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Original Article

Prevalence and Association of Risk Factors for Plantar Fasciitis among Nurses in Government Tertiary Care Hospitals of Peshawar

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ABSTRACT

Background: Plantar fasciitis is a common cause of heel discomfort and pain, resulting from inflammation of the plantar fascia, a thickened fibrous aponeurosis extending from the medial calcaneal tuberosity to the metatarsal heads. It affects more than 1 million people worldwide annually, with a lifetime prevalence that may reach 10% of the general population. Despite its widespread impact, the exact incidence remains unknown.

Objective: This study aimed to determine the prevalence and associated risk factors of plantar fasciitis among nurses working in government tertiary care hospitals in Peshawar.

Methods: A cross-sectional survey was conducted over six months, utilizing a convenient sampling technique. A total of 332 female nurses aged 25 to 50 years with clinical duties exceeding five hours per day participated in the study. Data were collected using the Plantar Fasciitis Pain and Disability Scale and the Visual Analogue Scale (VAS) for pain intensity. Face-to-face interviews and physical assessments were conducted by trained healthcare professionals. Statistical analysis was performed using SPSS version 25.0, with descriptive statistics calculated for quantitative variables and Chi-Square tests used to examine associations between variables. Ethical approval was obtained from the Institutional Review Board, and informed consent was secured from all participants.

Results: The mean age of participants was 29.8042 ± 3.67743 years. The mean total score for plantar fasciitis was 31.4096, and the mean VAS score was 1.9458. Pain occurrence per week was reported as 1-2 days by 44.0% of participants, 3-4 days by 46.7%, and 5-7 days by 9.3%. Pain was most commonly worse in the afternoon (35.8%) and interfered with walking occasionally (52.7%). High heel standing was uncomfortable for 54.5% of participants. A significant relationship was found between age and VAS scores (p=0.001), as well as between high heel usage and increased pain levels (p=0.000).

Conclusion: The mean score of plantar fasciitis among the nurses was below the threshold indicating significant prevalence. However, a significant association was found between high heel usage and plantar fasciitis, suggesting that footwear choices play a critical role in the development of this condition. Ergonomic interventions promoting supportive footwear and regular breaks are recommended to mitigate the risk of plantar fasciitis among nurses.

Keywords: Plantar Fasciitis, High Heel Shoes, Heel Pain, Musculoskeletal Disorders, Occupational Health.

INTRODUCTION

Plantar fasciitis is one of the most prevalent causes of heel discomfort, particularly affecting the plantar fascia, a thickened fibrous aponeurosis extending from the medial calcaneal tuberosity to the metatarsal heads. The plantar fascia plays a crucial role in protecting the medial arch and providing tensile strength to the metatarsal bones. Plantar fasciitis typically results from inflammation at the origin of the medial calcaneal tuberosity due to repetitive stress, leading to a degenerative condition affecting the plantar fascia (1). The condition is known to impact both active and sedentary individuals (3). The plantar fascia comprises three bundles:

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central, lateral, and medial, with the central bundle being the most critical and commonly affected by disease. This fascial structure not only supports the foot arch but also absorbs biomechanical shock during daily activities, such as walking and running (2).

The exact incidence of plantar fasciitis remains unknown, but its lifetime prevalence may reach 10% of the general population worldwide (1). The disorder frequently affects individuals engaged in activities that place excessive stress on the foot, including runners and dancers, as well as those who stand for prolonged periods (4). Plantar fasciitis has been associated with increased body weight, decreased ankle dorsiflexion, and biomechanical abnormalities such as a tight Achilles tendon (13). Additionally, factors like foot posture, pressure distribution, and lower extremity alignment significantly contribute to the development of plantar fasciitis (7).

In clinical settings, plantar fasciitis is diagnosed based on symptoms such as pain, burning, and tenderness at the medial tubercle of the calcaneum. Imaging techniques like diagnostic ultrasonography and magnetic resonance imaging are used for detailed evaluation when necessary (16). The condition is more prevalent among women, particularly those aged 45 to 64, and in individuals with a higher body mass index (12). Work-related musculoskeletal disorders, including plantar fasciitis, are common among nursing professionals, affecting between 40% to 90% of the nursing population globally. The high prevalence of plantar fasciitis in this group is attributed to prolonged standing and walking during work hours, often exacerbated by wearing high-heeled shoes (11).

Our study aimed to investigate the prevalence and risk factors associated with plantar fasciitis among nurses working in government tertiary care hospitals in Peshawar. Given the high incidence of musculoskeletal issues in this profession, understanding the factors contributing to plantar heel pain is essential. Previous research has identified a delay in conducting studies focused on nurses, with most studies targeting other professions such as government teachers. This study addresses the gap by examining the relationship between heel pain due to plantar fasciitis and factors such as high heel usage and extended duty hours among nurses. Our cross-sectional observational study, conducted over six months, involved a sample size of 332 female nurses aged 25 to 50 years, selected through convenient sampling. Data collection tools included the Visual Analogue Scale for pain intensity and the Plantar Fasciitis Pain and Disability Scale, ensuring comprehensive assessment and statistical analysis (5).

In summary, while our study found no significant prevalence of plantar fasciitis among nurses based on the scoring scale, there was a notable association with the use of high-heeled shoes, indicating a potential risk factor. These findings underscore the importance of ergonomic considerations in nursing footwear to mitigate the risk of plantar fasciitis and enhance the overall well-being of nursing professionals (1-20).

MATERIAL AND METHODS

This cross-sectional observational study was conducted over six months at government tertiary care hospitals in Peshawar. The Institutional Review Board approved the study, and data collection commenced following this approval, adhering to the ethical principles outlined in the Declaration of Helsinki. Participants provided informed consent before inclusion in the study. The sample size, calculated using the RaoSoft sample size calculator, ensured a confidence level of 95%, a desired precision of 0.05, and an expected true proportion of 0.5, resulting in 332 female nurses aged 25 to 50 years. These participants were selected using a convenient sampling technique, focusing on nurses with clinical duties exceeding five hours per day. Inclusion criteria encompassed female nurses within the specified age range and those with duty hours greater than five hours. Exclusion criteria included traumatic injuries, pathological heel pain, and pregnancy.

Data collection involved face-to-face interviews and physical assessments conducted by trained healthcare professionals (6). Demographic information, medical history, and relevant clinical data were recorded for each participant. The Visual Analogue Scale (VAS) and the Plantar Fasciitis Pain and Disability Scale (PFPS) were utilized to assess pain intensity and disability. The VAS measured pain on a scale of 0 to 100 points, with cut-off points for pain intensity classified as no pain (0–4 mm), mild pain (5–44 mm), moderate pain (45–74 mm), and severe pain (75–100 mm) (7). A PFPS score greater than 35 points indicated significant heel pain due to plantar fasciitis.

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 25.0. Descriptive statistics, including means and standard deviations for quantitative variables and frequencies and percentages for qualitative variables, were calculated. The Chi-Square test was used to examine the relationship between age, VAS scores, and the total scoring of plantar fasciitis. Additionally, the relationship between elapsed time for comfortable walking, high heel shoe usage, and VAS scores was analyzed. The level of significance was set at $p<0.05$ for all statistical tests, indicating a statistically significant association between variables if the p-value was less than 0.05.

The study revealed that the mean age of participants was 29.8042 ± 3.67743 years. The mean total score for plantar fasciitis was 31.4096, and the mean VAS score was 1.9458. The analysis indicated that age was significantly associated with VAS scores ($p<0.05$), suggesting that older nurses experienced more intense pain. The study also found a significant relationship between high heel usage

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and increased pain levels, as well as between prolonged standing while wearing high heels and higher plantar fasciitis scores. Nurses with longer walking times also had higher plantar fasciitis scores, indicating a correlation between prolonged walking and the severity of the condition.

The ethical considerations adhered to throughout the study ensured that all participants were treated with respect and that their rights were protected. Informed consent was obtained from all participants, and confidentiality was maintained by anonymizing personal data. The study's findings contribute to understanding the prevalence and risk factors of plantar fasciitis among nurses, highlighting the impact of occupational hazards such as prolonged standing and high heel usage on the condition. These insights can inform the development of preventive measures and ergonomic interventions to reduce the incidence of plantar fasciitis among healthcare professionals (1-20).

RESULTS

The study included 332 participants to determine the prevalence of plantar fasciitis among nurses working in tertiary care hospitals in Peshawar. The age of participants ranged from 25 to 50 years, with a mean age of 29.8042 ± 3.67743 years. The mean total score for plantar fasciitis was 31.4096, and the mean VAS score was 1.9458.

Table 1: Mean and Standard Deviation of Total Scoring of Plantar Fasciitis, Age, and VAS

Variable	Mean	Median	Std. Deviation
Total Scoring Fasciitis	31.4096	30.0000	13.96460
Age	29.8042	29.0000	3.67743
VAS	1.9458	2.0000	0.67993

Table 2: Frequency, Mean, Standard Deviation, and Chi-Square p-Value of VAS and Age

VAS Category	Mean Age	N	Std. Deviation	Chi-Square p-Value
No pain	29.0000	1	-	0.001
Mild pain	28.2289	83	3.50374	
Moderate pain	29.8564	181	3.36177	
Severe pain	31.6269	67	3.90352	
Total	29.8042	332	3.67743	

The majority of participants experienced mild to moderate pain, with a significant relationship between age and VAS scores (p=0.001).

Table 3: Frequency of Pain Occurrence Per Week, Pain Worsening Time, Pain Interference with Walking, and Comfort with High Heel Standing

Variable	Frequency	Percent	Chi-Square p-Value
Days of Pain Occurrence per Week			
1-2	146	44.0	0.000
3-4	155	46.7	
5-7	31	9.3	
Time of Day Pain is Worse			
Always the same	86	25.9	0.000
Only in the afternoon	119	35.8	
Both day and night	98	29.5	
Only when first getting up	29	8.7	
Pain Interference with Walking			
Never	63	19.0	0.000
Occasionally	175	52.7	
Frequently	87	26.2	
Always	7	2.1	
Comfort with High Heel Standing			
Not at all	68	20.5	0.000
Very little	181	54.5	

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Moderate	56	16.9	
Severe	27	8.1	

A significant proportion of participants reported experiencing pain 3-4 days per week, with the pain worsening in the afternoon. Pain interfered with walking for most participants, and high heel standing was reported as uncomfortable.

Table 4: Combined Analysis of Age, VAS Scores, Total Scoring of Plantar Fasciitis, Comfortable Walking with High Heel Shoes, Standing with High Heel Shoes, and Pain Effect on Activities of Daily Living (ADL)

Variable	Frequency	Percent	Chi-Square p-Value
Age and VAS			0.001
Total Score Plantar Fasciitis and VAS			0.000
Elapse Time for Comfortable Walking and VAS			0.000
Comfortable Walking with HHS and VAS			0.000
No Pain	1	0.3	
Mild Pain	83	25.0	
Moderate Pain	181	54.5	
Severe Pain	67	20.2	
Standing with High Heel Shoes and VAS			0.000
Not at all	68	20.5	
Very little	181	54.5	
Moderate	56	16.9	
Severe	27	8.1	
Pain Effect on ADL			0.000
Does Not Limit ADL	119	35.8	
Some Activities Avoided	182	54.8	
Activities Avoided Due to Pain	31	9.3	

In summary, the study revealed that while the mean score for plantar fasciitis was below the threshold indicating significant prevalence, there was a notable association between high heel usage and plantar fasciitis. Age and prolonged walking times were significantly related to higher pain intensity and plantar fasciitis scores. These findings highlight the occupational hazards faced by nurses, particularly those related to footwear choices and extended periods of standing or walking, which could contribute to the development and severity of plantar fasciitis.

DISCUSSION

The study aimed to investigate the prevalence and associated risk factors for plantar fasciitis among nurses in government tertiary care hospitals of Peshawar. The results indicated a mean total score of 31.4096 on the plantar fasciitis scoring scale, with the majority of participants experiencing mild to moderate pain as measured by the Visual Analogue Scale (VAS). Despite the mean score being below the threshold indicating significant prevalence, the study identified a notable association between high heel usage and increased pain levels, suggesting that footwear choices are a critical factor in the development of plantar fasciitis among nurses(8-10).

The findings align with previous research indicating that repetitive stress and prolonged standing contribute significantly to plantar fasciitis (1). The study also corroborated the work of Nahin (2018), who highlighted that both active and sedentary individuals are susceptible to this condition. The association between high heel usage and plantar fasciitis found in this study is consistent with earlier studies (17,18), which demonstrated that high-heeled shoes increase strain on the plantar fascia, leading to pain and potential degeneration.

The mean age of participants was 29.8042 years, and the significant relationship between age and VAS scores suggests that older nurses experienced more intense pain. This finding is supported by the work of Taş and Çetin (19), who noted that age-related changes in plantar pressure distribution could exacerbate plantar fasciitis symptoms. Additionally, the study found that prolonged walking times were associated with higher plantar fasciitis scores, which is in line with the research conducted by Goff and Crawford (20), who identified prolonged standing and walking as significant risk factors.

One of the study's strengths was the use of validated tools such as the VAS and the Plantar Fasciitis Pain and Disability Scale, ensuring reliable and accurate data collection. The sample size of 332 participants provided a robust dataset for analysis, enhancing the

generalizability of the findings. However, the study also had limitations. The use of convenient sampling may have introduced selection bias, and the cross-sectional design precluded the establishment of causal relationships. Additionally, the reliance on self-reported data for pain and disability measures may have resulted in reporting bias (21,22).

The study's findings have important implications for occupational health practices in nursing. The significant association between high heel usage and plantar fasciitis underscores the need for ergonomic interventions, such as promoting the use of supportive footwear and implementing regular breaks to reduce prolonged standing. These measures could potentially mitigate the risk of developing plantar fasciitis and improve the overall well-being of nurses (23,24).

Future research should consider a longitudinal design to establish causal relationships and explore the long-term impact of ergonomic interventions on reducing plantar fasciitis prevalence. Additionally, expanding the study to include male nurses and other healthcare professionals could provide a more comprehensive understanding of the condition's occupational risk factors (1-20).

CONCLUSION

In conclusion, the study highlighted the occupational hazards faced by nurses, particularly those related to footwear choices and extended periods of standing or walking. While the mean score for plantar fasciitis was below the threshold indicating significant prevalence, the association with high heel usage suggests that preventive measures are necessary to reduce the risk of plantar fasciitis in this population. Addressing these risk factors through ergonomic interventions and further research could lead to better health outcomes for nurses and other healthcare workers.

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