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Is There a Relationship Between Activity Limitation in ADLs and Quality of Life of Adults with Plantar Fasciitis?

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ABSTRACT

BACKGROUND: Plantar fasciitis (PF) is defined as inflammation of the plantar aponeurosis at its insertion on the medial calcaneal tubercle. It is common foot disorder, secondary to an inflammatory response caused by repetitive micro-trauma. This is prevalent in both sports' active persons and sedentary population. Complaints are pain occurring in the heel region during the first steps taken after sleep or after a long period of inactivity, that decreases as the movement progresses. PF has a negative impact on various aspects of the individual's ADL, as well as on sports and leisure time (especially active recreational activities) activities. There are very few studies that examines relationship between Activity limitations and quality of life in individuals with PF.
MATERIALS AND METHODS: Correlational Study with Purposive sampling was done. Total 60 - Both males and females having Pain with local compression on the medial calcaneal tubercle were taken. They had Plantar heel pain longer than 2 weeks (especially in the first few steps in the morning). Any surgery, pregnant females, calcaneus fractures, sprain, Neuropathy patients were excluded. Impact of PF on Body functions was measured by Foot Function Index (FFI) scale. Quality of life was measured by WHO-QOL BREF scale. After the end of study, scores of both the scales were correlated.
RESULTS: Result showed moderate negative correlation between FFI and QOL Score. (r = -0.616, p=0.000).
CONCLUSION: Difficulty in ADL in turn affects QOL of patients with plantar fasciitis.

KEY WORDS: Plantar fasciitis, Quality of life, Activities of daily living.

INTRODUCTION

In the human body, the foot plays a deterministic role in that walking ability is necessary for conducting everyday activities. [1] Plantar fasciitis is defined as inflammation of the plantar aponeurosis at its insertion on the medial calcaneal tubercle. [2] It is characterised by pain at the calcaneal origin of the plantar fascia and increased thickness of plantar fascia. It is common foot disorder in adults secondary to an inflammatory response caused by repetitive micro-trauma.[3]

The condition is prevalent in both sports active and sedentary population. The prevalence in the general population is estimated to range from 3.6% to 7 %. [4] Females are affected more than males and the gender distribution ratio of female to male is 3:1. [5]

The plantar aponeurosis consists of 3 bands: Lateral, Medial, and Central. The central band originates from the medial tubercle of calcaneus and travel to 5th toes. At the metatarsal head, the central band divides into 5 slips, each of which inserts into the proximal phalanx of each toe. When the toes are extended, the plantar fascia is functionally shortened as it wraps around each metatarsal head. The most common site of plantar fasciitis is near the central band of the plantar aponeurosis at the medial plantar tubercle of calcaneus. Patients with plantar fasciitis may experience pain in the middle of the central band just before it splits into 5 slips. [6]

The plantar fascia has both static purpose (during weight bearing, it supports the arch of the foot via tensioning and load bearing) and dynamic purpose (during the gait cycle, it alternately elongates and contracts, thus contributing to the windlass mechanism, which enables the medial arch to alternately flatten and elevate. [6]

Most authors agree that the causes of plantar fasciitis are numerous and often multifactorial. Anatomical factors include pes planus, Pes cavus, extremely flat feet or high arched feet, muscle imbalance, triceps surae tightness, and leg length discrepancies. Other potential contributing factors may include improper shoe fit and wear, increasing age, weight gain, overtraining\overuse and variety of systemic diseases. Two of the anatomic factors implicated as contributors to plantar fasciitis are muscle weakness and plantar fascia shortening. [7] It is also stated that PF is more common in people who stand for a long time due to work and productivity activities, and it is more common in individuals aged 40 and over.[8]

Complaints are characterised by pain occurring in the heel region during the first steps taken after sleep or after a long period of inactivity, pain that decreases as the movement progresses and after a certain period. It is generally accepted that plantar fasciitis predominately affects middle aged and older people, runners and persons involved in weight bearing occupations. Plantar fasciitis is also referred to plantar heel pain syndrome, heel spur syndrome, or painful heel syndrome. [9]

A first approach to diagnose PF is the palpation of the both the medial tubercle of the calcaneus and proximal portion of plantar fascia. Moreover, the windlass test can be performed to evaluate the plantar fascia loading. Diagnostic imaging is recommended when patient suffers of persistent heel pain after 4-6 months of conservative approaches. [9]

It has a negative impact on foot-specific and general health-related quality of life presenting distinct patterns of disability on different functional domains.[10] On the other hand, PF has a negative impact on various aspects of the individual's ADL, as well as on sports and leisure time (especially active recreational activities) activities.[11] Irving et al indicated that patients with chronic heel pain have inability to undertake physical activities, less energy to do daily tasks, and lower quality of life.[12]

As well as our knowledge, there are very few studies that examines relationship between Activity limitations and quality of life in individuals with PF. The purpose of this research is also to examine the activities of daily living that affect overall quality life of patients with PF. [12]

The knowledge of activities that can be barrier in daily living of individuals with plantar fasciitis can be helpful. We can also provide to patients, some techniques and modification in daily routine to counter this heel pain in initial stages. This helps to improve their quality of life.

MATERIAL AND METHODS

A correlational study was conducted at Physiotherapy department of Shree M.M Shah Physiotherapy College O.P.D, other O.P.D - I.P.D And Housing Societies across India. Total 60 patients (Both males and females) of plantar fasciitis were taken.

INCLUSION CRITERIA:

Age Group: 18 to 64 years.

Patients who have Pain with local compression on the medial calcaneal tubercle when the foot is in passive dorsiflexion.

Plantar heel pain lasting longer than 2 weeks (especially in the first few steps in the morning, increasing with load during the day)

Volunteers who wanted to participate in the study.

Both Males and Females.

EXCLUSION CRITERIA:

Any surgical Treatment for Plantar Fasciitis.

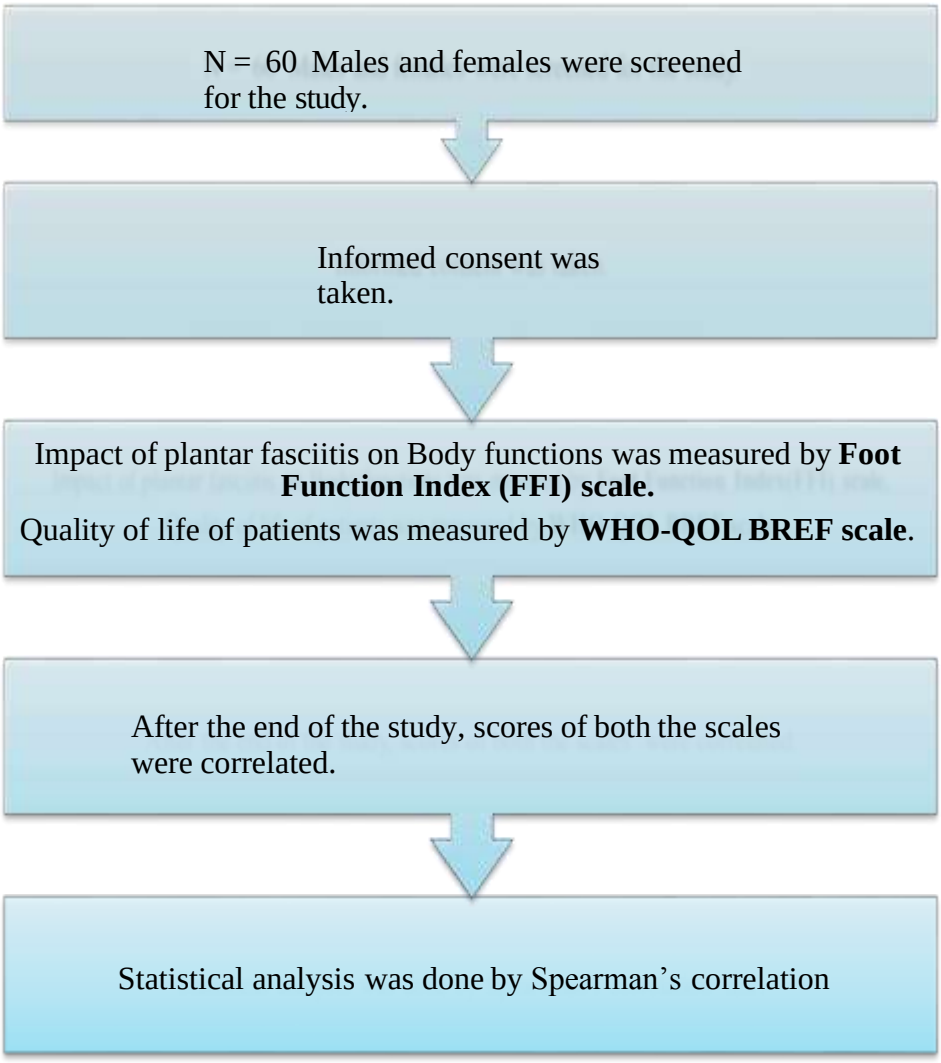
Having any chronic diseases in addition to the Plantar Fasciitis (Such as Diabetic neuropathy, Psychiatric disorder, Ankle fracture, sprain, Rheumatological Diseases, Osteoarthritis, and Rheumatoid Arthritis etc.).

Pregnant females

History of Trauma or Calcaneal Fracture.

Presence of calcaneal Osteophytes as confirmed by X-ray Examination

METHOD (FLOW-CHART)



OUTCOME MEASURE

1) Foot Function Index (FFI) Scale

To measure the impact of foot pathology on function in terms of pain, disability and activityrestriction.

2) WHO Quality of life (BREF) Scale

To Measure the Quality of life of individual with plantar fasciitis.

1) Foot Function Index (FFI) Scale

A Foot Function Index (FFI) is developed to measure the impact of foot pathology on body functions in terms of pain, disability and activity restriction. It is a self-administered index divided into 3 sub-scales. Both total and sub-scale scores are produced.

The FFI (questionnaire) consists of 23 items divided into 3 subcategories on the basis of patient values: pain, disability and activity limitation. The patient has to score each question on a scale from 0 (no pain or difficulty) to 10 (worst pain imaginable or so difficult it requires help), that best describes their foot over the past week.

The **pain subcategory** consists of 9 items and measures foot pain in different situations, such as walking barefoot versus walking with shoes.

The **disability subcategory** consists of 9 items and measures difficulty performing various functional activities because of foot problems, such as difficulty climbing stairs.

The **activity limitation subcategory** consists of 5 items and measures limitations in activities because of foot problems, such as staying in bed all day.

Recorded on a visual analogue scale (VAS), scores range from 0 to 10, with higher scores indicating worse pain. Both total and subcategory scores are calculated.

2) WHO-Quality of life BREF Scale

The WHOQOL-BREF is a shorter version of the WHOQOL-100.

Intended Population:

Specific populations or groups with a particular disease, or general populations.

Method of Use:

The WHOQOL-BREF is a self-administered questionnaire comprising 26 questions on the individual's perceptions of their health and well-being over the previous two weeks. Responsesto questions are on a

1-5 Likert scale where 1 represents "disagree" or "not at all" and 5 represents "completely agree" or "extremely".

The WHOQOL-BREF covers **four domains** - each with specific facets:

1. Physical health

- Activities of daily living
- Dependence on medicinal substances and medical aids Energy and fatigue
- Mobility
- Pain and discomfort
- Sleep and rest
- Work Capacity

2. Psychological

- Bodily image and appearance
- Negative feelings
- Positive feelings
- Self-esteem
- Spirituality / Religion / Personal beliefs
- Thinking, learning, memory and concentration

3. Social relationships

- Personal relationships
- Social support
- Sexual activity

4. Environment

- Financial resources
- Freedom, physical safety and security
- Health and social care: accessibility and quality
- Home environment
- Opportunities for acquiring new information and skills
- Participation in and opportunities for recreation / leisure activities
- Physical environment (pollution / noise / traffic / climate)
- Transport

Each individual item of the WHOQOL-BREF is scored from 1 to 5 on a response scale, which is stipulated as a five-point ordinal scale. The scores are then transformed linearly to a 0–100-scale. Domain scores are scaled in a positive direction means higher scores denote high quality of life.

STATISTICAL ANALYSIS

In this study, Statistical analysis was done using SPSS version 16 and excel 2007.

The level of significance was kept at p <0.05 with 95% confidence interval.

As the data did not follow the normal distribution according to Kolmogorov–Smirnov test (Normality test), non-parametric test - Spearman's correlation Test was used to correlate FFI and QOL.

RESULTS

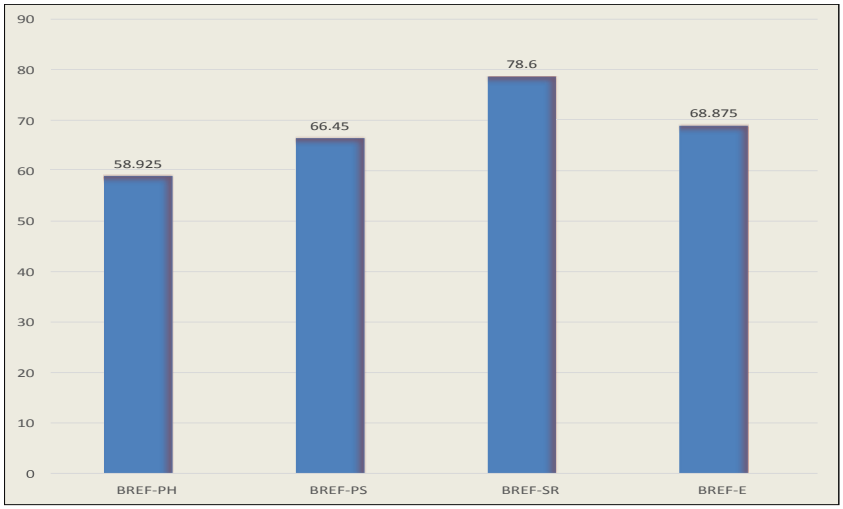
In the present study, total 60 patients with plantar fasciitis were screened. Out of 60 patients – 25 female patient and 35 male patients were included in study.

Mean age of patients in the study was 43.95 ± 12.04894. Mean FFI and QOL scores of 60 patients are shown in table 1 in terms of Mean ± SD.

Number of total subjects	60
Age (Years)	43.95 ± 12.04894
FFI scale Score	95.275 ± 20.083
QOL scale Score	272.85 ± 56.276

TABLE 1: Mean score of baseline data

Mean baseline score for all four domains – BREF-PH, BREF-PS, BREF-SR and BREF-E of WHO-BREFQOL shown in graph-1.



GRAPH: 1 Mean scores for all four domains of WHO-QOLBREF scale.

As graph shows, there is lowest scores in Physical health domain comparative to the others. That shows patients may have difficulty in their Activities of daily living. Dependence on medicinal substances and medical aids may be more. That ultimately uses more Energy and results in fatigue. It also affects Sleep schedule that leads to decrease Work Capacity of an individual.

Statistical results obtained in the study are shown in table 2. Results are considered significantif (p) value is < 0.05. If the value of correlation coefficient (r) is positive - there is positive correlation between two variables. It means that, when one variable decreases as the other variable decreases, or one variable increase while the other increases.

If the value of correlation coefficient (r) is negative – there is negative correlation between two variables. It is a relationship between two variables in which, one variable increases as the other decreases, and vice versa.

Outcome measure		Correlation coefficient (r)	P value	Interpretation
FFI	BREF (TOTAL)	-0.616	0.000	Moderate negative
FFI	BREF - PH	-0.738	0.000	Moderate Negative
FFI	BREF - PS	-0.584	0.000	Moderate negative
FFI	BREF - SR	-0.550	0.000	Moderate negative
FFI	BREF - E	-0.446	0.004	Low negative

TABLE: 2 Statistical analyses of variables.

FFI=Foot function index scale score, BREF=WHOQOLBREF scale score, BREF-PH= Physical health, BREF – PS =Psychological,BREF-SR=social relationships, BREF-E= Environment.

DISCUSSION

The present study was conducted with the aim to find the relation between two variables- Activity limitation in ADL Activities and QOL Of patients with plantar fasciitis. The statistical analysis shows negative correlation between these two variables.

In the present study, there is moderate negative correlation between Foot function index score and QOL Score. (r = -0.616, p=0.000). Patricia Palomo-Lopez et al, examined the QoL of patients with heel spurs. They concluded that PF can influence the QoL of male and female patients in terms of foot health and health in general, as measured by the FHSQ. (49% males and 51% females were obtained negative correlation between pain intensity and Quality of health in general. [13]

There is also moderate negative correlation between physical health domain (QOL) and FFI score.

(r = - 0.738, p= 0.000). Eduardo Araújo Pires et al, concluded that Plantar fasciitis is the most common cause of heel pain in adults, leading to reduced work capacity of employees worldwide, and is responsible for 10-15% of foot-related symptoms. The increase in sedentary habits in the global population, associated with weight gain and aging, may contribute to an increase in the prevalence of plantar fasciitis. [14]

In Environment domain of QOL, there is a low negative correlation with activity limitation. (FFI)

(r = -0.446, p = 0.004). Riddle et al, examined relationship of plantar fasciitis with jobs involving prolonged standing. Probably the increased incidence noted in higher social class families as they have modern floorings in their homes. [15]

There is Moderate negative correlation between social relationship domain of QOL and FFI score.

(r = - 0.550, p = 0.000). MJ Thomas et al, concluded that plantar heel pain affects approximately one in 10 adults aged 50 years and over in the general population, with approximately 80% experiencing some form of disability due to their heel pain. That increase dependency of an individual and seeking help for their ADL activities. [16]

Activity limitation in ADLs (FFI) also negatively affects psychological health of patients with plantar fasciitis. (r= - 0.584, p = 0.000). M Cotchett et al, reported increased symptoms of depression and anxiety in participants with foot/ankle pain compared to those without. This finding is consistent with other musculoskeletal conditions such as patellofemoral pain, knee arthroplasty and back pain. [17]

CONCLUSION

The present study concludes that, there is statistically Negative correlation between activity limitation and quality of life of patients with plantar fasciitis.

Thus, the present study accepts the Alternative hypothesis and reject the null hypothesis.

Hence proved that, difficulty in activities of daily living in turn affects quality of life of patient with plantar fasciitis. Especially, physical health, psychological health and social relationships are more affected compared to the environmental health.

If difficulty in ADL is decreases, it improves the quality of life of patients with plantar fasciitis.

LIMITATION & FUTURE SCOPE OF THE STUDY

In future, we can give specific intervention for plantar fasciitis patients and see the efficacy of the same. We can also add all kind of patients with Heel pain in the study.

CLINICAL IMPLICATIONS

We can make strategies to reduce pain due to plantar fasciitis and can also give modifications in daily activities like footwear modifications to improve overall health of individual with plantar fasciitis.

In strategies, we can give Electrotherapy and Exercise therapy protocol as well.

In **Electrotherapy** – Contrast bath, Hot water fermentation, Ultrasound.

In **Exercise therapy** - Active exercise of ankle, Ankle toe movements, plantar fascia stretching, Calf muscle stretching and strengthening, Foot intrinsic muscle strengthening.
In **Ergonomics** – Advice to avoid prolong standing and walking. Take bouts of rest in between prolong standing and walking. Advice to use ortho rubber slippers. Advice for regular exercises. Advice can also be given to take proper weight on both the foot. Regular follow upsshould be done.

Declaration by Authors

Ethical Approval: Approved
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