

Knowledge and awareness of plantar fasciitis in the Saudi population

Waleed Awwad,¹ Abdullah Almousa,² Fahad Alotaibi,³ Fahad Al-Sultan,⁴ Noura Almajed,⁵ Najla Alsaikhan,⁶ Marwan Zamzami,⁷ Ahlam Al-Moawi,⁸ Abdulaziz Almaawi⁹

Abstract

Objectives: To evaluate and assess the knowledge and awareness level of lay people about plantar fasciitis (PF).

Methods: The cross-sectional study was conducted at a shopping mall in Riyadh, Saudi Arabia, from May to July 2017, and comprised random individuals busy shopping in the area. Data was collected through a self-administered questionnaire, and was analysed using SPSS 22.

Results: Of the 176 subjects, 101(57.4%) were females and 75(42.6%) were males. The age range was 18-55 years, and 153(87%) belonged to urban population. Overall, 60(34%) subjects had never heard of plantar fasciitis. Also, 148(84%) subjects thought that specialised medical shoes can be used as possible treatment for plantar fasciitis ($p < 0.001$). Females had significantly higher knowledge regarding plantar fasciitis than males ($p = 0.009$).

Conclusion: Over 30% subjects did not have any knowledge about plantar fasciitis.

Keywords: Plantar fasciitis, Awareness, Foot pain, Heel pain. (JPMA 69: 1838; 2019) DOI:10.5455/JPMA.298471

Introduction

Heel pain is one of the most common pathologies of the musculoskeletal system.^{1,2} Plantar fasciitis (PF) contributes to a large portion of musculoskeletal complaints affecting two million Americans,¹ and costing an estimated US\$192-376 million.³ In many forms, PF is defined as sharp pain in the heel elicited after walking or standing up,³⁻⁵ and felt more on the medial aspect of the heel, especially with the first step in the morning and while progressing throughout the day.⁴

Unfortunately, there is no clear aetiology in most cases. Overweight, flat foot or high-arched feet may lead to PF.^{4,5} Damage due to PF could also be attributed to mechanical, thermal or chemical changes.⁶ However, there are some known risk factors for PF, the most important being gender, with women carrying a higher risk, especially between the ages of 45 and 64.^{3,4}

Diagnosing PF does not necessarily require imaging, but magnetic resonance imaging (MRI) could help in ruling out other differentials. Clinical presentation of sharp heel pain at the insertion of Planter fascia with mobilisation is the main diagnostic criteria.^{3,4} Conservative treatment is usually the mainstay for management that includes non-steroidal anti-inflammatory drugs (NSAIDs), footwear modification and stretching,⁴ along with laser therapy,

.....
^{1,7,9}King Saud University, Riyadh, Saudi Arabia, ^{2,6}King Saud University Medical City, King Saud University, Riyadh, ^{3,5}College of Medicine, King Saud University, Riyadh, ⁴Department of Medicine, King Saud Medical City, Riyadh, ⁸Department of Orthopedic Surgery, King Khalid University Hospital, Riyadh, Saudi Arabia.

Correspondence: Abdulaziz Almaawi. Email: aalmaawi@ksu.edu.sa

shockwave therapy and orthotics.¹

There is a lack of scientific literature on the knowledge and awareness of PF in the general population. The current study was planned to evaluate and assess the knowledge of Saudi population about PF. In addition to measuring public's awareness of PF, an evaluation of its causes, symptoms, diagnosis, and management, as perceived by the population, was also planned to be estimated.

Subjects and Methods

The cross-sectional study was conducted at a shopping mall in Riyadh, Saudi Arabia, from May to July 2017, and comprised random individuals busy shopping in the area who were enrolled using convenience sampling. After approval was obtained from the review board of the College of Medicine, King Saud University, Riyadh, a pilot study was conducted comprising 30 subjects, and it was found that only 4(13%) knew about PF. As such, the sample size for detecting the true population proportion of people who knew about PF was determined based on 95% confidence interval (CI) and 5% margin of error. It was calculated using Gpower.⁷ The subjects were enrolled regardless of gender, age, nationality and educational level. After getting informed consent from the subjects, a 25-item self-administered questionnaire regarding knowledge of PF from literature and proven hypotheses^{3,4,8-11} was handed to each subject. Expert orthopaedic surgeons had conducted a face validity examination of the questionnaire in order to ensure that the questions included in it covered the concept that they purported to measure. The measurement used a paper-

based survey comprising three main domains. The first domain collected the respondent's demographic characteristics, like gender, age, educational level, nationality, residency, place of birth as well as other information such as the weight (kg) and height (cm). The second domain comprised a multiple option series of questions that measured the PF knowledge of the respondents including the risk factors and management. The response options were either, 'Yes', 'No', or 'Do not know'. The first part of the second domain assessed risk factors like standing for a long time, overweight, doing sudden exercise, walking barefoot, wearing high-heeled/stiletto shoes, lack of exercise, flat foot, advancing age, bearing a heavy load, exposure to fractures in the joints of the foot, and arthritic disorders etc.

As for the knowledge part of the second domain, it explored possible PF treatments, like elongation exercises, rinsing the foot in iced water, oral cortisone replacement, intravenous / intramuscular (IV/IM) cortisone treatments, wearable night-time leg cast, and specialised medical shoes etc. Score from the two domains were subsequently calculated.

Additionally, the questionnaire asked whether the respondents had ever been made aware of PF or if whether they had ever been diagnosed with PF, and, if so, were they familiar with the methods of diagnosis used. As the diagnosis for PF is based mainly on an individual's clinical history,¹² the last section of the questionnaire was used to ask some leading questions that could strongly suggest a PF diagnosis. Firstly, whether the patient had ever suffered a chronic heel pain or not. Secondly, had the heel pain ever interfered with daily activities, and, thirdly, did the pain increase when they took their first step in the morning or after periods of inactivity. Lastly, if the pain improved upon further movement, did it then get worse after a period of sustained activity. The extent of their perceived sources of information on this syndrome and its usefulness was questioned.

SPSS 22 was used for data analysis. Data was presented as Mean \pm standard deviation (SD), and frequencies and percentages. Chi-squared Goodness-of-Fit test was used to assess the distribution of people's answers in relation to PF knowledge questions. Next, the summative and recoding features in the analytical programme were used to compute a total knowledge score by computing the correctly answered questions after awarding each correct answer two points which resulted in a total score of 0-44.

Associations between variables were measured with Pearson's correlation as a bivariate effect size statistics.

Moreover, a one-way analysis of variance (ANOVA) as well as an independent samples t-test were employed in order to explore the main effects of key patient demographic data, such as health and disease characteristics, age, gender, educational background, economic factors, as well as the participants' previous disease history and several other key factors that we believed were relevant to the subjects' knowledge on PF according to background research and evidence.

Finally, multivariate linear regression analysis was employed to understand the individual and joint relationship between patients' demographic characteristics such as age, gender, education, PF Knowledge score, and disease history along with their heel pain experiences when these independent variables were set as a variate against their measured knowledge score on PF as a dependent variable.

Results

Of the 176 subjects, 101(57.4%) were females and 75(42.6%) were males. The age range was 18-55 years; 153(87%) belonged to urban population; 157(89.2%) were Saudi nationals; and 124(70.4%) were university graduates (Table-1).

Social media was the most common source of knowledge for 71(40.3%) respondents followed by communication

Table-1: Respondents Demographic Characteristics. N=176.

	Frequency	Percentage
Gender		
Female	101	57.4
Male	75	42.6
Age		
18-24 Years	43	24.4
25-34 Years	45	25.6
35-44 Years	41	23.3
45-55 Years	34	19.3
>55 Years	13	7.4
Educational level		
Lower than High School	15	8.5
High School Level	37	21
University Degree	106	60.2
Post-Graduate Degree	18	10.2
Nationality		
Non-Saudi	19	10.8
Saudi	157	89.2
Residence		
Rural Area	18	10.2
City	153	86.9
Weight (Kg) mean(SD)		78.5 (23.8)
Height (cm) mean(SD)		164.8 (10.7)

SD: Standard Deviation.

Table-2: Patients' background history of heel pain and diagnoses with Plantar Fasciitis=176.

	Frequency	Percentage
How did you hear about Plantar Fasciitis?		
Never heard of Plantar Fasciitis	60	34.1%
From a medical doctor	31	17.6%
The internet sources	14	8%
Social media	71	40.3%
Are you diagnosed with Plantar Fasciitis?		
No	93	52.8%
Yes	72	40.9%
How were you diagnosed with Plantar Fasciitis?		
Not diagnosed	93	52.8%
A medical doctor diagnoses	31	17.6%
MRI	4	2.3%
Self-diagnosed	34	19.3%
Others	3	1.7%
Do you feel any constant pain in your heel area?		
Experience no pain	96	54.5%
Experience pain upon waking from bed	56	31.8%
Experience pain all the day	24	13.6%
Does the pain Interfere with your ADL?		
No interference with daily life activities	94	53.4%
Slight interference with daily activities & exercise	68	38.6%
Can't do daily exercise and activities	14	8%
Total	176	100%

with physicians 31(17.6%). Only 14(8%) participants relied on websites as the primary source of information.

Overall, 60(34.15%) subjects had never heard of PF, while 72(40.9%) confirmed they had previously been diagnosed with PF. The mode of diagnosis was clinical for 31(17.6%) subjects, MRI 4(2.3%) and others 3(1.7%). Besides, 34(19.3%) subjects said they had self-diagnosed the condition (Table-2).

In terms of knowledge, 140(79.5%) subjects thought that prolonged standing was responsible for PF; 129(73.3%) identified obesity ($p<0.001$), 120(68.2%) wearing high heels ($p<0.001$), and 92(52.3%) identified walking barefoot ($p<0.001$). Additionally, 84(47.7%) subjects attributed increase in the level of activity ($p<0.001$), 82(46.6%) ageing ($p<0.001$), 80(45.5%) pregnancy ($p=0.001$), and 73(41.5%) identified joint disorders ($p<0.001$) as causes for PF (Table-3).

Regarding knowledge about PF treatment options 130(73.9%) subjects thought that PF need not be treated ($p<0.001$). Also, 148(84.1%) knew that specialized medical shoes could help to treat PF and sooth the pain ($p<0.001$). Overall, the participants' knowledge indicated that elongation exercises was known to 121(68.8%) ($p<0.001$) and rinsing the foot in iced water to 100(56.8%) ($p<0.001$)

Table-3: The statistical difference on total knowledge score on plantar fasciitis across the respondent's key demographic and disease related categorical variables. N=175.

	Knowledge Score Mean (SD)	Test statistic	p
Sex			
Female	22.3 (7.4)	$\chi^2(1)=19.5$	0.009
Male	18.6 (10.1)		
AGE			
18-24 Years	24.1 (8.6)	$\chi^2(5)=7.5$	0.280
25-34 Years	20.5 (9.3)		
35-44 Years	20.3 (8)		
45-55 Years	23.2 (8.6)		
>55 Years	18 (8)		
Educational level			
Lower than High School	16.7 (8.4)	$\chi^2(3)=2.7$	0.040
High School Level	19.2 (9.4)		
University Degree	22.2 (8)		
Post-Graduate Degree	19 (10.6)		
Nationality			
Non-Saudi	24.8 (9)	$\chi^2(1)=0.531$	0.030
Saudi	20.2 (8.7)		
Residence			
Rural Area	20.6 (10.7)	$\chi^2(1)=1.1$	0.868
City	21 (8.4)		
Heel pain experience			
No heel pain experienced	18.8 (9.2)	$\chi^2(2)=1.1$	0.001
Pain upon wakening up	22 (7.6)		
Pain all the day	25.6 (7.2)		
History of Plantar Fasciitis			
No	18.3 (9.1)	$\chi^2(1)=2.8$	<0.001
Yes	23.5 (7.6)		
Previous knowledge of Plantar Fasciitis			
No	18.4 (10.3)	$\chi^2(1)=00$	0.011
Yes	22 (7.6)		
Level of pain interference with ADL*			
None	19 (8.9)	$\chi^2(2)=4.6$	0.009
Slight interference with ADL	22.3 (8.4)		
Cannot do ADL	25 (7.8)		

*Activity daily life.

subjects. However, only 69(39.2%) subjects thought that surgical intervention/interference could help, and 63(35.8%) thought IV/IM cortisone treatment could help in decreasing PF pain.

Female subjects had a significantly higher mean knowledge score 22.3 ± 7.4 regarding PF than their male counterparts 18.6 ± 10.1 ($p=0.009$). However, age did not influence the knowledge about PF with all age groups sharing similar scores, although the older age group subjects with a mean score of 23.2 ± 8.6 had relatively better knowledge about the condition. Participants with higher education were substantially better aware of PF ($p=0.04$) and belonging to either rural or urban regions did

not influence the knowledge scores ($p>0.05$). The mean knowledge scores were significantly higher for people who experienced pain all day 25.6 ± 7.2 ($p=0.001$) and those who had a history of PF 23.5 ± 7.6 ($p<0.001$). People who claimed that they had some previous knowledge regarding PF tended to have a significantly higher knowledge score 22.0 ± 7.6 than those who reported no previous knowledge 18.4 ± 10.3 ($p=0.011$). Subjects who thought there was no interference of pain with activities of daily living (ADL) had significantly lesser knowledge score compared to those who thought there was a slight and/or complete interference with ADL ($p=0.009$).

Multivariate linear regression showed significant at least one or more of the tested predictor variables had a significant multivariate association with people's knowledge about PF ($p<0.05$). People who reported having had some basic idea about PF had significantly greater knowledge score than those who had none ($p=0.040$). Moreover, there was a statistically significant difference between people who were exposed to education when compared to those who were not ($p<0.001$).

Discussion

A healthy population is possible only in the presence of important factors, such as knowledge, awareness and health literacy. Knowing the diagnosis of the disease and its complications may play a role in patients' satisfaction.¹³

Heel pain is a common complaint among orthopaedic patients.¹ PF is the most common type of heel pain, presenting as a sharp, chronic and piercing pain after periods of inactivity.¹⁴ However, there is a lack of literature regarding the knowledge and awareness about PF in the Saudi population which is a preventable condition. Therefore, the current study was conducted to measure and assess the level and factors influencing PF awareness among Saudi population. Findings indicated that women had more knowledge about PF than men, and the younger people were more knowledgeable. Although, we did not find any studies that assessed PF knowledge of subjects, other studies on different diseases has indicated that females are usually more knowledgeable than males,¹⁵⁻¹⁸ and younger age subjects had more knowledge probably due to higher education.^{19,20}

Interestingly, more than one-third of the participants had not even heard about PF, while the rest had gained knowledge from social media channels which are unreliable. This indicates that there is a necessity for awareness campaigns in the general population. The majority of study population who had foot pain (53.4%) denied any interference with ADL, while some

complained of slight interference (38.6%) or significant interference (8%). In contrast, a study suggested that foot pain impacted physical activity negatively and was associated with weakness, and decreased motor performance during physical activities.²¹ This discrepancy could be because the sample of the other study predominantly consisted of older subjects in whom aging could have caused an interference with their activities and physical performance.

The majority of subjects in the current study also assumed that prolonged standing, obesity, walking barefoot and wearing high-heeled shoes were the major causes of PF ($p<0.001$). Studies have shown that these are some known and acknowledged risk factors of PF that can influence the symptoms.^{3,4} In addition, most of the subjects believed that using specialised medical shoes will help them in relieving PF pain ($p<0.001$). This is in lie with a study which reported that specialised shoes were most effective in the initial treatment for PF.²¹ Also, many studies confirm that wearing customised medical shoes, especially designed for the propose of controlling pain, gave advantage to people experiencing foot pain related to PF.²²⁻²⁴ Rinsing the foot in iced water and elongation exercises were believed to produce improvement in PF symptoms in the current study ($p<0.001$). Two other studies reported that elongation of calf muscle caused an improvement in relieving PF symptoms.^{25,26}

The current study had its limitations. The use of a questionnaire with single-direction and simple questions to measure PF pain may be inaccurate characterisation of the level of pain and associated discomfort. Additionally, the knowledge questions were designed based on literature review, and offered people with three potential answer. The third option, 'Do not know', may have provided an easy way out for participants who lacked sufficient knowledge to answer the question. However, because we presumed that there would be some people who truly did not know the best correct answer, this option was valid in our situation but may prove to be invalid for other societies/regions. Therefore, we treated those who answered 'Do not know' or those who provided wrong answers equally in the index knowledge score. Lastly, our study was based on self-administered questionnaire, which may affect the results because of incomplete or inaccurate collections retrieved by the participants.

Given the importance of health literacy, it is evident that there was a lack of knowledge regarding some aspects about PF among participants in the current study. More studies with larger sample sizes and with the inclusion of participants from across Saudi Arabia along with a

dedicated questionnaire measuring all facets of PF pain are needed for better understanding the phenomenon in the target population.

Conclusion

Almost one-third of the study population did not have any knowledge about PF. Amongst the people who knew about PF, the majority had obtained information from unreliable sources, such as social media or the internet.

Disclaimer: The study was presented as an Abstract at the 20th Asia Pacific Orthopaedic Association Congress, Antalya, Turkey, from April 10 to 14, 2018.

Conflict of Interest: None.

Source of Funding: The Deanship of Scientific Research, King Saud University through the Undergraduate Student's Research Support Programme.

Acknowledgment: We are grateful to the College of Medicine Research Centre (CMRC), Deanship for Scientific Research, King Saud University.

References

- Salvioli S, Guidi M, Marcotulli G. The effectiveness of conservative, non-pharmacological treatment, of plantar heel pain: A systematic review with meta-analysis. *Foot (Edinb)*. 2017; 33:57-67.
- Tahririan MA, Motififard M, Tahmasebi MN, Siavashi B. Plantar fasciitis. *J Res Med Sci*. 2012;17:799-804.
- Petraglia F, Ramazzina I, Costantino C. Plantar fasciitis in athletes: diagnostic and treatment strategies. A systematic review. *Muscles Ligaments Tendons J*. 2017; 7:107-18.
- Thompson JV, Saini SS, Reb CW, Daniel JN. Diagnosis and management of plantar fasciitis. *J Am Osteopath Assoc*. 2014; 114:900-6.
- American Medical Association. Plantar Fasciitis. [online]2017[cited 2018 Mar 24]. Available from: URL: <http://plantar-fasciitis-pain-relief.com/plantar-fasciitis-exercises/plantar-fasciitis-american-medical-association/> 2017.
- Hawke F, Burns J. Understanding the nature and mechanism of foot pain. *J Foot Ankle Res*. 2009; 2:1
- Heinrich Heine Universität Düsseldorf n.d. GPower: Statistical Power Analyses for Windows and Mac. [Online] [Cited 2019 March 24]. Available from: URL:<http://www.gpower.hhu.de/en.html>.
- Mischke JJ, Jayaseelan DJ, Sault JD, Emerson Kavchak AJ. The symptomatic and functional effects of manual physical therapy on plantar heel pain: a systematic review. *J Man Manip Ther*. 2017; 25:3-10.
- Riddle DL, Pulisic M, Pidcoe P, Johnson RE. Risk factors for Plantar fasciitis: a matched case-control study. *J Bone Joint Surg Am*. 2003; 85-A:872-7.
- Irving DB, Cook JL, Young MA, Menz HB. Obesity and pronated foot type may increase the risk of chronic plantar heel pain: a matched case-control study. *BMC Musculoskelet Disord*. 2007; 8:41.
- Buchbinder R. Clinical practice. Plantar fasciitis. *N Engl J Med*. 2004; 350:2159-66.
- Schneider HP, Baca JM, Carpenter BB, Dayton PD, Fleischer AE, Sachs BD. American College of Foot and Ankle Surgeons Clinical Consensus Statement: Diagnosis and Treatment of Adult Acquired Infracalcaneal Heel Pain. *J Foot Ankle Surg*. 2018; 57:370-81.
- Al-Khowaiter SS, Al-Maawi AM, Al-Obaidy MS, Al-Ali AS, Al-Rukban MO, Al-Sedrani YA, et al. Patients awareness of their medical conditions in multi-specialty outpatient clinics in Saudi Arabia. *Saudi Med J*. 2008; 29:1797-801.
- Rompe JD. Plantar fasciopathy. *Sports Med Arthrosc Rev*. 2009; 17:100-4.
- Khan NS, Shehnaz SI, Guruswami GK, Ibrahim SAM, Mustafa SAJ. Knowledge of warning signs, presenting symptoms and risk factors of coronary heart disease among the population of Dubai and Northern Emirates in UAE: a cross-sectional study. *Nepal J Epidemiol*. 2017; 7:670-80.
- Awad A, Al-Nafisi H. Public knowledge of cardiovascular disease and its risk factors in Kuwait: a cross-sectional survey. *BMC Public Health*. 2014;14:1131.
- Quah JL, Yap S, Cheah SO, Ng YY, Goh ES, Doctor N, et al. Knowledge of signs and symptoms of heart attack and stroke among Singapore residents. *Biomed Res Int*. 2014; 2014:572425.
- Buykx P, Li J, Gavens L, Hooper L, Lovatt M, Gomes de Matos E, et al. Public awareness of the link between alcohol and cancer in England in 2015: a population-based survey. *BMC Public Health*. 2016; 16:1194.
- Pan Y, Chieng CY, Haris AAH, Ang SY. Assessment of the level of knowledge of colorectal cancer among public at outpatient clinics in Serdang Hospital: a survey based study. *Med J Malaysia*. 2017; 72:338-44.
- Al-Thafar AK, Al-Naim AF, Albges DS, Boqursain SK, Aldhafar AS, Ghreiz SM, et al. Knowledge Attitude and Practice of Colorectal Cancer among School Teachers in Al-Ahsa Saudi Arabia. *Asian Pac J Cancer Prev*. 2017; 18:2771-4.
- Muchna A, Najafi B, Wendel CS, Schwenk M, Armstrong DG, Mohler J. Foot Problems in Older Adults: Associations with Incident Falls, Frailty Syndrome and Sensor-Derived Gait, Balance, and Physical Activity Measures. *J Am Podiatr Med Assoc*. 2018;108:126-39.
- Gross MT, Byers JM, Krafft JL, Lackey EJ, Melton KM. The impact of custom semirigid foot orthotics on pain and disability for individuals with plantar fasciitis. *J Orthop Sports Phys Ther*. 2002; 32:149-57.
- Kitaoka HB, Luo ZP, An KN. Analysis of longitudinal arch supports in stabilizing the arch of the foot. *Clin Orthop Relat Res*. 1997:250-6.
- Pfeffer G, Bacchetti P, Deland J, Lewis A, Anderson R, Davis W, et al. Comparison of custom and prefabricated orthoses in the initial treatment of proximal plantar fasciitis. *Foot Ankle Int*. 1999; 20:214-21.
- Hyland MR, Webber-Gaffney A, Cohen L, Lichtman PT. Randomized controlled trial of calcaneal taping, sham taping, and plantar fascia stretching for the short-term management of plantar heel pain. *J Orthop Sports Phys Ther*. 2006; 36:364-71.
- Radford JA, Landorf KB, Buchbinder R, Cook C. Effectiveness of calf muscle stretching for the short-term treatment of plantar heel pain: a randomised trial. *BMC Musculoskelet Disord*. 2007; 8:36.