RESEARCH ARTICLE

Journal of Ecophysiology and Occupational Health, *Vol 24(2), DOI: 10.18311/jeoh/2024/36404, 191-197, June 2024*

ISSN (Online) : 0972-4397
ISSN (Online) : 0974-0805

Prevalence of Low Back Pain in Plantar Fasciitis Patients

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Abstract

Background: In India, the most typical form of heel pain is plantar, which results in inflammation of plantar fascia sometimes and can be seen in every age group. This condition mainly includes inflammation of plantar fascia and can be treated conservatively. It may cause many secondary symptoms along with it, and pain in back region is one of them. The purpose of this study is to discover how prevalent low back pain was in individuals who had plantar fasciitis. **Objectives:** Objectives are to evaluate the pain associated with plantar fasciitis, assess the low back pain and lastly check the prevalence of low back pain in plantar fasciitis patients by using different methods. **Method:** A convenience sampling method consisted of 65 participants were selected in relation with inclusion and exclusion criteria. The information collected, which comprises questionnaires and demographic data. Two standardised questionnaires were used, i.e., one to check the ability of an individual on the basis of plantar fasciitis and another to check the back pain especially in lower region. Both scales were given to 65 individuals one by one. First the foot's capability calculated, and then pain in lower back region was checked. The prevalence was calculated on the basis of both scale responses with the help of statistical analysis. **Results:** The outcomes of the statistical study indicated that, the incidence of low back pain is prevalent of individual's foot disability in plantar fasciitis patients. **Conclusion:** Findings show that the prevalence of low back pain is higher if plantar fasciitis has become chronic in the patient, and if the foot's ability is maximal, low back pain is minimal, and vice versa.

Keywords: Low Back Pain, Plantar fasciitis, Plantar Heel Pain

1. Introduction

A thin and long ligament that lies underneath the skin is called the plantar fascia[1]. It attaches proximally to the calcaneus and attaches top of sole to your foot, supports the arches and plays a dynamic role during the gait cycle where it elongates during the stance phase[1]. Acceleration occurs due to the alteration of potential energy stored in the tissues via passive contraction into kinetic energy. It locks the mid-foot during toe-off[1]. It plays important role in biomechanics and also acts as shock absorber[1]. Functionally the plantar fascia provides support to maintain the longitudinal arch[1]. At first, the pain is worst on standing after rest, typically early in the morning[1]. Once the patient starts walking, the pain tends to recede[1]. The pain eases but may not completely cure and is exacerbated by activities such as prolonged walking or exercise[1].

Many individuals who need skilled orthopaedic care frequently complain of heel discomfort, which is mostly caused by Plantar Fasciitis (PF)[2]. These patients primarily experience persistent pain beneath their heels[2]. With a focus on non-surgical treatment, the current article examines research conducted by eminent practitioners on

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Article Received on: 30.01.2024 Revised on: 06.03.2024 Accepted on: 08.03.2024

the anatomy of plantar fasciitis and its histopathological features, also factors associated to the condition, clinical features, imaging studies, differential diagnoses, and various treatment modalities[2]. In individuals with PF, anti-inflammatory drugs, plantar stretching, and orthoses were discovered to be the most significant treatments; corticosteroid injection, night splints and other various treatments[2]. When patients refuse the aforementioned therapies, surgical interventions should be done[2].

An inflammation of the fascia is commonly referred to as fasciitis[3].

It occurs due to overuse injury that is repetitive strain, trauma, altered foot biomechanics, age, obesity, prolonged standing, pes caves or pes planus deformities, improper shoes, leg length discrepancy[4].

Plantar fasciitis develops without a specific reason and might end up in stiffness and arch pain. It is primarily observed in the ones with flat feet or a high arch. This condition is not gender specific and occurs between the age of 40 to 60 years. Plantar fasciitis can be determined by windlass test. Heel pain shows test is positive which reproduced with passive dorsiflexion. It is done either in a weight bearing position or in a non-weight bearing position.

Low back pain termed as a painful condition which affects muscles or ligaments surrounding the lower spine. There is a strain on lower back due to repetitive heavy lifting or sudden jerky movement. It may be caused due to bulging or rupture of disks. As well as several cases are available which demonstrated that people have are experiencing heel pain causes unmanaged low back pain or dysfunction in later stages. Low back dysfunction includes postural asymmetry, decreased muscle size and reduced muscle function. It is associated with hamstring, quadriceps, adductors and calf strains or the degeneration of collagen in tendon that is referred as tendinopathy.

It is a common and frequently recurring condition that is of a nonspecific cause[5]. The therapy for generalised low back pain is a multidisciplinary approach to improve function and reduce disability[5]. It includes medication, self-care, spinal manipulation, massage, acupuncture, wedge sole, arch modification and physical therapy interventions[5].

However, it's frequently seen that pain-related limitations will take part in less physical activity[6]. Recent studies generated findings that contradict this theory[6]. This tends to be diversity in the degree of physical participation across those suffering from acute or subacute back pain, regardless of disability[6]. Individuals suffering from serious impairments from persistent back pain are probably not be very active[6].

Many studies have examined the connection among pain in lower region of back and function or physical capacity[7]. Studies indicates which ever age group is suffering from Low Back Pain (LBP) have diminished range of motion, compromised proprioception, diminished balancing ability, and decreased strength in comparison to those without symptoms[7]. Predicted on the idea that distinct biomechanical and physiological factors may contribute to various forms of Lower Back Pain (LBP), also the distinctions between LBP subgroups based on the degree of function and ability impairment and the nature of pathology (discogenic or degenerative) or pain location (local or referred)[7].

Although there hasn't been a link connecting heel pain to irritation in the low back then the foot mechanism is an important component. It comprises reduced dorsiflexion and navicular drop, dynamic foot pronation, and higher arch height. As an example, lateral forefoot wedges have been associated to the early beginning of the lumbar paraspinal muscle during gait, foot eversion corresponds to anterior pelvic tilt, and flat foot is correlated with reduced shock absorption during running at the lower back region. Investigations are conducted to look at the foot and the low back, that is identical to the relationship among the low back and musculotendon condition (tendinopathy). The aim of this project is to know the connection between spinal discomfort and heel discomfort.

Anyone is having plantar heel pain or any discomfort while walking will eventually feel secondary symptoms[8]. It may include swelling and pain in the affected area. While walking, if the steps become painful, it will directly affect the low back because of the prolonged position. Making the body suffer from discomfort and not being aware of the outcomes will have effects on other areas too. Adapting a single position for prolonged time will lead to increased pressure on the low back. Plantar fasciitis will mostly manifest with heel pain, and to reduce that, individuals who prefer sitting for prolonged periods of time will develop a low back pain.

Fewer studies have been conducted to analyse the correlation between various circumstances, but ultimately, they are interrelated with another directly on the basis of body mechanisms. Regardless of impairment, people with acute or subacute back pain seem to vary in their

levels of physical activity[9]. People with significant levels of impairment from persistent back pain are likely to be less physically active[9].

Low back pain can be caused by plantar heel pain if the pain is radiating as well. Heel pain results from various reasons, such as abnormal foot pathology, prolonged adaptation to a particular position, congenital abnormalities, and excessive stress while walking. Because the musculoskeletal the framework of the body is interconnected, there may be a connection between back discomfort and heel discomfort. Both heel discomfort and low back pain can be caused by issues with posture or gait. For example, an individual's gait may be affected by a misaligned hip or spine, which may result in an excessive amount of strain on the lower back and heels. Foot mechanics problems, such as rolling the foot inward or overpronation, can put stress on the lower back, knees, and hips in addition to the feet. Because of this tension and the body's attempt to adjust for the inconsistencies in the foot's movement, back discomfort may eventually result.

Tightness in specific muscle groups or imbalances in the muscles themselves can impact how the body moves in its whole. Like, tight calves can alter your gait and cause problems with your heel and lower back. Muscle imbalances: Tightness in specific muscle groups or imbalances in the muscles themselves can impact how the body moves as a whole. For example, tight calves can alter your gait and cause problems with your heel and lower back. This relationship may be influenced by inflammatory conditions. The most successful physical therapy combination for treating Lower Back Pain (LBP) in children and adolescents is the use of both manual therapy and therapeutic physical training[10]. A significant risk factor for low back pain and disability is physical as well as socioeconomic condition[11].

As there are studies done to identify the links between lower back pain and heel pain, it is important to make people aware that prolonged heel pain may be associated with pain in the lower back region. From this study, it has shown that people who are suffering from plantar fasciitis are having low back pain on the basis on ability of one's foot.

2. Materials and Method

The study was approved by Ethical Committee and Protocol Committee (protocol no.655/2022-2023). The survey approach was convenience sampling with 65 participants with using formula of $n=Z^2pq/L^2$.(4) The study was conducted in Satara district. The research concluded by providing two types of standardised questionnaires. We questioned the patient and checked the heel's capacity first with the FAAM scale (Foot and Ankle Ability Measure) used. And then later about the occurrence of low back pain was measured with the ODI (Oswestry Disability Index)[12]. A case sheet is for those who have plantar fasciitis, which includes name, age, gender, and email ID. To determine the prevalence, both questionnaires were distributed one at a time. The inclusion criteria were having Age group of 20 to 50 years Both male and female individuals, people with plantar fasciitis with low back pain, a positive windlass test was taken, and lastly, individuals who are having painful first steps in the morning. The exclusion criteria were individuals with plantar fasciitis due to systemic disease, foot pathology, trauma, ankle or foot surgery, congenital deformation of the foot, low back pain due to trauma or other conditions, and lower limb spasticity.

3. Result

The outputs of the two standardised questionnaires have been verified the low back pain among people with plantar fasciitis, one for capacity of foot and another for low discomfort in the back. There were two different standardised questionnaires. The response was taken by sending Google Forms and in offline mode too. The individuals that answered were already diagnosed with plantar fasciitis in the 20-50 age group. They were selected for the data analysis. The collected data was analysed by a statistician, and the results were calculated.

To evaluate foot function ability in plantar fasciitis patients:

Table 1 and Figure 1 indicates results of a standardised questionnaire which was provided, i.e., FAAM, to evaluate

Table 1. Category wise frequency and mean percentage about the foot function in plantar fasciitis patients

Category with respect to total patients	Frequency	Percentage
Normal	12	18.46%
Nearly normal	34	52.30%
Abnormal	19	29.23%

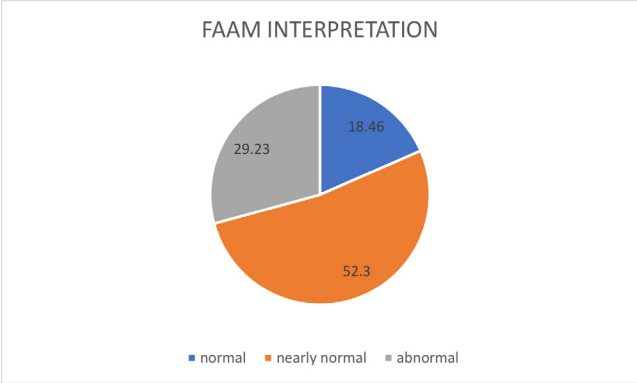

Figure 1. Mean percentage about the foot function in plantar fasciitis patients on the basis of FAAM scale.

the abilities of the foot in individuals with plantar fasciitis. In the age group between 20 and 50 years, responses to this questionnaire were 65, of which 12 individuals had normal foot abilities, 34 had nearly normal foot abilities, and 19 had abnormal foot abilities. This means 18.46% had normal foot ability, and 52.30% and 29.23% had nearly normal and abnormal foot abilities, respectively.

Table 2. Category wise frequency and mean percentage about the low back pain in plantar fasciitis patients

Oswestry Disability Index		
Average percentage of disability of each category with respect to total patients	**Frequency**	**Percentage**
Minimal	11	16.92%
Moderate	23	35.38%
Severe	24	36.92 %
Crippled	7	10.76%

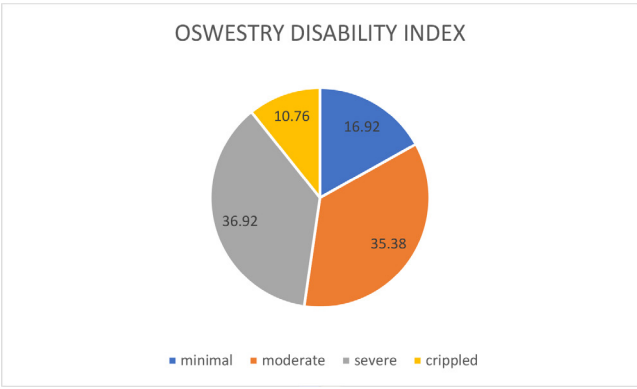

Figure 2. Mean percentage about the low back pain in plantar fasciitis patients on the basis of ODI scale.

To evaluate low back pain in plantar fasciitis patients:

Table 2 and Figure 2 shows results of a standardised questionnaire was provided, i.e., the Oswestry disability scale, in order to check the ability of the foot in individuals with plantar fasciitis. In the age group between 20 and 50 years, responses to this questionnaire were 65, of which 11 individuals had minimal LBP, 23 individuals had moderate LBP, 24 individuals had severe LBP, and 7 individuals had crippled LBP. This means 16.92%, 35.38%, 36.92%, and 10.76% had minimal, moderate, severe, and crippled LBP, respectively.

To evaluate the relation between two scales

Standardised questionnaires were provided, i.e., FAAM, for the purpose of determining the ability of the foot in individuals with plantar fasciitis and Oswestry disability index provided to check LBP.

Table 3 and Figure 3 shows the results of the age group between 20 and 50 years and responses to this questionnaire were 65, of which 12 individuals had normal foot abilities according to FAAM. Between them 8 people were having minimal LBP and 4 people were having moderate LBP i.e., 66.66% and 33.33% respectively according to ODI.

Table 3. Frequency and mean percentage of low back pain in individuals who are having normal foot function among plantar fasciitis

ODI Interpretation in Relation to FAAM	Frequency	Percentage
Minimal LBP	8	66.66%
Moderate LBP	4	33.33%

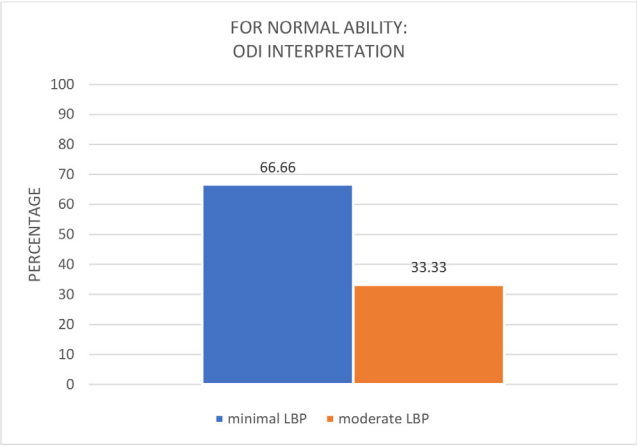

Figure 3. Mean percentage of minimal and moderate LBP in plantar fasciitis patients who are having normal FAAM score.

Table 4. Frequency and mean percentage of low back pain in individuals who are having nearly normal foot function among plantar fasciitis

ODI Interpretation in Relation to FAAM	Frequency	Percentage
Minimal LBP	3	8.8%
Moderate LBP	19	55.88%
Severe LBP	12	35.29%

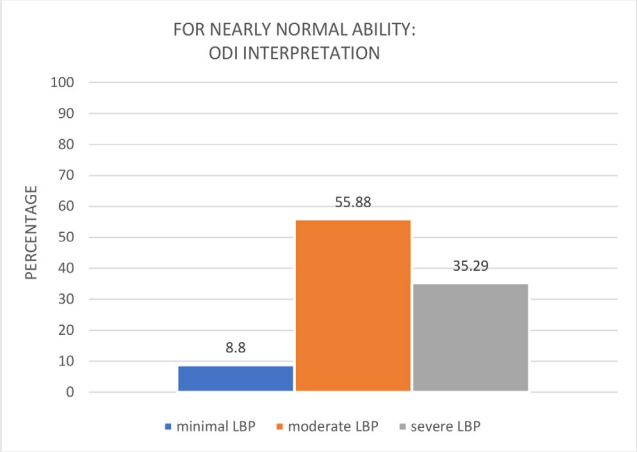

Figure 4. Mean percentage of minimal, moderate and severe LBP in plantar fasciitis patients who are having nearly normal FAAM score.

Standardised questionnaires which were provided, i.e., FAAM, for assessing the abilities of the foot in individuals with plantar fasciitis and Oswestry disability index provided to check LBP.

Table 4 and Figure 4 indicates the results of the age group between 20 and 50 years and responses to these questionnaires were 65, of which 34 individuals had nearly normal foot abilities according to FAAM. Between them 3 people were having minimal LBP, 19 people were having moderate LBP and 12 people were having severe LBP i.e., 8.8%, 55.88% and 35.29% respectively according to ODI.

Standardised questionnaires were provided, i.e., FAAM, for the aim of establishing the ability of the foot in individuals with plantar fasciitis and Oswestry disability index provided to check LBP.

Table 5 and Figure 5 indicates the results of the age group between 20 and 50 years and responses to these questionnaires were 65, of which 19 individuals had abnormal foot abilities according to FAAM. Between them 12 people were having severe LBP and 7 people were having crippled LBP i.e., 63.15% and 36.80% respectively according to ODI.

Table 5. Frequency and mean percentage of low back pain in individuals who are having abnormal foot function among plantar fasciitis

ODI Interpretation in Relation to FAAM	Frequency	Percentage
Severe LBP	12	63.15%
Crippled LBP	7	36.80%

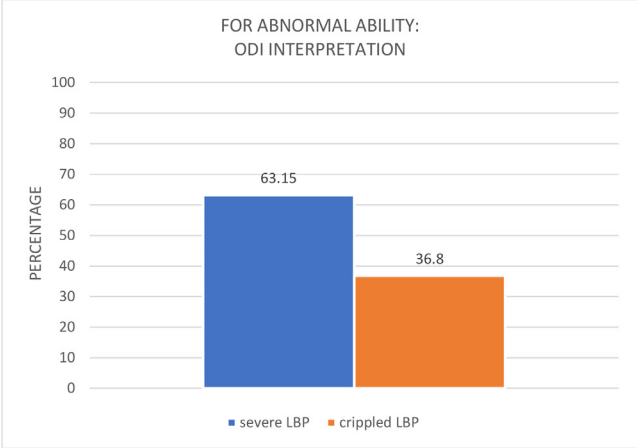

Figure 5. Mean percentage of severe and crippled LBP in plantar fasciitis patients who are having abnormal FAAM score.

4. Discussion

A total of 65 people with plantar fasciitis involved in this study to look at the relationship between plantar fasciitis and low back pain. To assess the association, two standardised questionnaires were given: the Oswestry low back pain scale and the FAAM. The analysis of correlation has been made on the basis of responses collected from both scales, FAAM and ODI.

In 2017, McClinton Shane, Weber Carolyn F, Heiderscheit Bryan carried out another the cohort study. The research concluded that the PHP group had a considerably higher percentage of people with LBP (74%)[4]. Furthermore, the PHP cohort's LBP prevalence was higher than the unadjusted prevalence of similar-aged individuals with LBP in the general population (42%) and the modified point prevalence (12%)[4]. Moreover, compared to those without PHP, those with LBP with PHP had a more severe low back impairment. There was

a correlation between lower levels of foot and ankle ability and higher degrees of low back impairment[4].

The purpose of this research is to find out if low back pain is present in plantar fasciitis patients. To find out that first, the responses were collected with the help of FAAM, which is primarily used to determine how much foot function is present in plantar fasciitis patients and the ODI responses were collected. Then the categories were made on the basis of the FAAM scale as well as ODI interpretations to distinguish the individuals in order to find a low back pain prevalence in each category of FAAM. Then the responses were checked for the same individual from both the scales one by one. And lastly, the mean value has been calculated by relating both responses to find out the prevalence.

The analysis showed that low back discomfort was either mild (66.66%) or moderate (33.33%) in those with normal abilities. Low back discomfort was reported by those with nearly normal abilities as slight (8.8%), moderate (55.88%), and severe (35.29%). Lastly severe (63.15%) and crippling (36.80%) low back discomfort were experienced by people with atypical talents. A smaller sample group, restricted regional coverage, insufficient time, and required bigger sample size to improve reliability were among the study's shortcomings.

Although low back pain and plantar heel pain appear indistinguishable at first, they can be closely related according to the kinetic chain, which is the network of joints, muscles, and bones that allows the body to move and transfer force. Knowing this link helps to explain how problems in one area of the body can appear in apparently unrelated areas.

The relationship between plantar heel pain and low back pain has its origins in the body's biomechanics. The kinetic chain extends upward from the feet, passing through the legs, pelvis, and spine before arriving at the neck. As plantar heel discomfort alters walk patterns and biomechanics, it can exacerbate low back pain. People who are uncomfortable in their heels may change their way of walk, which might cause their spine's alignment to shift. This may put more strain on the lower back's muscles, ligaments, and discs, which could eventually cause pain and discomfort there. Treating plantar heel pain correctly can help reduce related low back pain.

Another study has been carried out by Lin CC, McAuley JH, Macedo L, Barnett DC, Smeets RJ, Verbunt JA in March 2011 which stated that the frequency and kind of exercise that those who have acute or subacute LBP do seem to differ depending on pain-related impairment[6]. Lesser daily activity is also frequently seen in chronic LBP who have significant levels of impairment[6]. Independent of impairment, there seems to be variation in the amount of physical ability within people with acute or subacute back pain[6]. Individuals having various problems from persistent back pain are probably not seem to be very active[6].

Both low back pain and plantar heel pain can be attributed to muscle dysfunction or tightness in the lower back muscles that link to the legs and feet. The connection of plantar heel pain and low back pain essentially demonstrates how interconnected the body is. This strategy focuses on treating the underlying dysfunctions or imbalances that cause the discomfort and dysfunction, and also to treating the pain site.

Research concluded that patients having Low Back Pain (LBP) have less strength, poorer proprioception, a limited range of motion, and impaired balance when compared to those without symptoms[7].

5. Conclusion

According to that, people who have normal ability, experienced minimal low back pain, i.e. 66.66% as well as moderate low back pain i.e.33.33%. Then nearly normal ability individuals, experienced minimal low back pain, i.e.8.8%, moderate low back pain, i.e.55.88% and severe low back pain, i.e.35.29%. Lastly, abnormal ability individuals experienced severe low back pain, i.e.63.15%, as well as crippled low back pain, i.e.36.80%. More tools and questionnaires can be used in future research, which can also be done on a bigger population.

6. Abbreviations

1. FAAM: Foot and Ankle Ability Measure
2. ODI: Oswestry Disability Index
3. LBP: Low Back Pain

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