30 Kg	21-30 Kg
No. of trekkers	16	80	4	1	1	1
ITBFS Present/Not Present	Present	Not Present	Present	Not Present	Present	Not Present

Chart No: 11



Interpretation: Chart 11 shows that Weight carried by trekkers & trekkers present with ITBFS

Discussion:

Iliotibial Band Friction Syndrome involves pain in the region of lateral femoral condyle or slightly inferior to it that occurs after repetitive motion of the knee. Iliotibial Band Friction Syndrome is commonly seen in sport players over leading knee joint and all sports activities. Iliotibial Band repetitively shifts forward backward which causes friction and inflammation of Iliotibial Band.[4]

Trekking involves transversing through natural environments such as mountains, forests and trails. It is considered a versatile meditative activity. Trekking is an exhilarating outdoor activity that involves hiking through natural landscapes, offering adventurers the chance to immerse themselves in nature, challenge their physical limits, and discover remote wilderness areas.[4]

The primary aim of this study was to determine the prevalence of ITBFS among trekkers. The result states that there is 19% of prevalence of ITBFS in trekkers. There is a 35% prevalence of Iliotibial band friction syndrome in professional trekkers and 16% prevalence of Iliotibial band friction syndrome in recreational trekkers.

Our study reported that there was a 19% prevalence of Iliotibial Band Friction Syndrome among trekkers. Ronald lavine explained that repetitive knee movements increase the relative load on the contacting surfaces between the lateral patellar facet and the lateral femoral condyle, which contributes to the development of iliotibial band friction syndrome and patellofemoral pain syndrome. iliotibial band (ITB) tightness has been considered a major contributing factor to patellar malalignment due to its potential anatomical influence on the patella position.[4]

Panse, R et al in his study about Risk factors and impairments in iliotibial band friction syndrome among basketball players this study stated that 66% of basketball players medically diagnosed with ITBFS. Mild to moderate disability of lower extremity is seen in basketball players with ITBFS.[6]

Orchard et al in his study about Biomechanics of iliotibial band friction syndrome in runners explained that the ITBFS in runners, the posterior edge of the band impinges against the lateral epicondyle of the femur just after foot strike in the gait cycle. The friction occurs at, or slightly below 300 of knee flexion. Downhill running and slower speed of running which cause the knee to be less flexed at the foot strike, pre-dispose the athlete to the development of ITBFS.[16]

Sharma et al in his study about Comparison the Prevalence and Associated Risk Factors of Iliotibial Band Syndrome Among Cyclist And Runners study stated that there is higher prevalence in runners for ITBFS as compared with cyclist. Runners are more affected with ITBFS and all the tests are positive more for runners subjects. The cause of higher prevalence may be the ground reaction force body weight bearing during stance phase which is more in running from all the activities. They also concluded that the weight of the athletes also shows a positive correlation with incidence of ITBFS. The age of athlete also contributes as a positive correlative factor for prevalence of ITBFS in athlete.[17]

Hamill et al in his study about iliotibial band friction syndrome found that individuals exhibit a "loser" iliotibial band (ITB), experiencing increased strain and strain rate during running. This suggests greater susceptibility to friction and irritation, potentially contributing to ITBFS.[4]

In our study, we found a significantly there is 19% prevalence of ITBFS among trekkers. There is 35% of prevalence of ITBFS among professional trekkers. The lack of consistent warm-up and cool-down routines following trekking activities, coupled with a higher intensity and frequency of trekking among professional trekkers, exacerbates the strain on their lower extremities. Moreover, the absence of proper equipment, such as trekking poles and suitable boots, amplifies the strain on joints and muscles, leads trekkers to the musculoskeletal injuries. The uneven terrain presents an additional obstacle, requiring heightened attention and agility to navigate safely. These findings highlight the importance of proper preparation, equipment usage, and activity levels in preventing ITBFS among trekkers.[1]

There is 16% of prevalence of ITBFS among recreational trekkers. The reason for less prevalence in recreational trekkers is that their frequency of trekking as compared to professional trekkers is less. They don't carry heavy backpacks with them. They don't trek for longer distance. The intensity of trek is mild as compared to professional trekkers.[1]

Sun young kang et al in his study about the relationship between length of the iliotibial band and patellar position in Asians found that, increasing ITB tension has a significant effect on the position of the patella and therefore affects translation of the patella. Their findings do not indicate that ITB length is the only cause of lateral patellar translation; further studies are needed to assess the relative importance of different factors that could affect patellar position.[9]

In our study, we identified a notable finding regarding the relationship between ITBFS and the Q angle. We observed a strong negative correlation, which suggests that ITBFS occurrence is associated with a shortening in the length of the IT band. We determined that the absence of tightness in the IT band resulted in a normal muscle length, thereby preventing lateral patellar tracking. Previous research has indicated that tightness in the IT band muscle can lead to such tracking deviations In the Q angle. [9]

Consequently, in our study, the absence of IT band muscle tightness translated to no deviation in the Q angle. This finding underscores the importance of considering muscle length and tightness in the assessment of ITBFS and its associated biomechanical factors, such as patellar tracking and Q angle deviations. Previous studies have identified various factors contributing to lateral patellar translation, including titanically contracted vastus lateralis muscles and insufficient strength or timing of contraction in the vastus medialis oblique. However, our study focused solely on ITB length and did not investigate other potential factors. Therefore, the relative importance of ITB length to patellar position remains to be fully explained.[4]

Conclusion:

From this study it is concluded that there is a 19% prevalence of Iliotibial band friction syndrome in trekkers. There is a 35% prevalence of Iliotibial band friction syndrome in professional trekkers.

and 16% prevalence of Iliotibial band friction syndrome in recreational trekkers.

It is concluded that there is more prevalence in professional trekkers as compared to recreational trekkers.

Clinical Implications:

This study will help in raising awareness regarding the importance of incorporating warm-up and cooldown exercises before and after trekking. The study can act as a base of further interventional study.

Limitations:

IT band tightness was not taken into consideration.

Future scope of study:

This study can also be done in populations other than the age group of 18 - 40 yr. The study can act as base for further interventional studies.

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