

# Prevalence of Plantar Fasciitis among Tea vendors of age group 23 to 45

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**Abstract :** Plantar fasciitis (PF) is a common cause of heel pain, often linked to occupational factors like prolonged standing on hard surfaces. Tea vendors represent a demographic frequently exposed to these conditions due to the demanding nature of their work. This cross-sectional survey study included 300 tea vendors in Pune aged 23–45 who had been in the occupation for at least five years and worked a minimum of six hours daily. Participants were assessed using the Plantar Fasciitis Pain/Disability Scale (PFPS) and confirmed via the Windlass Test. Out of 300 participants, 98 (32.89%) tested positive for plantar fasciitis through the Windlass Test. Statistical analysis revealed a weak positive correlation between age and PFPS scores ( $r = 0.158$ ) and a stronger positive correlation between years of working and PF prevalence ( $r = 0.262$ ). There is a significant prevalence of plantar fasciitis among tea vendors, which increases with age and cumulative years of working, highlighting the need for ergonomic interventions and preventive measures in this occupational group

## INTRODUCTION

Plantar Fasciitis (PF) is widely recognized as one of the most prevalent causes of inferior heel pain in the adult population, accounting for approximately 11% to 15% of all foot-related clinical visits.<sup>[1]</sup> It is characterized by the degeneration and inflammation of the plantar fascia—a dense, fibrous band of connective tissue that originates from the medial tubercle of the calcaneus and extends to the proximal phalanges.<sup>[1]</sup> This structure plays a pivotal role in the "Windlass Mechanism," which maintains the longitudinal arch of the foot and provides shock absorption during the gait cycle. While the condition is often self-limiting, for those in high-demand occupations, it can lead to chronic disability, significantly affecting their quality of life and economic productivity.<sup>[1]</sup>

The aetiology of Plantar Fasciitis is multifactorial, involving a combination of anatomical, biomechanical, and environmental factors. Among these, occupational hazards are increasingly being scrutinized. Individuals who are required to stand or walk on hard surfaces for more than six hours a day are at a significantly higher risk.<sup>[2]</sup> Tea vendors in India represent a unique and understudied demographic within this risk category. The "Chai-wala" or tea vendor is a staple of the Indian urban landscape, often working in small stalls or mobile carts. Their daily routine involves standing in a confined space for 8 to 12 hours, often on concrete or asphalt surfaces, with minimal opportunities for sitting or foot elevation.<sup>[2]</sup>

Furthermore, the age group of 23 to 45 years represents the peak of an individual's economic productivity. In this age bracket, the body begins to undergo subtle physiological changes; the fat pad of the heel starts to lose its elasticity, and the regenerative capacity of the connective tissues slightly declines compared to younger years. When this biological aging is coupled with the mechanical stress of prolonged standing, the plantar fascia is subjected to repetitive micro-trauma. This does not result in a simple inflammatory response but rather a "fasciitis"—a failed healing response characterized by collagen degeneration and increased thickness of the fascia.<sup>[3]</sup>

Despite the visibility of tea vendors in society, there is a lack of structured data regarding their musculoskeletal health. Most ergonomic studies focus on industrial workers or corporate employees, leaving the informal sector largely ignored. The repetitive nature of preparing and serving tea, often involving small pivots and weight shifts on hard ground, creates a specific biomechanical profile that predisposes this group to PF.<sup>[4]</sup> This study, therefore, seeks to fill this gap in literature by quantifying the prevalence of Plantar Fasciitis among tea vendors in Pune. By focusing on the 23-45 age group, we aim to identify the early-to-mid career impact of this profession on foot health, providing a basis for future ergonomic recommendations and physiotherapeutic interventions.<sup>[4,5]</sup>

## RESEARCH METHODOLOGY

### 3.1 Population and Sample

The study employed a cross-sectional survey design conducted over a period of six months to investigate the prevalence of Plantar Fasciitis among tea vendors within the geographical limits of Pune. Using a convenient sampling technique, a total of 300 participants were recruited from various tea stalls and street-side shops. The inclusion criteria targeted both male and female full-time tea vendors aged between 23 and 45 years who had been active in the profession for at least five years and maintained a minimum daily working shift of six hours. To ensure the accuracy of the prevalence data and isolate Plantar Fasciitis as the primary source of symptoms, strict exclusion criteria were implemented. Participants were excluded if they had a prior history of ankle surgery or stress fractures, or if they presented with diagnosed structural foot deformities such as Pes Planus (flat feet), Cavus foot, or Equinus foot. Furthermore, individuals with concurrent pathologies that mimic heel pain, specifically Achilles tendonitis and calcaneal heel spurs, were also excluded from the study population.

### 3.2 Data and Sources of Data

The primary outcome measure used in this study was the Plantar Fasciitis Pain/Disability Scale (PFPS). This scale was administered via a self-assisted method to evaluate the intensity of pain and functional disability. A score between 23 and 94 on this scale prompted further clinical assessment. Additionally, the Windlass Test was utilized as a confirmatory diagnostic tool. During this test, the participant stands on a step

while the examiner dorsiflexes the big toe; a positive result is indicated by pain in the plantar fascia or near the heel.

### **PFPS Plantar Fasciitis Pain/Disability Scale**

MALE or FEMALE

Dx:

Today's date \_\_\_\_ \_

Date of Birth \_\_\_\_\_

Ethnicity \_\_\_\_\_

Onset of pain \_\_\_\_\_

1. VAS: Rate your pain on a scale of 1 to 100. \_\_\_\_\_ + 8.3 = score of \_\_\_\_\_
2. How many days a week does pain affect your mobility? (1-7) \_\_\_\_\_
3. Is the pain on the surface or deep? \_\_\_\_ Surface = 1, Deep = 3

#### Pain Description

4. Where is your pain located? 0 = Toes, 1 = Ball of foot, 2 = Mid sole, 3 = Bottom of Heel
5. In the past 6 weeks how often have you had pain?  
0 = Every other week 1 = Once a week 2 = Once a day 3 = Many times a day
6. How often since the onset of pain, have you been pain free?  
0 = weeks, 1 = days, 2 = hours, 3 = minutes
7. How long does the pain last?  
0 = only when I over exert, 1 = pain lasts for less than one hour, 2 = pain lasts for one to two hours,  
3 = pain lasts for more than two hours
8. In the past 6 weeks what time of day is your pain the worst? (Note this specifically for diagnosis of different problems).  
0 = Always the same, 1 = Only in the afternoon, 2 = Both day & night,  
3 = Only when you first get up
9. In the past 6 weeks does the pain make it hard to get to sleep?  
0 = Never, 1 = Some nights, 2 = most nights, 3 = every night
10. In the past 6 weeks, how often does your pain awaken you?  
0 = Never, 1 = Some nights, 2 = most nights, 3 = every night
11. How difficult is it to cope with your pain?  
0 = Easy to deal with, 1 = Inconvenient, 2 = Troublesome, 3 = Almost impossible
12. How much does the pain interfere with your athletics or with weight-bearing activities such as walking?  
0 = never, 1 = occasionally, 2 = frequently, 3 = always

**Mobility/Function**

13. When you awake, how many minutes must elapse before you can walk comfortably?  
 0 = No time, 1 = less than 10 minutes, 2 = 11 to 30 minutes, 3 = it takes over 30 minutes until I can walk comfortably
14. Is it more comfortable to walk on your toes than walk flat footed?  
 0 = No, 3 = Yes
15. Please check the columns below that describe how much your pain affects you in different conditions. (If you are unable to perform such a task list check "Severe.")

Activity	0 = Not at all	1 = Very little	2 = Moderate	3 = Severe
Walking in the morning				
Standing up on your toes				
Driving				
Climbing Stairs				
Descending Stairs				
Reaching up				
Bending over				
Walking bare foot				
Standing after watching a movie				
Riding a bike				
Running a short distance				

16. How often do you take medication for your pain?  
 0 = Less than once a week, 1 = Several times per week, 2 = Once Daily, 3 = More than once every day, since the injury
17. Describe the medications' affect on your pain.  
 0 = It always stops the pain, 1 = Decreases the pain, 2 = Usually takes the pain away, 3 = Little or no affect on the pain
18. How does the pain affect you emotionally?  
 0 = No affect, 1 = It causes anxiety, 2 = The pain worries me daily, 3 = It makes me consider giving up my recreational activities
19. Rate the limitations that your pain/injury affects your daily life style.  
 0 = Does not limit your lifestyle, 1 = some activities avoided (i.e. riding in car or sitting in stadium for hours), 3 = You avoid all activity due to injury

Total Score \_\_\_\_\_ Date \_\_\_\_\_

### 3.3 Theoretical framework

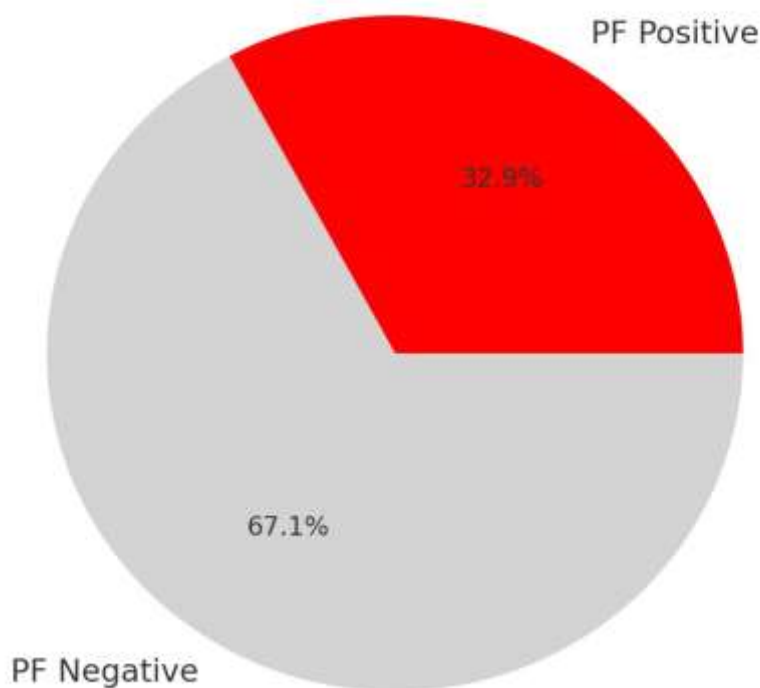
Following the approval from the Institutional Ethical Committee and the attainment of written informed consent from each participant, the study was conducted across various tea stalls in Pune. The procedure began with a preliminary screening of tea vendors to ensure they met the specific inclusion criteria, particularly focusing on their age (23–45) and professional experience (minimum 5 years). Once recruited, the participants were briefed on the nature and purpose of the study. The primary assessment involved the administration of the Plantar Fasciitis Pain/Disability Scale (PFPS), where participants provided subjective data regarding their heel pain levels and the resulting impact on their daily functional activities. Participants who scored within the symptomatic range (23 to 94) underwent a physical examination using the Windlass Test to clinically confirm the presence of Plantar Fasciitis. During this test, the participant was positioned in a weight-bearing stance on

a step, and the examiner performed passive dorsiflexion of the first metatarsophalangeal joint. A positive result was recorded if the maneuver elicited sharp pain at the insertion of the plantar fascia on the calcaneus. All collected data, including demographic details, working hours, and test results, were then meticulously documented for subsequent statistical analysis to determine the overall prevalence and correlations.

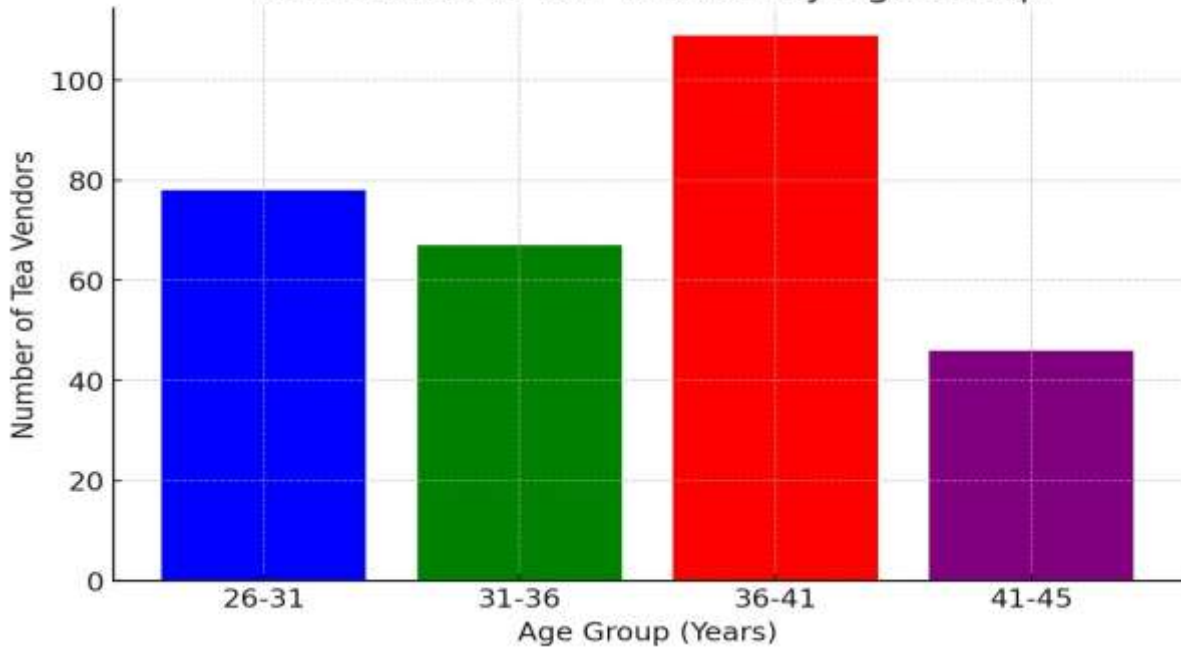
### 3.4 Statistical Analysis

Data was collected from a sample of 300 tea vendors using convenient sampling. Descriptive statistics were used to summarize the prevalence of foot pain and confirmed PF cases. Correlation analysis was performed to determine the relationship between PFPS scores and variables such as age, daily working hours, and years of occupation. The Pearson correlation coefficient ( $r$ ) was calculated, with values indicating the strength and direction of these relationships (e.g.,  $r = 0.158$  for age and  $r = 0.262$  for years of working). Prevalence rates were also calculated as percentages for different subgroups based on work duration and daily hours.

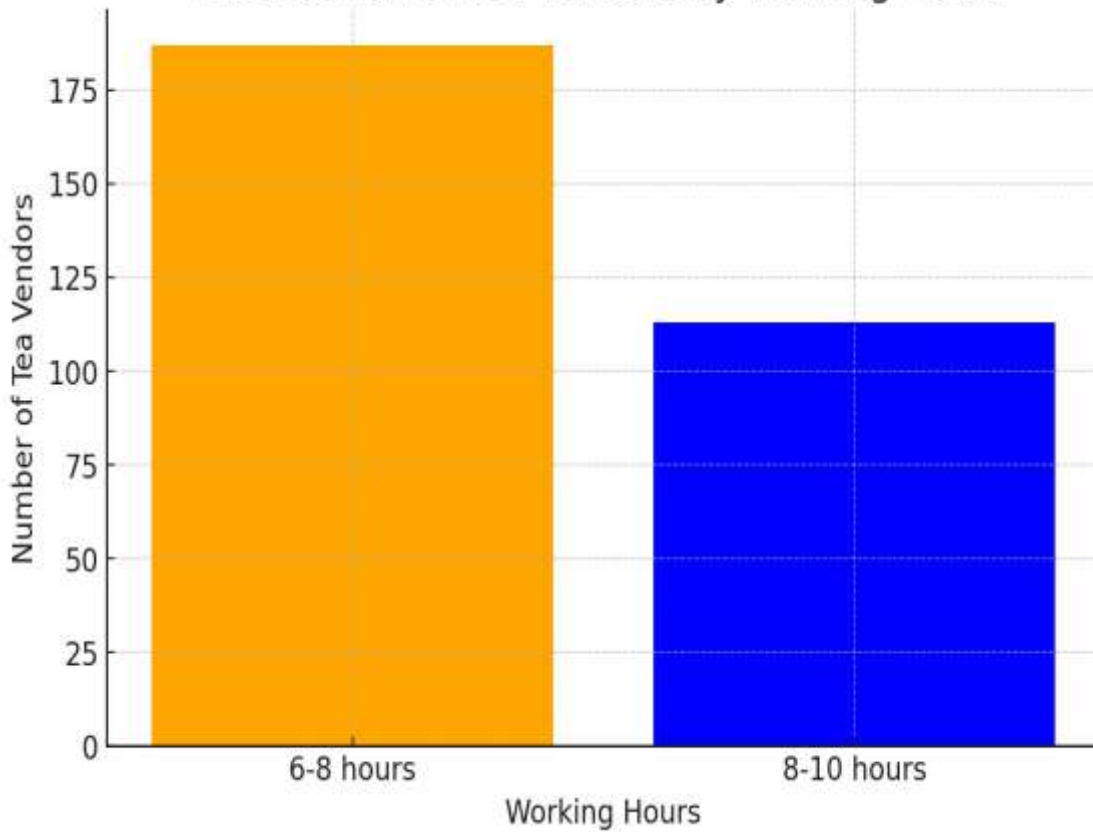
Prevalence Rate of Plantar Fasciitis (%)

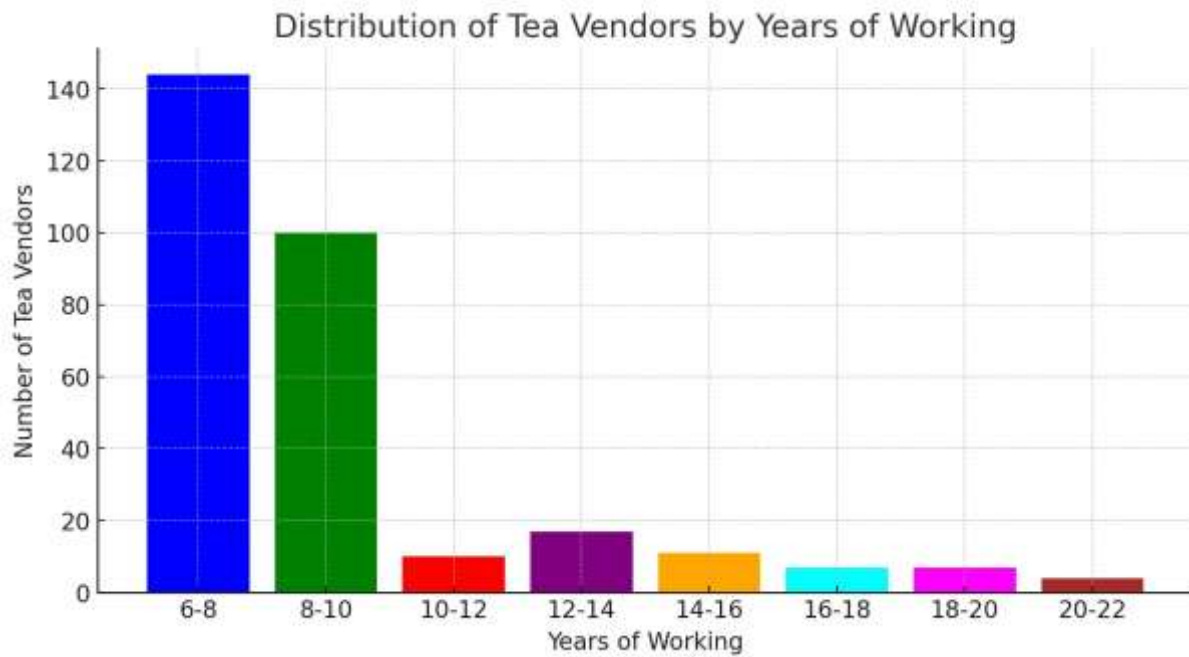


### Distribution of Tea Vendors by Age Group



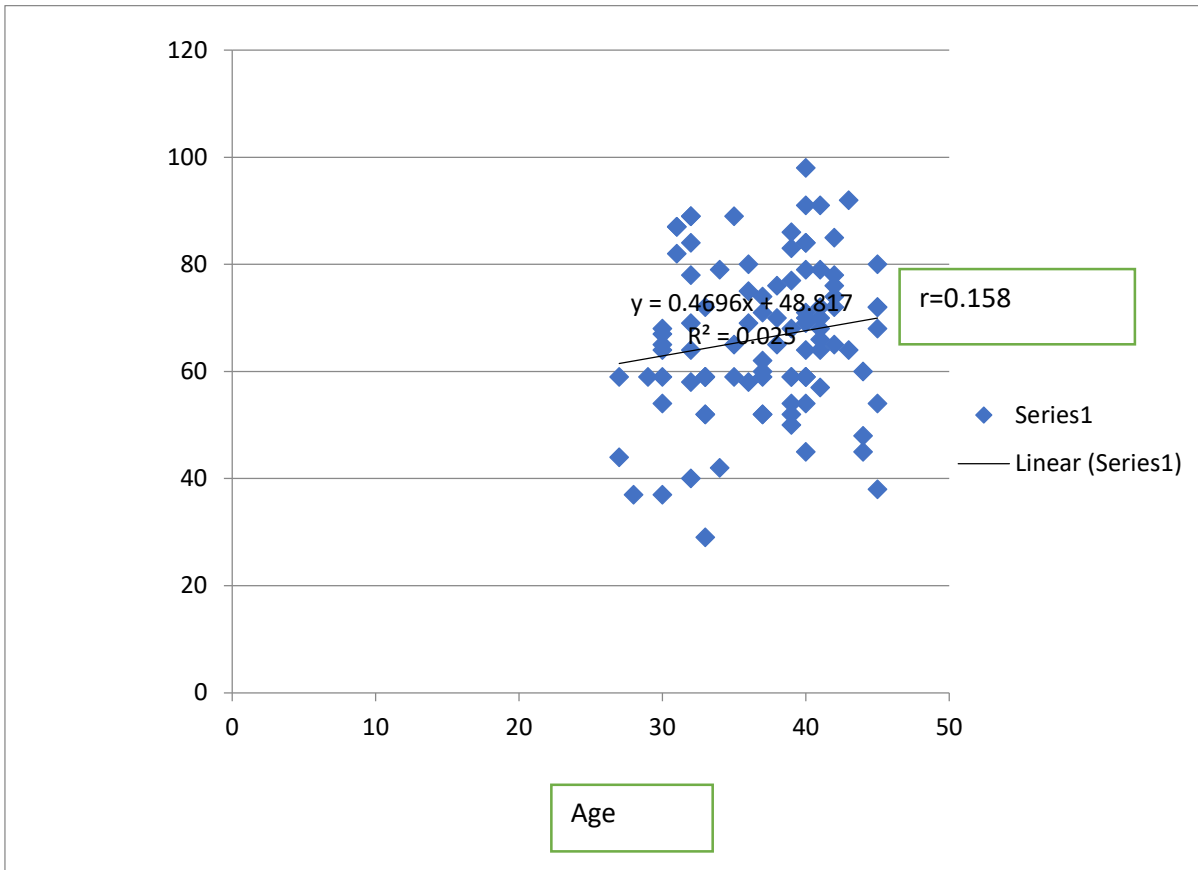
### Distribution of Tea Vendors by Working Hours



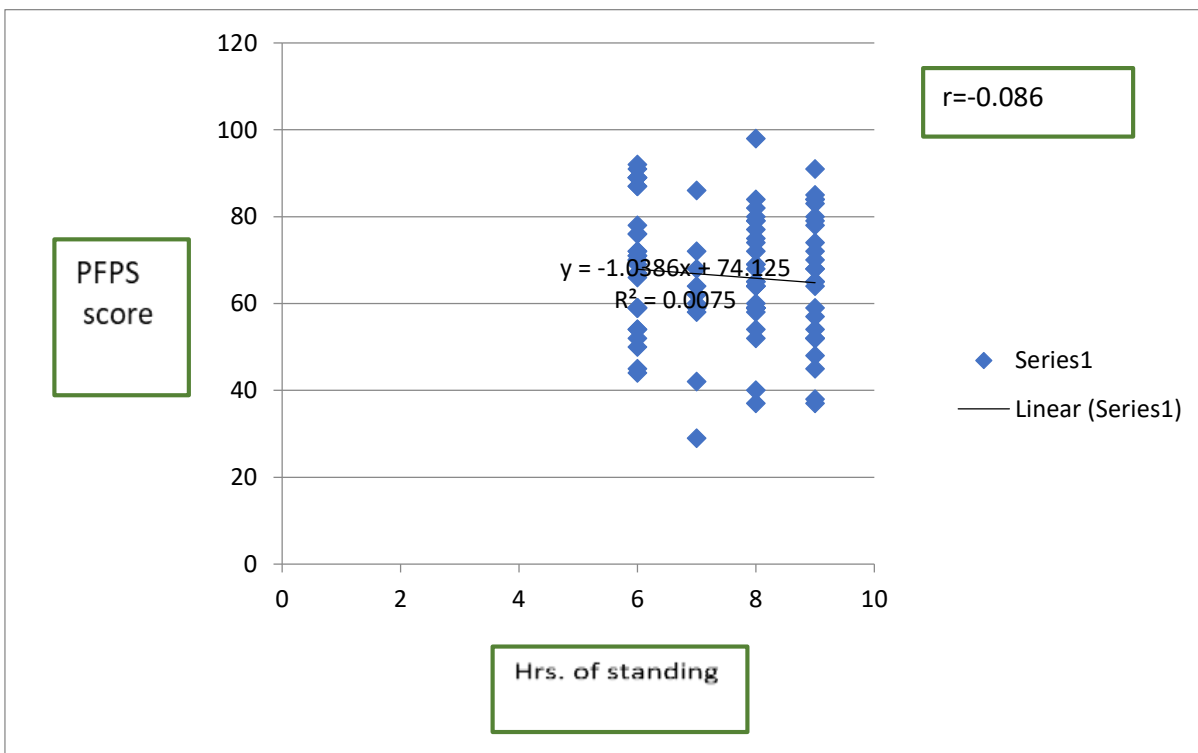


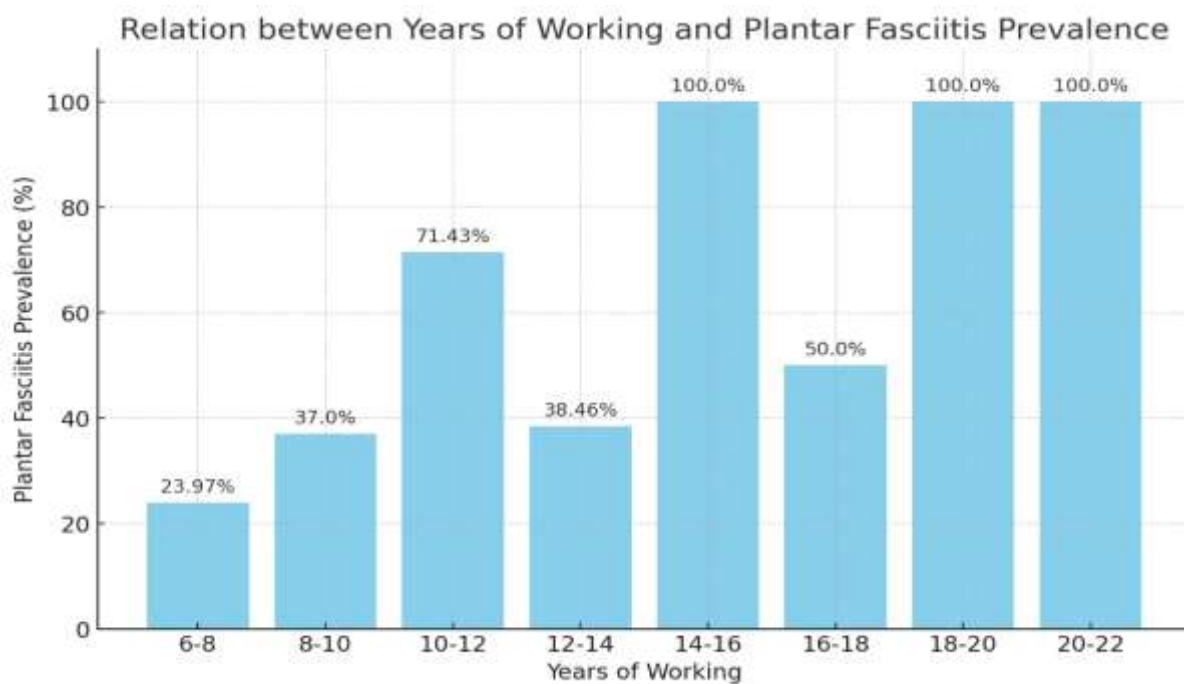
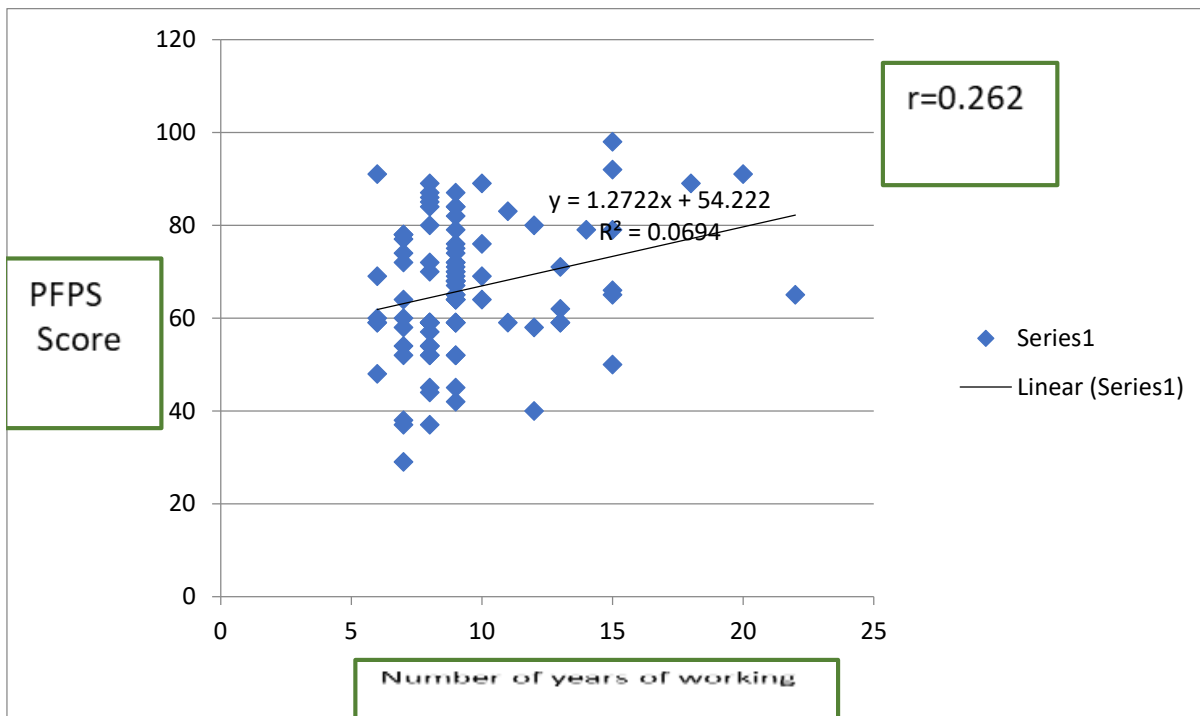
#### IV. RESULTS AND DISCUSSION

The study found that 54% (162 out of 300) of tea vendors reported foot pain, and 32.89% (98 vendors) were confirmed to have plantar fasciitis. Most participants were in the 36–41 age group (109 vendors) and worked 6–8 hours daily (187 vendors). Analysis showed that PF prevalence increases significantly with years of work: while vendors with 6–8 years of experience had a 23.97% prevalence, those with over 14 years showed a 100% prevalence. A weak positive correlation ( $r = 0.158$ ) was noted between age and PF severity. Interestingly, a weak negative correlation ( $r = -0.086$ ) was found between daily working hours and PFPS scores, possibly because those with severe pain reduced their hours.



Correlation between Age and PFPS score  
 $r = 0.158$  ( weak positive correlation)





## DISCUSSION

The results of this study indicate a substantial prevalence of Plantar Fasciitis (32.89%) among tea vendors, a figure that is considerably higher than the general population's estimated prevalence of 10%. This finding reinforces the hypothesis that the occupational environment of tea vending is a primary driver of foot pathology. [1,2] The high rate of positive Windlass Tests among the participants confirms that the pain reported is not merely general fatigue but is specifically linked to the mechanical dysfunction of the plantar fascia. [1]

A critical observation in this study was the positive correlation between the number of years in the profession and the prevalence of PF. This suggests a "cumulative loading" effect. In the early years of the profession (0–5 years), the body's compensatory mechanisms and the relative integrity of the collagen fibres may prevent

the onset of symptoms. However, as the duration of exposure increases beyond 10 to 14 years, the prevalence reaches nearly 100% in our sample. This is likely due to the progressive thickening and subsequent loss of elasticity in the fascia. Histological studies in similar occupational groups have shown that chronic loading leads to the replacement of normal collagen with fibroblastic proliferation, a hallmark of chronic Plantar Fasciitis.<sup>[4]</sup>

The relationship between age and the Plantar Fasciitis Pain/Disability Scale (PFPS) score also provides insight into the progression of the condition. While the correlation was weakly positive ( $r = 0.158$ ), it indicates that as vendors age, the functional impact of the pain becomes more severe. This could be attributed to the natural atrophy of the calcaneal fat pad that occurs with aging, which reduces the natural cushioning of the heel, thereby increasing the direct pressure on the fascial attachment. In the 23-45 age group, we see the transition from acute, manageable pain to the early stages of chronic disability.<sup>[4]</sup>

One of the more complex findings was the weak negative correlation ( $r = -0.086$ ) between daily working hours and the PFPS score. Biomechanically, one would expect more hours to equal more pain. However, this finding likely points to a "survival bias" or "healthy worker effect." Vendors experiencing extreme pain and high disability scores (high PFPS) are likely forced to reduce their working hours or take more frequent breaks, whereas those with lower scores continue to work longer shifts. This suggests that PF is not just a health issue but an economic one, directly limiting a vendor's ability to work a full day.<sup>[6]</sup>

The use of the Windlass Test as a diagnostic tool in this study was vital. By simulating the terminal stance phase of the gait cycle, the test puts the fascia under maximum tension. The high rate of positive results among those reporting heel pain suggests that the primary issue is a lack of flexibility in the medial longitudinal arch. Most tea vendors wear flat, non-supportive footwear (such as plastic slippers or worn-out sandals), which fails to support the arch and increases the tension on the fascia during standing.<sup>[9]</sup>

When compared to other studies, such as those on traffic wardens or assembly line workers, tea vendors show a similar risk profile. However, the confined space of a tea stall adds a unique factor: the "static loading" of the fascia. Unlike walking, where the fascia is loaded and unloaded, standing still leads to blood pooling and sustained compression of the tissue, which may accelerate the degenerative process. This study highlights the urgent need for education within this community regarding footwear choices—specifically the use of arch supports—and the implementation of simple calf-stretching exercises that can be performed during work hours.<sup>[8,9,10]</sup>

Limitations of this study include the lack of radiological confirmation (like Ultrasound or MRI) to measure fascial thickness, which would have provided a more objective measure of degeneration. Furthermore, other contributing factors such as Body Mass Index (BMI) and pre-existing foot deformities like pes planus (flat feet) were not analysed in depth. Future research should focus on longitudinal studies to track the progression of the disease and the effectiveness of specific orthotic interventions tailored for the informal street-vending sector.

## CONCLUSION

This study concludes that there is a high prevalence of plantar fasciitis among tea vendors aged 23 to 45, specifically affecting 32.89% of the surveyed population. The risk of developing the condition and the severity of pain increase with both advancing age and longer duration of employment in the profession. These results emphasize the critical need for occupational health awareness, ergonomic footwear, and periodic breaks to mitigate the impact of prolonged standing on the musculoskeletal health of tea vendors.

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