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Prevalence of Plantar Fasciitis and Its Contributing Factors Among Working Women

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ABSTRACT

Background: Plantar fasciitis is one of the most common musculoskeletal conditions affecting the foot, primarily presenting as intense heel pain at the site where the plantar fascia inserts into the anterior aspect of the calcaneus. Plantar fasciitis is a common cause of heel pain, often resulting from prolonged standing, inappropriate footwear, and poor biomechanics. **Objective:** To assess the prevalence and contributing factors of plantar fasciitis among working women. **Methodology:** This cross-sectional study was conducted with a sample of 176 working females from Lahore over a duration of six months, following the submission of the study synopsis. Non-probability purposive sampling was used for participant selection. The inclusion criteria consisted of females aged 25 to 50 years, currently working with more than six months of experience, and working at least seven hours a day, while also wearing hard, non-cushioned footwear with no built-in arch support. The exclusion criteria included females with recent foot or lower extremity injuries, neurological conditions (e.g., diabetes, peripheral vascular disease), psychological or mental disorders, or those who did not consent to participate. After gathering the responses through the demographic and structured questionnaire, we analysed the data using SPSS version 26. The data analysis was carried out statistically using descriptive statistics; the continuous variables were presented in tables with means and standard deviations, and the ordinal variables were presented in frequency tables. **Results:** Among 176 working women, the mean age of 32.86±3.96 years, the body weight of 65.15±8.14 kg, and the average height of 5.38±0.13 feet. The majority of participants were healthcare workers (46.6%), followed by office workers (22.7%). Average daily standing and walking durations were 5.96±1.91 hours and 4.66±1.52 hours, respectively. Only 33.5% exercised regularly. Chi-square analyses showed significant associatios between plantar fasciitis and various factors like standing duration, walking duration and footwear type. **Conclusion:** The prevalence of plantar fasciitis is 18.8% among working women, assessed via the Windlass test. Statistically significant associations were observed with age, body weight, occupation, prolonged standing and walking, lack of exercise, and footwear type ($p<0.05$).

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INTRODUCTION

Heel pain is a widespread issue faced by adults presenting with severe and chronic pain in the foot and ankle, typically caused by plantar fasciitis (PF). Plantar fascia is a thick fibrous layer of connective tissue which is located on the plantar surface of the foot. It has a triangular anatomy as it arises from the medial border of the calcaneal tuberosity and attaches at the base of the proximal five phalanges through the plantar plate and the metatarsophalangeal joints through collateral ligaments and deep transverse-metatarsal ligaments.[1] It is defined as a syndrome that occurs as a result of repeated micro-trauma to the plantar fascia, usually at its origin on the calcaneus bone, making the heel of the foot. Although its name indicates it is an inflammatory condition, it is a degenerative disorder that develops with time.[2] Studies show that in addition to degenerative alterations, histological observations reveal granulation tissue, micro-tears, disorganised collagen, and notably absent conventional inflammation.[3]

There are many factors that contribute to plantar fasciitis, including obesity, which is present in more than 70% of individuals with plantar fasciitis. Heel spurs formation, ageing, prolonged standing (greater than 8 hrs.), wearing hard shoes, reduced first metatarsophalangeal joint extension, reduced ankle dorsi-flexion, reduced flexibility in plantar fascia, increased ankle pronation, middle-aged females, and young male athletes are at high risk of developing plantar fasciitis. Numerous seronegative spondylo-arthropathies have been linked to PF; however, in around 85% of cases, no systemic variables are known to be involved.[4] It is usually presented by pain in the medial border of the heel that is worsened by prolonged standing or performing weight-bearing activities and on initial steps after a prolonged period of inactivity, and is relieved by rest.[5]

Plantar fasciitis is one of the most common musculoskeletal conditions affecting the foot, primarily presenting as intense heel pain at the site where the plantar fascia inserts into the anterior aspect of the calcaneus. The pain is typically most severe with the first steps after waking or following extended periods of inactivity.[6] It can also be triggered by long durations of standing or walking, making it particularly relevant for individuals engaged in occupations that demand prolonged weight-bearing. In athletic populations, symptoms may arise during high-intensity training, often easing during activity but recurring afterwards. PF is frequently accompanied by stiffness, localised swelling, and impaired foot function, all of which negatively impact daily mobility and overall quality of life.[7] Research suggests that women are affected by PF slightly more than men, potentially due to differences in biomechanics, footwear, and hormonal influences. Despite being prevalent, PF remains under-researched in a specific occupational population. Many women in urban centres work long hours in roles that require continuous standing or walking, often in non-ergonomic conditions with inadequate footwear support.[8]

The global prevalence of PF is more than 10% in the general population around the globe per annum.[9] Considering the prevalence of plantar fasciitis in Pakistan, different studies show a high prevalence of this condition in individuals. A study was made to evaluate the prevalence of plantar fasciitis in 364 police officers in Peshawar, which showed that about 13.2% officers had plantar fasciitis.[10] A similar research conducted in Multan to evaluate the prevalence of plantar fasciitis in working females showed a 72% prevalence rate.[11] Another study evaluating the prevalence of plantar fasciitis in 147 female traffic wardens of Lahore showed a high prevalence of 38.7%. Such a high prevalence of PF makes it a medical condition that requires an effective treatment plan.[12]

Imaging is not required to diagnose plantar fasciitis; instead, it is a clinical diagnosis. Heel spurs on the inferior surface of the heel or calcifications in the soft tissues may be seen on X-rays or ultrasound evaluations. Furthermore, a common aspect of ultrasonography is the thickening and swelling of the PF.[3] A special test, the Windlass test, is widely used in clinical settings for manual assessment and diagnosis of PF.[13] The foot function index (FFI), modified plantar fasciitis pain scale (PFPS) questionnaire and foot health status questionnaire (FHSQ) are commonly used questionnaires for assessing PF.[9,14] Conservative management is the first-line treatment and is effective in most cases. Rest and avoidance of aggravating activities help reduce stress on the fascia. At the same time, ice

application can provide symptomatic relief by decreasing local inflammation.[15]

Stretching exercises, particularly those targeting the plantar fascia and calf muscles, are widely recommended for improving flexibility and reducing tension. Strengthening the intrinsic foot muscles through exercises such as towel curls also aids in supporting the arch and improving foot function. Additionally, using supportive footwear and orthotic inserts can offload stress from the fascia, improving comfort during daily activities.[16] Other conservative interventions include night splints, which help maintain the fascia in a stretched position overnight, thereby reducing morning pain. Foot taping techniques, such as low-dye taping, provide temporary support and pain relief during weight-bearing tasks. Manual therapy, including soft tissue mobilisation and joint mobilisation by physiotherapists, can address biomechanical deficits and improve tissue mobility.

Weight management is also emphasised, as excess body weight increases the mechanical load on the plantar fascia. Short-term use of NSAIDs may be appropriate for managing pain and inflammation, but should be used cautiously.[17] There are many conservative and traditional physiotherapy methods used for the treatment of PF, including the use of electrical modalities, rest, icing, using NSAIDS, taping, using heel pads, soft tissue mobilisation, joint mobilisation, stretching of the Achilles tendon, or foot and leg strengthening exercises. Modern physiotherapy practices have incorporated new ways to relieve plantar fasciitis pain and discomfort through the Graston technique and ergonomics technique, which are types of instrument-assisted soft tissue mobilisation (IASTM).[18,19]

Plantar fasciitis is a common cause of heel pain, often resulting from prolonged standing, inappropriate footwear, and poor biomechanics. Working women in Pakistan, especially in urban settings, are increasingly exposed to such risk factors due to demanding occupational roles and limited ergonomic awareness. The purpose of study is to evaluate its prevalence and contributing factors in working women is essential for the early identification, prevention, and management. This study will help inform targeted interventions to improve occupational health and reduce productivity loss among working women.

METHODOLOGY

This cross-sectional study was conducted with a sample of 176 working females from Lahore over a duration of six months, following the submission of the study synopsis. Non-probability purposive sampling was used for participant selection. The inclusion criteria consisted of females aged 25 to 50 years, currently working with more than six months of experience, and working at least 7seven hours a day, while also wearing hard, non-cushioned footwear with no built-in arch support. The exclusion criteria included females with recent foot or lower extremity injuries, neurological conditions (e.g., diabetes, peripheral vascular disease), psychological or mental disorders, or those who did not consent to participate.

The prevalence of PF was assessed using the windlass test and the PFPS. After gathering the responses through the demographic and structured questionnaire, we analysed the data using SPSS version 26. The data analytic objective was carried out statistically using descriptive statistics; the continuous variables were presented in tables with means and standard deviations, and the ordinal variables were presented in frequency tables. The size of the sample was calculated by the following formula:

$$n = \frac{[Z2 \times P \times (1 - P)]}{e2}$$

Where z=confidence level=0.95×100=95% CI, P=expected true proportion=0.66, e=desired precision (half desired CI width)=0.07, n=sample size=176.

RESULTS

The study revealed that the female participants had an average age of 32.86 years with a standard deviation of 3.96 years, indicating a relatively consistent age range. The average body weight was 65.15 kg, and the height was 5.38 feet, with small variations in both. Participants exhibited moderate variability in their standing and walking durations, with an average of 5.96 hours spent standing and 4.66 hours spent walking each day. The majority of participants were healthcare workers, followed by office workers, business professionals, and those in education and marketing. However, a significant portion of the group, 66.5%, did not engage in any form of exercise. Regarding footwear, most participants wore shoes (52.3%) or sandals (28.4%), while

fewer chose slippers (12.5%) or heels (6.8%). The study also examined the prevalence of PF using the Windlass test, finding that 18.8% of the participants tested positive for the condition.

Among those with PF, the average pain/disability score on the PFPS Scale was 66.45, indicating moderate levels of discomfort and disability related to the condition. Chi-square analyses showed significant associations between PF and various factors such as age, body weight, occupation, standing duration, walking duration, exercise habits, and footwear type. Notably, wearing slippers was linked to a higher prevalence of PF, and those who engaged in regular exercise were less likely to test positive for the condition. Occupations that involved longer standing or walking durations, particularly in healthcare, also showed a higher incidence of PF. These results highlight the influence of lifestyle factors and footwear on the development of PF in females.

DISCUSSION

In this study, the prevalence of PF among working women was assessed using the Windlass test, with the severity of the condition further evaluated through the PFPS. The findings demonstrated that 18.8% of the 176 female participants tested positive for PF, with 33 individuals showing signs of the condition. The mean PFPS score for these participants was 66.45±10.29, suggesting that while there was a moderate level of pain and

Table 1: Demographic characteristics

Variables	Category	Frequency (f)	Percentage (%)
Occupation	Healthcare Workers	82	46.6
	Office Workers	40	22.7
	Business Women	20	11.4
	Educationist	22	12.5
	Marketing Persons	12	6.8
Exercise Involvement	Yes	59	33.5
	No	117	66.5
Types of Footwear	Shoes	92	52.3
	Sandals	50	28.4
	Slippers	22	12.5
	Heels	12	6.8
Prevalence of PF	Positive	33	18.8
	Negative	143	81.3
		Mean	Standard Deviation
Age (years)		32.86	3.96
Body Weight (kg)		65.15	8.14
Height (feet)		5.38	0.13
Standing Duration (hrs/day)		5.96	1.91
Walking Duration (hrs/day)		4.66	1.52
PFPS Score (females with PF)		66.45	10.29

Table 2: Association of PF with demographics

Association	Chi-Square Value	p-value
Age and PF	55.70	<0.001
Body Weight and PF	93.61	<0.001
Occupation and PF	--	<0.001
Standing Duration and PF	36.17	<0.001
Walking Duration and PF	36.17	<0.001
Exercise Involvement and PF	0.001	0.001
Type of Footwear and PF	10.03	<0.001

disability reported, there was also considerable variability in the severity of symptoms. This variation implies that while some participants may experience only mild discomfort, others may face more significant challenges due to PF.

In comparing these findings with existing literature, several important parallels and distinctions can be observed. Komal Santosh Bhoir et al presented an article in 2021 and found that only 21% nurses had a positive windlass test.[20] These findings were in line with the current study, indicating that working females have a significant, mild to moderate prevalence of PF. Further studies adopted self-reported measures to evaluate the prevalence of PF in subjects, probably of which a significantly higher prevalence of PF was noted. For instance, Nawaz et al. (2023) documented a high prevalence of heel discomfort (62.4%) among young professionals, with a higher incidence reported among women (77.8%).[21] Their study found occupational roles, particularly among teachers and nurses, to be strongly associated with heel pain, and identified standing and sitting durations as critical variables, factors that align closely with the current research.

The study also sought to identify the factors contributing to the development of PF among working women. The results revealed that several key demographic and occupational factors were significantly associated with the onset of PF. These included age, body weight, occupation type, duration of standing and walking, involvement in exercise, and the type of footwear worn by participants. Both intrinsic factors, such as age and body weight, and extrinsic factors, including the demands of specific occupations and footwear choices, appeared to influence the likelihood of developing PF. For example, healthcare workers, who spend long hours standing or walking, had a higher prevalence of PF, with 12 out of 82 healthcare professionals testing positive. This highlights the significant impact that occupational factors can have on the development of PF, suggesting that occupations requiring prolonged periods of standing or walking may increase the risk of the condition.

These current study's findings were supported by research conducted by Tamir Tsehay et al. (2023) in Ethiopia, where 51.8% of nurses working in surgical units reported experiencing PF. This high prevalence was linked to long-standing durations, increased work demands, and extended weekly working hours—occupational stressors similar to those identified in the present study.[22] Similarly, Hashmi et al. (2020), who explored the prevalence of PF among female teachers in Sialkot, reported a higher prevalence rate of 46.3%. This study also identified age as a significant predictor of PF, a finding that aligns with the current study's results. It suggests that age-related biomechanical and physiological changes may universally contribute to the condition, regardless of the specific population or profession.

The study further underscores the need to consider age as an important factor when assessing the risk and prevalence of PF in different groups, particularly in those engaged in occupations involving prolonged standing or physical exertion.[23] Another important factor that the study found a noteworthy association with was involvement in exercise or PA. Participants who reported engaging in regular physical activity were less likely to suffer from PF, with only 5.1% of those who exercised testing positive, compared to 25.6% of those who did not engage in exercise. This suggests that maintaining an active lifestyle may reduce the risk of PF, potentially by strengthening the muscles and ligaments in the feet and improving overall posture and gait. This finding was supported by a study conducted by Marianne Mørk.[6]

The type of footwear worn was another important factor identified in the study. It was found that participants who primarily wore slippers had a significantly higher prevalence of PF, with 19 out of 22 women in this category testing positive. In

contrast, those who wore more supportive footwear, such as shoes, had a lower incidence of PF. This finding underscores the importance of proper footwear in preventing PF and emphasises that less supportive footwear, such as slippers, may contribute to the development of the condition. These findings were supported by a study conducted by Ume Aiman et al. (2022), who found that 72% of working females in Multan reported significant pain and difficulty due to PF. Their results underscored extended standing hours, improper footwear, and postural malalignments as key contributing factors, all of which were significantly associated with PF in the current study as well.[11]

Overall, the findings from this study highlight the complex and multifactorial nature of plantar fasciitis. Both intrinsic factors, such as age and body weight, and extrinsic factors, such as occupational demands and footwear choices, play a significant role in the development of PF among working women. The variability in the severity of symptoms suggests that PF may manifest differently across individuals, requiring personalised approaches to treatment and prevention. These results can inform targeted interventions aimed at reducing the prevalence of PF in working women, such as workplace modifications, increased awareness of the importance of exercise, and the promotion of proper footwear choices.

CONCLUSION

The study identified a plantar fasciitis prevalence of 18.8% among working women, assessed through the Windlass test. Statistically significant associations were observed with age, body weight, occupation, prolonged standing and walking, lack of exercise, and footwear type ($p<0.05$). These findings emphasise the role of occupational and lifestyle factors in PF development. Preventive measures should prioritise ergonomic practices and physical activity to reduce plantar fasciitis risk in working women.

DECLARATIONS

Consent to participate: Written consent had been obtained from patients. All methods were performed following the relevant guidelines and regulations.

Availability of Data and Materials: Data will be made available upon request. The corresponding author will submit all dataset files.

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REFERENCES

1. Tahririan MA, Motififard M, Tahmasebi MN, Siavashi B. Plantar fasciitis. Journal of Research in Medical Sciences 2012; 17(8): 799–804.
2. Rhim HC, Kwon J, Park J, Borg-Stein J, Tenforde AS. A Systematic Review of Systematic Reviews on the Epidemiology, Evaluation, and Treatment of Plantar Fasciitis. Life (Basel) 2021; 11(12). DOI: 10.3390/life11121287
3. Buchanan BK, Kushner D. Plantar fasciitis. 2017. Bookshelf ID: NBK431073
4. Arnold MJ, Moody AL. Common Running Injuries: Evaluation and Management. American Family Physician 2018; 97(8): 510–6.
5. Trojian T, Tucker AK. Plantar fasciitis. American family physician 2019; 99(12): 744–50.
6. Mørk M, Soberg HL, Hoksrud AF, Heide M, Groven KS. The struggle to stay physically active—A qualitative study exploring experiences of individuals with persistent plantar fasciopathy. Journal of Foot and Ankle Research 2023; 16(1): 20. DOI: 10.1186/s13047-023-00620-4
7. Petraglia F, Ramazzina I, Costantino C. Plantar fasciitis in athletes: diagnostic and treatment strategies. A systematic review. Muscles Ligaments Tendons Journal 2017; 7(1): 107–18. DOI: 10.11138/mltj/2017.7.1.107
8. El-Shafei MA, Yousef AM, Hamada HA, et al. Effect of Low Versus High-Heeled Footwear on Spinopelvic Alignment at Different Phases of Menstrual Cycle in Young Adult Women: A Biopsychosocial Perspective. Frontiers in Psychology 2021; 12: 792446. DOI: 10.3389/fpsyg.2021.792446
9. Palomo-López P, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Rodríguez-Sanz D, Calvo-Lobo C, López-López D. Impact of plantar fasciitis on the quality of life of male and female patients according to the Foot Health Status Questionnaire. Journal of Pain Research 2018; 11: 875–80. DOI: 10.2147/JPR.S159918
10. Ul Abidin SZ, Haneef K, Malik NR, et al. Prevalence and associated risk factors for plantar fasciitis among security forces personnel in Peshawar. Annals of Allied Health Sciences 2019; 5(2): 20–3.
11. Aiman U, Malik L, Zahoor A. Pain and difficulty level in working females having plantar

fasciitis of Multan city: Pain & Difficulty in Working females with Plantar Fasciitis. Pakistan BioMedical Journal 2022; 5(8): 46–50. DOI: 10.54393/pbmj.v5i8.195
12. Idrees M, Ahmad A, Gilani SA. Frequency of Plantar Fasciitis Among Traffic Wardens of Lahore. 2019; 35.
13. Alshami AM, Babri AS, Souvlis T, Coppieters MW. Biomechanical evaluation of two clinical tests for plantar heel pain: the dorsiflexion-eversion test for tarsal tunnel syndrome and the windlass test for plantar fasciitis. Foot & Ankle International 2007; 28(4): 499–505. DOI: 10.3113/FAI.2007.0499
14. Farooq N, Aslam S, Bashir N, Awan WA, Shah M, Irshad A. Effectiveness of transverse friction massage of Flexor digitorum brevis and Calf muscle stretching in Plantar fasciitis on foot function index scale: A randomised control trial. Isra Medical Journal 2019; 11(4): 305–9.
15. Vynohradov VE, Pastukhova VA, Lukyantseva HV, Buka GY, Fedoniuk LY, Chervatiuk AM. Maintaining competitive activity in elite sports with acute plantar fasciitis. Polski Merkuriusz Lekarski 2023: 288. DOI: 10.36740/Merkur202303118
16. Siriphorn A, Eksakulkla S. Calf stretching and plantar fascia-specific stretching for plantar fasciitis: A systematic review and meta-analysis. Journal of Bodywork and Movement Therapies 2020; 24(4): 222–32. DOI: 10.1016/j.jbmt.2020.06.013
17. Yelverton C, Rama S, Zipfel B. Manual therapy interventions in the treatment of plantar fasciitis: A comparison of three approaches. Health SA Gesondheid 2019; 24. DOI: 10.4102/hsag.v24i0.1244
18. McKivigan J, Tulimero G. An Analysis of Graston Technique® for Soft-Tissue Therapy. Rehabilitation Science 2020; 5: 31–7.
19. Ahmed E, Fouda K. Active Release Technique and Ultrasound Therapy versus Ultrasound Alone in the Management of Plantar Fasciitis. Sylwan 2015; 160: 54–63.
20. Bhoir KS, VV G. Prevalence of Plantar Fasciitis Among Nurses at a Tertiary Care Centre in a Rural Area: A Cross-Sectional Study. International Journal of Physiotherapy Research 2021; 9(4): 3900–06. DOI: 10.16965/ijpr.2021.140
21. Nawaz I, Bukhari A, Warda Shafique Q, et al. Factors Associated With Heel Pain in Young Professionals. Pakistan Journal of Medical & Health Sciences 2023; 17(05): 16–. DOI: 10.53350/pjmhs202317516
22. Tamir Tsehay Y, Lamesgin Endalew H, Dessalegn Bogale A, Walle TA. Prevalence and Associated Factors of Ankle-Foot Pain Among Nurses Working in Surgical Units of Comprehensive Specialised Hospitals in Amhara Regional State, Northwest Ethiopia, 2022. Journal of Pain Research 2023; 16: 2685–96. DOI: 10.2147/JPR.S405417
23. Hashmi R, Naeem L, Arif S, Habiba U, Irfan R, Zafar M. Frequency of plantar fasciitis among females in the teaching profession. Journal of Aziz Fatimah Medical & Dental College 2020; 2(2): 53–7. DOI: 10.55279/jafmdc.v2i2.102