

Original Article

Prevalence and Risk factors of Plantar Fasciitis among Patients with Heel Pain Attending Primary Health Care Centers of Makkah, Kingdom of Saudi Arabia

Reda A. Goweda¹, Enas H. Alfalogy¹, Roaa N. Filfilan², Ghufraan A. Hariri²

¹Department of Family Medicine, Faculty of Medicine, Suez Canal University, Egypt

²Medical Students, Faculty of Medicine, Umm Al-Qura University, Makkah

Abstract

Background: Plantar fasciitis is the most common cause of heel pain in adults seen in primary care. Extended standing and running frequently cause strain on the plantar fascia. Plantar fasciitis outcome is generally good, about 80 percent of people have no symptoms after one year.

Objectives: To determine prevalence rate and risk factors of plantar fasciitis in primary health care settings.

Methods: A cross-sectional study was conducted on 270 patients with heel pain attending five randomly selected primary health care centers. An interview questionnaire was structured to recognize the socio-demographic data, medical history of heel pain and independent risk factors for plantar fasciitis. Diagnosis was based on history and clinical examination.

Results: The prevalence of plantar fasciitis among 270 patients was 57.8%. 88 (56.4 %) of them were males, 104 (66.7 %) were obese, 91 (58.3 %) were wearing inappropriate shoes and 140 (89.7 %) had sedentary lifestyle. Logistic regression showed that sedentary lifestyle is the most significant variable associated independently to plantar fasciitis (OR = 38.371; 95% CI: 5.411– 272.110 p 0.000)

Conclusion: Plantar fasciitis is very common in primary health care settings. Obesity, sedentary lifestyle, wearing inappropriate shoes, frequent running and long standing were shown to be risk factors.

Keywords: Prevalence, plantar fasciitis, risk factors

Available on line at:
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Correspondence:
Email: redagoweda@yahoo.com

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INTRODUCTION

Plantar fasciitis (PF) is the main cause of heel pain for which primary health care is sought. Plantar fasciitis is a common strain overuse injury that happens due to repetitive traction on the origin of plantar fascia over the distal calcaneus. It represents around 80% of heel pain and about 8–10% of injuries due to running.⁽¹⁾ In a study done by Suzan it was found that heel pain account for 41.5% of musculoskeletal problems in musculoskeletal pain in nurses at a tertiary center in Jeddah, Saudi Arabia.⁽²⁾ Around 10% of the United States population complains from heel pain that results in one million professional visits for treatment of plantar fasciitis annually.⁽³⁾ On the other hand, plantar fasciitis accounts for more than 600,000 outpatient visits yearly in the United States. The annual direct cost of treatments for plantar fasciitis is likely to be between \$192 and \$376 million dollars.⁽⁴⁾ The etiology of heel

pain due to plantar fasciitis is multifactorial, and it can occur traumatically; nevertheless, the majority of cases are due to overuse stresses. The lifetime prevalence is 10% and it commonly affects all ages with a peak occurrence between 40-60 years with an equal predominance in males and females particularly in younger ages.⁽⁵⁾ Plantar fasciitis is more probably to take place in patients whose profession or lifestyle causes an irregular stretching of the plantar fascia. Because of the high prevalence in runners⁽⁶⁾, it is assumed to be due to repetitive micro trauma. Probable risk factors incorporate professions that necessitate prolonged standing, obesity and heel spur.⁽⁷⁾ Furthermore, additional risk factors can be generally classified as either extrinsic (e.g. equipment training errors) or intrinsic (e.g. structural, functional, or degenerative).⁽⁸⁾ Diagnosis of plantar fasciitis depends on the patient's history and physical examination findings. Approximately more than 80% of plantar fasciitis cases can resolve spontaneously after one year duration. Fortunately, majority of patients with plantar

fasciitis ultimately have satisfactory outcomes with conservative treatment.⁽⁹⁾ Consequently, management of patient expectations reduces concerns and frustrations for both patients and physicians. Most patients with plantar fasciitis eventually have improved, as revealed in one long-term follow-up study⁽¹⁰⁾, in which they reported that 80 percent of patients treated conservatively for plantar fasciitis had complete alleviation of symptoms such as pain by four years, while only 5% of patients had undergone surgery for plantar fascia release since all conservative treatments had failed.⁽¹¹⁾

The aim of this study was to assess prevalence of plantar fasciitis and its related risk factors in Makkah, aiming to give recommendations to reduce its morbidity.

METHODS

This was a cross-sectional study, carried out in five randomly selected primary health care centers in Makkah, Kingdom of Saudi Arabia. It was conducted among 270 randomly selected patients based on prevalence of 80% and according to the following equation:

$$\frac{(1.96)^2 pq}{d^2}$$

where $q = 1 - p$, 95% confidence interval for proportion p with margin of error d 0.05⁽¹⁾. All patients attending with heel and foot pain were eligible for the study. Subjects were chosen by multistage sampling technique as 5 primary care centers were chosen by simple random sample from all primary care centers in Makkah, then 270 were chosen from the 5 centers equally. From each center, 54 patients were selected randomly from September 2014 till December 2014, after excluding patients with heel pain due to acute foot injuries or rheumatic diseases.

An interview questionnaire was structured to recognize the socio-demographic data (e.g. age, gender, and occupation), medical history of chronic diseases e.g. diabetes mellitus (DM) and hypertension and other risk factors for plantar fasciitis (e.g. excessive running, prolonged standing or physical inactivity). Excessive running was considered if patients were running on regular basis. Prolonged standing was considered if patients were standing most of the day. Patients were considered physically inactive if they practiced less than a) 3 days of vigorous activity of at least 20 minutes per day OR b) 5 days of moderate-intensity activity or walking of at least 30 minutes per day OR c) 5 days of any combination of walking, moderate intensity or vigorous intensity activities. Height and weight were measured then body mass index (BMI) was calculated for every patient. Obesity was considered if $BMI \geq 30 \text{ kg/m}^2$.

A pilot study was done prior to the study among 25 patients to ensure validity and standardization of the questionnaire that was used to assess risk factors.

Diagnosis of plantar fasciitis was based on patient history and physical examination findings.⁽¹²⁾

On history: patients have heel pain and tightness after standing up from bed in the morning or after they have been seated for a prolonged time. Typically, the heel pain will improve with ambulation but could intensify by the end of the day if the patient continues to walk or stand for a long time.

On physical examination; BMI was estimated as obesity is considered a risk factor ($BMI \geq 30 \text{ kg/m}^2$ or more) patients may walk with their affected foot in an equine position to avoid placing pressure on the painful heel. Palpation of the medial plantar calcaneal region will elicit a sharp, stabbing pain. Passive ankle/first toe dorsiflexion can cause discomfort in the proximal plantar fascia; it can also assess tightness of the Achilles tendon.

Statistical Analysis

Data was analyzed using IBM advanced SPSS statistical package version 20. Chi-square test was used to examine the relation between qualitative variables. Logistic regression analysis was done to determine which of the factors were independently associated with plantar fasciitis. P- Value less than 0.05 was considered significant.

Ethical Considerations

The study was approved by the institutional review board and the ethics committee. The study conformed to the principles of Helsinki declaration (2013) and the international ethics guidelines. This study was done after getting verbal consent from the patients. Researchers' contact information (phone number, email, and department) were presented to the participants who wish to return at any time for feedback and follow-up. All data were solely used in the proposed research and confidentiality was assured.

RESULTS

The mean age of the patients of the present study was 42.70 ± 12.66 . The prevalence of plantar fasciitis in this study was 57.8%. 88 (56.4 %) of them were males, 104 (66.7 %) were obese, 91 (58.3 %) were wearing inappropriate shoes and 140 (89.7 %) had sedentary lifestyle (Figure 1&2). There was a significant relationship between plantar fasciitis and obesity, sedentary lifestyle, wearing inappropriate shoes, frequent running, long standing and chronic diseases (p value < 0.05) (table 1). Our logistic regression model showed that sedentary life style is the most significant variable associated independently to plantar fasciitis (OR = 38.371; 95% CI: 5.411– 272.110 p 0.000) (Table 2).

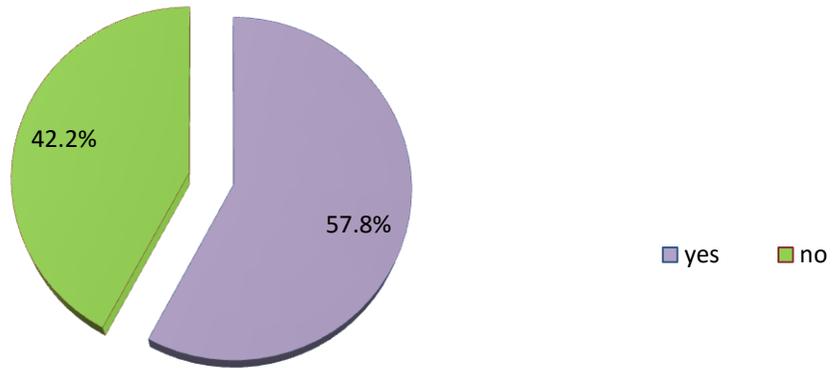


Figure 1: Prevalence of plantar fasciitis among primary health care patients

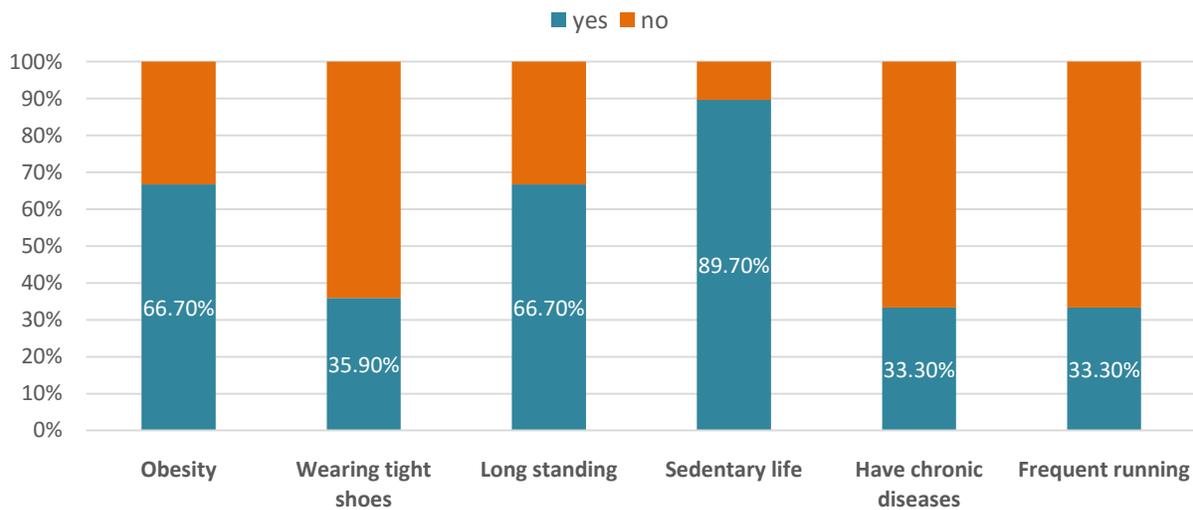


Figure 2 Risk factors of plantar fasciitis among Primary Health Care patients

Table (1): Comparison between patients with and without plantar fasciitis regarding risk factors

Risk factors	Plantar fasciitis			X ²	P -value
	Yes	No	Total		
Gender					
Male	88 (56.4 %)	42 (36.8 %)	130 (48.1%)	10.102	0.001
Female	68 (43.6 %)	72 (63.2 %)	140 (51.8%)		
Obesity	104 (66.7 %)	31 (27.2%)	135(50.0%)	50.769	0.000
Wearing tight shoes	91 (58.3 %)	24 (21.1%)	115 (42.5%)	37.44	0.000
Long standing	104 (62.8 %)	30 (26.3 %)	134 (49.6%)	35.204	0.000
Sedentary life style	140 (89.7 %)	60 (52.6 %)	200 (74.0%)	47.238	0.000
Have chronic diseases	56 (49.1 %)	52 (33.3 %)	108 (40.0%)	6.842	0.009
Frequent running	36 (23.1 %)	15 (13.2 %)	51(18.8 %)	4.230	0.040

Table (2): Binary Logistic regression analysis for predictors of plantar fasciitis

	P value	OR	95% C.I	
			Lower	Upper
BMI	0.000	18.247	7.917	42.055
Tight shoes	0.001	.176	.063	.496
Long standing	0.000	6.577	2.720	15.905
Sedentary lifestyle	0.000	38.371	5.411	272.110
gender	0.009	.310	.129	.745
running	0.002	16.012	2.766	92.710
Age	0.000	1.726	1.363	2.185
Chronic diseases	0.003	16.012	2.766	85.710

DISCUSSION

Plantar fasciitis is an important public health disorder as it is the most common cause of heel pain in the outpatient setting.⁽¹³⁾ Plantar fasciitis is a common cause of heel pain in adults. In USA, it is estimated that more than 1 million patients seek treatment annually for this condition, with two-thirds going to their family physician.⁽¹¹⁾

In the current study the prevalence of plantar fasciitis was 57.8% among patients attending with heel and foot problems which approximate the finding of the literature. In a study done by Neufeld et al. it was found that the prevalence was 80%.⁽¹⁾ Cutts et al. reported that between 4% and 7% of people have heel pain at any given time and about 80% of these cases are due to plantar fasciitis.⁽¹⁴⁾ While Zhiyun et al. mentioned that approximately 10% of people have the disorder at some point during their life.⁽¹⁵⁾ Within the current literature, prevalence rates of plantar fasciitis among a population of runners have been shown to be between 4% and 22%.⁽¹⁶⁾ The mean age of the patients of the present study was 42.70±12.66, which coincides with results done by Crawford et al., who reported the ages of 25 and 65 years old.⁽¹⁷⁾ Other studies reported that plantar fasciitis affects 1 in 10 people at some point during their lifetime and most commonly affects people between 40–60 years of age.^(18,19)

In the current study, males reported a little bit higher prevalence of plantar fasciitis (56.4 %). The current literature is inconsistent regarding the association between sex and plantar fasciitis, while some studies showed that men and women affected equally⁽²⁰⁾. Some other studies showed an increased prevalence in men as was reported by Taunton et al. that found a significant sex difference within their study population, as 54% of those affected were males and 46% were females.⁽²¹⁾ While others showed an increased prevalence in women as reported by Rano et al.⁽²²⁾ There are no theories within the current literature hypothesizing the reason for a difference in the prevalence of plantar fasciitis between the two sexes, whether it is due to a function of different hormones or structural differences caused by genetic variations, as is suggested by the increased incidence of anterior cruciate ligament tears in women compared with men.

In the current study there was a significant relationship between plantar fasciitis with obesity, sedentary lifestyle, wearing inappropriate shoes, frequent running, long standing and chronic diseases, which coincides with the findings of Beeson et al., who found that risk factors included overuse such as from long periods of standing, increase in exercise, and obesity.⁽²³⁾

About 89.7 % of patients with plantar fasciitis in the present study had sedentary life style and logistic regression showed that it is the most significant variable associated independently to plantar fasciitis (OR = 38.371; 95% CI: 5.411– 272.110 p 0.000), which is in agreement with a study conducted by Goff et al.⁽²⁴⁾ Two thirds (62.8%) of plantar fasciitis patients in the present study had a job that required long standing. Several studies have shown an association between work-related prolonged weight-bearing and plantar fasciitis⁽²⁵⁾. In their case series, Lapidus and Guidotti's patient population included a predominance of occupations that necessitate continual standing or walking, such as waiters, maids, and kitchen workers.⁽²⁶⁾

Obesity plays an important role as a risk factor in the current study as 66.7% of the patients with plantar fasciitis were obese. Studies have suggested a strong association between an increased body mass index and the development of plantar fasciitis in the non-athletic population; this association between weight and plantar fasciitis has not been observed in the athletic population.⁽²⁷⁾ Obesity is seen in 70% of individuals who present with plantar fasciitis and is an independent risk factor⁽²⁸⁾. Many studies found that increased body mass index (BMI) is a significant risk factor for plantar fasciitis, with a BMI of more than 30 kg/m² having an odds ratio of 5.6 (95% confidence interval, 1.9 to 16.6; p < 0.01) compared with a BMI of less than 25 kg/m²⁽²⁹⁻³⁰⁾ Frey and Zamora demonstrated a 1.4-fold increased probability of plantar fasciitis being diagnosed in an overweight or obese patient.⁽³⁰⁾

In our study, frequent running was shown to be a risk factor for plantar fasciitis. This is in agreement with finding of a study done by Narvaez et al. which reported that plantar fasciitis has also been associated with young individuals engaging in sports involving jumping.⁽³¹⁾ A study done by Yin et al.⁽³²⁾ reported that tight and inappropriate footwear have also been

identified as a significant risk factor, which is in agreement with our study finding that shows 58.3% of plantar fasciitis patients wear inappropriate shoes.

Limitation of the study

The study was limited by implementing a cross sectional design that is not ideal in assessment of the risk factors and outcome. Another limitation is the evaluation of patients having heel pain who attend primary health care centers and not including patients who attend hospital outpatient clinics.

CONCLUSION AND RECOMMENDATIONS

Plantar fasciitis is very common in primary health care settings with obesity, sedentary lifestyle, wearing inappropriate shoes, frequent running and long standing which were shown to be risk factors.

Health education program is highly recommended for those patients with plantar fasciitis, additionally health education programs should be conducted to general population to protect people from plantar fasciitis which is considered as a preventable condition.

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Conflict of interests: The authors declare that they have no competing interests, financial or non-financial.

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