

Impact Of Pain On Functional Limitation And Quality Of Life In Plantar Fasciitis -A Cross Sectional Prevalence Study

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Abstract

Background: Heel pain interferes with everyday activities is often caused by plantar fasciitis. We evaluated the impact of symptoms on people's quality of life. Characterising the primary functional limitations and determining the frequency of moderate to severe PF symptoms in patients receiving treatment at particular institutions in Kollam district, Kerala.

Methods: It is across-sectional prevalence survey of 210 PF patients that was administered via a questionnaire. A standardised Plantar Fasciitis Pain and Symptoms questionnaire with 19 items and scores ranging from 0 to 3 was used to assess the intensity of symptoms. Descriptive statistics were used to summarise prevalence patterns, and total severity ratings were calculated. To examine the relationships between age, gender, and symptom severity, ANOVA and Post Hoc tests are used.

Results: Males 20.05%, while females 79.5% with age group of 46.6 ± 12 years. All participants complained of heel pain, with the majority of complaints (96.7%) originating from the heel's bottom. 86.2% of participants reported that their pain peaked when they woke up, and 75.7% reported that their pain occurred frequently during the day. Severe symptoms were present in 97% of individuals. Functional limitations included standing after sitting (91.9%), barefoot walking (75.7%), 44% reported having trouble sleeping, and 81.5% reported anxiousness on daily basis. Females experienced significantly more severe symptoms ($p = 0.021$).

Conclusion: Plantar fasciitis causes severe pain and major functional and psychological repercussions in adults, especially women. To reduce disability, early intervention is crucial.

Keywords: Plantar fasciitis, Heel pain, Quality of life, Functional restrictions

INTRODUCTION

Plantar fasciitis is a common foot condition brought on by an inflammatory reaction to repeated micro trauma. The plantar fascia, which runs across the bottom of the foot, is inflamed in this condition. The medial, central, and lateral bands are formed by the merging of the plantar section of the forefoot at three different points along its longitudinal length, which begins in the calcaneus.¹

The thickest part is the central aponeurotic band. Five longitudinal digitations that insert at the level of each metatarsophalangeal joint capsule are formed by its distal division. Plantar fasciitis is frequently associated with the central aponeurotic band of the plantar fascia²The middle band of the PF is frequently mentioned from a biomechanical perspective as the primary supporter of the foot's longitudinal arch, serving as a windlass and preventing arch flattening. Additionally, the plantar fascia serves as an effective shock absorber during stride propulsion³.

The Windlass Mechanism: According to Hicks' original description, the foot and the ligaments that support it work like a triangle truss. Plantar fascia, which runs from the calcaneus to the phalanges, acts as the tie-rod for this structure's arch, which is made up of the calcaneus, mid tarsal joint, and metatarsals. The medial longitudinal arch is often flattened during weight bearing by vertical pressures transmitted via the tibia, with ground response forces applied at the heel and metatarsal heads further influencing this effect. This collapse is resisted by the plantar fascia due to its direction and tensile strength. The plantar fascia, which extends from the base of the calcaneus to the phalanges, preserves the medial longitudinal arch⁴ by limiting the excessive separation of the calcaneus and metatarsals⁴.

Biomechanical Influences on Plantar Fascia Abnormalities: The plantar fascia is under a lot of stress from vertical and ground response forces, and pain is mostly caused by excessive tensile loading at the calcaneal connection. Fuller suggested that overstretching the fascia could cause pain at the bony insertion, where strong traction can

elevate the periosteum and promote bone growth, or within the fascia itself. Such mechanical force explains the calcaneal spurs' horizontal orientation in accordance with Wolff's law⁵.

The windlass test, which involves forcing the great toe to extend while bearing weight, can replicate symptoms clinically by causing pain at the medial calcaneal tubercle. This test can still be used to diagnose plantar Fascial discomfort even if it has a poor sensitivity and a high specificity. In conclusion, the information that is now available points to the creation of calcaneal spurs as the aetiology of plantar fasciitis, rather than excessive tensile strain within the plantar fascia. Therefore, the biomechanical elements that lead to aberrant Fascial loading should be the focus of effective therapy⁶.

In addition to placing undue strain on the foot's soft tissues and mid-tarsal joint, a malfunctioning windlass mechanism may cause the foot to take longer to re-supinate during walking. Plantar fasciitis could result from this. Pain in the bottom of the heel is the most typical PF symptom⁷. This discomfort is frequently severe and may be more noticeable while taking one's first steps in the morning or after periods of inactivity. Stiffness and tightness may also be experienced by certain individuals.. Rest, stretching, strengthening, changing shoes, arch supports; orthotics, night splints, anti-inflammatory drugs, and surgery are just a few of the numerous therapeutic options available.⁸

MATERIAL AND METHOD

A cross-sectional, questionnaire-based prevalence survey was conducted in the Kollam district of Kerala to find out how often plantar fasciitis is among patients who visit PNNM Hospital. 210 individuals with a clinical diagnosis of plantar fasciitis participated in this study. The Plantar Fasciitis Pain/Disability Scale (PFPS) was used to measure pain and disability.. People having a clinical diagnosis of plantar fasciitis were given the questionnaire. To collect the patient's personal information, a different form is available. Enrolment included patients of various ages and genders. Individuals with a history of systemic inflammatory disorders, recent foot surgery, or other heel pain reasons were not included.

There are 19 entries in the PFPS that cover various facets of the condition. The Plantar Fasciitis Pain/Disability Scale (PFPS) was used to evaluate the study's findings.. Pain level, frequency, duration, location, pain peak time, sleep disturbance, coping skills, impact on walking and daily activities, morning stiffness, toe-walking comfort, functional limitations in tasks like stairs, bending, driving, and running, medication use and effects, emotional impact, and overall lifestyle limitation are among its 19 components.

RESULTS

Gender distribution

Gender Total	Male	Female
210	43	167

Table 1: Gender distribution of participants in Numbers

Age distribution

	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	< 40 Years	60	28.6	28.6
	40 - 60 Years	123	58.6	58.6
	> 60 Years	27	12.9	12.9
	Total	210	100.0	100.0

Table 2: Number and percentage of participants in different age groups

Pain impacts in daily activities and well-being

Variables	N	Min.	Max.	Mean	Std. Deviation
Q1pain score	210	4.8	11.4	8.388	1.5229
Q2 days of pain (1 - 7)	210	7	7	7.00	.000
Q3 pain superficial or deep	210	3	3	3.00	.000
Q4 pain site	210	2	3	2.97	.180
Q5 times of pain	210	0	3	2.63	.728
Q6_Pain relief after onset	210	0	3	2.17	.514
Q7_Pain_Duration	210	0	3	1.40	.783

Q8_peak time of pain	210	0	3	2.72	.758
Q9_sleepless night due to pain	210	0	3	.57	.737
Q10_wake up in between sleep due to pain	210	0	3	.51	.686
Q11_how difficult cope up with pain	210	0	3	1.67	.831
Q12_how much is Weight bearing Limitation	210	0	3	1.76	.719

Table 3: Descriptive data on how pain impacts in daily activities and well-being**Pain impacts on quality of life**

Q16_Medication_Use	210	0	3	1.50	.955
Q17_medicine effect	210	0	3	2.07	.535
Q18_Daily_Life_Impact	210	1	3	1.96	.644
Q19_Mental_Health_Impact	210	0	3	1.97	1.030

Table 4: Descriptive statistics on how pain impacts on quality of life**Impact of pain in Functional limitation**

Q13_time taken for free movement	210	0	3	1.80	.697
Q14_toewalking or flat foot waking is better	210	0	3	2.93	.458
Q15_Walking_Limitation	210	1	3	2.69	.503
Q15 Toe standing	210	0	3	1.83	.874
Q15_Stairs climbing	210	0	3	2.09	.814
Q15 Reaching up	210	0	3	.62	.743
Q15 Bending over	210	0	3	.85	.839
Q15 Barefoot walking	210	0	3	2.72	.538
Q15 Standing after long sitting	210	1	3	2.90	.340
Q15 Bike Riding	210	0	3	1.65	1.136
Q15 Running a short distance	210	0	3	1.98	.824
Q15 Driving	210	0	3	1.47	1.146
Q15 Descending stairs	210	0	3	1.84	.665

Table 5: Descriptive statistics of impact of pain in Functional limitation**Age and symptom severity**

			Total Symptom Score		Total
			Moderate	Severe	
Age Group	< 40 Years	Count%within Age Group	3 5.0%	57 95.0%	60 100.0%
	40 - 60 Years	Count%within Age Group	3 2.4%	120 97.6%	123 100.0%
	> 60 Years	Count%within Age Group	1 3.7%	26 96.3%	27 100.0%
Total		Count%within Age Group	7 3.3%	203 96.7%	210 100.0%

Table 6: Age and symptom severity**Gender and symptom severity**

			Total Symptom Score		Total
			Moderate	Severe	
Gender	Male	Count % within Gender	2 4.7%	41 95.3%	43 100.0%

	Female	Count	5	162	167
		% within Gender	3.0%	97.0%	100.0%
Total		Count	7	203	210
		% within Gender.	3.3%	96.7%	100.0%

Table 7: Gender and symptom severity

ANOVA for symptom scores between different age Group

Groups	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	48.620	2	24.310	1.430	.242
Between Groups	3519.289	207	17.001		
Between Groups	3567.910	209			

Table 8: Total Symptom Score across age group

Post Hoc Tests (Turkey HSD) for finding the severity of symptoms between the age groups

Age Group	Age Group	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
< 40 Years	40 - 60 Years	0.4402	.6493	.777	-1.973	1.093
	> 60 Years	1.6128	.9555	.212	-3.869	.643
40 - 60 Years	< 40 Years	0.4402	.6493	.777	-1.093	1.973
	> 60 Years	1.1726	.8763	.376	-3.241	.896
> 60 Years	< 40 Years	1.6128	.9555	.212	-.643	3.869
	40 - 60 Years	1.1726	.8763	.376	-.896	3.241

Table 9: Severity of symptoms between the age groups

Age and gender demographic information were displayed as percentages and numbers. The distribution of males and females, as well as the distribution across age groups, was compared. The PFPS scores for the three domains; pain, quality of life, and functional limitation were analysed using descriptive statistics. The total symptom score was calculated according to gender and age groups. The symptom scores of the various age groups were compared using analysis of variance (ANOVA). As a higher symptom burden was noted in the oldest age group, a post hoc test was also applied.

In Table 1, out of 210 confirmed cases of plantar fasciitis, female has a strong predominance with 79.5% (167 no) and male 20.5% (43 no). In Table 2, out of the 210 participants, 60 (28.6%) were aged <40 years, 123 (58.6%) aged 40–60 years, and 27 (12.9%) aged >60 years. The majority of participants (58.6%) were in the 40–60 years age group. In Table 3, shows the participants experienced persistent and deep pain, with a high mean pain score ($M = 8.39$). Pain occurred daily (7/7 days), most often during activity, and was only partially relieved after onset. It caused frequent episodes ($M = 2.63$), interfered with coping ability ($M = 1.67$), and produced moderate limitations in weight-bearing tasks ($M = 1.76$). Sleep disturbance was less severe, but pain overall had a substantial impact on both physical functioning and psychological well-being.

In Table 4, the results shows pain significantly affects different aspects of quality of life. Participants reported a moderate level of medication use ($M = 1.50$), with medicines showing generally positive effects ($M = 2.07$). Pain was found to interfere with daily life activities ($M = 1.96$) and had a noticeable impact on mental health ($M = 1.97$). These findings indicate that pain influences both the physical and psychological domains of quality of life. In Table 5, the result shows pain negatively impacts on several functional activities. Walking restriction ($M = 2.69$), barefoot walking ($M = 2.72$), and significant difficulty standing after prolonged sitting ($M = 2.90$) were also noted by the participants. There were moderate issues with the stairs. Moderate difficulties were noted in stair climbing ($M = 2.09$), toe standing ($M = 1.83$), and descending stairs ($M = 1.84$). Activities such as reaching up ($M = 0.62$) and bending ($M = 0.85$) were less affected. Overall, pain was most disruptive in weight-bearing and mobility-related tasks, showing a significant reduction in quality of life.

In table 6, across all age groups, symptom severity was predominantly severe. Among participants younger than 40 years, 95.0% had severe symptoms and 5.0% had moderate symptoms among those aged 40 to 60, 2.4% experienced mild symptoms and 97.6% reported severe symptoms. Among participants older than 60 years, 96.3% had severe symptoms and 3.7% moderate symptoms. Overall, there was no major variation across age groups, with severe symptoms being consistently dominant in the study population. In table 7 symptom severity was predominantly severe in both genders, with 95.3% of males and 97.0% of females experiencing severe symptoms.

In table 8 the mean total symptom score for participants aged < 40 years was 26.25 (SD = 4.29), for those aged 40–60 years it was 26.69 (SD = 3.99), and for those aged > 60 years it was 27.86 (SD = 4.32). Overall, the total mean symptom score for all participants was 26.71 (SD = 4.13; 95% CI: 26.15–27.27). This pattern suggests a modest increase in symptom burden with age, with the oldest group (>60 years) showing the highest mean score. In table 9, although the >60 years group had slightly higher mean symptom scores than the younger groups, these differences were not statistically significant. This suggests that symptom severity was consistently high across all age categories, with no clear age-related gradient. The lack of significant differences indicates that plantar fasciitis symptoms may affect adults similarly, regardless of age."

DISCUSSION

Determining the prevalence and contributing variables of incapacitating foot pain was the aim of the study. The results showed that 96.7% of subjects reported having severe symptoms. According to the findings, 96.7% of participants classified as having severe symptoms. Women are more likely than males to experience incapacitating foot pain, which rises until late middle life before declining. This prevalence trend is comparable to that of other musculoskeletal ailments, such as shoulder and low back pain⁹.

Studies have examined the quality of life of people with plantar fasciitis. But according to the PFPS, this is the first study to demonstrate that PF can affect the overall foot health and Quality of Life of both male and female PF patients. Of the 210 confirmed instances of plantar fasciitis, 79.5% (167 no) are in women, whereas 20.5% (43 no) are in males¹⁰.

Females scored higher than males, and the difference between the mean PFPS scores of the sexes was statistically significant ($P = 0.004$). This finding is consistent with Patricia et al.'s research, which indicated that men had a higher health-related quality of life than women. Additionally, Hendry et al., shown that moderate-to-severe foot discomfort was quite common and linked to female gender in the group of university-bound student¹¹.

The survey's findings show that moderate-to-severe foot pain was quite common among people with a university education; impacting almost 40% of participants. It was associated with a lower quality of life and worse foot health. The prevalence of foot pain reported in this study is substantially higher than estimates from population surveys, despite differences in criteria. The general health features of the respondents, who had high rates of obesity, comorbidity, and multi-morbidity, may help to explain this¹².

This study found that patients with risk factors for foot illness were also more likely to see a decrease in their quality of life. On the other hand, those with foot disease risk factors who do sports appeared to experience less of an adverse effect on their quality of life. There aren't many prior studies that compare to the Achilles Project on how foot illness affects quality of life. According to the assessment's findings, a significant percentage of people with foot illness experience a decline in their quality of life¹³.

Generally speaking, foot disease affected women's quality of life more than it did men's. The percentages of men and women who experienced walking difficulty (43.1% against 36.4%; $P < 0.001$), pain (33.7% versus 26.7%; $P < 0.001$), embarrassment (28.8% versus 25.1%; $P < 0.001$), and showed significant gender differences. Limited daily activities were reported by comparable percentages of men and women (19.7% of women, 19.4% of men; $P = 0.360$ ^{14,15}). Overall, a higher percentage of patients in the older patient age groups had foot illness that impacted their quality of life than in the younger patient age groups (fig. 2). Patients with risk factors experienced a lower quality of life in a larger proportion of cases. Research has looked at plantar fasciitis patients' quality of life. However, according to the PFPS, this is the first study to demonstrate that PF can affect the quality of life (Quality of Life) of both male and female PF patients with regard to foot health and general health. The PFPS scores of 79.5% male and 20.5% female patients with PF, aged 18–64, were gathered. The term "PF" refers to a group of osseous and soft-tissue pathologic conditions that affect the heel¹⁶.

Women who wear high heels are more likely to get plantar fasciitis. According to the research, women's quality of life and ability to perform daily tasks are significantly impacted by plantar fasciitis.¹⁷, supports the notion that foot straining circumstances or vocations, rather than age or gender, and are the primary cause of plantar fasciitis. Moderate-to-severe foot discomfort was independently linked to non-professional occupation class. This supports

earlier research's conclusions that physical labour and other lower-class employment are known risk factors for pain and impairment¹⁸.

CONCLUSION

In this study of 210 people, 96.7% of participants reported having significant symptoms, indicating that their pain was acute and on-going. According to the description, the discomfort was deep, occurred daily, peaked when movement or weight bearing, and only partially went away after starting. It led to a reduction in everyday activities and mental health quality of life, as well as clear functional limitations, especially in weight-bearing activities (e.g., standing after prolonged sitting, walking barefoot, and walking in general). Despite being mild and generally helpful, taking medication did not totally eliminate symptoms. Across all age groups and genders, the burden of symptoms was consistently high (no significant post-hoc differences were detected). Overall, the findings demonstrate that pain has a substantial impact on both physical and mental health, underscoring the need for targeted pain management and functional rehabilitation.

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