

Original Article

Prevalence and Effects of Plantar Fasciitis on Functional Activities among Doctors and Nurses in Sialkot, a Cross-Sectional Survey.

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ABSTRACT

Background: Plantar fasciitis is a debilitating condition that affects a significant number of adults worldwide, characterized by heel pain and functional limitations. Healthcare professionals, particularly nurses and doctors, are at a heightened risk due to their prolonged standing and weight-bearing activities. Despite this, there remains a paucity of research focusing on this demographic, especially within the context of developing countries like Pakistan.

Objective: This study aimed to determine the prevalence and impact of plantar fasciitis on the functional activities of doctors and nurses in Sialkot, Pakistan, thereby contributing to the existing literature and providing insights for occupational health interventions.

Methods: A cross-sectional survey was conducted in two major hospitals of Sialkot from October 2023 to January 2024. The study recruited 165 participants through non-probability convenient sampling. Inclusion criteria were professionals aged 25-50 with positive windlass tests and experiencing morning pain for over a month, while those with heel fractures, surgeries, infections, or foot deformities were excluded. The Foot Function Index questionnaire was employed to measure pain, disability, and activity limitation. Data were analyzed using SPSS version 25, employing a one-sample t-test to compare group means.

Results: The mean scores for pain, disability, and activity limitation were 53.48 ± 12.24 , 52.88 ± 10.43 , and 9.15 ± 3.36 , respectively. The one-sample t-test revealed significant differences from the test value of 50 for pain ($t=3.663$, $p<0.001$) and disability ($t=3.548$, $p=0.001$), with activity limitation significantly below the test value ($t=-155.848$, $p<0.001$).

Conclusion: The study confirmed a high prevalence of plantar fasciitis among healthcare professionals, with notable implications for their daily functionality and occupational health. The condition was more prevalent among nurses compared to doctors, and significantly affected their ability to perform daily tasks, leading to increased disability and activity limitations.

Keywords: Plantar Fasciitis, Prevalence, Healthcare Professionals, Occupational Health, Functional Limitations, Foot Function Index, Pakistan

INTRODUCTION

Plantar Fasciitis (PF) is a prevalent condition characterized by the inflammation of the plantar aponeurosis, a thick fibrous band that runs along the bottom of the foot, primarily at its insertion on the medial tubercle of the calcaneus. This condition leads to chronic degenerative changes, including continuous tension, micro-tearing, and a subsequent healing response, often manifesting as heel discomfort described as burning, aching, or occasionally lancinating pain. Notably, the pain associated with PF tends to intensify following prolonged rest or the initial steps taken upon waking (1, 2). Despite its unclear etiology, PF shares similarities with Achilles tendinopathy, involving microtears, localized disruption of the collagen matrix, and microscopic degenerative damage. Etiological factors have been linked to biomechanical foot abnormalities, such as high or low arches, subtalar eversion, pronated feet, and acquired shortening of the hamstring and gastrocnemius muscles, which contribute to the pathology (3, 4).

Epidemiologically, PF affects a significant portion of the population, with estimates suggesting that 10% will experience the condition at least once in their lifetime. Contrary to the belief that PF predominantly affects athletes, research indicates a higher prevalence among sedentary individuals. In the United States alone, approximately two million people are afflicted with PF, accounting for 11-

15% of heel problems necessitating medical intervention. A demographic analysis reveals that 83% of affected individuals are active, working adults aged between 25 and 65. Surveys, including one conducted by the American Podiatric Medical Association (APMA) in 2014, report a 27% prevalence rate among respondents, aligning with earlier studies indicating a 10% prevalence in the general population, with the highest incidence observed among individuals aged 45 to 65 (5).

Risk factors for PF extend beyond biomechanical issues, including prolonged weight-bearing activities, sudden changes in physical activity, walking on hard surfaces, inadequate stretching, improper footwear, limited ankle dorsiflexion, Achilles tendon stiffness, aging, significant foot pronation, and obesity. These factors contribute to pathological loading on the plantar fascia's calcaneal insertion, leading to microtears, perifascial edema, and heel pad thickening. Such changes compromise the foot's biomechanics, hinder effective force absorption, and exacerbate symptoms (6).

Despite the widespread nature of PF, its occurrence appears to be independent of age or gender. Within healthcare settings, particularly among nurses, foot and ankle pain has garnered less attention compared to issues like low back or neck pain. However, this oversight neglects the significant impact that foot and ankle discomfort can have on nursing practice. Independent associations have been established between shoe comfort and foot and ankle pain outcomes, underscoring the need for further exploration into this area (7).

The nursing profession, known for its physical and psychological demands, predisposes practitioners to work-related musculoskeletal disorders, including PF. Nurses' extended periods of standing and engagement in labor-intensive tasks, such as patient and equipment handling, coupled with movement on hard surfaces, heighten their risk of developing PF. The nature of their work, involving prolonged weight-bearing on unforgiving surfaces, emphasizes the need for targeted research into the condition's prevalence and impact among healthcare professionals (8).

This study aims to investigate the prevalence of PF among nurses and doctors and its influence on their functional activities, utilizing the windlass test as a primary diagnostic tool. Despite the significance of PF and its potential to impair the daily functions of healthcare workers, research exploring the differential effects of PF on male and female nurses remains scarce, highlighting a critical gap in the literature that this study seeks to address (6).

MATERIAL AND METHODS

The cross-sectional study was conducted at Sardar Begum and Civil Hospital in Sialkot, Pakistan, spanning from October 2023 to January 2024. This investigation received the requisite approval from the University of Management and Technology, Sialkot's research ethics committee, and was carried out over a four-month period following the endorsement of the research synopsis. A sample size of 165 participants was determined using epitool, aligning with recommendations from the literature (9). Recruitment was facilitated through non-probability convenient sampling methods, following authorization from the hospital administration. Inclusion criteria were defined for participants aged between 25 to 50 years who exhibited a positive result on the windlass test and reported morning pain with the first stride persisting for more than one month (6). Exclusion criteria were established for individuals with a history of heel fractures, surgeries, infections, or foot deformities.

Measurement instruments employed in this study included the Numeric Pain Rating Scale (NPRS) and the Foot Function Index questionnaire, both of which were available in English and Urdu. Given the varied educational backgrounds of the nursing staff, some of whom were not diploma holders, questionnaires were administered verbally to these individuals and completed based on their responses to ensure clarity and accuracy. The data collection process spanned 3 to 4 days, aimed at evaluating the awareness levels regarding plantar fasciitis among doctors and nurses in the Sialkot region.

Upon data collection completion, statistical analysis was conducted using SPSS version 25 and Microsoft Word 2013. The one-sample t-test was applied to assess the mean and standard deviation, with a 95% confidence interval to determine the difference.

From an ethical standpoint, the study adhered to stringent guidelines to ensure the respect and protection of participant rights. Consent was obtained from all participants, with assurances that their data would remain confidential and that they retained the right to withdraw from the study at any point without repercussions. The development of questionnaires and the conduct of interviews were meticulously designed to avoid offensive, abusive, or discriminatory language. Privacy and anonymity of the participants were paramount, with all measures taken to safeguard these principles throughout the research process. Additionally, the study was conducted in accordance with the Helsinki Declaration, ensuring that all ethical considerations were met, including the acknowledgment of all sources and authors in accordance with the APA referencing system. No material was included without

appropriate citations, and data confidentiality was rigorously maintained to protect participant identities and the integrity of the research findings.

RESULTS

The study's analysis of plantar fasciitis across different sections revealed significant statistical findings. For Section 1, encompassing 166 participants, the mean score was 53.4819 with a standard deviation of 12.24781. The standard error of the mean was noted as 0.95061. The one-sample t-test yielded a t-value of 3.663 with 165 degrees of freedom, showing a significant mean difference of 3.48193 from the hypothesized value of 50 ($p < 0.001$), indicating a substantially higher score with a 95% confidence interval between 1.6050 and 5.3589 (Table 1).

In Section 2, with a sample size identical to Section 3 of 165 participants, the mean score was slightly lower at 52.8822, and the standard deviation was 10.43462, indicating less variability than in Section 1. The standard error of the mean was reduced to 0.81233. The t-test showed a mean score that was significantly above the hypothesized value, with a t-value of 3.548 ($df = 164$, $p = 0.001$), and the mean difference was recorded at 2.88215, with the confidence interval ranging from 1.2782 to 4.4861 (Table 2).

Contrastingly, Section 3 presented a starkly different set of results. The mean score was a mere 9.1515 with a much lower standard deviation of 3.36679 and a standard error of 0.26210, reflecting tighter data clustering. The t-test demonstrated an extremely significant deviation from the hypothesized mean with a t-value of -155.848 ($df = 164$, $p < 0.001$), signifying a profound mean difference of -40.84848. The 95% confidence interval for this difference was notably narrow, spanning from -41.3660 to -40.3310, emphasizing the robustness of the result (Table 3).

The group statistics for Section 4 provided occupational insights, differentiating between doctors and nurses. The sample included 78 doctors with a mean score of 42.3605 and a standard deviation of 7.28039. In comparison, the 87 nurses had a higher mean score of 48.0122 with a standard deviation of 6.58110. The standard error of the mean for doctors was 0.82434 compared to 0.70557 for nurses, suggesting more precise estimates for the latter group (Table 4).

Table 1 One-Sample Statistics and Tests:

Section	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)	Mean Difference	95% CI Lower	95% CI Upper
section1.score	166	53.4819	12.24781	0.95061	3.663	165	0.000	3.48193	1.6050	5.3589
section2.score	165	52.8822	10.43462	0.81233	3.548	164	0.001	2.88215	1.2782	4.4861
section3.score	165	9.1515	3.36679	0.26210	-155.848	164	0.000	-40.84848	-41.3660	-40.3310

Table 2 Group Statistics for Section 4:

Occupation	N	Mean	Std. Deviation	Std. Error Mean
Doctor	78	42.3605	7.28039	0.82434
Nurse	87	48.0122	6.58110	0.70557

Table 3 Independent Samples Tests for Section 4:

Description	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	95% CI Upper
Equal variances assumed	-5.237	163	0.000	-5.65169	1.07909	-7.78248	-3.52089
Equal variances not assumed	-5.209	156.123	0.000	-5.65169	1.08506	-7.79499	-3.50839

The independent samples tests for Section 4 examined the mean differences between doctors and nurses under the assumption of equal variances and otherwise. The results indicated a statistically significant difference in scores between the two professions. When assuming equal variances, the t-test yielded a t-value of -5.237 (df = 163, $p < 0.001$), with a mean difference of -5.65169 and a 95% confidence interval ranging from -7.78248 to -3.52089. Without this assumption, the t-value was -5.209 (df = 156.123, $p < 0.001$), and the confidence interval was similarly positioned from -7.79499 to -3.50839. Both tests confirmed a significantly lower score for doctors compared to nurses (Table 5).

These results underscore the impact of plantar fasciitis on healthcare professionals, revealing the extent to which the condition can affect different groups within the same occupational environment. The data serves as an essential quantitative measure of the prevalence and effects of plantar fasciitis, laying the groundwork for targeted interventions.

DISCUSSION

The investigation into plantar fasciitis within the medical community, as demonstrated by this study, underscores the pervasiveness and impact of the condition among healthcare professionals. Utilizing the Foot Function Index questionnaire, the study delineated the extent of pain, disability, and activity limitation experienced by participants, revealing that pain was present in 53% of cases on the pain scale, disabilities accounted for 52%, and activity limitation was noted in 9% of the sample population. These findings are integral to understanding the multifaceted nature of plantar fasciitis, which not only affects physical well-being but also hampers the efficiency and quality of life of those afflicted (6).

In contrast with earlier studies that employed a variety of data collection methods ranging from interviews to alternative questionnaires, the current study offers a rigorous assessment specifically tailored to the prevalence and consequences of plantar fasciitis (9, 10). Notably, the study observed a higher susceptibility of plantar fasciitis in women compared to men, a distinction that may be attributed to the prolonged periods of standing inherent in nursing duties, coupled with the potential weight-bearing demands of the profession. Interestingly, the recent findings suggest no significant correlation between body mass index (BMI) and plantar fasciitis, challenging previous assertions that linked higher BMI with the condition. This highlights the importance of occupational risk factors over anthropometric measures in the context of plantar fasciitis prevalence among healthcare professionals (11, 14).

Comparative studies in diverse geographic locales such as Saudi Arabia, Taiwan, and Jazan have reported varying prevalence rates, with figures ranging from 37% to 57.8%. These discrepancies could stem from methodological differences, including the operational definitions of pain and the demographics of the study samples, such as age and weight, as well as the differing durations of work shifts. Furthermore, the healthcare systems and scope of practice in these studies differ significantly from those in the current context, potentially influencing the incidence of plantar fasciitis (10, 12, 16).

Despite the larger sample sizes and response rates in certain previous studies, the current investigation is distinguished by the employment of the gold standard Foot Function Index questionnaire, which enhances the validity and reliability of the findings. This methodological strength provides a comprehensive assessment of foot health, particularly in distinguishing the specific challenges faced by doctors and nurses. It also allows for a more nuanced interpretation of the impact of plantar fasciitis on the daily activities and functional abilities of medical professionals (13).

However, the study is not without its limitations. The cross-sectional design, while effective for establishing prevalence, does not permit the establishment of causality. Moreover, the sample size, although sufficient to detect significant differences, may not fully capture the diversity and variations within the broader population of healthcare workers. Future research could benefit from longitudinal designs to track the progression of plantar fasciitis over time and its long-term impact on healthcare professionals' occupational health.

CONCLUSION

In conclusion, the findings from the current study contribute meaningfully to the body of literature on plantar fasciitis within healthcare settings. They corroborate the increased risk and prevalence among nursing professionals, highlighting the condition's implications for workplace health and functionality. Recommendations for future research include the incorporation of longitudinal study designs and the examination of preventative and therapeutic interventions tailored to the occupational needs of healthcare workers. Such measures are crucial for enhancing the well-being of those who form the backbone of patient care and ensuring the sustainability of their professional contributions.

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