



EVALUATE THE INCIDENCE OF PREDISPOSING FACTORS OF PLANTAR FASCIITIS IN SECURITY GUARDS: AN OBSERVATIONAL STUDY

DR. KAILASAM GEETHA, DR. K. Senthil kumar, DR.C.Shanthi, DR .S. Ragava
Krishna, DR .K.Madhavi

ABSTRACT

EVALUATE THE INCIDENCE OF PREDISPOSING FACTORS OF PLANTAR FASCIITIS IN SECURITY GUARDS: AN OBSERVATIONAL STUDY

Objectives: To find out the incidence of predisposing factors of plantar fasciitis in security guards by screening the following factors Age (20 to 60) , Gender (Males & Females), BMI ,Shoe type, Arch height, Period of weight bearing by number hours they stand , walk in a day .

Methods: Observational study was conducted to find out the incidence of predisposing factors of plantar fasciitis in SVIMS, TTD. We obtained our targeted sample of 100 was obtained using convenience sampling.

Result: The estimated occurrence of heel pain came out to be 34.78% . Among them the incidence of plantar fasciitis was 34.78 % . age, gender, BMI, types of shoe , arch observation , period of weight bearing were among predisposing factors.

Conclusion: The condition was found to have low prevalence , age 40 - 60 , BMI more than 24 - 26, prolonged standing (more than 6-8hrs) were found to have strong association with this condition .

Key words: Plantar fasciitis, heel pain, security guard, incidence.

INTRODUCTION

ANATOMY:

- Comprised of white longitudinally organized fibrous connective tissue which originates on the periosteum of the medial calcaneal tubercle, where it is thinner but it extends into a thicker central portion . ⁽¹⁾
- The thicker central portion of the plantar fascia then extends into five bands surrounding the flexor tendons as it passes all 5 metatarsal heads.
- Pain in the plantar fascia can be insertional and/or non-insertional and may involve the larger central band, but may also include the medial and lateral band of the plantar fascia.
- Blends with the paratenon of the Achilles tendon, the intrinsic foot musculature, skin, and subcutaneous tissue. ⁽²⁾

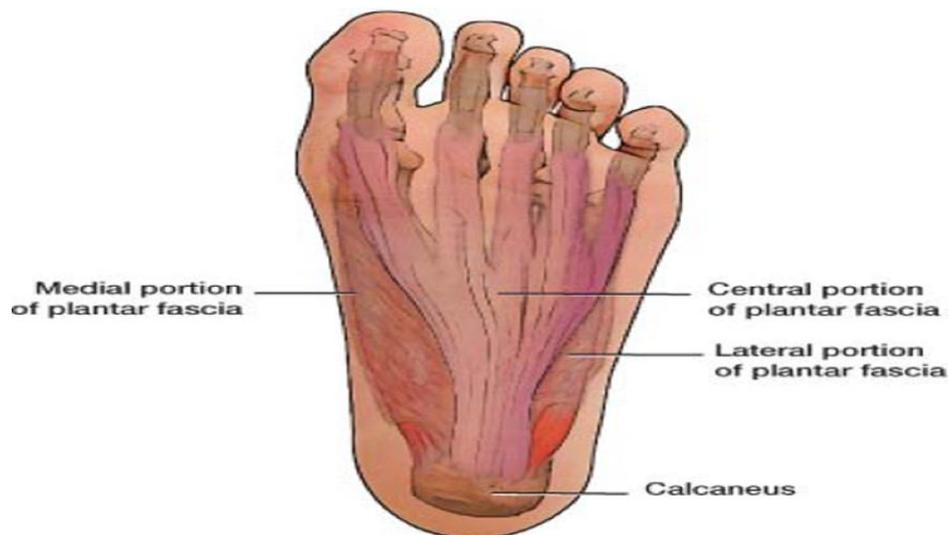


FIGURE : Anatomy of plantar fascia of left foot

BIOMECHANICS:

During weight-bearing: Tibia loads the foot “truss” and creates tension through the plantar fascia (windlass mechanism), The tension created in the plantar fascia adds critical stability to a loaded foot with minimal muscle activity. ⁽³⁾

The “windlass mechanism” is a mechanical model that provides a thorough explanation of these of these biomechanical factors and stresses. The windlass mechanism describes the manner by which the plantar fascia supports the foot during weight – bearing activities and provides information regarding the biomechanical stresses placed on the plantar fascia. ^(4,5)

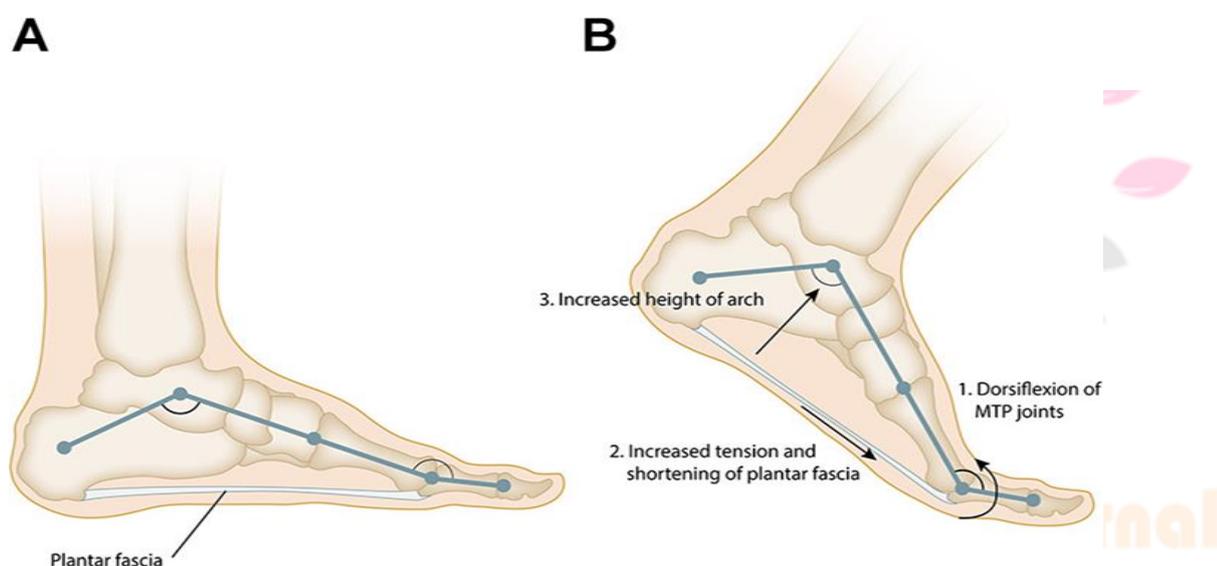


Figure 2. (A) The plantar fascia and the longitudinal arch of the foot form a truss. (B) Dorsiflexion of the toes during the late stance phase of gait the plantar fascia around the metatarsal heads leading to an increase in the height and stability of the longitudinal arch of the foot, this effect is known as the “Windlass” mechanism.

DEFINITION:

Plantar fasciitis is the result of collagen degeneration of the plantar fascia at the origin, the calcaneal tuberosity of the heel as well as the surrounding perifascial structures. Is a clinical condition characterized by pain and inflammation secondary to strain on the intrinsic musculature and the plantar fascia at the origin from the medial calcaneal tubercle. ^(6,7)

INCIDENCE :

The exact incidence and prevalence of plantar fasciitis by age are unknown. This condition Accounts for about 10% of runner-related injuries (Some literature shows prevalence rates among a population of runners to be as high as 22%) to occur in about 10% of the general population .83% of these patients being active working adults between the ages of 25 and 65 years old 11% to 15% of all foot symptoms requiring professional medical care .May present bilaterally in a third of the cases^[8].The average plantar heel pain episode lasts longer than 6 months and it affects up to 10-15% of the population. Approximately 90% of cases are treated successfully with conservative care.^[9] Females present with the plantar heel slightly more commonly than males.^[10] In the US alone, there are estimates that this disorder generates up to 2 million patient visits per year, and account for 1% of all visits to orthopaedic clinics .Plantar heel pain is the most common foot condition treated in physical therapy clinics and accounts for up to 40% of all patients being seen in podiatric clinics.^[11]

CAUSES: ⁽¹²⁾

| Etiology | Disorder |
|---------------|--|
| Neurologic | Peripheral neuropathy (idiopathic, diabetic, nutritional) |
| | L5/S1 neural foraminal impingement or lumbar spinal stenosis |
| | Tarsal tunnel syndrome |
| | Baxter neuroma (neuritis) |
| Traumatic | Plantar fascia tear / rupture |
| | Calcaneal stress fracture |
| Rheumatologic | Rheumatoid arthritis |
| | Reactivearthritis |
| | Psoriatic Arthritis |

| Etiology | Disorder |
|--------------|----------------------------------|
| | Seronegative spondyloarthropathy |
| Degenerative | Fat pad atrophy |
| | Plantar fasciitis (fasciopathy) |

PATHOPHYSIOLOGY : ⁽¹³⁾

Plantar fasciitis has been linked to excessive stress placed on the tissue as a result of athletic activity, muscle weakness or tightness, improper shoes, increase in body weight, aging, inadequate footwear and occupation. Plantar fasciitis is usually not the result of a single event but more commonly the result of a history of repetitive micro trauma combined with a biomechanical deficiency of the foot. Finally, degenerative changes that come with age, such as atrophy of the heel fat pad, may also increase ones risk.

Mechanism for development of plantar fasciitis :

Most likely this number is in the thousands. With each step, the load of the body weight to be applied to the arch causing the arch to drop. This drop in the arch makes the ball of the foot and heel to spread further apart. The fascia in the foot goes into tension to resist this force. If this tension in the fascia is greater than the fascia can handle, the fascia is damaged and the area will become inflamed.

The load applied to the foot is divided into two types: Intrinsic load stems from the muscles contracting to move the foot. Much of the intrinsic load applied to the fascia results from the calf muscles.

The plantar fascia is part of a larger structure termed the CT band. The main components of the CT band are the calf, Achilles tendon and plantar fascia. All these components are linked so that tension on any part of the CT band increase tension in the entire system.

CLINICAL PRESENTATIONS

The classical presentation of plantar fasciitis include a:

1. Gradual insidious onset infero – medial heel pain at the fascial attachment to the medial calcaneal tubercle.
2. This usually coincides with a history of pain upon rising in the morning with first step.
3. Pain after periods of non – weight bearing followed by reduction in symptoms after 35 – 40 mins of daily activities.^(14,15)

After 2-3 hrs pain will begin to the intensity as activities continues throughout the day

Limited dorsiflexion and tight achilles tendon

A limp may be present or may have a preference to toe walking Pain is usually worse when barefoot on hard surfaces and with stair climbing.⁽¹⁶⁾

RISK FACTORS: ^(17,18)

In most cases, plantar fasciitis develops without a specific, identifiable reason. There are, however, many factors that can make you more prone to the condition.

New or increased activity Repetitive high impact activity (running/dancing/sports)
Prolonged standing on hard surfaces (especially among nurses, factory workers, and teachers)
flat feet or a high arch (medial longitudinal ligament) Tight calf muscles – (insufficient flexibility in the Achilles tendon) Obesity Age (plantar fasciitis is most common among people aged 40 to 60) .

EXAMINATION:

Primary Findings May Include:

patient's medical history, physical activity, and foot pain symptoms ·Pain reproduced by palpating the plantar medial calcaneal tubercle at the site of the plantar fascial insertion on the heel bone. Pain reproduced with passive dorsiflexion of the foot and toes. ⁽¹⁸⁾

Windlass Test - Passive dorsiflexion of the first metatarsophalangeal joint (test to provoke symptoms at the plantar fascia by creating maximal stretch), positive test if pain is reproduced.^[19]

Secondary findings may include:

Tight Achilles heel cord, pes planus , or pes cavus.

Altered gait (look for biomechanical factors that may predispose client plantar fascia problems) or predisposing factors mentioned previously.

Obesity .

Work-related weight-bearing.

DIFFERENTIAL DIAGNOSIS (20)

Neurological - abductor digiti quinti nerve entrapment, lumbar spine disorders, problems with medial calcaneal branch of the posterior tibial nerve, tarsal tunnel syndrome

Soft tissue - Achilles Tendinopathy, fat pad atrophy, heel contusion, plantar fascia rupture, posterior tibial tendonitis, retrocalcaneal bursitis

Skeletal Severs' disease, calcaneal stress fracture, infections, inflammatory arthropathies, subtalar arthritis

Miscellaneous

Metabolic disorders, osteomalacia, Paget's disease, sickle cell disease, tumors (rare), vascular insufficiency, Rheumatoid arthritis

TREATMENT:

Frequently use heat and stretch to treat connective tissue tightness. Heating is often accomplished with continuous ultrasound is the method of choice for heating dense connective tissue in a well defined area²¹Ultrasound heats the tissues and the tissues absorb the energy, resulting in an increase in circulation and also potentially affecting the speed of tissue repair.

NEED OF THE STUDY

Security guard – as the name itself indicates the job that should be alert and be on prolonged standing . there is increase burden on security force from the past few years due to security situation. these circumstance have led to heighten the physical demands expected of them including long time standing hours and walking on irregular surfaces making them susceptible toward the development of plantar fasciitis .there was lack of literature on plantar fasciitis in security guards .

The need of the study is to focus on the components involved in evaluating plantar fasciitis in security guard.

The purpose of the study is to educate the security guard, making them of aware of the risk factor of plantar fasciitis by evaluating components of plantar fasciitis.

So I want to find out the incidence of predisposing factors of plantar fasciitis in security guard.

AIM OF THE STUDY

To observe the incidence of predisposing factors of plantar fasciitis in security guards at SVIMS UNIVERSITY and TTD.

OBJECTIVE OF THE STUDY

To find out the incidence of predisposing factors of plantar fasciitis in security guards by screening the non-modifiable factors – Age, Gender modifiable factors - BMI, Arch height, Type of shoe, Period of weight bearing by no. of hours they stand , walk in a day .

REVIEW OF LITERATURE

Usen N : Lemont H : (2012) ; Concluded that heel pain mostly caused by plantar fasciitis ,is common complaints of many patients who are requiring professional orthopaedic care and are mostly suffering from chronic pain beneath their heels⁽²²⁾

Stecco C, Corradin M, Macchi V (2003): Concluded that PF is result of degenerative irritation of the plantar fascia origin at the medial calcaneal tuberosity of the heel as well as surrounding painful structure .⁽²³⁾

RE Carrlson ,LL fleming , WC huhom (2000) : Concluded that by using aseruohydrolic testing machine , showed that dorsiflexion of the toes tightness the plantar fascia and increase the effect that tensile force in the tendoachilis has on the tensile strain and force in the plantar fascia .⁽²⁴⁾

Shashwat Prakash , Anand Misra (2014) : Experimental study and different subject design, The results of this study provide evidence that manual therapy is a superior approach in improving pain and disability in individuals with plantar fasciitis and can be incorporated in the regular treatment regime of the same.⁽²⁵⁾

Lucrezia TOGNOLO, Federico GIORDANI (2021): Concluded that ESWT on myofascial points could provide an interesting alternative with better outcomes in terms of time needed for recovery compared to traditional ESWT for the conservative management of PF.⁽²⁶⁾

Cheung JT-M, An K-N, Zhang M (2013): Concluded that partial and total plantar fascia release reduce the heel pain .⁽²⁷⁾

Crary JL, Hollis JM, Manoli A : Concluded that plantar fascia release decreases the strain in the spring and long plantar ligament.⁽²⁸⁾

Crary JL, Hollis JM, Manoli A (2008) : Heel pain -plantar fasciitis clinical practice guidelines linked to the international classification and disability⁽²⁹⁾

Riddle DL, Pulisic M, Pidcoke P, Johnson RE (2003): Evaluate the risk factors for plantar fasciitis by a matched case – control study .⁽³⁰⁾

S. S. Euna , S (2006) : This study was aimed at comparing the plantar fasciitis treatment effect of a double air-cushioned shoe to that of physiotherapy combined with ESWT. Methods. Retrospective chart review of 40 patients diagnosed with plantar fasciitis was performed. Group 1 wore a double air-cushioned shoe for 2 months, and group 2 underwent physiotherapy with ESWT .once/week over a 4-week period. The foot function index (FFI) score was obtained at the initial visit, 1 month, and 2 months. Results. There were 25 patients in group 1 and 15 patients in group 2. The pretreatment FFI was 62.6 for group 1 and 50 for group 2. The 1-month posttreatment FFI was 45.6 for group 1 and 35.7 for group 2. The 2-month posttreatment FFI was 35 for group 1 and 43.1 for group 2. In both groups 1 and 2, follow-up FFIs were significantly improved from the initial FFI ($p < 0:05$) and there were no significant differences between two groups ($p > 0:05$). Conclusions. The double air-cushioned shoe can be considered an alternative treatment option for noninvasive treatment of early-stage plantar fasciitis.⁽³³⁾

Lopes AD, Hespanhol Júnior LC, Yeung SS, Costa LOP (2012) :Evaluate the main running – related musculoskeletal injuries ⁽³²⁾

Eduardo araujio pires , carmen (2020) : Impact of chronic plantar fasciitis on work – releted activity : observed that none of the medical expert examination manuals provides support for the medical expert to grant leave to workers with chronic plantar fasciitis from their work-related activities to receive secondary treatment for at least four weeks. In addition, stratification by acute or chronic disease is not observed. Two manuals scale leave time by type of activity ⁽³³⁾

Rajni Ranjan ,Rakesh Kumar : Role of low dye taping for short term treatment of plantar fasciitis. In this prospective study, 56 patients were included. Low dye taping applied for one week. First step pain (Measured on VAS scale) and Foot Health Status Questionnaire domain of foot pain, foot function and general foot health were used to evaluate the patient prior to taping and after one week of low dye taping. Patient treated with low dye taping reported significant improvement in first step pain and Foot Health Questionnaires Score after one week of treatment. Five patients experienced an adverse event. Concluded that Low dye taping is effective in short term basis ⁽³⁴⁾

M. S. Rathleff¹, C. M. Mølgaard², U. Fredberg³ 2014: This is the first randomized trial to compare high-load strength training with plantar-specific stretching among patients with ultrasonography-verified plantar fasciitis.

The primary endpoint at 3 months showed that high-load strength training was associated with a larger improvement in FFI and that patients tended to be more satisfied with the results of the treatment. This study adds new knowledge on the positive effect of a new, simple, progressive exercise protocol for a severe and debilitating condition. ⁽³⁵⁾

Stated that With the exception of BMI, impairment and demographic variables do not predict the extent of functional loss in patients with plantar fasciitis. The most likely domains of function to be at least moderately affected in patients with plantar fasciitis are running-related activities and usual work or hobbies .

RS Hinaman et al (2003) : Concluded that therapeutic taping would result in greater improvement in pain and disability than neutral taping .⁽³⁶⁾

E. R. Waclawski, J. Beach, A. Milne, E. Yacyshyn (2015) : Systematic review: plantar fasciitis and prolonged weight bearing , This systematic review found low-quality evidence of an association between PF and weight-bearing tasks such as walking and standing on hard surfaces. The only occupations specifically identified as having higher risk were those associated with the engine assembly plant. Further research is required to fully determine the association between weight bearing and PF.⁽³⁷⁾

Robert .A , Wener. MD (2010) : Risk Factors for Plantar Fasciitis Among Assembly Plant Workers , Plantar fasciitis is relatively common in the manufacturing setting. These findings suggest several options for primary and secondary prevention strategies. Shoe rotation may be an effective strategy that may be used as either a primary or secondary strategy. The use of shoe orthoses with a medial longitudinal arch and metatarsal pad may be used as a preventive or treatment strategy. Work stations that decrease the percentage of time walking or standing on hard surfaces (eg, allowing workers to alternate between sitting and standing postures or providing cushioning mats for concrete surfaces) may lower the risk for plantar fasciitis.⁽³⁸⁾

Mario Roxs , ND (2005) ; Stated that plantar fasciitis is reported to most common cause of inferior heel pain in adults .⁽³⁹⁾

Mario Roxas (2005) : Also stated that obesity or sudden weight gain , reduced ankle dorsiflexion , pes planus and occupations include prolong weight bearing are greatest risk factors associated with plantar fasciitis .⁽⁴⁰⁾

Matthew R . Hyland (2006) : Stated that excessive pronation is a commonly sited risk factors associated with plantar fasciitis .⁽⁴¹⁾

MC Carthy DJ , et al : Conducted study on the anatomical basis of inferior calcaneal lesion , and concluded that plantar fasciitis is most common causes of pain in the inferior heel .⁽⁴²⁾

Furey JG : Conducted a study on plantar fasciitis and he concluded that the incidence reportedly peak with ages 40 – 60 years and in younger people among runners .⁽⁴³⁾

KARR SD : Studied on sub calcaneal heal pain and states that faulty bio – mechanics which leads to high arched foot high is a common cause for plantar fasciitis .⁽⁴⁴⁾

WERING S.C, Smeathers J ,Yates (2019): Concluded that fascial thickness and pain in plantar fascia are associated focus mainly on reducing pain , inflammation , tissue stress and restoring muscle strength and flexibility.⁽⁴⁵⁾

GLAZER (2015) : Stated that diagnosis and correction of biomechanical factors leading to plantar fasciitis should a main stay of treatment and prevent recurrence.⁽⁴⁶⁾

BENEDICT F DIAGIOVANNI et al (2003) :Concluded that use of tissue specific plantar fascia stretching protocol as the key component of treatment for chronic plantar fasciitis ^(47,48)

METHODOLOGY

MATERIALS USED :

Portable body composition analyser Consent document

METHOD:

Sample size : N = 100

Type of sampling : convenience sampling
Study design : observational study
Study setup : SVIMS,TTD
Study duration : 3 months
Study period : June 2022 - August 2022
Study population : Security guards

INCLUSION CRITERIA :

Security guard – males, females

Age : Sub group - 1 : 20 -40

Sub group- 2 : 40 -60

Heel pain in the acute phase after being diagnosed by a doctor

Pain during first step in the morning or after sitting down for a > 1 hr .

Increasing pain with walking or standing for > 30 mins.

Local pain where fascia attached to the heel pain.

Unilateral heel pain.

Arch height (medial longitudinal arch)

EXCLUSION CRITERIA :

Age group > 60 age group

Previous foot trauma (dysfunction of the foot or ankle)

Arthritis of the knee, ankle , foot

Previous surgery or previous treatment of the foot.

Any neurological abnormality (tarsal tunnel syndrome)

Inability to understand instructions (or)refuse to participate .

Congenital deformities of foot and ankle .

Lower limb spasticity

Thyroid , DM.

Procedure :

A prior informed consent will be obtained from all the participants after fully explaining the procedure. We are taken prior permission with security department for the study and asked them to gather at one place. A total of 100 subjects were taken for this study with $N = (Z\text{-score})^2 \times \text{Std Dev} \times (1\text{-Std}) / (\text{Margin of error})^2$. An observational study conducted in SVIMS, Tirupati for a duration of 3 months from June to August 2022. Calculated their height, weight, BMI with the help of portable body composition analyzer, observe type of shoe & arch position is record and I have done windlass test to identify plantar fasciitis in those security individuals. Data were analyzed using Statistical package for Social Sciences (SPSS) Software (v29.9). Subjects are screened for Age, gender, BMI, type of shoe and arch height (Medial longitudinal arch) and duration of standing and waking in a day. The study includes both males and females with age of 20 to 60 and Security guard – males, Age : 20 to 60, Heel pain in the acute phase after being diagnosed by a doctor, Pain during first step in the morning or after sitting down for a > 1 hour, Increasing pain with walking or standing for > 30 mins, Local pain where fascia attached to the heel pain. Unilateral heel pain, arch height (medial longitudinal arch). The study exclude age > 60, Previous foot trauma (dysfunction of the foot or ankle), Arthritis of the knee, ankle, foot, Previous surgery or previous treatment of the foot, Any neurological abnormality (tarsal tunnel syndrome, Inability to understand instructions (or) refuse to participate, Congenital deformities of foot and ankle, Lower limb spasticity. This study excludes subjects with DM, both hypo and hyper thyroid as these complication may have some physiological changes such as peripheral neuropathy, muscle cramps which might affect the result of study. I exclude subjects who are not willing for the study.

OUTCOME MEASURES:

1. BMI by portable body composition analyser
2. Arch height – wet test

STATISTICAL DATA ANALYSIS AND RESULT

Table : 2 Demographic Data

| Gender | Frequencies | Percentage |
|--------------|-------------|------------|
| Male | 87 | 87% |
| Female | 13 | 13% |
| Total | 100 | 100% |

According to table 1 , Males with Frequencies of 87 and percentage of 87 % and Females with Frequencies of 13 and percentage of 13 %.

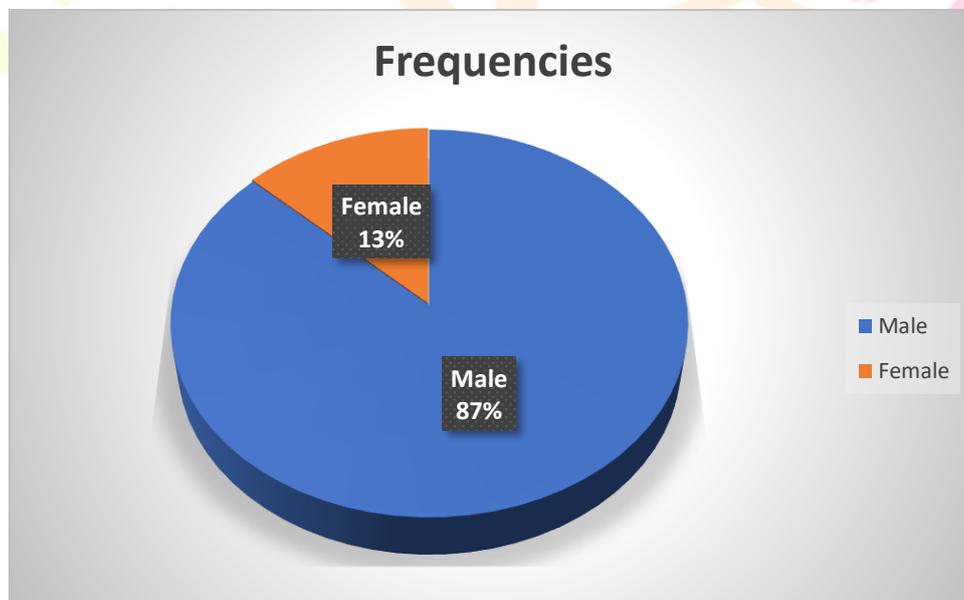


Figure 3 : Gender and their percentages participated in the study

Table 3: Mean , SD & Percentages of subjects based on age group

| AGE | Frequencies | Mean ± SD | Percentage |
|-------|-------------|-----------------|------------|
| 20-30 | 31 | 25.034 ± 2.718 | 31% |

| | | | |
|--------------|-----|----------------|------|
| 30-40 | 24 | 34.416 ± 3.133 | 24% |
| 40-50 | 27 | 43.888 ± 3.004 | 27% |
| 50-60 | 18 | 53.052 ± 2.320 | 18% |
| Total | 100 | | 100% |

Table 3 , represents Age between = 20 – 30 frequencies of people 31 and percentage 31%. Age between = 30 -40 frequencies of people 24 and percentage 24%. Age between = 40 – 50 frequencies of people 27 and percentage 27 %.Age between = 50 – 60 frequencies of people 18 and percentage 18 % .

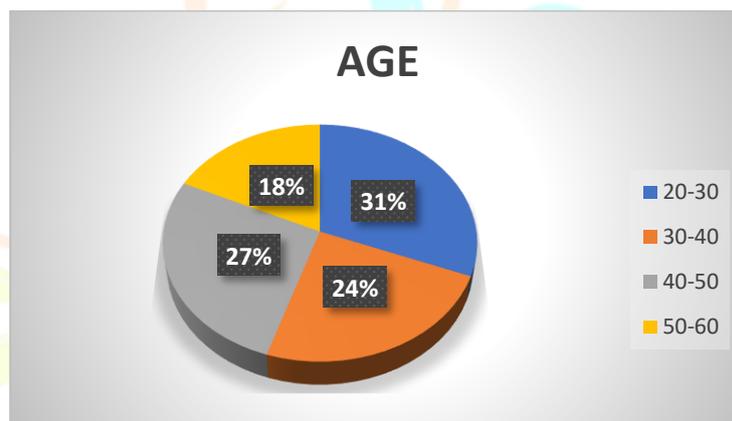


Figure 4 : Percentages of age group participated in the study

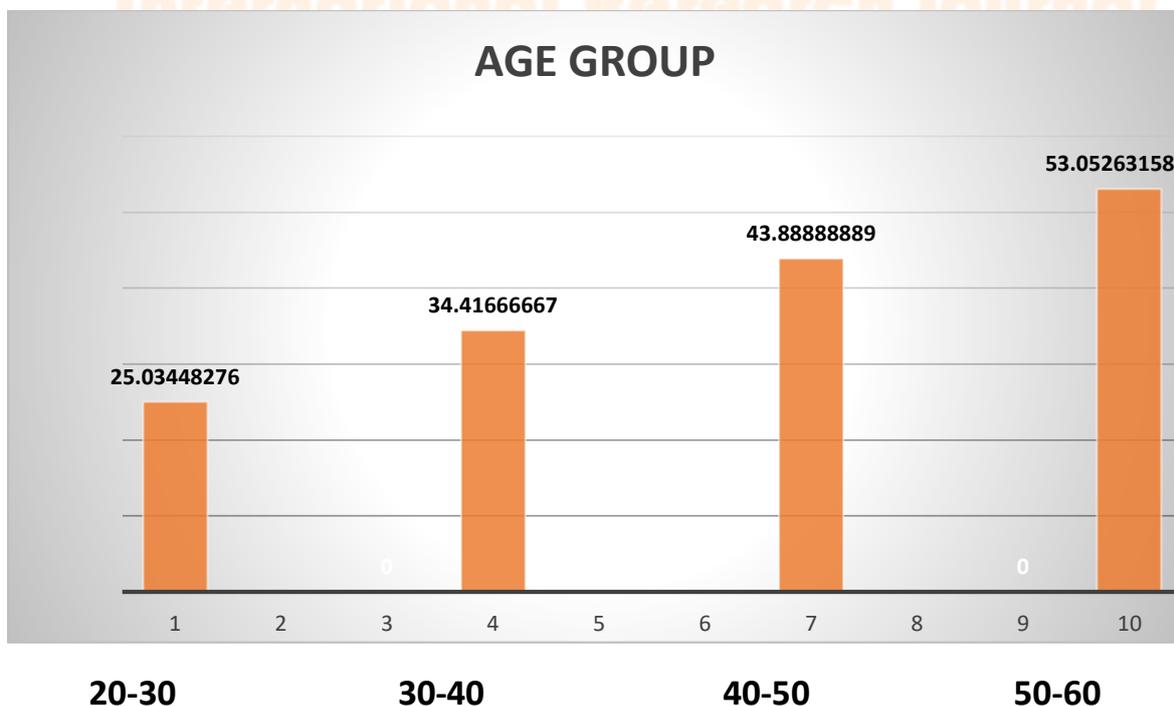


Figure 5 : Graphical representation for mean values of age

TABLE - 4 : Mean , SD & Percentages of BMI

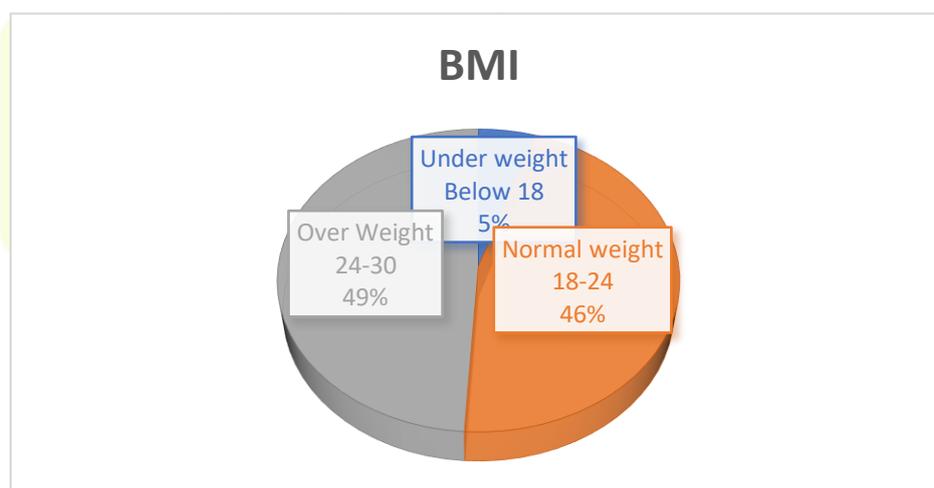
A value derived from the mass (weight) and height of person .

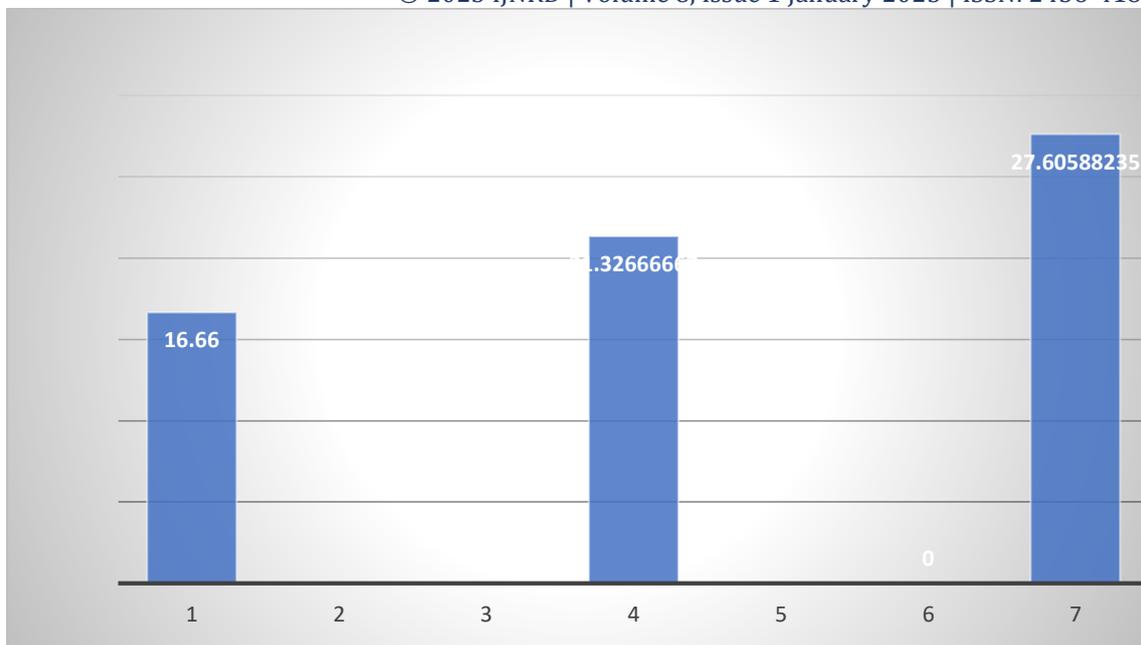
The BMI is defined as the body mass divided by the square of the body height .
Expressed in units of kg / m^2 , resulting from mass in kilograms and height in meters.

➤ **BMI FORMULA :** $\text{BMI} = \text{Weight} / \text{Height}^2$

| Description | BMI | Frequencies | Mean ±SD | Percentage |
|----------------------|----------|-------------|--------------|------------|
| Under weight | Below 18 | 5 | 16.66±0.898 | 5% |
| Normal weight | 18-24 | 46 | 21.326±1.545 | 46% |
| Over Weight | 24-30 | 49 | 27.60±2.825 | 49% |
| Total | | 100 | | 100% |

Table 5 represents 5% subjects were underweight with Mean 16.66 and SD of 0.898 , 46% were normal weight with mean 21.326 and SD of 1.545, 49 % subjects were over weight with mean of 27.60 and SD of 2.825

**Figure 6 : Percentages of subjects based on BMI**



UNDER WEIGHT

NORMAL WEIGHT

OVER WEIGHT

Figure 7 : Graphical representation of mean and standard deviation of BMI

Table 5 : Percentages of weight bearing hours

| HOURS | Frequencies | Percentage |
|--------------|-------------|------------|
| 0-2 | 4 | 4 % |
| 2-4 | 14 | 14% |
| 4-6 | 80 | 80% |
| 6-8 | 2 | 2% |
| Total | 100 | 100% |

According to table 6, 0 -2 hours : period of weight bearing population percentage 4 %, 2- 4 hours : period of weight bearing population percentage 14 %, 4-6 hours : period of weight bearing population percentage 82 %.

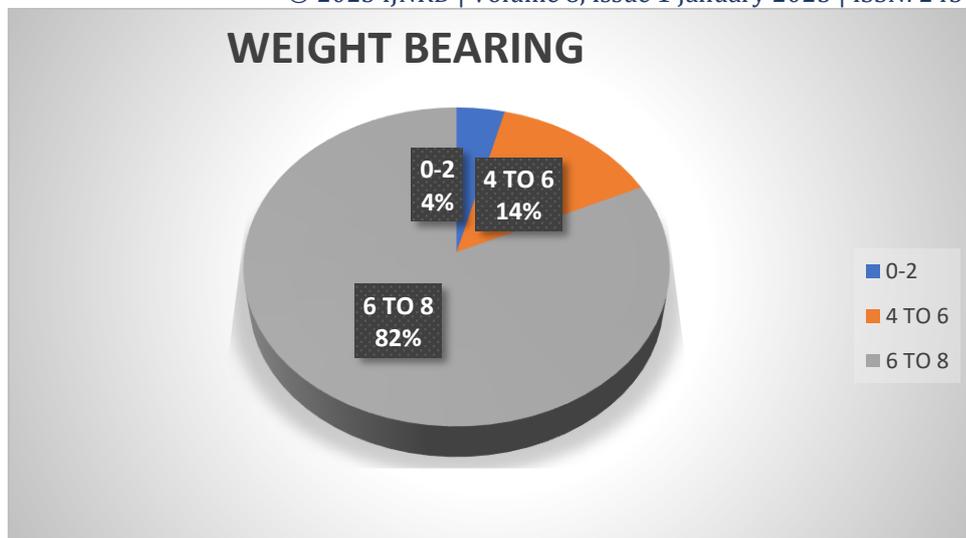
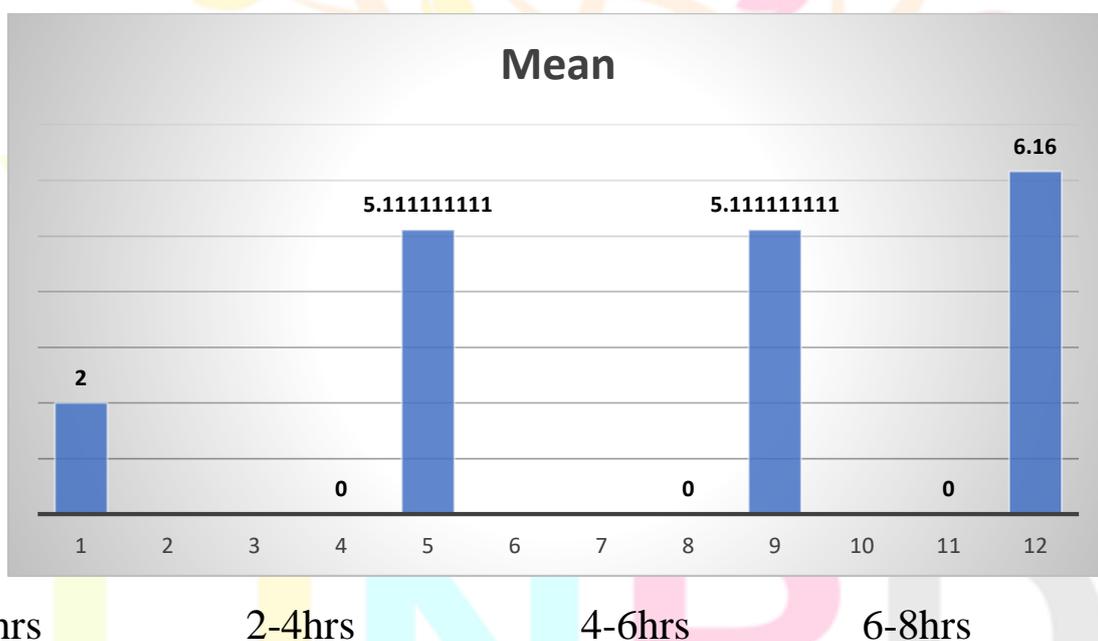


Figure 8 : Percentages of weight bearing hours



0-2hrs

2-4hrs

4-6hrs

6-8hrs

Figure 9 :Graphical representation of mean and standard deviation of weight bearing hours

Table 6: Gender wise representation of subjects with normal arch and flat foot

| Medial longitudinal arch | NORMAL ARCH | FLAT FOOT |
|--------------------------|-------------|-----------|
| MALE | 75 | 12 |
| FEMALE | 11 | 2 |
| TOTAL | 86 | 14 |

According to table 8 Out of 100 subjects ,75 males have normal arch & 12 males have flat foot ,11 females have normal arch & 2 female have flat foot.

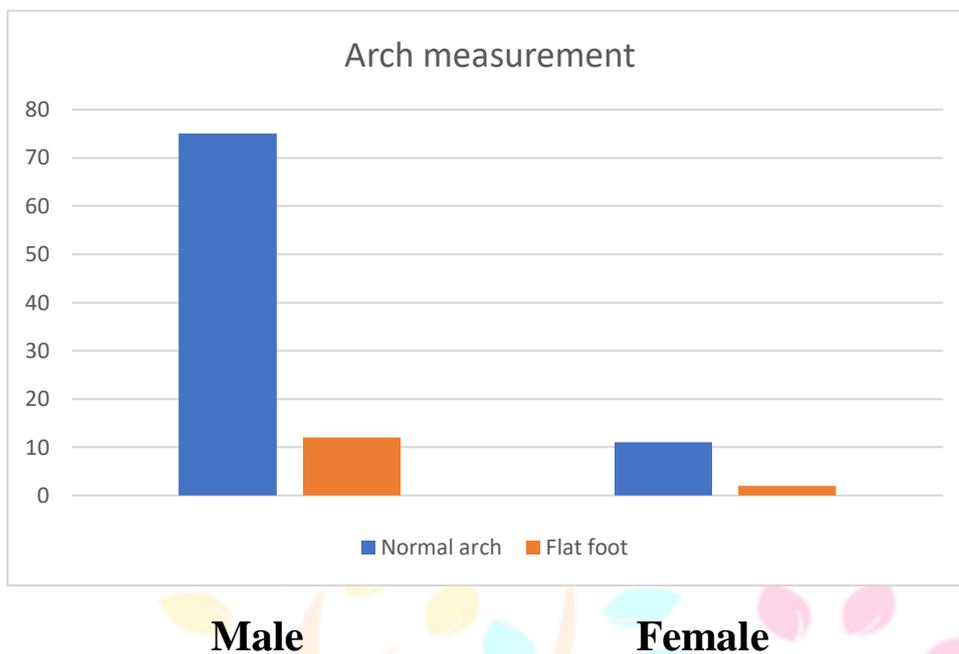


Figure 10 : Graphical representation of gender wise distribution of medial longitudinal arch and flat foot

Table 7 : Subjects using Hard type and Soft type shoe

| Type of shoe | Soft | Hard |
|--------------|------|------|
| Male | 10 | 77 |
| Female | 3 | 10 |
| Total | 13 | 87 |

Table 9 represents Out of 100 subject , 10 males were using soft sole shoe , 77 males were using hard sole , 3 females were using soft sole shoe , 10 females were using of hard sole in females.

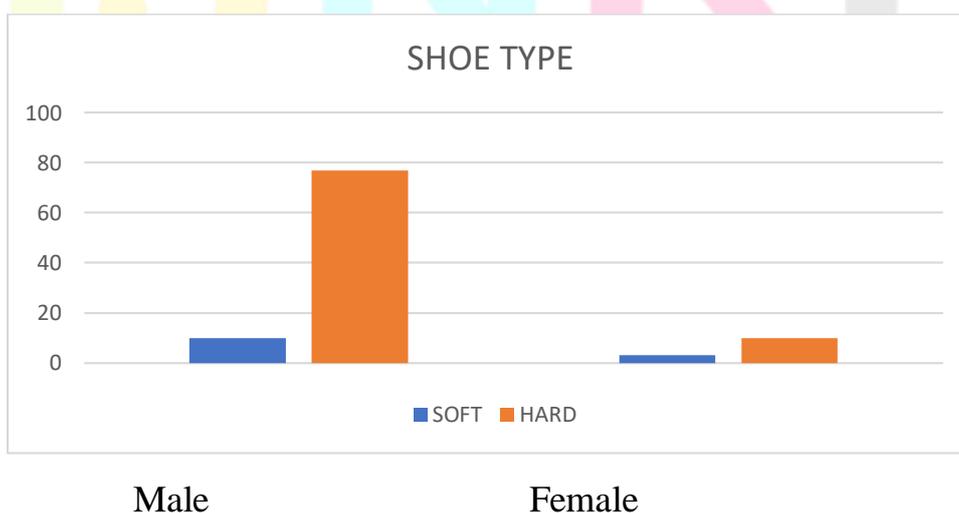
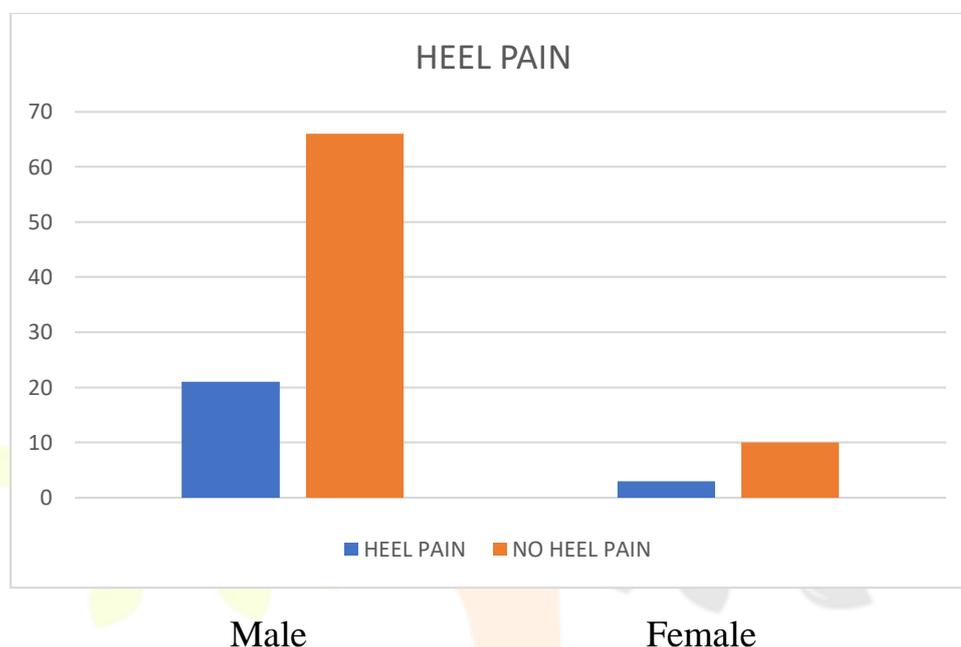


Figure 11 : Graphical representation for using hard and soft sole

Table 8 : Subjects have with heel pain and without heel pain

| Gender | Heel pain | No heel pain |
|---------|-----------|--------------|
| Males | 21 | 66 |
| Females | 3 | 10 |
| Total | 24 | 76 |

According to table 10 Out of 89 males ; 21 subjects have heel pain ,66 subjects have no heel pain, Out of 13 females ; 3 subjects have heel pain , 10 subjects have no heel pain.

**Figure 12 :Graphical representation for number of heel pain subjects**

Out of 100 Samples taken , only 24 subjects had heel pain. The physical examination of individuals with heel pain revealed that 24 subjects had plantar fasciitis . from collected data, the estimated occurrence of heel pain with plantar fasciitis is 34.78% .weight bearing / Standing was the most complained aggravating factor with a percentage of 34.78 % . From analysis of age as a risk factor shows that age group ranging from 40-60 years accounted for 45% and over weight 40% . analysis of gender only 3 female and 21 Male subjects affected . Long standing hours more than 6 to 8 exposed 84 % , shoe type was also considered to be a risk factor . hard shoes was of greater percentage of 70.84% out of 24 heel pain subjects . in sub group of 20 -40 age group low prevalence of occurrence of plantar fasciitis .

Discussion

The study aim is to observe the incidence of predisposing factors of plantar fasciitis in security guards at SVIMS university and TTD .out of 100 participants only 24 had Plantar fasciitis which comprised 34.78% during the observational period of 3 months. Focused risk factors include age , BMI, long duty hours and type of shoe .

We found 24 subjects, age ranged from between 40-60 was about 53.3 % , with BMI of 22 to 26 and 4 to 8 hours of standing

An antecedent Study Showed that plantar fasciitis remained an important public health disorder as 10 % of the population presented with heel pain over their lives where 83 % of the patient were active working adults." ⁽⁵⁰⁾

Another preceding study the prevalence of heel pain was estimated to range from 3.6%. to 7%. And the disorder has been reported to account for about 8% of all running related injuries. ⁽⁵¹⁾

Focused predisposing factors include gender, age, BMI, Long duty hours, type of shoe. Age 40 to 60 years was found to be more affected about 100 Samples.

Another study showed that aid condition had been reported to peak between 40 to 60 year of age, Association between obesity and said problem was 34.78% in our study. A Remote Study showed that increased body weight and a BMI had been shown to be Significant risk factor for plantar fasciitis. more a BMI of more than 30 had an odd ratio of 5.6 % compared with a BMI of less than 25 % ⁽⁵²⁾

During the observation period of 3 months I found 24 subject with heel pain .the age group of 40 -60 with BMI 24 -30 has an 34.78 % increased risk factor for plantar fasciitis .In this study , no person had a notice of any associated foot deformities.

If the duration of standing was more than 8 hours there might be chances of affecting plantar fasciitis in more individuals . since the study duration was short period , sample size is small.

If the sample size was large with longer study duration , there might be correlation with the BMI , age , hours of standing duration Several studies also mentioned an association between work related prolonged weight bearing and plantar fasciitis, among Considered predisposing factor, type of foot wear also played an important role in developing heel pain about 71.1%. ⁽⁵³⁾

Focusing on this problem will create awareness regarding plantar fasciitis and its impact on the predisposing factors such as age , gender , BMI , type of shoe .the matter can be dealt efficiently by decreasing duty hours, modified foot wear and decreasing the weight bearing time by alternating the work duration period .

CONCLUSION

Although the condition has very low prevalence but tackling with the causative factors it can help to eradicate the emergence at early point of time . The individuals who have been exposed to the risk factors but have not yet developed the condition , can be prevented from it by addressing the issues leading to the said complaints .Age group 40 -60 years, male , BMI with 24 -26kg / m² and weight bearing time/ walking time more than 4- 8 hours , type of shoe were found to have strong association with the condition .

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ANNEXURE – 1

PROFORM FOR DATA COLLECTION

NAME OF THE SUBJECT :

DATE :

IP.NO :

AGE :

GENDER : MALE / FEMALE

OCCUPATION :

SIDE INVOLVED :

HEIGHT :

WEIGHT :

BMI :

DURATION OF STANDING & WALKING :



ANNEXURE – 2

CONSENT FORM

I _____ {name} _____ voluntarily give consent to participate in the study entitled “To evaluate the incidence of predisposing factors of plantar fasciitis in security guards at SVIMS university and TTD : observational study. In doing so I affirm that:

- I have been given full information in my native language about the study and have understood the purpose and nature of the study and the potential risks to me resulting from my participation in the study.
- I have been given ample opportunity to ask questions, which have been answered to my satisfaction.
- I understand that my participation in the study is purely voluntary and that unwillingness/refusal to participate will not adversely affect the medical care due to me.
- I have been assured that there is no additional medical expenditure to be incurred by me on account of my participation in the study.
- That I faced no coercion to sign this consent form.
- I have been informed that notwithstanding my signing this consent, I can withdraw from the study at any point of time, without it compromising in any way, the medical care to which I am entitled.

Signature of patient

Signature of Witness

Signature of Investigator

Name of patient

Name of Witness

Name of Investigator

Date

Date

Date

Place

Place

Place

ANNEXURE – 3

సమ్మతి పత్రం

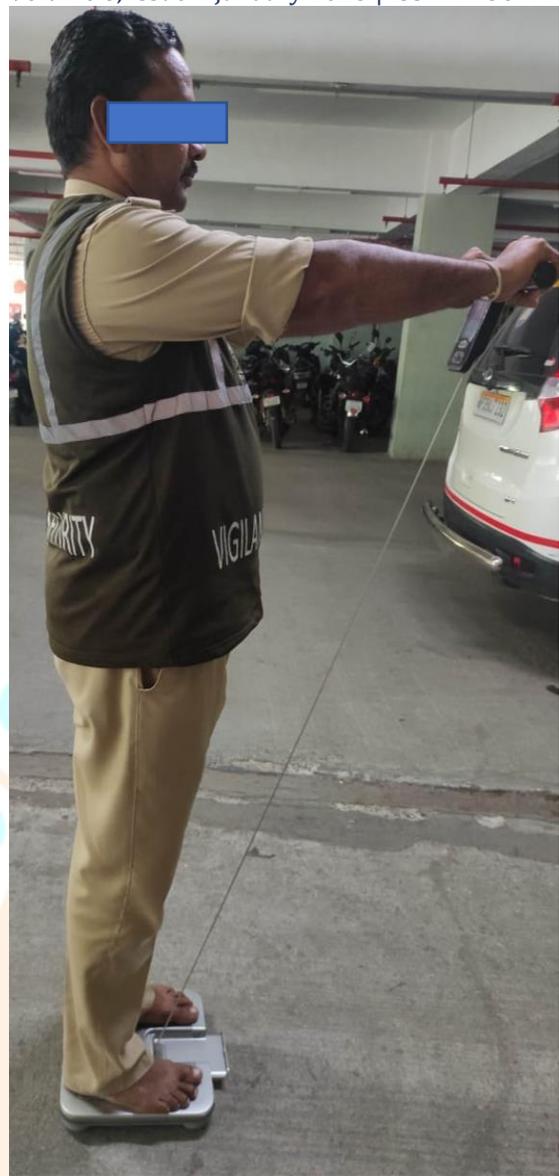
అధ్యయనం పేరు ” Evaluate the incidence of predisposing factors of plantar fasciitis in security guards ”

_____ (_____) _____

- నేను _____
- నేను _____
- _____
- _____
- _____
- _____
- _____

| | | |
|------------------|--------------------|-------------------|
| రోగి సంతకం | సాక్షి సంతకం | పరిశోధకుని సంతకం: |
| రోగి పూర్తి పేరు | సాక్షి పూర్తి పేరు | పరిశోధకుని పేరు |
| స్థలము | స్థలము | స్థలము |
| తేదీ | తేదీ | తేదీ |





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figure 14 & 15 : Recording height , weight , BMI of the security guards by using portable body composition analyser in male population.

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figure 16 : Recording height , weight , BMI of the security guards by using portable body composition analyser in female population.



Figure 17 : Testing windlass test in subjects with heel pain