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Prevalence of Plantar Fasciitis and its Associated Factors: A Retrospective Study in Patients Attending Primary Healthcare Clinics in Riyadh

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Abstract **Introduction:** Plantar fasciitis (PF) is a prevalent musculoskeletal disorder and a leading cause of heel pain, particularly among the elderly, women, obese individuals and those engaged in prolonged standing or weight-bearing activities. While PF has been widely studied globally, its prevalence in Saudi Arabia remains insufficiently studied. This study aims to assess the prevalence of PF and its associated risk factors among patients attending King Abdulaziz Medical City. **Methods:** A retrospective cohort study was conducted at three primary healthcare centers within King Abdulaziz Medical City. We included all patients aged ≥18 years diagnosed with PF between January 2017 and December 2022. Data were extracted from electronic health records using the Best Care system, including sociodemographic variables (age, gender, marital status, occupation, BMI) and clinical characteristics (hypertension, diabetes mellitus, dyslipidemia, calcaneal spur). **Results:** The median age at diagnosis was 56 years, with 73% being females. Among PF patients, 10% had hypertension, 7.7% had diabetes, 23% had dyslipidemia, and 0.2% had calcaneal spur. The median BMI was 33.2 kg/m². The overall prevalence of PF among the 68134 patients in the three healthcare centers was 1.7%, with Iskan Al Yarmouk recording the highest prevalence (0.9%), followed by Health Care Specialty Center (0.6%) and National Guard Comprehensive Specialized Clinic (0.2%). **Conclusion:** The prevalence of PF among patients attending primary healthcare centers at King Abdulaziz Medical City was 1.7%, with a strong association with obesity and female gender. Targeted interventions, particularly among high-risk groups, are recommended such as incorporate weight management counseling and appropriate footwear guidance into routine care for patients at risk of plantar fasciitis. Further research is needed to explore long-term outcomes and optimize treatment strategies for PF patients in Saudi Arabia.

Key Words Plantar Fasciitis, Heel Pain, Prevalence, Risk Factors, Obesity, Saudi Arabia

INTRODUCTION

Plantar fasciitis (PF) is a prevalent musculoskeletal disorder affecting individuals across various age groups and activity levels. It accounts for over one million physician visits annually in the United States [1-4] and is particularly common among runners, with an incidence of up to 17.4% in this population [5]. Pathophysiologically, PF is considered a non-inflammatory degenerative condition in which repetitive mechanical strain on the plantar fascia leads to microtears and subsequent localized inflammation at its insertion site [6]. Several anatomical and biomechanical factors predispose individuals to PF, including pes planus, pes cavus, restricted ankle dorsiflexion, and excessive foot pronation or supination [7-8]. Additionally, common risk factors identified across studies include prolonged weight-bearing, obesity, advancing age, and occupational demands requiring extensive standing or walking [9-10]. Epidemiological data suggest a higher prevalence of PF among females compared to males, with obesity serving as a significant contributing factor [11].

The prevalence of PF varies among different populations and occupational groups. In the general adult population of the United States, the estimated prevalence of clinically diagnosed PF is approximately 0.85% [12]. A similar prevalence of 0.85% was observed among individuals within a tertiary healthcare system, with an

increased incidence among those with diabetes [13]. Occupationally, the prevalence of PF among nurses in Taiwan was reported at 13.11%, whereas physicians exhibited a comparatively lower prevalence of 8.14%. Among pharmacists, the prevalence was notably high at 54%, with incidence rates increasing with age [11,14].

PF is a leading cause of heel pain, particularly in professions that require prolonged standing or sustained weight-bearing activities [15]. The condition is associated with significant pain and functional impairment, adversely affecting daily activities and occupational performance [9].

Gait analysis studies have demonstrated distinct alterations in foot and ankle biomechanics among individuals with PF compared to asymptomatic controls, highlighting the condition's impact on locomotor function [16,17].

Despite its clinical significance, data on the prevalence of PF in Saudi Arabia remain limited. Therefore, this study aims to assess the prevalence of PF and its associated risk factors among patients attending any of the three primary healthcare centers at King Abdulaziz Medical City.

Objectives

This study aimed to:

- Determine the prevalence of plantar fasciitis among patients attending primary healthcare centers at King Abdulaziz Medical City
- Describe the demographic characteristics of patients diagnosed with plantar fasciitis
- Identify the clinical features and comorbidities associated with plantar fasciitis in this population

MATERIALS AND METHODS

Study design and Study Area/Setting

This retrospective cohort study was conducted in three main primary healthcare centers at King Abdulaziz Medical City, including the Health Care Specialty Center (HCSC), King Abdul-Aziz City Housing clinics (Iskan Al Yarmouk), and the National Guard Comprehensive Specialized Clinic (NGCSC) that serve Saudi National Guard's employees who live in Riyadh and their families. All serve around 200,000, 100,000, and 200,000, respectively. Each primary health care center has 20-25 family medicine clinics, three pediatric clinics, three obstetrics & gynecology, one clinic for each of the following specialties: general surgery, dermatology, ear, nose and throat, and ophthalmology

Study Population

We included PF patients of both genders aged more than 18 years and who attended any of the three mentioned centers between January 2017 and December 2022.

Exclusion Criteria

Patients were excluded if they had incomplete medical records, secondary causes of heel pain (e.g., fractures, tumors, inflammatory arthritis), or unclear diagnostic coding for PF.

Sampling Technique

Total coverage of all PF patients who attended any of the three mentioned centers between January 2017 and December 2022 who followed the inclusion criteria.

Data Collection Methods, Instruments, and Measurements

Two researchers independently extracted data from the electronic health records (EHRs) using the Best Care system, cross-verifying entries to ensure consistency. Diagnoses of PF were confirmed based on ICD-10 coding, clinical examination notes, and documented treatment plans. A standardized data extraction form was used to record sociodemographic variables (age, gender, marital status, occupation, BMI) and clinical features (hypertension, diabetes mellitus, dyslipidemia, calcaneal spur). Any discrepancies were resolved by consensus between the researchers.

Statistical Analysis

The data was cleaned and organized in Excel and then imported into SPSS version 27 (Statistical Product and Service Solutions, SPSS Inc., Chicago, IL, USA) for analysis. The normality of continuous variables was assessed using both a histogram and the Kolmogorov-Smirnov test. Descriptive statistics were used to calculate the median and interquartile range for the continuous variables and frequencies with percentages for categorical variables.

Ethical consideration

The ethical committee of KAIMRC has approved the study with IRB number: NRC23R/058/02 The confidentiality and anonymity of respondents were rigorously preserved.

Reporting Standards

This study adheres to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies.

RESULTS

The median age at diagnosis was 56 years, with most patients being females (73%). Most patients were from King Abdul-Aziz City Housing clinics (55%), while 33% were from the HealthCare Specialty Center and 12% from the National Guard Comprehensive Specialized Clinic. The majority were outpatients (94%) Table 1.

Only 10% of PF patients had hypertension, 7.7% had diabetes mellitus, 23% had dyslipidemia and only 0.2% had calcaneal spur. The median body mass index of PF patients was 33.2 Table 2.

Out of 68134 patients at three main primary health care centers at King Abdulaziz Medical City, The prevalence of plantar fasciitis was 1.7%. The diagnosis rates of PF differ across the three hospitals. ISKAN Hospital recorded the highest number of plantar fasciitis cases (0.9%). HCSC reported 378 PF cases (0.6%) and NGCSC had 140 cases of PF (0.2%) Figure 1.

Table 1: Demographic Characteristics of Plantar Fasciitis Patients

Characteristic	N = 1,163[1]
Age at diagnosis	56 (45, 61)
Gender	
Female	848 (73%)
Male	315 (27%)
Hospital name	
HCSC	378 (33%)
ISKAN	645 (55%)
NGCSC	140 (12%)
Patient type	
EP	73 (6.3%)
OP	1,090 (94%)

[1]n (%); Median (IQR) ISKAN: King Abdul-Aziz City Housing clinics (Iskan Al Yarmouk) HCSC: Health Care Specialty Center NGCSC: National Guard Comprehensive Specialized Clinic

Table 2: Clinical Characteristics of Plantar Fasciitis Patients

Characteristic	N = 1,163[1]
Hypertension	
No	1,044 (90%)
Yes	119 (10%)
Diabetes mellitus	
No	1,073 (92%)
Yes	90 (7.7%)
Dyslipidemia	
No	894 (77%)
Yes	269 (23%)
Calcaneal spur	
No	1,161 (100%)
Yes	2 (0.2%)
Body mass index	33.2 (28.8, 35.7)
Missing	120

[1]n (%); Median (IQR)

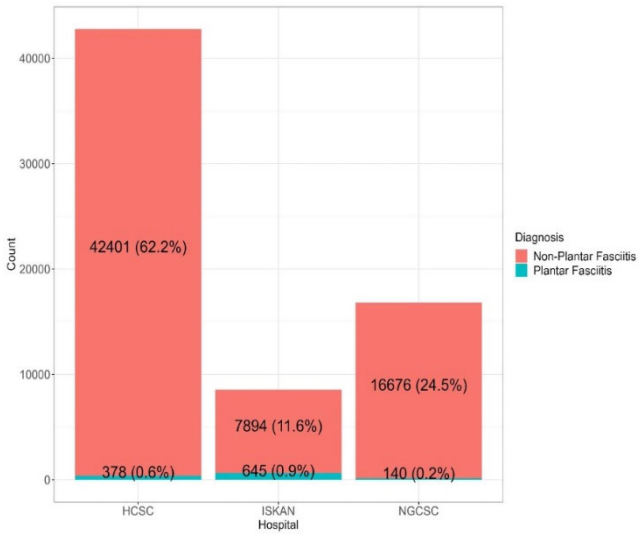

Figure 1: Prevalence of Plantar Fasciitis Among Patients Presenting to Primary Health Care Centers at King Abdulaziz Medical City

DISCUSSION

Plantar fasciitis is a common painful foot condition that mostly affects adults, with peak incidence at 40 – 60 years of age [18]. It is caused by persistent plantar fascia overload due to overuse or increased pressure, as in obesity [7]. This study assessed the prevalence of plantar fasciitis in King Abdul-Aziz City Housing clinics (ISKAN), HealthCare Specialty Center (HCSC) and National Guard Comprehensive Specialized Clinic (NGCSC).

There were 1163 diagnosed plantar fasciitis cases during the study period. Most plantar fasciitis patients were from King Abdul-Aziz City Housing clinics (55%), while 33% were from the HealthCare Specialty Center and 12% from the National Guard Comprehensive Specialized Clinic. The prevalence of plantar fasciitis was 1.7% at the three main primary healthcare centers at King Abdul-Aziz Medical City. Moreover, the prevalence of plantar fasciitis was 0.9% in ISKAN Hospital, 0.6% in HCSC and 0.2% in NGCSC. A previous study by Khired reported a higher prevalence (37%) of plantar fasciitis among a small sample of the Jazan region population. The study suggested a significant association between the rate of plantar fasciitis development and being 40 to 55 years old, being 56 to 65 years old, being obese, having weakness of the gastrocnemius, soleus, and the intrinsic foot muscles, jobs requiring a great amount of time standing or walking and jobs requiring a moderate amount of time standing or walking. However, being male predicted a lower rate of plantar fasciitis [9]. Another study by Goweda et al. assessed the prevalence of plantar fasciitis among patients with heel pain in primary health care settings in Makkah; the study reported a 57.8% prevalence of plantar fasciitis that was significantly associated with obesity, sedentary lifestyle, wearing inappropriate shoes, frequent running, long-standing and chronic diseases [19]. In the United States, the prevalence of plantar fasciitis was 0.85%, with a higher prevalence among women, people aged 45 to 64 years and obese individuals [12]. A study by Malik et al. reported the prevalence of plantar fasciitis among sales promotion workers in Faisalabad, showing a 30.3% prevalence that was significantly associated with Foot Function Index pain, disability, and activity limitation [20].

Several risk factors were previously linked to plantar fasciitis prevalence, like female gender, older age, obesity and the presence of chronic illness. [19,12] In our study, 73% of the diagnosed plantar fasciitis patients were females and 23% had dyslipidemia. However, only 7.7% had diabetes mellitus and 10% had hypertension and the median body mass index was 33.2. diabetes mellitus is a chronic epidemic disease associated with significant micro- and macroangiopathy dysfunction and polyneuropathy. There is a significantly increased prevalence of plantar fasciitis with diabetes mellitus, mainly with the presence of neuropathic complications and foot ulcers [21-22]. Moreover, a recent study by Saroha et al. showed that diabetes mellitus patients had significantly thicker Achilles tendon and plantar fascia with significantly lower Achilles tendon and plantar fascia stiffness when compared to healthy control [23].

Our study provides a comprehensive overview of the prevalence of plantar fasciitis in King Abdul-Aziz City Housing clinics, HealthCare Specialty Center and National Guard Comprehensive Specialized Clinic between January 2017 and December 2022. However, the study had some

limitations. Firstly, the study relied mainly on recorded data that risk information bias and inaccuracies. Moreover, given the study design, we could not establish a causal relationship between variables.

CONCLUSIONS

The overall prevalence of plantar fasciitis in the three main primary health care centers at King Abdul-Aziz Medical City was 1.7%, with 0.9% prevalence in ISKAN Hospital, 0.6% prevalence in HCSC and 0.2% in NGCSC.

Limitations

This study has some limitations. First, its retrospective design prevents establishing causal relationships between variables. Second, the reliance on electronic health records may introduce misclassification or coding errors. Third, important behavioral and lifestyle factors such as footwear choices, specific occupational activities, or levels of physical activity were not captured. Finally, the findings are limited to patients within a single healthcare system, which may affect the generalizability of the results to other populations in Saudi Arabia

Implications for Practice

The findings highlight the need for targeted screening of high-risk groups, particularly obese women and patients with comorbid conditions such as dyslipidemia. Primary care providers should incorporate weight management counseling and appropriate footwear guidance into routine care for patients at risk of plantar fasciitis. These measures can help reduce the burden of heel pain and improve patients' daily functioning and quality of life.

Future Recommendations

Future research should include prospective cohort studies to validate these findings and explore causal relationships. Studies should also evaluate treatment outcomes and long-term prognosis for plantar fasciitis in the local population. Additionally, economic impact assessments and quality-of-life studies are recommended to guide health policy. Finally, qualitative research involving patient perspectives could help identify barriers to prevention and management.

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