Prevalence of Plantar Fasciitis in Mall Workers of Kolhapur City

Payal Ingawale[1], Dr. Maithili Patil[2]
[1,2]*D Y Patil Education Society DU Kolhapur*

Abstract- Background- Plantar fasciitis is a most frequent cause of heel pain which may affect activities of daily living. Multiple factors can contribute to plantar fasciitis, but the most common factor is prolonged weight bearing. The classical presentation is a sharp pain elicited by palpation over the medial calcaneal region. Plantar fasciitis can be best diagnosed clinically by windlass test in which passive dorsiflexion of great toe causes sudden severe pain over plantar aponeurosis. Plantar fasciitis has been treated conservatively by proper physiotherapy, and by surgical intervention in most severe cases. Methodology- An observational study was conducted by using convenient sampling in mall workers of Kolhapur city. The data collection sheet was prepared and distributed to the study population. Data was then analyzed by statistical analysis. Result- The prevalence plantar fasciitis in mall workers of the Kolhapur city was 35.13%. Out of 39 respondents 25(37.88) were male and 14(31.11%) were females. This means of prevalence of plantar fasciitis in targeted population, for male respondents was 37.88% and for females was 31.11% with p value 0.46. Conclusion- Plantar fasciitis may cause disabling condition, which may further affect quality of life. Occupation that requires prolonged standing or walking are prone to develop plantar fasciitis. Complains of heel pain that was felt by respondents ranged from low to moderate category.

Keywords- Plantar fasciitis, pain, standing, walking.

INTRODUCTION

There are multiple factors that may develop plantar faciitis. Intrinsic factors includes high BMI, age excessive foot pronation, limited ankle dorsiflexion; extrinsic factor includes occupational prolonged weight bearing, inappropriate foot wear these factors contribute to create a pathological overload over the plantar aponeurosis at the calcaneal insertion, causes micro-tears in the fascia that gives rise to perifascial edema and increase heel pad thickness which can be identified during surgery. These underlying changes can be seen on magnetic resonace imaging. Plantar fasciitis has been associated with obesity, middle age & Biomechanical abnormalities in the foot such as tight Achilles tendon, tight hamstring, pes cavus & pes planus [1-3]. Weakness in gastrocnemius muscle, tensor fasciae latae and gluteal muscle including gluteus maximus and gluteus medius has an impact on plantar fascia load distribution. Therefore, gluteal muscle weakness may be an important etiological factor in plantar fasciitis. Reduced strength in hip abductor and external rotator may lead to incidence of plantar fasciitis as these muscles play an important role in dynamic alignment in lower extremity. In weak hip abductors and external rotators, hamstring works in compensation and this may turn into tightness in hamstring and increased knee flexion which results in prolonged forefoot loading and promote windlass mechanism [4]. Ergonomic factor is one of the most frequent cause of occupational disease. Working with standing position for a prolonged time everyday can cause health problem. Sale workers job description requires to work by standing & moving longer cause the muscle to get load statically.

Plantar fasciitis is a most frequent cause of the heel pain. Plantar Fascia extend from Plantar Surface of calcaneus to the Metacarpal heads & supports the medial arch of the foot. During weight bearing or walking, load on the foot is supported by the passive structure bone & ligaments, therefore maximum stress of the body weight falls on the ligaments & Plantar fascia. Pain is felt over the inner aspect of soul or heel during weight bearing. The pain usually worst in the morning. On examination tenderness at the inner part of the calcaneus, at site of origin of plantar fascia is seen. Pain is relieved as soon as weight bearing is discontinued. Occupations that involves prolonged periods of standing & maintaining an upright posture, are associated with an increased risk of Plantar fascia[5].

Differential diagnosis is as following, metatarsalgia in which pain and tenderness is located under the metatarsal heads, Morton's metatarsalgia which may be caused due to thickened digital nerve where the sudden onset of pain with burning sensation is felt over the outer border of the forefoot and in between the third and fourth toes while walking. In tarsal tunnel syndrome pain and burning sensation sometimes paraesthesia may felt in toes and sole of the foot along with distribution of medial plantar ligament [6]. Diagnosis of the plantar fasciitis can be done clinically with appropriate history. Windlass test can be best diagnose plantar fasciitis.[7] Instead of this ultrasonography, radiography or magnetic resonance imaging can be used for confirmatory diagnosis. In plain radiography the absent or narrowing of the fat pad deep below the plantar fascia, and thickening of the plantar fascia, and cortical changes may be seen. Ultrasonography may show thick plantar fascia, calcification of plantar fascia, loss of fibrillar structure, connections in the perifascial fluid. Oedema in the adjacent soft tissues or plantar fascia thickening may be detected by magnetic resonance imaging [1]. X-ray of the heel may show bony spur in the calcaneus which may not have much significance. Continues overstrain of plantar fascia may be due to constant weight bearing, running, excessive exercises lead to stripping of the periosteum from its origin at the calcaneus. Thus, the gap is formed which is filled by proliferation of the bone results in formation of the calcaneal spur. Therefore, calcaneal spur may ultimately have formed as a late sequela of plantar fasciitis. The calcaneal spur may or may not be painful.

Soft cushion heel or silicon heel pads are being used inside the shoe to relive the overpressure area of weight bearing. NSAIDs drugs or local steroid injection into plantar fascia are also given to relieve pain. Morning exercises focusing on intrinsic muscles in warm water before initiating weight bearing are helpful to lessen the morning pain [6]. Several treatment option are available to relieve Plantar heel pain including, cryotherapy, stretching, foot orthosis, night splinting & Invasive therapy. Other treatment interventions such as Ultrasound, exercise, Extra corporeal shockwave therapy or manual therapy are used [8]. There has been research done on musculoskeletal discomfort among sales promotion girl, in which they have found prevalence of discomfort of waist, right calf, low back, left calf. Several studies stated prevalence of plantar fasciitis in a prolonged standing occupations. Mall worker job requires prolonged standing at their workplace which may give rise to develop plantar fasciitis. The study was aimed to study prevalence of plantar fasciitis in mall workers of Kolhapur city.

MATERIALS AND METHODS

The study was conducted in Kolhapur city among 111 mall workers. All the necessary ethical clearance was obtained from the Institutional Ethical Committee.

Inclusion criteria –Mall worker standing for 6-7 hour/day, belonging to both the genders, age group 25-40 years and having work experience of more than 2 years.

Exclusion Criteria-Participants having history of recent lower limb surgery (last 6 months), history of recent lower limb fracture, Acute ankle sprain, Achilles tendinopathy, Radiating pain in lower limbs, Multiple joint pain, Tarsal tunnel syndrome.

A data collection sheet was prepared and distributed among them. Data collection sheet included demographic data, work description and diagnostic criteria for plantar fasciitis. Entire data collection sheet was explained to each respondent. The minimum number of criteria for diagnosis of plantar fasciitis was three out of four.

Data was collected from each participant. A brief demographic data was obtained and respondents were diagnosed with plantar fasciitis using above diagnostic criteria. Prevalence of plantar fasciitis was calculated by statistical analysis.

Fig.4 Assessment of windlass test

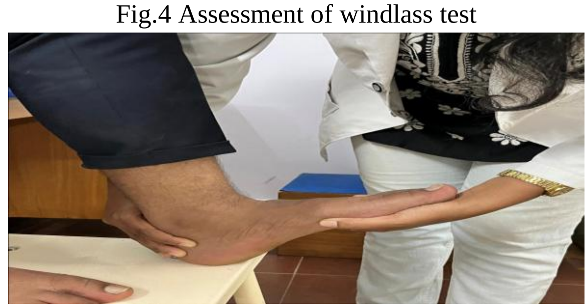

Figure 5. Assessment for pain while dorsiflexion of ankle

RESULTS

Table 1. Prevalence of plantar fasciitis in male and female mall workers

Gender	No. of Respondents	Percentage	P Value
Male	25	37.88%	0.46
Female	14	31.11%	

Table 2. Diagnostic criteria felt by total number of respondents

Diagnostic criteria	No. Of Respondents	Percentage
Palpation of medial plantar calcaneal region elicits a sharp pain	48	44%
Painful first step in the morning	31	28%
Dosriflexion of the great toe and MTP joint extension sudden severe pain over plantar aponeurosis	41	37%
Passive ankle dorsiflexion causes discomfort in proximal plantar region	25	22.9%
None	56	51.4%

Table 3. Total number of diagnostic criteria felt by respondents

Total No. of Diagnostic Criteria	No. of Participants	Percentage
0	59	53%
1	5	5%
2	8	7%
3	28	25%
4	11	10%

Table 4. Age wise distribution of respondents

Age	No. of Respondents	Percentage
25-30	58	52%
31-35	26	24%
36-40	27	24%
Total	111	100%

Table 5. Gender wise distribution of respondents

Gender	No. of Participants	Percentage
Female	45	59%
Male	66	41%
Total	111	100%

Table 6. Work experience (in years) of the respondents

Work experience	No. of Respondents	Percentage
0-5	47	42%
6-10	38	34%
11-15	15	14%
16-20	11	10%
Total	111	100%

DISCUSSION

The above study was an observational study which mainly focused on mall workers, as mall worker job requires prolonged standing or walking on duty. The purpose of this study was to find out prevalence of plantar fasciitis in mall workers of Kolhapur city. Because of prolonged upright posture lower limbs and back are under constant stress and develop number of musculoskeletal problems. It is found that 35.13% of targeted population have plantar fasciitis.

Out of 111 respondents 39(35.13%) respondents full filled the criteria (three or more than three out of four) of plantar fasciitis. The prevalence plantar fasciitis in mall workers of the Kolhapur city is 35.13%.

Out of 39 respondents 25(37.88%) were male and 14(31.11%) were females. This means of prevalence of plantar fasciitis in targeted population, for male respondents is 37.88% and for females is 31.11% with p value 0.46.

The workers ages range from 25-40 years. Out of that 58(52%) respondents were from age group of 25-30 years, 26(24%) respondents were between 31-35yrs, 27(24%) respondents were from age group of 36-40yrs. Several studies revealed the incidence of plantar fasciitis is higher in old age and middle age [9-11]. One previous study was conducted, it was found that incidence of plantar fasciitis was higher in age greater than 24 years than ages of 20 to 24 years.

The male respondents were more than female. Out of 111 respondents 66 (59%) were males and 45(41%) were females. The male workers were more than female workers, this could be due to higher population of the males in mall workers of Kolhapur city. In the above it was study found that male worker had higher prevalence of plantar fasciitis (37.88%) than female (31.11%) in mall workers of Kolhapur city. Although studies stated incidence of plantar fasciitis was higher in females than in males [12,10-11] the study conducted by Granado et.al which found no difference in male and female in terms of developing plantar fasciitis[13].

About 10% of respondents had work experience of 16-20 years , 14% of respondent had work experience of 11-15yrs, about 34% respondents had 6-10 years of work experience and 42% respondents had experience of 2-5 yrs. Out of 111 respondents 97(87%) had standing duration of less than 8hr and 14(13%) respondents had standing duration more than 8hr. About 87% of targeted population had standing duration less than 8 hours and 13% had more than 8 hrs. As prolonged standing occupations are more prone to develop plantar fasciitis, the incidence of plantar fasciitis found with increasing years of working & increasing duration of standing or walking. Job requiring 3-6 hours /day or 6-12 hours /day standing or walking are at greater risk of developing plantar fasciitis [11].

Several studies used diagnostic criteria for plantar fasciitis[11,14]. Similarly, we used diagnostic criteria for diagnosis of plantar fasciitis. The minimum number of criteria for diagnosis of plantar fasciitis was three out of four in present study.

Majority of the respondents 48(44%) were felt the palpation of medial plantar calcaneal region elicits a sharp pain and 41 (37%) were felt the dosriflexion of the great toe and MTP joint extension sudden severe pain over plantar aponeurosis. Painful first step in the morning was the felt by 31(28%) respondents. 25(22.9%) respondents had felt passive ankle dorsiflexion causes discomfort in proximal plantar region. The maximum number of respondents 56(51.4) felt none of the given diagnostic criteria . Pain on palpation over medial calcaneal region and painful morning step may be because of degeneration of plantar fascia. Great toe extension, dorsiflexion at MTP joints or at ankle joint produces tension in the plantar fascia that elicits sharp pain over plantar fascia. The respondents who all had felt one or two symptoms in given diagnostic criteria were at higher risk of developing plantar fasciitis. They need to be aware of plantar specific stretching and strengthening programs, appropriate footwear, minimize standing duration whenever possible to reduce risk of incidence of plantar fasciitis.

CONCLUSION

It was found that prevalence of plantar fasciitis in targeted population is 35.13%. Complains of heel pain that was felt by respondents ranged from low to moderate category. The mostly felt complaints were palpation of medial plantar calcaneal region elicits a sharp pain, dorsiflexion of great toe and MTP joint extension causes sudden severe pain over plantar aponeurosis . Plantar fasciitis may cause disabling condition, which may further affect quality of life. Occupation that requires prolonged standing or walking are prone to develop plantar fasciitis. Mall workers were suggested to sit down whenever there was no task that require to take standing position. Mall workers also advised to stand with good posture and not to take whole body weight on single leg, use soft and flat footwear. It is also suggested to warm up before and after work , calf and TA self-stretching in between the working hour.

It is important to make aware prolong standing workers in the mall about daily exercise including stretching, strengthening and endurance exercises to reduce the risk of plantar fasciitis.

REFERENCE

[1] Ferdinando Draghi, Imaging of plantar fascia disorder: findings on plain radiography, ultrasonography and magnetic resonance imaging, Insights imaging, 2016, 869-878

[2] Suhas Aradhya BM, Ultrasonographic assessment of Indian patients with plantar fasciitis and its clinical correlation: A prospective observational study, 2023, Cureus 15(3)

[3] Komal Santosh Bhoir, prevalence of plantar fasciitis among nurses at a tertiary care centre in a rural area: A cross sectional study, International journal of physiotheraphy research 2021, vol 9(4)

[4] Jin Hyuck Lee,The effects of hip strengthening exercises in a patient with plantar fasciitis ,medicine 2019, 98[26]

[5] Ni Ketu Maya Purvitagiri, correlation between prolonged standing and plantar fasciitis,journal of Orthopaedi and Traumatology Surabaya , 2017, vol 6,no.1, 33-39

[6] Jayant joshi, Orthopaedics and applied physiotheraphy, 3rd edition, page no. 2215-2244

[7] Lori A Bolgla, plantar fasciitis and the windlass mechanism ; a biomechanical link to clinical practice , Journal of atheletic training,2004, 39[1],77-82

[8] David J. Magee, Orthopedic physical assessment, page no.941

[9] Karthik G. Mohanraj, Knowlegde and awareness on the association between higher body mass index and plantar fasciitis among Chennain population-A survey, International journal of dentistry and oral science, 2021;08(03):1957-1962

[10] Richard L. Nahin, Prevalence and pharmaceutical treatment of plantar fasciitis in US adults, The journal of pain Volume 19, 2018, pages 885-896

[11] Zenat Khired, The prevalence and risk factors of plantar fasciitis amongst the population of Jazan, Cureus14 (9), 2022

[12] Jennifer Anderson, Musculoskeletal disorders, foot health and foot wear choice in occupations involving prolonged standing, International journal of industrial ergonomics 81, 2021

[13] Granado MJ, Effect of gender, toe extension position, and plantar fasciitis on plantar fascia thickness, foot and ankle international journal 2019,40:439-46

[14] Aditi Jadhav, Comparative effectiveness of Gua Sha, cryotheraphy, and positional release technique on tenderness and function in subjects with plantar fasciitis : a randomised clinical trail, Int. J Ther Massage Bodywork 2023,16(1): 13-23