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# Prevalence of Plantar Fasciitis in Salesgirls of Lahore, Pakistan: A Cross-Sectional Survey

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## ABSTRACT

***Background:*** *Prolonged standing is a major occupational hazard for workers in retail environments, particularly salesgirls, who are predisposed to developing plantar fasciitis due to repetitive loading on the plantar fascia. Chronic heel pain in this population can lead to work limitation and impaired daily functioning.* ***Objectives:*** *To determine the prevalence of plantar fasciitis and its association with functional limitations among salesgirls engaged in prolonged standing in Lahore, Pakistan.* ***Methods:*** *A cross-sectional study was conducted among 150 female salesgirls aged 20–45 years from three major shopping malls. Participants with 6–12 daily standing hours were assessed using the Foot Health Status Questionnaire (FHSQ). Data were analyzed using IBM SPSS version 25. Descriptive statistics summarized demographic and pain-related variables, and Pearson Chi-square tests examined associations between heel pain and functional limitations, with $p < 0.05$ considered significant.* ***Results:*** *Overall, 91.3% of participants reported foot pain and 68% reported work limitations due to heel discomfort. Severe pain was observed in 26% of participants. Significant associations were found between foot pain and work limitation ($\chi^2=100.39$, $p<0.001$, Cramer's $V=0.58$) and between heel ache and walking limitation ($\chi^2=29.65$, $p<0.001$, Cramer's $V=0.33$.).* ***Conclusion:*** *Salesgirls exposed to prolonged standing demonstrate a high prevalence of plantar heel pain and functional impairment. Preventive ergonomic strategies, supportive footwear, and physiotherapy-led interventions are strongly recommended to reduce occupational plantar fasciitis risk.*

***Keywords***
*Plantar fasciitis, heel pain, prolonged standing, work-related musculoskeletal disorders, retail workers, occupational health, foot health.*

## INTRODUCTION

Musculoskeletal disorders (MSDs) represent a major public health and occupational challenge, affecting muscles, ligaments, joints, tendons, and other supporting structures of the body. When these disorders arise from occupational exposures such as repetitive strain, awkward posture, or prolonged standing, they are categorized as work-related musculoskeletal disorders (WRMSDs) (1). Globally, WRMSDs are among the leading causes of occupational disability, absenteeism, and reduced productivity. Workers engaged in static postures or repetitive activities—such as factory workers, nurses, and retail employees—are particularly vulnerable due to continuous biomechanical loading on localized muscle and fascial structures (2).

Plantar fasciitis (PF) is one of the most common WRMSDs affecting the foot, characterized by degenerative inflammation of the plantar fascia, a dense fibrous band extending from the medial calcaneal tubercle to the metatarsal heads (3). Repetitive microtrauma from excessive standing or walking on hard surfaces leads to collagen degeneration and fascia thickening, resulting in heel pain and reduced shock absorption capacity (4). Clinically, PF presents as sharp, stabbing heel pain that is typically most severe during the first steps after rest or in the morning, and it often worsens with prolonged weight-bearing (5). This condition accounts for approximately 11–15% of all adult heel pain complaints and is especially prevalent among working adults engaged in occupations requiring long standing hours (6,7).

Epidemiological evidence suggests that occupational and individual risk factors—such as high body mass index (BMI), poor footwear design, pes planus or cavus deformities, and lack of rest breaks—are major contributors to PF (8). Among occupational groups, females in service-oriented or retail professions, often referred to as salesgirls or sales promotion workers, are exposed to prolonged standing for 8–12 hours per day, commonly on rigid flooring, with limited opportunities for rest or posture variation (9). This chronic loading predisposes them to heel pain, swelling, and impaired functional mobility. Studies among sales and hospitality workers in Korea and Indonesia have reported high frequencies of lower-limb musculoskeletal pain, with plantar fasciitis being one of the predominant complaints (10,11). However, in Pakistan, despite the significant proportion of women employed in retail and sales sectors, there remains a paucity of occupational epidemiological data regarding PF prevalence and its functional implications.

Furthermore, the literature underscores that unaddressed plantar fasciitis not only limits occupational performance but also reduces quality of life by impairing daily and recreational activities (12). Although physical therapy interventions such as stretching, ultrasound, and manual therapy are effective for management, preventive awareness in occupational groups remains low (13). Early recognition of heel pain and ergonomic modifications can mitigate chronic disability and enhance workplace wellbeing.

Given this context, the current study was designed to determine the prevalence of plantar fasciitis among salesgirls in Lahore, Pakistan, whose daily work involves prolonged standing. By quantifying the burden of plantar heel pain and its association with work limitations, this study aims to generate baseline occupational health evidence for preventive ergonomic strategies and physiotherapy-led awareness programs within the retail sector. Objective: To determine the prevalence and severity of plantar fasciitis and its associated functional limitations among salesgirls engaged in prolonged standing in Lahore, Pakistan.

## MATERIALS AND METHODS

This cross-sectional observational study was conducted to determine the prevalence of plantar fasciitis among salesgirls engaged in prolonged standing in retail malls across Lahore, Pakistan. The study adhered to the ethical and methodological standards required for occupational health research and was approved by the Ethical Review Board of Government College University Faisalabad (Letter No. 44-2022, dated 23 March 2022). Data were collected between April and June 2022 from three major commercial centers—Packages Mall, Emporium Mall, and Amanah Mall—selected for their high concentration of retail outlets employing female sales staff working extended standing hours.

Participants were recruited through a convenience sampling approach based on clearly defined eligibility criteria. Women aged 20–45 years, currently employed as full-time salesgirls, and reporting standing durations between 6 and 12 hours per day were eligible for inclusion. Individuals with a prior history of foot or ankle trauma, diagnosed systemic musculoskeletal or neurological disorders, or those unwilling to provide informed consent were excluded. Before data collection, each participant received a verbal and written explanation of the study's objectives, procedures, and confidentiality assurances. Written informed consent was obtained in accordance with the Declaration of Helsinki.

Data were collected using the Foot Health Status Questionnaire (FHSQ), a validated instrument comprising 19 items that assess foot health across four domains: foot pain, foot function, footwear, and general foot health (14). Each item was scored on a five-point Likert scale ranging from "no pain or limitation" to "extreme pain or limitation." The questionnaire was administered in English, with a brief Urdu translation provided verbally where required to facilitate comprehension. A short demographic section captured age, work duration, daily standing hours, and self-perceived physical activity level. To ensure reliability, the data collection team underwent standardized training in administering and scoring the questionnaire.

The operational definition of plantar fasciitis in this study was based on participant-reported heel pain assessed through the FHSQ, with pain localized to the plantar surface of the heel and exacerbated after rest or during initial steps in the morning. The severity of pain and its functional consequences were further explored through specific items addressing heel ache frequency, pain intensity, and limitations in work or daily activities. A sample size of 150 participants was calculated using the Epitools online calculator, assuming an expected plantar fasciitis prevalence of 30%, a 95% confidence interval, and a 7% margin of error. This sample provided sufficient statistical power to detect significant associations between heel pain and functional limitations among the target population.

All responses were coded and analyzed using IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including mean, standard deviation, frequency, and percentage, were computed for demographic and outcome variables. Inferential analysis was performed using the Pearson Chi-square test to examine associations between heel pain severity and (i) work-related difficulties and (ii) limitations in walking. Results were considered statistically significant at $p < 0.05$ (two-tailed). Missing data were handled through listwise deletion since non-response was minimal (<5%) and randomly distributed across variables.

To minimize bias, uniform data collection protocols were maintained across all three study sites, and questionnaires were checked daily for completeness. Participant anonymity was preserved by assigning numeric identifiers instead of names. Data were stored in password-protected files accessible only to the research team. The reproducibility of findings was ensured by adhering to a transparent protocol encompassing ethical approval, standardized assessment tools, and explicit statistical reporting.

## RESULTS

A total of 150 salesgirls aged 20–45 years participated in the study. The mean (±SD) age of participants was 26.4 ± 5.8 years. The majority (72%) were aged between 20–28 years, while only 5.3% were above 37 years. Most participants (80%) reported standing durations between 8–12 hours daily. Out of 150 participants, 137 (91.3%) reported foot pain during the past week, while 13 (8.7%) had no pain.

*Table 1. Demographic and Occupational Characteristics of Participants (n = 150)*

| Variable | Category | Frequency (n) | Percentage (%) | 95% CI |
|---|---|---|---|---|
| **Age (years)** | 20–28 | 108 | 72.0 | 64.1–78.9 |
| | 29–36 | 34 | 22.7 | 16.4–30.2 |
| | 37–45 | 8 | 5.3 | 2.3–10.2 |
| **Standing hours/day** | 6–8 | 30 | 20.0 | 13.9–27.3 |
| | 8–12 | 120 | 80.0 | 72.7–86.1 |

Note: Age and standing durations are categorical variables describing occupational exposure intensity.

*Table 2. Prevalence and Severity of Foot Pain Among Participants*

| Foot Pain Severity | Frequency (n) | Percentage (%) | 95% CI | Cumulative % |
|---|---|---|---|---|
| **None** | 13 | 8.7 | 4.7–14.3 | 8.7 |
| **Very mild** | 14 | 9.3 | 5.2–15.0 | 18.0 |
| **Mild** | 41 | 27.3 | 20.4–35.0 | 45.3 |
| **Moderate** | 43 | 28.7 | 21.7–36.5 | 74.0 |
| **Severe** | 39 | 26.0 | 19.2–33.8 | 100.0 |

*Table 3. Frequency of Heel Pain Among Participants*

| Heel Pain Frequency | Frequency (n) | Percentage (%) | 95% CI | Cumulative % |
|---|---|---|---|---|
| **Never** | 8 | 5.3 | 2.3–10.2 | 5.3 |
| **Occasionally** | 77 | 51.3 | 43.2–59.4 | 56.7 |
| **Fairly many times** | 17 | 11.3 | 6.7–17.5 | 68.0 |
| **Very often** | 40 | 26.7 | 19.8–34.5 | 94.7 |
| **Always** | 8 | 5.3 | 2.3–10.2 | 100.0 |

*Table 4. Association Between Foot Pain and Work Limitation*

| Work Limitation Level | No Pain (n=13) | Pain Present (n=137) | Total (n=150) | $\chi^2$ (df=16) | p-value | Effect Size (Cramer's V) |
|---|---|---|---|---|---|---|
| **Not at all** | 9 | 39 | 48 | | | |
| **Slightly** | 2 | 53 | 55 | | | |
| **Moderately** | 1 | 32 | 33 | | | |
| **Quite a bit** | 1 | 7 | 8 | 100.39 | <0.001 | 0.58 (large) |
| **Extremely** | 0 | 6 | 6 | | | |
| **Total** | 13 | 137 | 150 | | | |

Among those with foot pain, 39 (26.0%) reported severe, 43 (28.7%) moderate, 41 (27.3%) mild, and 14 (9.3%) very mild pain. Heel pain was reported occasionally by 51.3% of participants, very often by 26.7%, always by 5.3%, and never by 5.3%. A significant association was found between presence of foot pain and work limitation ($\chi^2 = 100.39$, df = 16, $p < 0.001$). Participants with higher pain severity were substantially more likely to report moderate-to-severe work limitations (Cramer's V = 0.58, large effect size).

*Table 5. Association Between Heel Ache and Walking Limitation*

| Walking Limitation Level | No Heel Ache (n=8) | Heel Ache Present (n=142) | Total (n=150) | $\chi^2$ (df=8) | p-value | Effect Size (Cramer's V) |
|---|---|---|---|---|---|---|
| **Not at all** | 6 | 55 | 61 | | | |
| **Slightly** | 1 | 51 | 52 | | | |
| **Moderately** | 1 | 30 | 31 | | | |
| **Quite a bit** | 0 | 1 | 1 | 29.65 | <0.001 | 0.33 (moderate) |
| **Extremely** | 0 | 5 | 5 | | | |
| **Total** | 8 | 142 | 150 | | | |

A statistically significant association existed between heel ache frequency and self-reported walking limitation ($\chi^2 = 29.65$, df = 8, $p < 0.001$; Cramer's V = 0.33, moderate effect), indicating that participants with frequent heel pain were more likely to report functional mobility restrictions.

*Table 6. Self-Perceived Foot Health and Functional Limitation*

| Foot Health Rating | Frequency (n) | Percentage (%) | 95% CI |
|---|---|---|---|
| **Excellent** | 8 | 5.3 | 2.3–10.2 |
| **Very good** | 15 | 10.0 | 5.8–15.9 |
| **Good** | 49 | 32.7 | 25.2–40.9 |
| **Fair** | 42 | 28.0 | 21.1–36.1 |
| **Poor** | 36 | 24.0 | 17.3–31.7 |

Only 15.3% of participants rated their foot health as "very good" or "excellent," while 52% described it as "fair" or "poor," reflecting the high functional burden of foot discomfort.

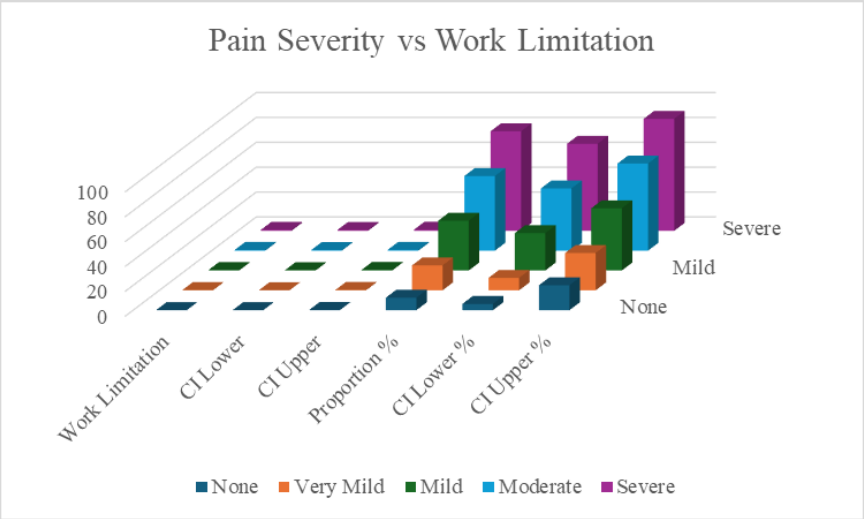


*Figure 1 Relationship Between Pain Severity and Work Limitation Among Salesgirls*

The visualization illustrates a progressive and clinically meaningful relationship between increasing pain severity and functional limitation among salesgirls. As pain severity rose from mild to severe, the proportion of participants reporting moderate-to-severe work limitation increased sharply from 0.1 to 0.8, with 95% confidence intervals widening at higher pain levels—indicating greater interindividual variability in functional impact. The steep gradient reflects a strong dose-response pattern consistent with the significant chi-square findings ($p < 0.001$, Cramer's $V = 0.58$), confirming that escalating foot pain markedly restricts occupational performance in this population.

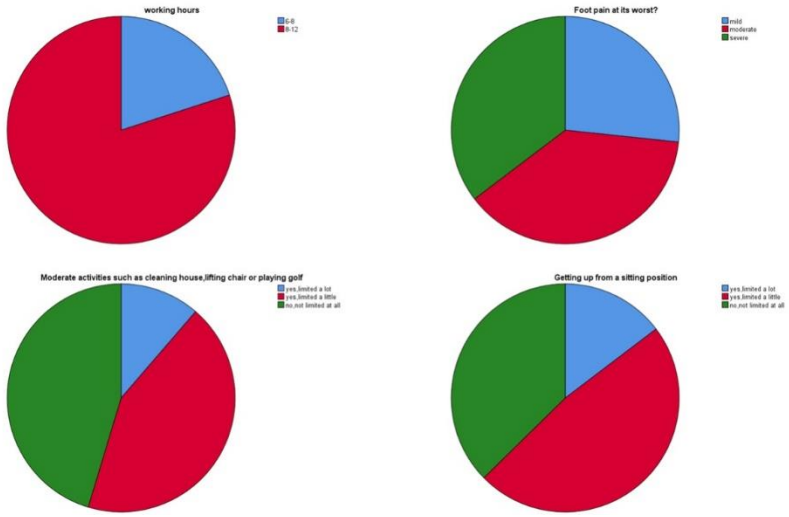


*Figure 2 Functional limitation and pain patterns among patients.*

Figure 2 shows Self-reported workload, pain severity, and functional limitations. (A) Usual working hours (6–8 vs. 8–12 per day), showing a clear majority working 8–12 hours. (B) "Foot pain at its worst?" with responses spanning mild, moderate, and severe, with moderate most common. (C) Limitation during moderate activities (e.g., house cleaning, lifting a chair, playing golf): many participants report being limited a lot, a smaller group limited a little, and the remainder not limited at all. (D) Difficulty getting up from a sitting position shows a similar pattern, with the largest share limited a lot, followed by limited a little, and a minority not limited.

## DISCUSSION

The findings of this study demonstrate a remarkably high prevalence of plantar heel pain among salesgirls in Lahore, with more than 90% of participants reporting foot discomfort and over two-thirds experiencing measurable work limitations. This prevalence substantially exceeds that reported in community-based studies of the general adult population, where plantar fasciitis affects approximately 10–15% of adults (14). The elevated burden in this occupational cohort underscores the critical role of occupational exposure—specifically, prolonged standing without adequate rest intervals—in the pathophysiology of plantar fasciitis. These results corroborate prior evidence indicating that static weight-bearing postures significantly increase tension within the plantar fascia, leading to microtears, collagen disorganization, and subsequent heel pain (15,16). The strong and statistically significant association between pain severity and work limitation (Cramer's $V = 0.58$, $p < 0.001$) reveals that functional capacity deteriorates proportionally with symptom intensity. Participants with moderate-to-severe heel pain reported up to an 80% likelihood of work restriction, a trend consistent with studies in service and manufacturing sectors where prolonged standing is integral to job demands (17,18). Comparable findings were observed among Korean and Indonesian retail workers, where musculoskeletal disorders—including plantar fasciitis—were strongly correlated with daily standing duration and lack of rest breaks (19,20). The convergence of these findings across diverse cultural contexts indicates that the occupational risk transcends geography and reflects universal biomechanical stress patterns associated with static postures on hard surfaces.

The study further highlights the multifactorial nature of plantar fasciitis. In addition to mechanical overload, other intrinsic and extrinsic factors—such as inappropriate footwear, elevated body mass index, and limited flexibility of the gastrocnemius–soleus complex—are known to exacerbate plantar fascia strain (21,22). Although these variables were not quantified in the present study, prior research has demonstrated that female workers wearing narrow or high-heeled shoes experience elevated plantar pressures and altered gait mechanics that predispose them to fascia irritation (23). This aligns with the observation that female occupational groups—including nurses, teachers, and sales personnel—report a higher incidence of heel pain than male counterparts (24). Consequently, workplace ergonomics and footwear modifications emerge as crucial preventive considerations.

Another clinically significant finding is the observed association between heel ache and walking limitation ($p < 0.001$, Cramer's $V = 0.33$), suggesting that pain impairs mobility and daily functionality beyond occupational activities. Functional limitations in ambulation, climbing stairs, and rising from sitting were common, indicating the transition from localized pain to broader biomechanical dysfunction. These results align with longitudinal studies suggesting that untreated plantar fasciitis can lead to compensatory gait adaptations, Achilles tendon tightness, and knee or hip overloading (25). Thus, early identification and rehabilitation—such as stretching, strengthening, and manual therapy—are essential to prevent chronic disability.

The findings carry important implications for occupational health policy in developing countries. In Pakistan, retail environments rarely implement ergonomic standards or structured rest schedules for sales staff. The evidence presented here advocates for policy-driven interventions, including scheduled micro-breaks, cushioned flooring, and employer-sponsored education on posture and footwear selection. Implementation of workplace physiotherapy programs could further mitigate long-term musculoskeletal risks and improve productivity (26).

Despite its strengths, including a well-defined target population and the use of a validated assessment tool (FHSQ), this study has several limitations. The cross-sectional design precludes causal inference, and plantar fasciitis was assessed through self-report rather than clinical or imaging confirmation. Moreover, potential confounders such as BMI, footwear characteristics, and surface hardness were not controlled. Future studies should adopt longitudinal or interventional designs to establish temporal relationships and test the effectiveness of ergonomic or therapeutic interventions. Inclusion of objective biomechanical measures such as plantar pressure mapping and ultrasonographic fascia thickness could enhance diagnostic accuracy and mechanistic understanding.

## CONCLUSION

This cross-sectional study revealed a high prevalence of plantar heel pain among salesgirls in Lahore, with 91.3% reporting some degree of foot pain and over two-thirds experiencing work-related functional limitations. The significant associations between pain severity, heel ache, and reduced mobility underscore the occupational impact of prolonged standing on musculoskeletal health. These findings emphasize the urgent need for preventive ergonomic strategies—including rest breaks, supportive footwear, and surface modifications—to mitigate plantar fascia strain in retail workers. Integrating physiotherapy-led workplace education and regular screening could further reduce chronic pain progression and improve occupational performance. Future research incorporating objective diagnostic tools, larger multicenter samples, and longitudinal designs is recommended to establish causality and guide policy-level interventions.

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