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PREVALENCE OF ACHILLES TENDON INJURY IN FOOTBALL PLAYERS

Physiotherapy

Ajaykumar Khant* B.P.T. *Corresponding Author

Dr. Kosha Gor M.P.T (Cardiopulmonary sciences), Assistant professor, Venus Institute Of Physiotherapy, Swarrnim srartup and innovation university, Gandhinager.

Dr. Jaynesh Vandra M.P.T (Musculoskeletal), Ph.D Scholar., Assistant Professor, Venus Institute Of Physiotherapy, Swarrnim Startup And Innovation University, Gandhinager.

ABSTRACT

Background: Achilles tendinopathy (AT) is a clinical condition characterized by pain and swelling in and around the Achilles tendon, mainly arising from overuse. Achilles tendinopathy (AT) or Tendon injury is one of the most common injuries in physical exercise (PE), especially happens to athletes who are always engaged in long-term, continuous and high-intensity competition or training. Even after surgical treatment, AT may still occur repeatedly and the recurrence rate is as high as 44%. It is not easy to be diagnosed in the early stage of disease because of its long incubation period. So, the need of Achilles Tendon injury when participating in Exercise, and on the basis of that we can find out estimated risks of Achilles Tendon injury for different ages, genders, sport events, characteristics of subjects, training years, and regions in Ahmedabad city. **Methodology:** This study included 100 male and female football players with convenient sampling method. Subjects were assessed for Achilles Tendon injury via Royal London test and if positive directed to Victorian Institute of Sports Assessment-Achilles (VISA-A) questionnaire to find out prevalence of Achilles Tendon Injury in football players. **Result And Conclusion:** This study shows that there is Age group of 16-25 having prevalence of 68% and age group of 26-35 having prevalence of 24%.Prevalence of Achilles tendon injury in football players.

KEYWORDS

Prevalence, Achilles Tendinopathy, Football

INTRODUCTION

The clinical symptoms of pain, swelling, and impaired physical function of Achilles tendon are common in sports and daily life. Traditionally, many terms have been used to describe the disorders, including tendinitis, tendinosis, and paratenonitis. However, recent histopathological studies have found these disorders as a result of a failed healing response, which may cause degenerative changes in the tendon. The failed healing response includes three different and continuous stages (reactive tendinopathy, tendon disrepair, and degenerative tendinopathy) [1][2][3]. However, inflammatory response is not found in the three stages. In 1998, Maffulli et al. suggested to use the term tendinopathy in order to describe these intratendinous disorders [4].

The two main categories of Achilles tendinopathy are classified according to anatomical location and broadly include insertional (at the calcaneus-Achilles tendon junction) and noninsertional (2 to 6 cm proximal to the insertion of the Achilles tendon into the calcaneus) tendinopathy [5].

Achilles tendinopathy is one of the most frequently ankle and foot overuse injuries [6]. This disorder is more likely to be found in the individuals who participate in the physical activities such as running and jumping. It may affect 9% of recreational runners and cause up to 5% of professional athletes to end their careers [7]. In an epidemiologic investigation of 1394 nonathletes, Achilles tendinopathy was found in 5.6% of the subjects (4% insertional, 3.6% noninsertional, and 1.9% both forms) [8]. In another research, Kvist found that 20% to 25% of Achilles tendinopathy patients had insertional disorder, 66% had noninsertional, and 23% had either retrocalcaneal bursitis or insertional tendinopathy [9].

Chronic Achilles tendinopathy is more common in older people than in young people. In Kvist's study, among 470 patients who had Achilles tendinopathy, only 25% of the patients were young athletes and 10% were younger than 14 years [9]. Moreover, insertional tendinopathy tends to occur in more active persons, whereas noninsertional tendon injury tends to occur in older, less active, and overweight persons.

The risk factors of Achilles tendinopathy can be divided into intrinsic and extrinsic factors, either alone or combination. Intrinsic factors include biomechanical abnormalities of the lower extremity such as leg length discrepancy hyperpronation, varus deformity of the forefoot, pes cavus and limited mobility of the subtalar joint[10], and systemic conditions such as increasing age [11][12] , inflammatory arthropathies, corticosteroid use, diabetes, hypertension, obesity, gout, hyperostotic conditions [13][14] [15] [16]lipidaemias, aromatase inhibitors, and quinolone antibiotics[17]. Extrinsic factors include excessive mechanical overload and training errors such as increased interval training, abrupt changes in scheduling, excessive hill training, training on hard or sloping surfaces, increased mileage, increased repetitive loading, poor shock absorption, and wedging from uneven wear.

Sports injuries have been found to inhibit optimal sports' performance and these injuries, which can have both long and short term harmful effects, causes lasting physical damage or disability[1], affect quality of life, thus could result in reduced physical activity participation. Every sport comes with risk of injury that is peculiar. The occurrence of sports injuries and its associated problems are on the increase [2]. In association football, commonly known as soccer, injuries have been identified to result from multiple risk factors and ankle injuries are one of the most common injuries[3].Ankle injuries in soccer may give rise to problems like reduced performance, time away from competition and possibly disability[4]. The bones that make up the ankle joint are a regular site of injury and often times, bending and twisting forces can precipitate these injuries [5], with the most common being ankle sprain, fracture, and tendinopathy.

Achilles tendinopathy is a clinical condition characterized by pain and swelling in and around the Achilles tendon, mainly arising from overuse[6]. It is often a result of increase in training load. The Achilles tendon is the strongest tendon in the body serving both the gastrocnemius and soleus muscles originating near the mid-calf and inserts posteriorly at the calcaneus [7]. Achilles tendinopathy commonly happens in the mid-substance of the tendon or less commonly at its insertion in the calcaneus[8]. Previous observational studies have proved that competitive athletes have a 24% lifetime incidence of Achilles tendinopathy.

Soccer is widely recognized to be the world's most popular sport [14], and is played at different levels, worldwide, national, state, universities and even secondary schools. It is played by players in over 200 countries, making it the world's most popular sport [14]. Soccer involves several crafts that demand complex movements making the athletes susceptible to injuries, and tendinopathy is one of the most recorded overuse sports injuries in modern societies [15].

Participation in soccer is a worldwide event with tremendous health and economic benefits [16], increased self-esteem, peer socialization, general fitness, as well as reducing various diseases risks, crime rate and poverty [17]. A lot of attention has been given to elite soccer players

while in university soccer players, there are higher numbers of participants who began playing early and continue for a longer period. For some of them, their gears are not always suitable for the sport, thereby increasing the threat of tendinopathy [9]. The average university soccer players play soccer at least three (3) times a week, and Achilles tendinopathy occurs as a result of overuse. The increase in the popularity of soccer and expectations from players make meaningful numbers of soccer injuries conceivable. University soccer players also go through rigorous physical training, preparing for inter-club competition, inter- school competition. They are not professionals, so much attention is not given to them, but the trainings and constant field activity also makes them susceptible to sports injuries like Achilles tendinopathy. Also, intrinsic factors inherent in individual's physiology could also influence susceptibility to Achilles tendinopathy [9]

METHODOLOGY

Study Design, Setting And Sampling

Study Design: A Cross-sectional Study

Study Setting: Football academies of Ahmedabad city

Sampling Technique: Convenient Sampling

Population: Football players

Sample Size: 100 subjects, based on following formula:

$N = Z^2 P(1-P) / d^2$

Where, N= Sample size

Z= Level of confidence (95%)

P=Expected Prevalence (Previous researches) d=Precision (Corresponding Effect size)

Selection Criteria

Inclusion Criteria:

- Athletes who are willing to take participate in the survey.
- Age group 16 to 35 years.
- Male and Female football players.
- Playing football more than 2 years.

Exclusion Criteria:

- Athletes who are not willing to take part in survey
- Participants who actively engaged in other sports like basketball, sprinting were excluded because these sports could make them prone to Achilles tendinopathy.
- Any lower extremity trauma or injury in past 5 years.
- Subjects having connective tissue disorder
- Subjects having any neuromuscular disoder

MATERIALS REQUIRED

- Assessment form
- Consent form
- Pen, Pencil and Paper
- Mat and Plinth

METHODOLOGY

Ethical approval was obtained from Institutional Ethical Committee of Venus institute of physiotherapy, Gandhinagar. A letter of introduction from the Department of physiotherapy, Venus institute of physiotherapy, Gandhinagar was given to the coaches of the various teams seeking for permission to carry out the research with their teams. Informed consent was obtained from all participants and assuring them of confidentiality of their information.

The Royal London test, a psychometrically sound instrument, was used for assessing Achilles tendinopathy [18][19]. To start the test, the participant lay prone on the plinth with the feet hanging outside the table. The ankle was in neutral position and the Achilles tendon was palpated for tenderness.

The participant was asked to dorsiflex and the ankle was palpated on dorsiflexion. Results were classified as tenderness present on dorsiflexion or absent. In patients with Achilles tendinopathy, tenderness was felt on palpation with the ankle in neutral position, but on dorsiflexion tenderness was absent or reduced.

Figure 1: Flowchart of the study procedure

OUTCOME MEASURE

VISA–A Scale:

the Victorian Institute of Sports Assessment-Achilles (VISA-A) questionnaire was administered; it is a valid, reliable, and user-friendly index of the severity of Achilles tendinopathy, which contains eight questions that covers the 3 domains of pain (questions 1 to 3), function (questions 4 to 6), and activity (questions 7 and 8). Questions 1 to 7 are scored over 10, and question 8 carries a maximum of 30. Scores are summed to give a total of 100. An asymptomatic person would score 100. For question 8 which has three part (A, B, C), participants must answer only one part; A, B, or C that relates to the person's reality. If the participant experiences pain when performing sport, he or she automatically loses at least 10, and possibly 20, points.

Reliability And Validity of Visa-A:

J M Robinson The VISA-A questionnaire: a valid and reliable index of the clinical severity of Achilles tendinopathy: To develop and test a questionnaire based instrument that would serve as an index

of severity of Achilles tendinopathy. Item generation, item reduction, item scaling, and pretesting were used to develop a questionnaire to assess the severity of Achilles tendinopathy. The final version consisted of eight questions that measured the domains of pain, function in daily living, and sporting activity. Results range from 0 to 100, where 100 represents the perfect score. Its validity and reliability were then tested in a population of non-surgical patients with Achilles tendinopathy (n = 45), presurgical patients with Achilles tendinopathy (n = 14), and two normal control populations (total n = 87). The VISA-A questionnaire had good test-retest (r = 0.93), intrarater (three tests, r = 0.90), and interrater (r = 0.90) reliability as well as good stability when compared one week apart (r = 0.81). The mean (95% confidence interval) VISA-A score in the non-surgical patients was 64 (59-69), in presurgical patients 44 (28-60), and in control subjects it exceeded 96 (94-99). Thus the VISA-A score was higher in non-surgical than presurgical patients (p = 0.02) and higher in control subjects than in both patient populations (p<0.001). The VISA-A questionnaire is reliable and displayed construct validity when means were compared in patients with a range of severity of Achilles tendinopathy and control subjects.

RESULT

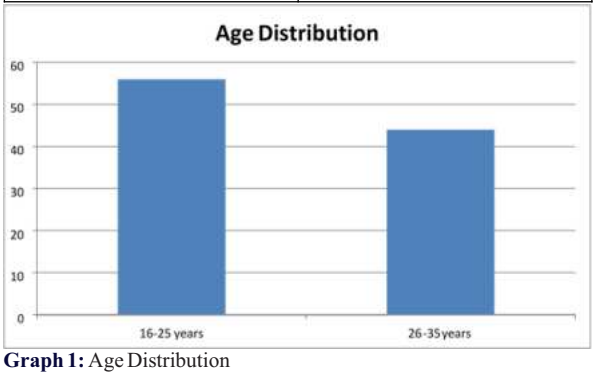
All statistical analysis was done using SPSS 25.0 software for windows. Descriptive analysiswas used to obtain mean and standard deviations.

Demographic Data

Age: The research was performed on 100 participants between the age of 16-35. There were 56 patients between the ages of 16 to 25, 44 patients between the age 26 to 35.

Table 1: Age Distribution

Age Distribution	
16-25 years	26-35 years
56	44

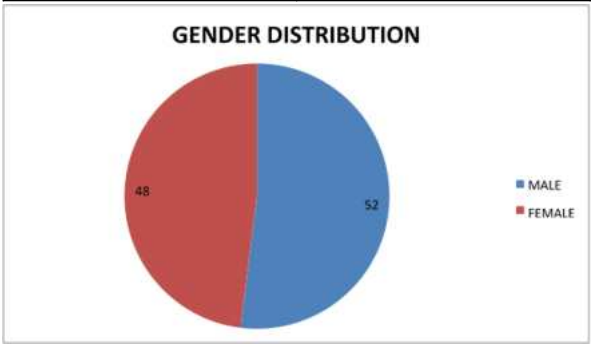


Graph 1: Age Distribution

GENDER DISTRIBUTION

Table 2: Gender Distribution

Gender Distribution	
Male	Female
52	48



Graph 2: Gender Distribution

Table 3: Hours Of Training

Mode	Number	Percentage
3 hours	48	48%
4 hours	27	27%
5 hours	14	14%
6 hours	07	7%
>6 hours	03	3%

Table 4: Distance

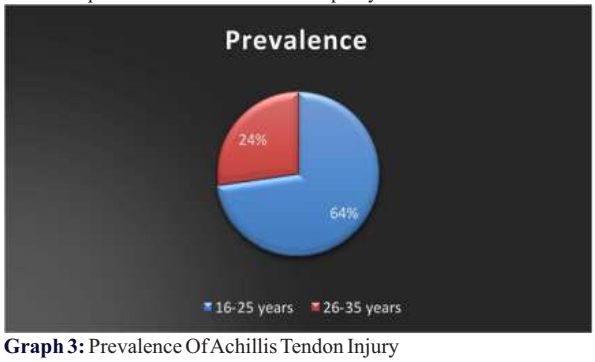
Distance	Number	Percentage
3 years	68	68%
4 years	25	25%
>4 years	07	7%

Age group of 16-25 having prevalence of 68% and age group of 26-35 having prevalenceof 24%.

Table 5: Mean Value Of VISA-A Score

	Mean + SD
Age	23.25±4.46
SF36	64.51±12.18
VISA-A	50.79 ± 19.98

VISA-A score less then 60 is seen in person with tendinopathy and SF-36 is considered goodas score high here mean value of VISa –A is less then 60 in persons with Achillis tendinopathy.



Graph 3: Prevalence Of Achillis Tendon Injury

The VISA-A questionnaire: An index of the severity of Achilles tendinopathy

IN THIS QUESTIONNAIRE, THE TERM PAIN REFERS SPECIFICALLY PAIN IN THE ACHILLESTENDON

REGION

1. For how many minutes do you have stiffness in the Achilles region on first getting up?

100mins ☐☐☐☐☐☐☐☐☐☐☐ 0 mins

0 1 2 3 4 5 6 7 8 9 10

POINTS

2. Once you are warmed up for the day, do you have pain when stretching the Achilles tendon fully over the edge of a step? (keeping knee straight)

strong severe pain ☐☐☐☐☐☐☐☐☐☐☐ POINTS no pain

0 1 2 3 4 5 6 7 8 9 10

3. After walking on flat ground for 30 minutes, do you have pain within the next 2 hours? (If unable to walk on flat ground for 30 minutes because of pain, score 0 for this question).

strong severe pain ☐☐☐☐☐☐☐☐☐☐☐ POINTS no pain

0 1 2 3 4 5 6 7 8 9 10

The VISA-A questionnaire: An index of the severity of Achilles tendinopathy

IN THIS QUESTIONNAIRE, THE TERM PAIN REFERS SPECIFICALLY PAIN IN THE ACHILLESTENDON

REGION

4. For how many minutes do you have stiffness in the Achilles region on first getting up?

POINTS
100 mins 0 mins
0 1 2 3 4 5 6 7 8 9 10

5. Once you are warmed up for the day, do you have pain when stretching the Achilles tendon fully over the edge of a step? (keeping knee straight)

strong severe pain POINTS no pain
0 1 2 3 4 5 6 7 8 9 10

6. After walking on flat ground for 30 minutes, do you have pain within the next 2 hours? (If unable to walk on flat ground for 30 minutes because of pain, score 0 for this question).

strong severe pain POINTS no pain
0 1 2 3 4 5 6 7 8 9 10

7. Do you have pain walking downstairs with a normal gait cycle?

strong severe pain POINTS no pain
0 1 2 3 4 5 6 7 8 9 10

8. Do you have pain during or immediately after doing 10 (single leg) heel raises from a flat surface?

strong severe pain POINTS no pain
0 1 2 3 4 5 6 7 8 9 10

9. How many single leg hops can you do without pain?

POINTS
0 10
0 1 2 3 4 5 6 7 8 9 10

10.Are you currently undertaking sport or other physical activity?
0 Not at all POINTS

4 Modified training ± modified competition

7 Full training ± competition but not at same level as when symptoms began
10 Competing at the same or higher level as when symptoms began

11. Please complete **EITHER A, B or C** in this question.
• If you have **no pain while undertaking Achilles tendon loading sports** please complete **Q8a only**.
• If you have **pain while undertaking Achilles tendon loading sports but it does not stop you from completing the activity**, please complete **Q8b only**.
• If you have **pain that stops you from completing Achilles tendon loading sports**, please complete **Q8c only**.

A. If you have **no pain** while undertaking **Achilles tendon loading sports**, for how long can you train/practise?

POINTS

NIL 1-10 mins 11-20 mins 21-30mins >30 mins
0 7 14 21 30

OR

B. If you have some pain while undertaking **Achilles tendon loading sport**, but it does not stop you from completing your training/practice for how long can you train/practise?

POINTS

NIL 1-10 mins 11-20 mins 21-30mins >30 mins
0 4 10 14 20

OR

C. If you have **pain that stops you** from completing your training/practice in **Achilles tendon loading sport**, for how long can you train/practise?

NIL 1-10 mins 11-20 mins 21-30mins >30 mins POINTS
0 2 5 7 10

TOTAL SCORE (/100) %

DISCUSSION

The overall incidence rate is 1.85 per 1,000 registered persons per year, and for the adult population it is 2.35. There are no other studies on the incidence rates of Achilles tendinopathy in the general population to compare these results with. The prevalence rate was higher than that for another tendinopathy like lateral epicondylitis of 1.3% (men) and 1.1% (women) in 9,696 persons registered at two general practitioners.10 The incidence rates in our study are lower than the incidence of 2.98 found in the military population4 and than the annual incidence 7% and 9% in top-level runners.2 3 While it seems plausible that the incidence rate of Achilles tendon injuries is higher in athletes than within a more general population, only in 35% of the cases in our study was a relationship with sports activity described. Intrinsic risk factors such as body weight and insulin resistance might also play a role.11 Although we could not assess information on body weight, the diagnosis of Diabetes Mellitus (DM) was available from the medical records.

The minor difference between the incidence and prevalence rate suggests that most patients only visit their General Practitioner (GP) once with their Achilles tendon problems. This might be because of a short duration of symptoms or that the patients go to a physiotherapist or sports physician afterwards.

This cross-sectional study has some limitations, due to which the actual incidence of Achilles tendinopathy is probably higher than observed in this study. Firstly, not every person with a certain complaint will visit a healthcare professional. In a cross-sectional population-based study, Picavet et al reported that approximately 50% of the patients with musculoskeletal complaints visited a healthcare professional. However, those with severe or persistent complaints will probably seek healthcare. Second, while most patients in the Dutch healthcare system will visit their GP before being referred to a therapist or specialist, since 2006 patients can visit a physiotherapist or sports physician without referral by a GP. It would be interesting to know the incidence rates of Achilles tendinopathy within the patient population of the Dutch physiotherapists and sports physicians as well, but since the denominators of these populations are unknown, no exact incidence rates could be obtained. Finally, because there is no specific registration code available for Achilles tendinopathy, GPs register this injury using other or more general codes.

In concordance with other studies,13 most cases were encountered in the middle-aged population (age group 41–60 years). At present, the prevalence of Achilles tendon rupture in PE is not clear, a study showed that the incidence of Achilles tendon rupture was higher in sedentary men aged 29–48. It was speculated that the relationship between AT and age may be due to the changes of mechanical properties of Achilles tendon with age. Recently, Sprague et al. found that there was a positive correlation between age and viscosity of uninjured Achilles tendon. Aging was usually associated with reduced cellular structure, increased glycoamine polysaccharide content, and decreased fibrous tissue, all of which can lead to degenerative changes in the Achilles tendon. At the same time, the aging tendon loses elasticity, forcing the muscle to work harder, eventually leading to changes in tendon structure.

Consistent with the previous study, we found that the prevalence of AT in football players was significantly higher than in other sports. This may be related to the high training intensity of football players and the heavy load on Achilles tendon. Some reviews showed that the prevalence of Achilles tendon injury in running and track and field sports is the highest. Ball games generally require athletes to make a rapid judgment according to the competition form in a short time, such as repeated bounce, dribble pass, back and forth quick start and other technical actions with a large load on the Achilles tendon. These technical actions need the support of the Achilles tendon, which also lays a huge hidden danger for its injury.

CONCLUSION

This study was conducted among Football players of Ahmedabad city and it revealed that players those are having long training hours prone to developing tendinopathy. This study shows that there is Age group

of 16-25 having prevalence of 68% and age group of 26-35 having prevalence of 24%.

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