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"Clinical Presentations of Plantar Fasciitis: A Study in a Tertiary Care Hospital of Bangladesh"

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Abstract **Original Research Article**

Background: Plantar fasciitis (PF) is a tough fibrous connective tissue structure which spans the plantar surface of the foot from the inferior heel to the toes. Even pain emanating from this portion is most often referred to as plantar fasciitis. In Bangladesh, we have not enough research-based information regarding the clinical features and presentations of plantar fasciitis (PF). ***Aim of the study:*** The aim of this study was to assess the clinical features and presentations of plantar fasciitis (PF). ***Methods:*** This prospective observational study was conducted in the department Physical Medicine & Rehabilitation, Pabna Medical College Hospital, Pabna, Bangladesh during the period from January 2020 to January 2021. In total 100 patients with plantar fasciitis (PF) diagnosed and treated in mentioned hospital were included as the study subjects of this study. A predesigned questioner was used in data collection. Data regarding demographic, clinical, diagnostic etiological status of the patients were recorded. All data were collected, processed and analyzed by using MS Office and SPSS version 23 programs as per need. ***Results*:** In this study, the male-female ratio was 1.4:1. Most of the participants (39%) were from 18-30 years' age group. Among total participants, in some cases diabetes, depression, CAD, CKD, obesity and cancer were found as comorbidities. In analyzing the personal level variables among the participants, we found the mean (±SD) SF-12 physical (0-100), SF-12 mental (0-100), HADS anxiety (0-21), HADS depression (0-21), MFPDI (Pain) and MFPDI (Function) as 40.14±11.73, 51.28±11.94, 6.72±4.51, 5.11±3.76, -0.5±1.50 and -1.0±1.75 respectively. Besides these, as foot variables the mean (±SD) 1st MTP joint dorsiflexion (Degree), ankle dorsiflexion-knee flexed (Degree), ankle dorsiflexion-knee extended (Degree), Foot Posture Index, navicular height (mmd), Arch index were found as 62.25±18.67, 51.45±8.75, 63.50±8.76, 2.7±1.75, 0.18±0.04 and 0.23±0.03 respectively. In imaging, majority of the patients (52%) were with 'no plantar calcaneal spur or plantar fascia thickening. ***Conclusion:*** According to the findings of this study, we can conclude that, young male people are major prone to plantar fasciitis (PF). Functional difficulties are more potential than pain among patients with PF.

Keywords: Clinical presentations, Features, Plantar fasciitis, Pain, MTP.

1. INTRODUCTION

Plantar fasciitis (PF) represents the most frequent cause of talalgia in adult patients which affects approximately 2 million people per year in the United States only [1]. It is a self-limiting condition which improves with conservative treatment in 90% of the total cases [2]. But 10% of patients may not improve with conservative treatment may enter the chronic stage, which is usually denominated recalcitrant plantar fasciitis (RPF) [3]. When nonoperative measures are exhausted, then operative treatment should be considered [4]. The diagnosis PF is clinical but, in some cases, it can be associated with imaging studies such like magnetic resonance imaging and ultrasonography for detecting other pathologies [5]. MRI findings are assessed before and after conservative treatment and are

considered as an indicator of a good response in terms of pain and function [6]. The thickness of the plantar fasciitis can be determined by ancillary tests where 4 mm is considered to be pathologic [7]. Now a day, one of the most accepted and trusted operative treatment methods for RPF is 'release of the proximal medial gastrocnemii because of its low rate of complications and good functional results [8]. Orthotic devices are considered as an alternative treatment in PF. In another study it was reported that, orthoses reduce the foot pronation, collapse of the longitudinal arch and is associated elongation of the foot [9, 10]. Some randomized controlled trials [11, 12] have evaluated the effects of foot orthoses from a patient's perspective. But, some systematic reviews of these trials have reported that, the evidence for the effectiveness of foot orthoses in treating plantar fasciitis (PF) is poor and further investigation and rigorous randomized clinical trials are in needed [13, 14].

2. OBJECTIVE

General Objective

- To assess the clinical features and presentations of plantar fasciitis (PF).

Specific Objective

- To assess the demographic status of patients with PF.
- To evaluate person and foot level variables among PF patients.
- To assess the imaging findings in relation to tenderness to palpation of PF patients.

3. METHODOLOGY

This prospective observational study was conducted in the department Physical Medicine & Rehabilitation, Pabna Medical College Hospital, Pabna, Bangladesh during the period from January 2020 to January 2021. In total 100 patients with plantar fasciitis (PF) diagnosed and treated in mentioned hospital were included as the study subjects of this study.

As per the inclusion criteria of this study, only consecutive patients with clinical diagnosis of plantar fasciitis, experienced symptoms for at least 4 weeks were included. On the other hand, according to the exclusion criteria of this study, patients with a history of a major orthopedic or medical condition like inflammatory arthritis or diabetes which can influence the condition were excluded for this study. This study was approved by the ethical committee of the mentioned hospital. Proper written informed consents were taken from all the participate before data collection. A predesigned questioner was used in data collection. All eligible participants were evaluated by the survey questionnaire that gathered information on demographic characteristics and aspects of general health including the Short Form-12 (SF-12) [15] and the Hospital Anxiety and Depression Scale (HADS) [16]. Specific questions included the presence of pain in and around the foot in the past 12 months and the Manchester Foot Pain and Disability Index (MFPDI) [17]. The Foot Posture Index is a multidimensional visual observation tool consisting of six criteria scored on a 5-point scale (range, -2 to +2) [18] and scores of the six criteria were converted to a single Rasch-transformed logit scale, with higher scores representing a more pronated (flatter) foot [19]. Weight bearing lateral radiographs was obtained from both feet according to a defined standardized protocol [20]. Plantar calcaneal spurs were scored by a single reader (M.M.), blind to all other participant information, and documented as absent (score = 0), small (score = 1), moderate (score = 2) or severe (score = 3) using standard atlas images. Plantar calcaneal spurs were then dichotomized as being absent (score 0 or 1) or present (score 2 or 3). To establish inter-rater re- liability, M.M. and H.B.M. independently scored 120 lateral radiographs (60 right foot, 60 left foot). Plantar fascia thickness was measured where the plantar fascia crossed the anterior aspect of the inferior border of the calcaneus on the longitudinal view, but at its thickest point in the transverse plane [21]. Three repeated measurements were obtained, and plantar fascia thickening was defined as >4 mm for the highest of the measurements [22]. All data were collected, processed and analyzed by using MS Office and SPSS version 23 programs as per need.

4. RESULT

In this study, among total 46 participants, 59% were male whereas the 41% were female. So, mole participants were dominating in number and the male-female ratio was 1.4:1. Most of the participants (39%) were from 18-30 years' age group. Besides this, 24%, 22% and 15% participants were from <18, 31-50 and >50 years' age groups respectively. On the other hand, the mean (±SD) BMI in Kg/m2 of the participants was found 29.3. Among total participants in some cases diabetes (n=9), depression (n=7), CAD (n=4), chronic kidney disease (n=4), obesity (n=4) and cancer (n=2) were found as some comorbidities. In this study in analyzing the personal level variables among participants we found the mean (±SD) SF-12 physical (0-100), SF-12 mental (0-100), HADS anxiety (0-21), HADS depression (0-21), MFPDI (Pain) and MFPDI (Function) as 40.14±11.73, 51.28±11.94, 6.72±4.51, 5.11±3.76, -0.5±1.50 and -1.0±1.75 respectively. Besides these, as foot variables the mean (±SD) 1st MTP joint dorsiflexion (Degree), ankle dorsiflexion-knee flexed (Degree), ankle dorsiflexion-knee extended (Degree), Foot Posture Index, navicular height (mmd), Arch index were found as 62.25±18.67, 51.45±8.75, 63.50±8.76, 2.7±1.75, 0.18±0.04 and 0.23±0.03 respectively. In imaging, majority of the patients (52%) were with 'no plantar calcaneal spur or plantar fascia thickening. Besides this 'plantar calcaneal spur alone, 'plantar fascia thickening alone' and 'plantar calcaneal spur and plantar fascia thickening' were found in 9%, 24% and 15% participants respectively.

Table-1: Demographic status of participants (N=100)

Variables	n	%
Age distribution in year		
<18	24	24%
18-30	39	39%
31-50	22	22%
>50	15	15%
Gender distribution		
Male	59	59%
Female	41	41%
BMI (Kg/m^2) of participants		
Mean (±SD)	29.3	
Comorbidity distribution		
Diabetes	9	9%
Depression	7	7%
CAD	4	4%
Chronic kidney disease	4	4%
Obesity	4	4%
Cancer	2	2%

Table-2: Person level variables among participants (N=100)

Characteristics	Value (Mean ± SD/n)
SF-12 physical (0-100) [a]	40.14±11.73
SF-12 mental (0-100) [a]	51.28±11.94
HADS anxiety (0-21) [b]	6.72±4.51
HADS depression (0-21) [b]	5.11±3.76
Disabling foot pain, n (%)	27 (0.59%)
MFPDI (Pain) [b]	-0.5±1.50
MFPDI (Function) [b]	-1.0±1.75

Values are in mean (±SD) unless otherwise stated. [a] Higher score indicates better function. [b] Higher score indicates worse function. [c] Higher score indicates flatter (more pronated) foot. [d] Adjusted for foot length; lower score indicates flatter (more pronated) foot. MFPDI: Manchester Foot Pain and Disability Index; SF-12: Short Form-12; HADS: Hospital Anxiety and Depression Scale.

Table-3: Foot level variables among participants (N=100)

Characteristics	Value (Mean ±SD)
1st MTP joint dorsiflexion (Degree)	62.25±18.67
Ankle dorsiflexion-knee flexed (Degree)	51.45±8.75
Ankle dorsiflexion-knee extended (Degree)	63.50±8.76
Foot Posture Index	2.7±1.75
Navicular height, mmd	0.18±0.04
Arch index	0.23±0.03

Table-4: Imaging findings in relation to tenderness to palpation among participants (N=100)

Characteristics	n	%
No plantar calcaneal spur or plantar fascia thickening	52	52%
Plantar calcaneal spur alone	9	9%
Plantar fascia thickening alone	24	24%
Plantar calcaneal spur and plantar fascia thickening	15	15%

5. DISCUSSION

The aim of this study was to assess the clinical features and presentations of plantar fasciitis (PF). In this study, the male-female ratio was 1.4:1. Most of the participants (39%) were from 18-30 years' age group. The mean (±SD) BMI in Kg/m2 of the participants was found 29.3. Among total participants in some cases diabetes (n=9), depression (n=7), CAD (n=4), chronic kidney disease (n=4), obesity (n=4) and cancer (n=2) were found as some comorbidities. It is well known that; plantar fasciitis patients suffer an increase in plantar fascia thickness [23]. A decrease in plantar fascia thickness measured by means of MRI after conservative treatment has been reported in acute cases [24] and in cases with a chronic symptom's onset [25]. In our study in imaging, majority of the patients (52%)

were with 'no plantar calcaneal spur or plantar fascia thickening. Besides this 'plantar calcaneal spur alone, 'plantar fascia thickening alone' and 'plantar calcaneal spur and plantar fascia thickening' were found in 9%, 24% and 15% participants respectively. But in a study, it was reported that, the plantar fascia thickness measured by MRI is not supposed to be modified by the treatment [26]. Besides these, in this study, as foot variables the mean (±SD) 1st MTP joint dorsiflexion (Degree), ankle dorsiflexion-knee flexed (Degree), ankle dorsiflexion-knee extended (Degree), Foot Posture Index, navicular height (mmd), Arch index were found as 62.25±18.67, 51.45±8.75, 63.50±8.76, 2.7±1.75, 0.18±0.04 and 0.23±0.03 respectively. A reduction in thickness of the plantar fascia (PF) following treatment has been shown to be associated with the degree of symptomatic improvement [27]. The most widely accepted surgical treatment for plantar fasciitis has long been the partial plantar fasciotomy. [28] However, foot and ankle surgeons moved to "gastrocnemius recession" techniques because of some characteristic biomechanical complications [25], the unsatisfactory results with some patient series and their better understanding of biomechanics [29].

Limitation of the study

This was a single centered study with a small sized sample. So, findings of this study may not reflect the exact scenario of the whole country.

6. CONCLUSION & RECOMMENDATION

According to the findings of this study, we can conclude that, young male people are major prone to plantar fasciitis (PF). Functional difficulties are more potential than pain among patients with PF. MRI may be considered as the most effective diagnostic method for assessing plantar fasciitis and its status. For getting more specific findings we would like to recommend for conducting similar more studies with larger sized samples in several places.

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