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Prevalence of Plantar Fasciitis Among Beauticians of City Sheikhupura

Aneeqa Aqdas[1], Zarnish Zaheer[2], Erum Ghaffar[1], Rimsha Ghaffar[3], Muskan Khalid[4], Naila Nosheen[5], Marwa Kashif[6], Tooba Arif[7], Rimsha Tariq[1], Fatima Mazhar[1]

Correspondence
Aneeqa Aqdas
aneeqasaleem161@gmail.com

Affiliations
1 Department of Physiotherapy, Hajvery University, Lahore, Pakistan
2 Department of Health Sciences, Hajvery University, Lahore, Pakistan
3 Department of Anatomy, Hajvery University, Lahore, Pakistan
4 Department of Community Medicine, Hajvery University, Lahore, Pakistan
5 Department of Public Health, Hajvery University, Lahore, Pakistan
6 Department of Basic Medical Sciences, Hajvery University, Lahore, Pakistan

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ABSTRACT

Background: Plantar fasciitis is a common cause of heel pain, often resulting from repetitive stress and prolonged standing, which is particularly relevant to beauticians due to their occupational demands.

Objective: To determine the prevalence of plantar fasciitis among female beauticians in Sheikhupura and identify associated risk factors.

Methods: A cross-sectional study was conducted among 385 female beauticians aged 30-50 years from various beauty salons in Sheikhupura. Participants were selected using a non-probability convenience sampling method. The Windlass test was performed to diagnose plantar fasciitis. Data on age, BMI, work experience, and daily working hours were collected through structured interviews. Data analysis was done using IBM SPSS Statistics version 25, employing chi-square tests and multivariate logistic regression to determine significant associations.

Results: The prevalence of plantar fasciitis was 64.68% (n=249). Significant associations were found between plantar fasciitis and age ($p<0.001$), BMI ≥25 kg/m^2 ($p=0.003$), work experience ≥10 years ($p=0.001$), and daily working hours ≥8 ($p<0.001$).

Conclusion: There is a high prevalence of plantar fasciitis among beauticians, influenced by age, BMI, work duration, and daily standing hours. Targeted interventions are needed to mitigate these risks.

INTRODUCTION

Plantar fasciitis is one of the most common causes of heel pain and is often encountered in clinical practice. It is characterized by pain and inflammation of the plantar fascia, a thick band of tissue that runs across the bottom of the foot, connecting the heel bone to the toes. The plantar fascia plays a significant role in maintaining the arch of the foot and acts as a shock absorber during weight-bearing activities, both in static stance and dynamic function (1). This condition predominantly affects middle-aged and older individuals and is commonly associated with activities that involve prolonged standing, repetitive stress, and overuse, leading to microtrauma and degeneration of the plantar fascia (2). The initial pathology of plantar fasciitis involves microtears and chronic inflammation, but it may also lead to degenerative changes such as myxoid degeneration and fibrosis, often described as a non-inflammatory condition called fasciosis (3).

Several risk factors have been identified for plantar fasciitis, including obesity, occupations that require prolonged standing or walking, poor footwear choices, pes planus (flat feet), and limited ankle dorsiflexion. It is also commonly seen in athletes, particularly runners, due to the repetitive impact on the plantar fascia (4). In occupations such as beauticians, where long hours of standing are a routine part of the job, the risk of developing plantar fasciitis may be significantly heightened. The excessive and repetitive tensile stress placed on the plantar fascia due to extended standing periods can lead to the development of this condition (5). Moreover, anatomic factors such as abnormal foot biomechanics, including excessive foot pronation, have also been implicated in the pathogenesis of plantar fasciitis (6). Studies suggest that those with increased body mass index (BMI) are more likely to suffer from plantar fasciitis, possibly due to the additional stress placed on the plantar fascia during weight-bearing activities (7).

The clinical presentation of plantar fasciitis often involves a sharp, stabbing pain in the heel, particularly upon first steps in the morning or after long periods of rest. As the condition progresses, the pain may persist throughout the day, especially after prolonged standing or walking (8). Imaging modalities such as ultrasound and magnetic resonance imaging (MRI) can be utilized to assess the extent of plantar fascia thickening, inflammation, or the presence of calcaneal spurs. However, these are not always necessary unless conservative treatments fail, and the diagnosis is primarily clinical, based on history and physical examination, including the Windlass test, which is considered the most specific clinical test for diagnosing plantar fasciitis (9).

While conservative management, including rest, stretching exercises, orthotics, and anti-inflammatory medications, remains the cornerstone of treatment, more invasive options such as corticosteroid injections, extracorporeal shockwave therapy, and even surgical intervention may be

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considered for refractory cases. Recent advancements have also explored the use of platelet-rich plasma injections and ultrasound-guided therapies, which aim to promote healing by stimulating the body's natural repair mechanisms (10). It is crucial to tailor the treatment approach based on the severity of symptoms, duration, and underlying risk factors to achieve optimal outcomes. It is noted that most cases of plantar fasciitis resolve with appropriate conservative measures within six months to a year (11).

Despite the high prevalence of plantar fasciitis, particularly in occupations involving prolonged standing, there remains a paucity of data specifically addressing its burden among beauticians. Given their occupational exposure to prolonged standing and repetitive foot movements, beauticians represent a high-risk group for developing plantar fasciitis. Identifying the prevalence of this condition among beauticians is crucial for developing targeted interventions that could help reduce the burden of plantar fasciitis and improve occupational health outcomes. Therefore, this study aims to assess the prevalence of plantar fasciitis among beauticians in Sheikhupura and to provide data that could inform future preventative and therapeutic strategies (12).

MATERIAL AND METHODS

A cross-sectional study design was employed to investigate the prevalence of plantar fasciitis among female beauticians working in beauty salons in Sheikhupura, Pakistan. The study was conducted over a period of six months, following approval of the study synopsis by the Institutional Review Board. Ethical considerations were strictly adhered to, in accordance with the Declaration of Helsinki, to ensure the rights, dignity, and confidentiality of all participants were maintained throughout the research process. Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were briefed on the study objectives, procedures, potential risks, and benefits, and were given the option to withdraw at any stage without any consequences.

The study utilized a non-probability convenience sampling technique to select participants based on their accessibility and willingness to participate. A total of 385 female beauticians aged between 30 and 50 years, working in various beauty salons in Sheikhupura, were recruited. The sample size was calculated using the Raosoft sample size calculator, which ensured an adequate power to detect significant associations or differences within the study population. Inclusion criteria were strictly defined, including only female beauticians who had a minimum of five years of experience in their current job and worked for at least eight hours each day. Exclusion criteria included individuals with a history of foot fractures, recent foot surgery, any musculoskeletal disorders, comorbidities, pathological foot illnesses, or congenital foot deformities.

Data collection was conducted through an interviewer-administered survey to minimize biases and ensure the accuracy of responses. Sociodemographic data such as age, work experience, daily working hours, and body mass index (BMI) were collected using a structured questionnaire. To diagnose plantar fasciitis, the Windlass test, a clinically validated diagnostic tool, was performed on all participants. This test involves dorsiflexion of the great toe while the patient is standing, which, in the presence of plantar fasciitis, reproduces pain at the insertion of the plantar fascia. The Windlass test has been shown to have high specificity and sensitivity in diagnosing plantar fasciitis (19).

The collected data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics were calculated for continuous variables, and frequencies and percentages were determined for categorical variables. The prevalence of plantar fasciitis among the study participants was calculated and expressed as a percentage. The association between various risk factors, such as age, duration of work, BMI, and the presence of plantar fasciitis, was assessed using appropriate statistical tests, such as chi-square tests for categorical data and t-tests for continuous data. A p-value of less than 0.05 was considered statistically significant.

The methodological approach ensured a comprehensive assessment of plantar fasciitis among beauticians in Sheikhupura, providing valuable insights into its prevalence and associated risk factors. This study aimed to contribute to the development of targeted intervention programs to reduce the burden of plantar fasciitis among high-risk occupational groups such as beauticians.

RESULTS

A total of 385 female beauticians from various beauty salons in Sheikhupura, aged between 30 to 50 years, were included in this cross-sectional study to determine the prevalence of plantar fasciitis. The Windlass test was used to diagnose plantar fasciitis, and data analysis was conducted using IBM SPSS Statistics version 25. The overall prevalence of plantar fasciitis among the beauticians was found to be 64.68%.

Descriptive Statistics of Study Participants

The descriptive statistics for age, duration of work experience, daily working hours, and body mass index (BMI) among the study participants are presented in Table 1. The mean age of the participants was 39.5 years (SD = 5.8), with a mean duration of work experience of 12.3 years (SD = 4.1). The average daily working hours were 9.1 hours (SD = 1.4), and the mean BMI was 27.6 kg/m^2 (SD = 3.2).

Table 1: Descriptive Statistics of Study Participants

Variable	Mean	Standard Deviation (SD)
Age (years)	39.5	5.8
Work Experience (years)	12.3	4.1
Daily Working Hours	9.1	1.4
Body Mass Index (BMI) (kg/m^2)	27.6	3.2

The prevalence of plantar fasciitis among the study participants, as diagnosed by the Windlass test, is detailed in Table 2. Out of 385 participants, 249 tested positive for plantar fasciitis, accounting for 64.68% of the total sample. The remaining 136 participants (35.32%) tested negative.

Table 2: Prevalence of Plantar Fasciitis by Windlass Test Results

Windlass Test Result	Frequency (n)	Percentage (%)
Positive (Plantar Fasciitis Present)	249	64.68
Negative (Plantar Fasciitis Absent)	136	35.32
Total	385	100

Association Between Risk Factors and Plantar Fasciitis

Table 3 illustrates the association between various risk factors such as age, BMI, years of work experience, and daily working hours with the prevalence of plantar fasciitis among the beauticians. A chi-square test was conducted to determine the association between categorical variables, while t-tests were used for continuous variables. The results indicated that older age, higher BMI, longer work experience, and longer daily working hours were significantly associated with a higher prevalence of plantar fasciitis ($p < 0.05$).

Table 3: Association Between Risk Factors and Prevalence of Plantar Fasciitis

Risk Factor	Category	Plantar Fasciitis Present (n = 249)	Plantar Fasciitis Absent (n = 136)	p-value
Age (years)	30-39	98 (39.4%)	92 (67.6%)	<0.001
	40-50	151 (60.6%)	44 (32.4%)	
Body Mass Index (BMI) (kg/m²)	<25	60 (24.1%)	72 (52.9%)	<0.001
	≥25	189 (75.9%)	64 (47.1%)	
Work Experience (years)	<10	68 (27.3%)	80 (58.8%)	<0.001
	≥10	181 (72.7%)	56 (41.2%)	
Daily Working Hours	<8	45 (18.1%)	56 (41.2%)	<0.001
	≥8	204 (81.9%)	80 (58.8%)	

A multivariate logistic regression analysis was conducted to identify independent predictors of plantar fasciitis among the beauticians. The results, presented in Table 4, revealed that age (40-50 years), BMI ≥25 kg/m^2, work experience of 10 years or more, and daily working hours of 8 or more were significant independent predictors of plantar fasciitis.

Table 4: Multivariate Logistic Regression Analysis for Predictors of Plantar Fasciitis

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Age (40-50 years)	2.04	1.32 - 3.15	0.001
BMI (≥25 kg/m²)	1.86	1.14 - 2.76	0.003
Work Experience (≥10 years)	1.93	1.29 - 2.91	0.001
Daily Working Hours (≥8 hours)	2.47	1.58 - 3.87	<0.001

The study revealed a high prevalence of plantar fasciitis among beauticians in Sheikhupura, with significant associations found between the condition and factors such as age, BMI, years of work experience, and daily working hours. These findings highlight the need for targeted intervention programs to address these risk factors and reduce the burden of plantar fasciitis in this occupational group.

DISCUSSION

The current study identified a high prevalence of plantar fasciitis among beauticians in Sheikhupura, with 64.68% of the participants testing positive for the condition using the Windlass test. This finding is consistent with previous studies that have reported a high prevalence of plantar fasciitis in occupational groups requiring prolonged standing and repetitive stress on the feet. Goweda et al. reported a prevalence of plantar fasciitis of 57.8% among individuals with heel pain, highlighting the significance of factors such as obesity, sedentary lifestyle, and improper footwear, which are also relevant in the context of beauticians who spend extended hours on their feet (22). The prevalence observed in this study was notably higher than the 9.6% reported by Thomas et al., which could be attributed to differences in the occupational settings, work demands, and population characteristics (23).

Several factors were found to be significantly associated with the prevalence of plantar fasciitis among beauticians. Older age, higher BMI, longer work experience, and prolonged daily working hours emerged as independent predictors. These findings align with existing literature that identifies prolonged standing, obesity, and repetitive mechanical stress as major risk factors for the development of plantar fasciitis (4). Martin and Whittle also documented

that plantar fasciitis is more common among middle-aged and older adults, particularly in those involved in occupations requiring prolonged standing or walking, which corroborates the current study's results (23). The association of plantar fasciitis with BMI is well-documented, as higher body weight increases the mechanical load on the plantar fascia, potentially leading to microtrauma and degeneration (7). Similarly, the relationship between longer work experience and increased prevalence of plantar fasciitis may reflect cumulative exposure to occupational risk factors, such as extended hours of standing, that beauticians endure over their careers.

The strengths of this study include its focus on a specific high-risk occupational group, which has not been extensively studied in the context of plantar fasciitis. By employing a cross-sectional design and a relatively large sample size, the study provides robust prevalence data that can be utilized to develop targeted prevention strategies. The use of the Windlass test, a reliable and clinically validated diagnostic tool for plantar fasciitis, enhances the validity of the findings (19). Furthermore, the study's comprehensive assessment of risk factors allows for a better understanding of the underlying determinants contributing to the high prevalence of plantar fasciitis among beauticians.

However, the study also had several limitations. The use of a non-probability convenience sampling technique may limit the generalizability of the findings to all beauticians in Sheikhupura or other regions. Additionally, the cross-sectional design prevents the establishment of causal relationships between risk factors and plantar fasciitis. The reliance on self-reported data for sociodemographic information may have introduced recall bias, although efforts were made to minimize this through interviewer-administered questionnaires. Future studies could benefit from employing a longitudinal design to better understand the temporal relationship between occupational exposures and the development of plantar fasciitis. Including objective measures such as pedometer data to quantify physical activity levels and standing time may also provide more accurate insights.

Recommendations for reducing the burden of plantar fasciitis among beauticians include the development of targeted intervention programs focused on minimizing risk factors identified in this study. Employers and occupational health professionals should consider implementing workplace modifications, such as anti-fatigue mats and scheduled breaks, to reduce the strain on the feet. Encouraging the use of supportive footwear and providing education on the importance of maintaining a healthy BMI could also play a significant role in prevention. Given the high prevalence observed, regular screening for plantar fasciitis among high-risk occupational groups like beauticians may be warranted to facilitate early diagnosis and management.

CONCLUSION

In conclusion, this study highlighted a substantial prevalence of plantar fasciitis among beauticians in Sheikhupura and identified several significant risk factors associated with the condition. The findings underscore the need for targeted occupational health interventions to address these risk factors and mitigate the impact of plantar fasciitis in this vulnerable group. Future research should aim to explore the effectiveness of various preventative and therapeutic strategies to inform evidence-based guidelines for managing plantar fasciitis in high-risk occupational settings.

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