



A CROSS SECTIONAL STUDY TO FIND OUT PREPONDERANCE OF PLANTER FASCIITIS IN TRAFFIC POLICE OFFICERS OF SURAT CITY

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ABSTRACT

Introduction: The plantar fascia, or plantar aponeurosis, is the investing fascial layer of the plantar aspect of the foot which consists of a network of connective and adipose tissues. In addition planter fasciitis foot related factors such as pronated foot type, limited ankle joint dorsiflexion, first metatarsophalangeal joint dorsiflexion and reduced muscle strength, more over that shown planter heel pain is associated with a range of person-level factors, including increased body mass index (BMI), depression, anxiety and stress, and occupations requiring prolonged periods of standing.

Objective: To determine the preponderance of plantar fasciitis among traffic police in Surat city. To determine most effective work related risk factor among traffic police in Surat city.

Methodology: 150 traffic police were included in the study. There were 135 male and 15 female age between 20-50 years was taken from region 1, 2, 3, 4 traffic police office at Surat, Gujarat. All these participants were interviewed by the interviewer based on the self-administrated questionnaires using Google form.

Results: All the variables and self-made questionnaire's questions were analysed based on their frequency distribution. There were 94% of total participants have 8 hour of work. Out of 150 participants 34 having positive windlass test. There were 24.3% having quite a bit pain during stair climbing.

Conclusion: This study concluded that over all preponderance of traffic police officers in Surat city is 37%. In that high prevalence was found in males were more as compared to females.

Keywords: Plantar Fasciitis (PF), Traffic police officer, Prevalence, Windlass test

INTRODUCTION

The structure of the sole of the foot consists of skin, superficial fascia, deep fascia, muscles, vessels and nerves. The superficial fascia of sole is fibrous & dense while deep fascia is thick in the centre & thin at the sides. The thickened central part is known as the plantar fascia.^[1] The function of the plantar fascia during gait is augmented by the dynamic actions of several other extrinsic muscles of the foot.^[2] During loading phase of the gait cycle plantar fascia allows for flexibility of the midfoot and provides shock absorption.^[3]

Plantar fasciitis [PF] is a soft tissue injury commonly resulting in inferior heel pain. It is the inflammation of plantar fascia at the medial tubercle of calcaneum.^[4] The condition is defined as a sharp pain at the medial plantar aspect of the calcaneus and medial longitudinal arch of the foot. It is usually aggravated with the first few steps in the morning and after long periods of non-weight-bearing that diminishes as walking progresses, with fascial stretching and metabolite dispersing.^[5]

It is estimated that more than 1 million patients seek treatment annually for this condition, with two-thirds going to their family physician.^[6] This overuse injury that occurs due to repetitive strain causing micro-tears of the plantar fascia.^[7] Some occupations demand prolonged standing that causes weight bearing on the foot because of these the repetitive tensile load placed on the fascia that considered risk to PF.^[8]

A number of factors have been suggested that may increase the risk of developing PF. These include age, sex, weight, pregnancy, being flat-footed (pes planus), having a high arch (pes cavus) or having an abnormal pattern of walking. Shoe type is also thought to be important with loose, thin-soled shoes and shoes without enough arch support or flexible padding to absorb shock possibly increasing the risk of PF.^[8]

PF is often occurred in sports activities that involve long distance walking and running. It is also frequently seen in dancers, tennis players, basketball players and non-athletes whose occupations require prolonged weight bearing.^[9] Traffic police requires extended periods of weight bearing throughout the day, for more than 4-8 hours. A review published in 2000 examined whether work exposure was a risk factor for foot pain. Based on the three studies that were included in the review, the author concluded that prolonged standing and walking were risk factors for developing foot pain including PF.^[10]

Although the majority of the patients with PF have resolution of the symptoms within 10 months but approximately 10% have development of impairment of activity and disability.^[11,12] PF is usually treated conservatively. Conservative treatment is almost always successful; most patients respond and are better within 9 months of physiotherapy treatment. Conservative treatment includes medical therapy and physical therapy. Medical therapy includes NSAIDs, injecting local steroids etc.^[13] Physical therapy includes taping, stretching, night splints, shoe insert, thermal modalities, ultrasound therapy, laser therapy, myofascial release technique etc, have been advocated to manage the PF.^[14]

Various tests have been advocated to diagnose and to measure the extent of PF. It can be measured by active and passive ankle dorsiflexion test, dorsiflexion – eversion test, windlass test and longitudinal arch angle.^[15] Windlass test is very essential test use to rule out impairment of body structure related to fascia and ligaments of the foot. Sensitivity of windlass test in weight bearing test is 0.33 while specificity is 0.99. Where as in non-weight bearing test Sensitivity is 0.18 & specificity is 0.99.^[15]

In India two study have been reported that due to prolonged standing hours may affect leg, knee, lower back and sole of foot in traffic police. Most commonly traffic police having pain at base of heel, tenderness at the bottom of the foot, burning or often sharp pain, swelling at the bottom of foot as well as limp may be present over heel. Traffic police having mostly severe pain after continuous standing at the side of job for 6-8 hours.^[16]

To our knowledge, there is no study in the literature which has evaluated the frequency of plantar fasciitis in traffic police. Thus, the rationale of the present study was to find out the prevalence of the plantar fasciitis among traffic police in Surat city and profession associated risk factor in traffic police.

MATERIAL & METHODOLOGY

Study design: A cross sectional study

Sample size: Total sample size of n= 150 was obtained by using an online calculator.

Study duration: 6 months.

Sampling technique: convenient sampling.

Study setting: Division 1,2,3,4 Traffic Police Office, Surat, Gujarat.

Inclusion criteria: Both male and female of Age between 20 to 50 year, Complain of Morning pain and stiffness, History of pain since 6-8 weeks, Prolonged standing up to 4 -8 hours daily during work, History of heel pain on palpation of medial planter calcaneal region and bottom of heel, No history of pain any trauma/surgery at foot since last 6 month.

Exclusion criteria: History of systematic diseases or trauma, Standing position less than 4 hours, Any injection taken on the heel within 3 months, Use of any assistive device or splints, History of neurological, cardiac or musculoskeletal problems and any psychological disease.

Outcome measure: Visual analogue scale (VAS), Self – administered Questionnaire using Google form (https://docs.google.com/forms/d/1IROfr3QZLL6xrmlY_v2aFN4Yv5cY-iURDw_0DxnVL0/edit?ts=60757bfd)

Procedure: A Convenient sample of 135 male and 15 female age between 20 to 50 were taken from region 1:-(Kharvarnagar), Region 2:- (Katargam), Region 3:- (Athwagate), Region 4:-(Adajan patiya), Surat after receiving permission from head of department, traffic police association, Surat, Gujarat. Participants were selected for study based on inclusion and exclusion criteria. All participant were asked to sign consent Google form prior to participate in the study. An online self-administered questionnaire was used to collect data. Questionnaire include total three sections. First section is Informed consent. Second section includes the demographic data and total duty hours. Third part of the questionnaire includes questions related to participants pain level (measured with VAS), site of pain, duration of pain, timing of pain, any swelling, current medication, windlass test, other questions such as how much does your foot health limit your climbing stairs?, due to plantar fasciitis how foot affects your mobility/function and activity of daily living and presence of other associated disease. Patients were diagnosed based on history of heel pain, positive windlass test and other symptoms like tightness after standing up from bed in morning, heel pain on palpation of the medial plantar calcaneal region.

STATISTICAL ANALYSIS & RESULTS:

Statistical analysis was done using SPSS version 21.00 software. This study included AGE, GENDER, BMI and VAS as quantitative variables. All the variables and self-made questionnaire's questions were analysed based on their frequency distribution. Variables were also analysed based on gender distribution.

There were 135 male and 15 female out of 150 participants in study. The mean age of male participants was 27.88 (5.84) whereas mean age of female participants was 26.40 (7.34).

Table 1: Descriptive statistics of selected variables of participants(n=150)

VARIABLES	MEAN ± STD.DEVIATION
Age	27.7 ± 6.003
Height (cm)	168.35 ± 5.89
Weight (kg)	63.25 ± 10.20
BMI	22.31 ± 3.54

Table 2 Percentage distribution according to hours of work

Hours of work	Percentage
Less than 4 hour	0.7%
8 hour	94%
9 hour	0.7%
10 hour	2.7%
12 hour	2%

Table 3: Descriptive statistics of selected variables based on intensity of heel pain (N=150)

	GENDER	FREQUENCY		PERCENTAGE	
		YES	NO	YES	NO
PAIN IN EARLY MORNING	MALE	19	116	14.1	85.9
	FEMALE	2	13	13.3	86.7
PAIN WHOLE DAY	MALE	10	125	7.4	92.6
	FEMALE	0	15	0	100
PAIN IN LATE NIGHT	MALE	6	129	4.4	95.6
	FEMALE	0	15	0	100

Table 4: Descriptive statistics of selected variable based on duration of heel pain.

PAIN DURATION	GENDER	FREQUENCY		PERCENTAGE	
		YES	NO	YES	NO
PAIN SINCE 1-2 WEEK	MALE	11	124	8.1	91.9
	FEMALE	1	14	6.7	93.3
PAIN SINCE 2-4 WEEK	MALE	7	128	5.2	94.8
	FEMALE	0	15	0	100
PAIN SINCE 4-6 WEEK	MALE	11	124	8.1	91.9
	FEMALE	0	15	0	100
PAIN SINCE 6-8 WEEK	MALE	6	129	4.4	95.6
	FEMALE	1	14	6.7	93.3

Based on the percentage of windlass test, there were total 37% of participants have positive windlass test out of which 23.7% were male and 13.3% were female participants.

Frequency distribution of participants having heel pain while climbing the stair shows 24.3% having quite a bit pain during stair climbing. Response was divided into 5 categories.

Frequency distribution of participants having heel pain on the basis of level of activity shows 24.3% population have quite a bit difficulty while doing any kind of work or activity.

Frequency distribution of participants having heel pain and found difficulty in searching suitable as well as comfortable shoes (footwear) shows 29.7% strongly agreed with the difficulties during selection of shoes, where as 24.3% disagreed with statement.

Frequency distribution of participants having heel pain which disturb their emotional and physical health reported as small to moderate amount of time. Total 1.3% participants have reported swelling at the ankle joint as well as on medication.

Total 35.1% reported worry for their heel pain and 27% reported anxiety for the same.

Frequency distribution of participants having heel pain along with the other joint pain shows 2.2% male have hip pain 3.0% male have knee pain whereas 2.2% male have ankle pain along with heel pain.

DISCUSSION

The present cross sectional study was conducted to find out the prevalence of planter fasciitis in traffic police of surat city. Secondary aim of the study is to determine the work related risk factor associated with development of heel pain in traffic police officers.

In this study total 150 participants were selected based on the inclusion and exclusion criteria. Out of 150 participants, there were 135 male and 15 female having mean age of 27.88 ± 5.84 and 26.40 ± 7.34 years respectively.

Result of the study shows 37% subjects have PF with positive windlass test. Out of total 37% of prevalence 23.7% prevalence found in male participants and in female participants prevalence rate of PF is 13.3% with positive windlass test.

Work for long hours involve standing continuously on daily basis. They are indulged in performing their duties efficiently, not even realizing the negative impact of those on their physical health particularly affecting musculoskeletal system. During the hours of their duty, they may adopt a relaxing posture which may affect their physical health. Moreover, prolonged standing during duty hour lead to muscle fatigue and continuous weight on heel.

Due to nature of work of traffic police officers, unhealthy diet and irregular eating time and lack of exercise make them obese and the long static standing hours makes their body stiff. Improper footwear they use also causes foot posture related problems especially as they require to stand for long hours.^[17] According to systemic review, the proportion of time standing on a hard surfaces and walking is associated with an increased risk of PF.^[18]

A high proportion of participants that is 94% have duty of almost 8 long hours. This requires prolonged standing. This finding may contribute for development of PF in traffic police officers. The observed positive associations with high BMI, impaired physical and mental health, more anxiety and depression, and long duty hour and prolonged standing are consistent with previous experiments.^[19]

Ahmed Q.A, et al had done a study on frequency of plantar fasciitis among traffic wardens of Lahore. Their results shows frequency of plantar fasciitis among 147 wardens was 38.7%. A total of 90 (61.2%) subjects were having morning stiffness while 85 (57.8%) had pain on palpation of medial plantar calcaneal region. 96 (65.3%) wardens reported of having 4-8 hours daily standing work while VAS revealed severe pain experienced by 42 (28.6%) subjects. There was a significant relationship between plantar fasciitis, prolonged standing and frequent running.^[20]

In the current study there was a significant relationship between plantar fasciitis with long standings which accords with the findings of Riaz Hashmi et al. Their study comprises of 150 teacher and they found that 46.7% of studied population was suffering from plantar fasciitis. But they concluded that PF is positively associated with age; however standing hours and BMI was not associated with it.^[21]

Keith Rome et al had done a study on risk factors associated with the development of plantar heel pain in athletes. They have reported pain in the heel region in 36 runners.^[22]

As stated earlier in the text, improper footwear is also one of the risk factor for developing PF. Sharma Pallavi et al had compared the plantar fasciitis among female wearing flat footwear and heels in young adults. They concluded that 12% female out of total 20% prevalence were wearing regular heels.^[4] In our study female participants were less than the male participants and no one is wearing heels during duty hours.

Many of the factors related to the development of plantar fasciitis can be modified. In our study major factor contributing for development of plantar fasciitis is prolonged working hour which requires prolonged standing. When working in a standing or walking position the feet function as a shock absorber. The feet is also effected by gravity, and carries the weight of the whole body, but if overused, they pressure on the feet can result in problems of feet, knee, hips and spine as the body tries to compensate for pain felt in feet. Time spent on your feet is one of the most important risk factors for overuse of feet.^[23]

For traffic police it is possible to walk around and change the position of the body, and therefore they may not experience the problems related to working in a standing position as often as e.g. salesmen or factory workers. For the traffic police it is however a problem, that they are not provided chair to take a seat one in a while. What the experts argue is that there should be time for a break, and that exercise might also help reducing the pain experienced when standing for a long time. Our survey shows, that the duty shifts is a very long and with only short breaks and that the traffic police personal do not have time to exercise because of their long hours.^[24]

To conclude, our study with all the data collected and analysed, we must say that planter fasciitis having a connection with person individual profession, working hours and how they take care for their posture during duty time. Also, it affects individuals' preventive measures for their own problems. As traffic police officers having long time of duty hours and very less knowledge about their standing posture they may very prone to have any kind of foot or lower extremity related musculoskeletal diseases.

For making balance between health and work each and every professional workers need to do some daily exercises for preventing any disease in their later life span. As 'prevention is better than cure' early realisation is necessary for healthybody.

CONCLUSION

This study concluded that over all preponderance of traffic police officers in Surat city is 37%. Out of total population males are more affected than females. Apart from their work criteria there are other related problem which needs awareness and proper prevention.

LIMITATION AND FUTURE RECOMMENDATIONS

Small sample size so study can be done on huge population. Study is confined to limited area and population so it can be carried out on variety of profession. One can arrange proper exercise program and awareness camp for prevention. Also can be done with difference treatment plan for profession specific problems.

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