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Emerging Incidence of Plantar Fasciitis in Adults: A Cross-Sectional Study

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ABSTRACT

AIM: This study aims to identify the emerging prevalence of plantar fasciitis in adults.
OBJECTIVE: This study was conducted to investigate the factors leading to plantar fasciitis among adults along with daily activities affected due to it.
METHOD: The pain scale for plantar fasciitis was used for this cross-sectional study. A total of 150 questionnaire were sent to adults from age 20 to 30 among which 143 responses were received.
RESULT AND CONCLUSION: The study identified the major activities affected by the pain of plantar fasciitis in adults. Among the 143 responses, majority of adults who suffered pain due to plantar fasciitis were identified to be female adults. Flat foot was also one of the major factors contributing to the pain in PF.

KEY WORDS: Plantar fasciitis, flat foot, pain, daily life activities, survey

INTRODUCTION

A large percentage of people will experience plantar fasciitis at some point in their lives. It is a common musculoskeletal condition that is defined by pain in the heel and plantar part of the foot. The peak incidence of this illness is thought to occur between the ages of 40 and 65, with an estimated 10% of people experiencing it [1]. Numerous risk factors, including lifestyle choices, work commitments, and anatomical predispositions, are commonly associated with the disorder. These factors combine to cause the plantar fascia, a thick band of connective tissue that supports the arch of the foot, to degenerate. According to recent studies, plantar fasciitis is now understood to be a more complex degenerative disease, commonly known as plantar fasciosis, rather than only an inflammatory disorder [2]. This nuanced understanding underscores the importance of recognizing the multifactorial nature of the condition, which can lead to chronic pain and functional impairment if not addressed appropriately.

The etiology of plantar fasciitis is significantly influenced by the foot's architecture. The plantar fascia supports the arch and aids in the overall biomechanics of the foot. It begins at the medial tubercle of the calcaneus and extends towards the metatarsal heads [3]. The plantar fascia is subjected to significant tensile forces during weight-bearing activities, and any alterations in foot biomechanics, such as excessive pronation or flatfoot, can lead to micro-tears and subsequent degeneration of the fascia [2]. Furthermore, the condition is often exacerbated by factors such as obesity, which places additional stress on the plantar fascia, and inappropriate footwear that fails to provide adequate support [4].

Developing successful treatment plans and preventative actions for people at risk of

developing plantar fasciitis requires an understanding of these anatomical and physiological foundations. One common anatomical variation that plays a major role in the development of plantar fasciitis is flatfoot, also known as pes planus. People who have flatfoot have a depressed arch, which can cause them to pronate excessively when running or walking. The plantar fascia is under more stress due to this changed biomechanics, which causes micro trauma and degeneration [2].

Studies have shown that individuals with flatfoot are more likely to experience symptoms of plantar fasciitis, particularly when engaging in activities that involve prolonged standing or high-impact movements [4]. The relationship between flatfoot and plantar fasciitis highlights the importance of addressing foot structure in both prevention and treatment strategies. Custom orthotics and supportive footwear can help mitigate the effects of flat foot by providing the necessary arch support and reducing strain on the plantar fascia because excess body weight puts more strain on the foot, especially during weight-bearing activities, obesity is another important risk factor for plantar fasciitis. According to research, people who have a body mass index (BMI) of more than 30 kg/m² are more likely to get this illness [2]. The additional weight can lead to increased pressure on the plantar fascia, resulting in micro-tears and degeneration over time. Furthermore, obesity is often associated with a sedentary lifestyle, which can lead to weakened foot muscles and decreased support for the arch, further exacerbating the risk of plantar fasciitis [1]. Effective weight management strategies, including diet and exercise, are crucial for individuals at risk of developing plantar fasciitis, as reducing body weight can alleviate the mechanical stress on the plantar fascia and promote overall foot health.

The choice of footwear is a critical factor influencing the development of plantar fasciitis. Inadequate footwear, characterized by poor arch support, cushioning, and stability, can contribute to the onset of symptoms [4]. Footwear that lacks proper support can exacerbate existing biomechanical issues, such as flatfoot or over pronation, leading to increased strain on the plantar fascia. Conversely, supportive footwear designed to accommodate the unique structure of the foot can help distribute weight more evenly and reduce the risk of injury [2]. It is essential for individuals, particularly those with risk factors for plantar fasciitis, to select appropriate footwear that provides adequate support and cushioning to minimize the likelihood of developing this painful condition.

The distribution of weight on the foot during various activities also plays a significant role in the development of plantar fasciitis. Abnormal weight distribution, often resulting from biomechanical abnormalities or poor footwear choices, can lead to excessive stress on specific areas of the plantar fascia [4]. For instance, individuals who tend to place more weight on their heels or forefoot may experience increased strain on the corresponding regions of the plantar fascia, leading to pain and inflammation. Understanding the mechanics of weight distribution is crucial for developing targeted interventions, such as gait retraining and the use of orthotic devices, to alleviate symptoms and prevent recurrence [2]. By addressing these biomechanical factors, healthcare professionals can help individuals manage their condition more effectively and improve their overall quality of life.

Plantar fasciitis affects a diverse range of individuals, with certain groups being more susceptible to the condition. Athletes, particularly runners, are often at risk due to the repetitive stress placed on the plantar fascia during training and competition [3]. However, it is essential to note that non-athletic populations, including individuals with occupations that require prolonged standing or walking, such as teachers, healthcare workers, and assembly line

workers, are also significantly affected [4]. The prevalence of plantar fasciitis in these populations underscores the need for preventive measures and early intervention strategies to mitigate the impact of this condition on daily functioning and overall health. The effects of plantar fasciitis extend beyond localized pain, influencing various aspects of an individual's life. One of the most notable consequences is the alteration of gait patterns, as individuals may subconsciously adjust their walking or running mechanics to compensate for pain [5]. This compensation can lead to further musculoskeletal issues, including knee, hip, and lower back pain, as the body attempts to redistribute weight and alleviate discomfort [2]. Additionally, the chronic pain associated with plantar fasciitis can result in decreased physical activity, leading to a decline in overall fitness and well-being [1]. The interplay between pain, altered biomechanics, and reduced activity levels highlights the importance of addressing plantar fasciitis comprehensively to prevent long-term complications.

Various professions are impacted by plantar fasciitis, particularly those that require prolonged standing or repetitive foot movements. Occupations such as teaching, nursing, and construction work are commonly associated with a higher incidence of plantar fasciitis due to the demands placed on the feet [4]. Furthermore, individuals engaged in athletic pursuits, particularly runners and dancers, are also at increased risk due to the repetitive stress and impact associated with their activities [3]. The prevalence of plantar fasciitis across diverse professions emphasizes the need for targeted interventions, including ergonomic assessments, proper footwear recommendations, and education on injury prevention strategies.

METHODOLOGY

This cross-sectional study was conducted over a three-month period, from September to November 2024, targeting male and female students at Sharda University, aged between 20 and 30 years. The study aimed to assess the prevalence of plantar fasciitis (PF) and evaluate the associated pain intensity and its impact on daily activities among

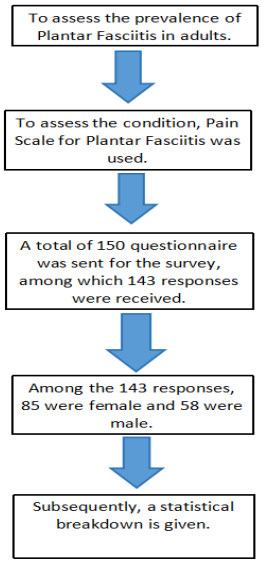
university students. Participants were selected using a convenient sampling method, which allowed for the efficient recruitment of individuals within the specified demographic. A total of 150 questionnaires were distributed, and 143 completed responses were returned, resulting in a high response rate of 95.3%. This response rate is indicative of a robust engagement from the target population, enhancing the reliability of the findings. The use of convenience sampling is common in behavioral research, as it facilitates the collection of data from readily available participants, although it may introduce biases compared to probability sampling methods.

To achieve the study's objectives, the Plantar Fasciitis Pain or Disability Scale (PFPS) questionnaire was employed as the primary data collection tool. The PFPS is a validated instrument specifically designed to evaluate pain associated with plantar fasciitis. It comprises a series of questions that assess pain intensity, functional limitations, and the overall impact of plantar fasciitis on daily activities. The questionnaire also includes control questions to verify the diagnosis of plantar fasciitis, ensuring the accuracy of the data collected6. A PFPS score greater than 35 points was considered indicative of heel pain resulting from plantar fasciitis. This threshold was established based on previous literature, which suggests that scores above this value are clinically significant in identifying individuals with plantar fasciitis. In addition to pain assessment, the PFPS questionnaire included items that specifically addressed the impact of pain on participants' daily physical activities. This aspect of the study aimed to elucidate the functional limitations associated with plantar fasciitis, providing a comprehensive understanding of how this condition affects

the quality of life of university students.

The inclusion criteria for this study were carefully defined to ensure that participants were representative of individuals at risk for developing plantar fasciitis. Eligible participants included those who either stand for extended periods during daily activities, have flat feet, or experience foot pain—conditions recognized as risk factors for plantar fasciitis. Conversely, the exclusion criteria were established to eliminate potential con-founders that could skew the study's results. Participants were excluded if they had a history of foot surgery, leg length discrepancy (LLD), or previous leg fractures or surgeries. These conditions could significantly affect pain levels and functional outcomes independent of plantar fasciitis, thereby ensuring that the findings were specifically related to the condition under investigation. By adhering to these rigorous inclusion and exclusion criteria, the study aimed to produce findings that accurately reflect the prevalence and impact of plantar fasciitis among university students, thereby contributing valuable insights to the existing body of literature on this common musculoskeletal condition.

PROCEDURE



RESULTS

The study comprised of 143 participants between the ages of 20 and 30. Of the population studied, it was found that 56.6% of the participants suffer from Plantar Fasciitis as shown on Table 1. This was concluded as these were the participants that scored over 35points in the PFPS.

Plantar fasciitis	Frequency n (%)	Male	Female
Yes	81 (56.6%)	36 (62%)	45 (52%)
No	62 (43.4%)	22 (37%)	40 (47%)

The Physical Activities affected by the participants is shown in table 2.

Activity	0 = Not at All	1 = Very Little	2 = Moderate	3 = Severe
Walking in the Morning	43 (30.07%)	73 (51.05%)	19 (5.59%)	8 (5.59%)
Standing Up on Your Toes	19 (13.29%)	75 (52.45%)	35 (9.79%)	14 (9.79%)
Driving	60 (41.69%)	44 (30.77%)	30 (6.59%)	9 (6.29%)
Climbing Stairs	9 (6.29%)	72 (50.35%)	39 (16.08%)	23 (16.08%)
Descending Stairs	35 (24.47%)	62 (43.36%)	30 (11.18%)	16 (11.18%)
Reaching Up	19 (13.29%)	64 (44.75%)	40 (13.99%)	20 (13.99%)
Bending Over	43 (30.07%)	62 (43.36%)	29 (6.29%)	9 (6.29%)
Walking Barefoot	48 (33.57%)	53 (37.06%)	36 (4.19%)	6 (4.19%)
Standing After Watching a Movie	19 (13.29%)	58 (40.56%)	45 (14.68%)	21 (14.68%)
Riding a Bike	53 (37.06%)	50 (34.96%)	30 (6.99%)	10 (6.99%)
Running a Short Distance	12 (8.39%)	69 (48.25%)	43 (13.29%)	19 (13.29%)

Participants having flat foot is shown in table 3.

Flat Foot	Male (%)	Female (%)
YES	20 (34%)	24 (28%)
NO	38 (65%)	61 (71%)

The results show that most of the participants suffer pain during their daily life activities due PF. The PFPS scale used for the survey includes list of activities, scoring pain from “not at all” to “severe”. The survey also concluded that the majority of participants suffering from the pain of PF is female population.

Most of the participants who scored more than 35 points in PFPS were professionally nurses, physiotherapists, teachers, interns and others. This also concluded that the professions that includes long standing hours have risks of developing pain from PF.

Participants also reported that the change of shoes from flat shoes to an arched sports shoes helped them overcome most percent of pain caused due to PF. Participants suffered more pain when they wear flat shoe with no arch rather than an arched sports shoe.

The intention of the study was to also find prevalence of PF in participants who have flat foot. As shown in table no.

3. Among the 143 participants, 44 participants have flat foot (FF). Participants with FF were more prone to the pain on doing physical activities.

DISCUSSION

Plantar fasciitis is a prevalent musculoskeletal condition characterized by heel pain and discomfort in the plantar aspect of the foot. This study aimed to assess the prevalence of plantar fasciitis among university students aged 20 to 30 years, revealing that 56.6% of participants reported symptoms consistent with this condition. The findings underscore the significant impact of plantar fasciitis on a demographic that is often overlooked in the literature, particularly among younger individuals who may not typically associate foot pain with their age group. Previous studies have similarly highlighted that plantar fasciitis is not solely a condition affecting older adults but is increasingly recognized among younger populations, particularly those engaged in activities that place repetitive stress on the feet [7,8]

The high prevalence rate observed in this study aligns with findings from Khired et al., who noted that understanding the prevalence and risk factors for plantar fasciitis is crucial for improving patient comfort and quality of life [7]. Additionally, Elabd's research supports the notion that bio-mechanical imbalances and obesity are significant contributors to the development of plantar fasciitis, emphasizing that this condition can affect a wide range of individuals, including younger populations [8]. The study's methodology, which employed the Plantar Fasciitis Pain or Disability Scale (PFPS), provided a robust framework for assessing pain intensity and functional limitations. The use of a validated questionnaire ensured that the data collected accurately reflected the participants' experiences, enhancing the reliability of the findings [9].

One of the critical factors contributing to the development of plantar fasciitis is the biomechanical stress placed on the plantar fascia. The study highlighted that individuals with flatfoot or those who engage in prolonged standing or high-impact activities are at a higher risk. This is particularly relevant for university students who may participate in various physical activities, including sports and prolonged periods of standing during lectures or practical sessions. Research by Ahmad et al. indicates that flat feet and prolonged standing are significant risk factors for plantar fasciitis, further emphasizing the need for targeted interventions [10]. The relationship between foot structure, such as flatfoot, and the incidence of plantar fasciitis underscores the importance of appropriate footwear and custom orthotics to mitigate the risk of developing this condition [11].

Moreover, the impact of obesity as a risk factor for plantar fasciitis cannot be overlooked. The study's findings suggest that individuals with a higher body mass index (BMI) are more susceptible to developing symptoms, as excess weight

places additional strain on the plantar fascia. This is consistent with findings from multiple studies that have documented a strong association between higher BMI and the development of plantar fasciitis [12,13]. This highlights the importance of promoting healthy lifestyle choices among university students, including regular physical activity and weight management strategies, to reduce the risk of plantar fasciitis and improve overall foot health [8,12].

The results also indicate that plantar fasciitis significantly affects daily activities, with participants reporting varying degrees of pain during common tasks such as walking, standing, and climbing stairs. This functional impairment can lead to a decrease in physical activity levels, further exacerbating the condition and potentially leading to a cycle of pain and inactivity. Therefore, it is crucial for health-care professionals, including physiotherapists, to develop comprehensive treatment plans that address not only the pain associated with plantar fasciitis but also the underlying bio-mechanical factors contributing to its development [14,15].

CONCLUSION

This study highlights the significant prevalence of plantar fasciitis among university students aged 20 to 30 years, with 56.6% of participants reporting symptoms consistent with this condition. The findings emphasize that plantar fasciitis is not solely a concern for older adults but is increasingly affecting younger populations, particularly those engaged in activities that place repetitive stress on the feet. The use of the Plantar Fasciitis Pain or Disability Scale (PFPS) provided valuable insights into the pain intensity and functional limitations experienced by participants, underscoring the condition's impact on daily activities.

The study's methodology, which included a high response rate of 95.3%, enhances the reliability of the findings. The inclusion and exclusion criteria were rigorously defined to ensure that the results accurately reflect the prevalence of plantar fasciitis among the target demographic. The results indicate that factors such as foot structure, body weight, and activity levels play a crucial role in the development of plantar fasciitis, necessitating targeted interventions to mitigate these risks.

Given the significant impact of plantar fasciitis on the quality of life and daily functioning of affected individuals, it is essential for health-care professionals to develop comprehensive treatment and prevention strategies. These may include education on proper footwear, weight management, and the importance of addressing bio-mechanical factors through interventions such as orthotics and gait retraining.

In conclusion, this study contributes valuable insights to the existing literature on plantar fasciitis, highlighting the need for increased awareness and proactive measures within the university student population. Future research should focus on longitudinal studies to explore the long-term implications of plantar fasciitis in younger individuals and the effectiveness of various intervention strategies in alleviating symptoms and improving overall foot health.

Declaration by Authors

Ethical Approval: Approved

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