

Is There a Relationship Between Perceived Activity Performance-Satisfaction Level and Quality of Life in Activities of Daily Living in Adults with Plantar Fasciitis?

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ABSTRACT

Aim: Plantar fasciitis (PF) is a disease that negatively affects quality of life (QOL) and activities of daily living and is the most common cause of heel pain. The aim of this study is to examine the relationship between QOL, perceived activity performance and satisfaction in adults with PF and to determine the activities that have problems in daily living. **Materials and Methods:** A total of 96 participants, 26 male and 70 female, aged between 18-65 years, with a mean age of 53.88±6.41 years diagnosed with PF completed the study. The Nottingham Health Profile was used to determine the QOL, the Canadian Occupational Performance Measure was used to determine the perceived activity performance and satisfaction level.

Results: The findings show the perceived activity performance and satisfaction levels of individuals with PF are negatively related to pain and energy levels, which are sub-dimensions of QOL (p=0.001; p=0.017; p=0.001; p=0.018). Moreover, it has been determined individuals have problems in many activities, such as walking, working, going up and down stairs, housecleaning and sleeping.

Conclusion: This study showed the QOL of individuals with PF decreases as activity performance and satisfaction level decrease. Pain is one of the most important factors affecting activity performance, and recurrent and increasing pain with activity may have limited activity participation in individuals with PF. Therefore, pain should be considered as a priority in the evaluation and intervention plans of individuals with PF. Also, activity-based intervention plans should be developed for activities where these individuals have problems in daily living.

Keywords: Activities of daily living; activity performance; plantar fasciitis; quality of life.

Plantar Fasiitli Erişkinlerde Günlük Yaşam Aktivitelerinde Algılanan Aktivite Performansı-Memnuniyet Düzeyi ve Yaşam Kalitesi Arasında İlişki Var mı?

ÖZ

Amaç: Plantar fasiit (PF), yaşam kalitesini ve günlük yaşam aktivitelerini olumsuz etkileyen bir hastalıktır ve topuk ağrısının en sık nedenidir. Bu çalışmanın amacı, plantar fasiitli erişkinlerde yaşam kalitesi (YK), algılanan aktivite performansı ve memnuniyeti arasındaki ilişkiyi incelemek ve bireylerin günlük yaşamda sorun yaşadığı aktiviteleri belirlemektir.

Gereç ve Yöntemler: Çalışmayı 18-65 yaş arası, yaş ortalaması 53,88±6,41 yıl olan, PF tanılı 26 erkek, 70 kadın katılımcı olmak üzere 96 kişi tamamladı. Katılımcıların YK düzeyini belirlemek için Nottingham Sağlık Profili, algılanan aktivite performansı ve memnuniyet düzeyini belirlemek için Kanada Aktivite Performans Ölçümü kullanıldı.

Bulgular: Bulgular, plantar fasiitli bireylerin algılanan aktivite performansı ve memnuniyet düzeylerinin yaşam kalitesinin alt boyutları olan ağrı düzeyleri ve enerji düzeyleri ile negatif ilişkili olduğunu göstermektedir (p=0,001; p=0,017; p=0,001; p=0,018). Ayrıca bireylerin yürüme, çalışma, merdiven inip çıkma, ev temizleme ve uyuma gibi birçok aktivitede sorun yaşadıkları belirlenmiştir.

Sonuç: Bu çalışma, plantar fasiitli bireylerin aktivite performans ve memnuniyet düzeyi azaldıkça yaşam kalitelerinin düştüğünü göstermiştir. Ağrı, aktivite performansını etkileyen en önemli faktörlerden biridir ve plantar fasiitli bireylerde aktivite ile tekrarlayan ve artan ağrı, bireylerin aktivite katılımını kısıtlamış olabilir. Bu nedenle ağrı, plantar fasiitli bireylerin değerlendirme ve müdahale planlarında öncelikli olarak dikkate alınmalıdır.

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Ayrıca bu bireylerin günlük yaşamda sorun yaşadığı aktivitelere yönelik aktivite-temelli müdahale planları geliştirilmelidir.

Anahtar Kelimeler: Günlük yaşam aktiviteleri; aktivite performansı; plantar fasiit; yaşam kalitesi.

INTRODUCTION

Plantar fasciitis (PF) is a degeneration of the plantar aponeurosis and is the most common cause of heel pain (1). Although the exact cause of PF is not known, researchers have reported that it is a recurrent degenerative and inflammatory disease with mechanical overload and microtraumas (2). It is 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 (3,4). On the other hand, researchers stated that different lifestyles, such as inactiveness or sudden initiation of intense exercise, affect the incidence of this disease (5,6). When the formation mechanism of PF is examined, it has been stated that anatomical and environmental risk factors also different abnormalities in foot mechanics as well as had negative effects on foot biomechanics (7). Extremely flat feet or high arched feet are more prone to developing PF. Wearing unsupportive shoes on hard, flat surfaces places an abnormal load on the plantar fascia and can lead to PF (8,9).

Complaints are characterized 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, and recurrence of the pain depending on the physical tempo in activities of daily living (ADL) are expressed (10,11). It has been reported that, in addition to the restriction of physical activities in individuals due to the pain that occurs due to this disease, individuals are negatively affected both socially and psychologically due to these problems, and their quality-of-life decreases (12). 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 (13,14).

As well as our knowledge, there was no study that examines on relationship between quality of life and activity performance and satisfaction levels in ADL in individuals with PF. In addition, it has not been comprehensively determined in activities that have problems in daily life. The current study was carried out to examine the relationship between quality of life and perceived activity performance and satisfaction in adults with PF and to determine activities that have problems in daily life.

MATERIAL AND METHODS

The study was conducted in accordance with the Principles of the Declaration of Helsinki. Ethics committee approval was obtained for the study from the Lokman Hekim University Non-Interventional Clinical Research Ethics Committee on 12/04/2021 with the decision number 2021/035.

This study was carried out as a cross-sectional study and simple random sampling method was used. The study was conducted with 96 individuals with a diagnosis of PF between the ages of 18-65 who applied to the

Occupational Therapy Department between April 2021 and October 2021. The participants were informed about the study and the study was carried out by signing the consent form stating that they volunteered for the study.

Participants

The power of the study and effect sizes were analyzed using G*Power software, version 3.1.9.2. Power analysis was performed to calculate the sample size. When the sample size was calculated with a medium effect size, 95% confidence interval and 80% power, it was calculated that 96 individuals were required. 96 participants were selected according to the following inclusion and exclusion criteria and completed the study.

Inclusion criteria for the study; (1) between the age of 18-65; (2) pain with local compression on the medial calcaneal tubercle when the foot is in passive dorsiflexion; (3) plantar heel pain lasting longer than 3 months (especially in the first few steps in the morning, increasing with load during the day); (4) having a Mini Mental State Examination score of 24 and above; (5) volunteer to participate in the study.

Exclusion criteria were (1) any surgical or medication treatment for PF and (2) having any chronic disease that may affect the study in addition to the PF (such as diabetes mellitus, neurological, psychiatric, orthopedic, rheumatological diseases such as osteoarthritis, rheumatoid arthritis etc.), (3) being pregnant.

Instruments

Demographic information form prepared by the authors, Mini Mental State Examination (MMSE), Canadian Occupational Performance Measure (COPM) and Nottingham Health Profile (NHP) were used to evaluate the participants.

Demographic Information Form: Participants' age, gender, body mass index and educational status were recorded.

Mini Mental State Examination (MMSE): This test was used to determine the cognitive status of individuals for inclusion criteria. MMSE consists of a total of 5 items and a total of 30 points under the headings of orientation (10 points in total), recording memory (3 points in total), attention and calculation (5 points in total), recall (3 points in total) and language (9 points in total). A value of 24 points is accepted as the threshold value (Less than 24 points refers to poor cognitive ability). The Pearson correlation coefficient for the test-retest reliability of the MMSE is $r=0.827$ (15,16). The validity and reliability study of the Turkish MMSE was performed by Güngen et al. (17). In the Turkish validity and reliability study of the test, it showed sensitivity at the level of 0.91 and specificity at the level of 0.95. The positive and negative predictive values and Kappa values are 0.90, 0.95, and 0.86, respectively (17).

Canadian Occupational Performance Measure (COPM): COPM was used to evaluate the perceived activity performance and satisfaction levels of individuals in ADL. This scale determines the problems faced by individuals in ADL with semi-structured interviews and evaluates the identified problems with the performance and satisfaction scores given by the individuals themselves. Initially, the problems experienced by the

individuals with ADL in the activity performance (self-care, productivity, and leisure) are determined and it is demanded to give an importance score based on a likert system, which is graded between 1 and 10 for each activity that has a problem. Afterwards, the activities with a maximum of 5 problems are determined according to the importance score, and they are asked to give performance and satisfaction points based on the Likert system, which is also rated between 1 and 10 for each activity. Performance and satisfaction scores are obtained by summing the performance and satisfaction scores and dividing them by the number of activities (18). Since the development article of COPM is a pilot study, validity and reliability findings are not included. Later, validity and reliability studies of the scale in many different languages and diagnostic groups took place in the literature. The Turkish adaptation, validity and reliability of the scale were determined by Torpil et al. The test-retest reliability of the Turkish version of COPM is 0.988 and the satisfaction is 0.986, indicating excellent reliability (19).

Nottingham Health Profile (NHP): NHP consists of 6 dimensions including energy, pain, emotional reactions, sleep, social isolation and physical activity and a total of 38 questions. Each question is answered yes or no and is scored between 0 and 100 (lower scores indicate a better quality of life) The NHP has both face and biological validity, as it is sensitive to differences between groups and to changes over time, can be administered easily and quickly, and can be used in several different populations, including the elderly. Content validity was established through semi-structured cognitive debriefing interviews during initial development of survey. The concurrent validity was measured through comparison to other questionnaires and ratings given by medical professionals (e.g., correlation coefficient = 0.74 when compared with McGill Pain Questionnaire; = 0.65 when compared with a physiotherapist's disability rating). The discriminant validity of the NHP is high. All six sections of the NHP showed significant differences ($p < 0.001$) between four groups of elderly people with distinct health statuses. Reliability has been evaluated using test/re-test methods; the NHP was found to have high reliability as an indicator of subjective physical, emotional, and social health status. Test-retest correlation coefficients at four weeks ranged from 0.75 to 0.88 for the six sections of Part I and from 0.44 to 0.86 (0.55-0.89 in a second group) for the seven items in Part II. Spearman correlations among domain scores ranged from 0.32 (sleep and social isolation) to 0.70 (pain and physical mobility). The intraclass correlation coefficient was found to be 0.95, with an effect size of 0.52 (20). In the Turkish NHP, test-retest reliability of the dimensions varied between 0.70 and 0.92, and internal consistency values ranged between 0.56 and 0.87 (21).

Statistical Analysis

The data were analyzed using the IBM SPSS 26.0 program. The descriptive statistics of the data are presented as n (%) and if the variable is normally distributed, the mean±standard deviation, otherwise the median (minimum-maximum) or median (1st quartile - 3rd quartile). The normality of data was analyzed with the Shapiro-Wilk Test. It was determined that the data did

not show normal distribution and non-parametric statistical methods were used. Correlations between variables were analyzed using the Spearman correlation coefficient.

RESULTS

The current study was completed with 96 participants, 26 male (27.10%) and 70 female (72.90%), and their mean age was 53.88±6.41 years. The mean body mass index of the participants was determined as 30.78±2.82 kg/m² and more than half of the participants were high school graduates. Table 1 presents the demographic data.

Table 1. Sociodemographic data of individuals with plantar faciit.

	n	Minimum	Maximum	Mean	Standard Deviation
Age (year)	96	36.00	63.00	53.88	6.41
BMI	96	22.44	39.24	30.78	2.82
Educational status	n				%
Primary school	17				17.70
High school	53				55.20
University	26				27.10
Sex	n				%
Male	26				27.10
Female	70				72.90

Participants' quality of life and perceived activity performance and satisfaction problems were found. The quality of life and perceived activity performance levels of the participants are presented in Table 2.

Table 2. Quality of life and perceived activity performance and satisfaction results.

	n	Minimum	Maximum	Mean	Standard Deviation
NHP-EL	96	0.00	60.80	22.15	16.29
NHP-P	96	19.45	69.77	43.04	13.55
NHP-ER	96	0.00	42.17	23.25	12.76
NHP-S	96	0.00	41.89	10.47	14.25
NHP-SI	96	0.00	55.93	17.09	13.84
NHP-PA	96	31.04	67.50	54.41	14.25
NHP-Total	96	51.90	291.03	170.42	39.94
	n	Minimum	Maximum	Mean	Standart Deviation
COPM-Performance	96	4.20	8.20	6.48	0.69
COPM-Satisfaction	96	3.00	9.00	7.01	0.87

COPM: Canadian Occupational Performance Measure; NHP: Nottingham Health Profile-Energy Level (EL)/Pain (P)/Emotional Reaction (ER)/ Sleep (S)/ Social Isolation (SI)/ Physical Abilities (PA).

There was no relationship between the participants' emotional reaction, social isolation, sleep and physical activity level in quality of life and perceived activity performance and satisfaction level ($p>0.05$). A mild negative correlation was found between pain and total quality of life of the participants and activity performance ($r=-0.213$, $p=0.023$) and satisfaction ($r=0.202$, $p=0.048$). A moderate negative correlation was found between energy in quality of life and perceived activity performance ($r=-0.449$, $p<0.01$) and satisfaction level ($r=-0.408$, $p<0.01$). The relationship between participants' quality of life and perceived activity performance and satisfaction levels is presented in Table 3.

Table 3. The correlations between quality of life and perceived activity performance and satisfaction.

		COPM- Performance	COPM- Satisfaction
NHP-EL	r	-0.449	-0.408
	p	0.001*	0.001*
NHP-P	r	-0.244	-0.241
	p	0.017*	0.018*
NHP-ER	r	-0.028	-0.062
	p	0.789	0.547
NHP-S	r	0.043	0.108
	p	0.672	0.295
NHP-SI	r	-0.059	0.33
	p	0.570	0.748
NHP-PA	r	0.139	0.148
	p	0.178	0.150
NHP-TOTAL	r	-0.233	-0.202
	p	0.023*	0.04*

COPM: Canadian Occupational Performance Measure; NHP: Nottingham Health Profile-Energy Level (EL)/Pain (P)/Emotional Reaction (ER)/ Sleep (S)/ Social Isolation (SI)/ Physical Abilities (PA)/ * $p<0.05$.

When the activities stated by the participants in COPM are examined; they had problems in self-care activities (48.53%), productivity activities (25.8%) and leisure time activities (25.8%) in ADL. Problems were expressed in self-care activities, personal care (25.16%), functional mobility (17.3%) and community management (6.06%). In productivity activities, the most problems were expressed in paid or unpaid work (11.91%) and household management (13.03%). When the leisure activities were examined, participants stated that the participants mostly experienced active recreation (18.87%) and socialization (6.29%) problems. The activities and distributions of the participants according to their activity performance areas are detailed in Table 4.

Table 4. The activities and distributions of the participants according to their activity performance areas.

SELF-CARE	n (216)	(48.53%)
PERSONAL CARE	n (112)	(25.16%)
Sleep	30	6.74
Wearing shoes	16	3.59
Taking a bath	15	3.37
Toilet	13	2.92
Get dressed	10	2.24
FUNCTIONAL MOBILITY	n (77)	(17.3%)
Going up/down stairs	42	9.43
Getting up after sleep	16	3.59
Walking from one place or room to another	15	3.37
Using public transportation	4	0.89
Going up or downhill	28	6.29
COMMUNITY MANAGEMENT	n (27)	(6.06%)
Driving a car	11	2.47
Shopping	11	2.47
Walking a pet	5	1.12
PRODUCTIVITY PAID OR UNPAID WORK	n (115)	(25.8%)
Working	34	7.64
Go to work	13	2.92
Go to the course	6	1.34
HOUSEHOLD MANAGEMENT	n (58)	(13.03%)
Cleaning house	32	7.19
Cooking	14	3.14
Ironing	12	2.69
SCHOOL AND/OR PLAY	n (4)	(0.89%)
Studying	4	0.89
LEISURE TIME QUIET RECREATION	n (114)	(25.6%)
Reading boks/newspapers	2	0.44
ACTIVE RECREATION	n (84)	(18.87%)
Walking	58	13.03
Doing sport or exercises (football, basketball, etc.)	26	5.84
SOCIALIZATION	n (28)	(6.29%)
Meeting friends	17	3.82
Meeting with family	11	2.47
TOTAL	445	100

n= Number of activities for which participants stated problems.

DISCUSSION

The current study was conducted to examine the relationship between quality of life and perceived activity performance and satisfaction in ADL in adults with PF and to determine the activities that they have problems in daily life. It was determined that energy problems, especially in quality of life, negatively affect perceived activity and performance in daily living activities in individuals with PF. On the other hand, it was determined that adults with PF had problems in many activities such as walking, working, going up and down stairs, cleaning the house and sleeping.

Body abnormalities, being overweight, age-related degenerative changes, and activities that require prolonged standing and/or ambulation are commonly known risk factors for PF (22). In most cases of PF, symptoms disappear within 12 months. However, in

some cases, complaints extending up to 12-18 months are an important problem that reduces the quality of life. In addition to having negative effects on physical and social activities, it causes losses in terms of financial resources and workforce (23). The restriction of physical activities by plantar heel pain and the fact that individuals put barriers both socially and psychologically due to this problem negatively affect health-related quality of life (24,25). Many previous studies have shown that plantar heel pain has adverse effects on various aspects of the individual's life, including ADL, quality of life related to the foot and ankle, and functions in sports and recreational activities (26). The authors stated that being exposed to activities such as walking on hard floors and standing for a long time is associated with pain. While D'Souza et al. (27) could not find a significant relationship between PF and obesity, they stated that there was a significant relationship between PF and faulty foot mechanics. An increase in BMI, standing for too long, and non-ergonomic working conditions may be the cause of PF and other musculoskeletal-related symptoms. Symptoms may also occur with prolonged standing, sometimes accompanied by stiffness, and in the chronic case, the pain worsens at the end of the day and limits the patient's daily activities (28). In the current study, a negative relationship was found between the energy levels and pain levels of individuals and their perceived activity performance and satisfaction levels. The increased pain level in individuals with PF negatively may affect the activity performance and satisfaction level that individuals perceived, especially in activities involving long standing and physical energy use.

When the activities stated by the individuals in the COPM were examined, they had problems in self-care activities, productivity activities and leisure time activities in ADL. Davies et al. (29) stated that individuals with PF experience problems in ADL, especially in recreational activities. Individuals' perceived activity performance levels were relatively low. Pain is one of the important factors affecting the activity performance of individuals (30). Repetitive and increased pain with activity in individuals with PF may have limited their participation in activity. In addition, not being able to participate in some activities that increase the pain experience but are included in the basic daily life activities of the individual may have caused a decrease in the quality of life of the individuals.

The findings of the study showed that individuals with PF experience significant difficulties especially in physical activities that require standing skills such as going up and down stairs, walking, doing sports, and cleaning the house. It is known that the physical activity level of individuals affects the functional mechanics of the human musculoskeletal system and can clearly affect the geometry and biomechanics of the gait and be affected by the level of the plantar fascia, which is an important factor in the preservation of the arch system. Rchalis (31) reported that the degree of physical activity may influence the structural disposition of the foot soft tissues of which the plantar fascia cannot be excluded. In addition, the study showed that individuals with PF have difficulty in activities related to working life, which is

defined as productive activities. Since literature on the relative effect of work-related physical activity on plantar fascia and other soft tissues is scanty, there is a need to determine such relationships especially within our developing environment.

The study showed that there is a significant relationship between the general quality of life levels of individuals with PF and their perceived activity performance and satisfaction level. It is known from previous studies in the literature that individuals with PF have a lower quality of life than the general population (1,32). Fernández-Lao C et al. (32) observed a negative association between pain intensity and health in general (regardless of age or gender) in patients with PF. Patricia Palomo-López et al. (1) stated that PF has a significant negative impact on foot-specific and general health-related quality of life. In addition, it is stated that variables such as gender, height, and weight affect the level of quality of life associated with PF (1). With all these findings, it was important to observe that the negative impact of PF on quality of life is related to the activity performance level of individuals. While planning rehabilitation for individuals with PF, knowing the activity performance level and especially which activities are affected will guide activity-based interventions and may directly affect the quality of life of individuals.

Although the study has significant findings, it has several limitations. First, the radiographic images of the individuals with PF included in the study were not examined. PF can bring along the symptom of calcaneal epine, known as "heel spur" among the people, and this may affect the level of pain. Availability of radiography images to examine the presence of secondary symptoms such as calcaneal epin would have been useful for research.

The second limitation is that since the study mainly focused on the perceived activity performance and quality of life of individuals with PF, conditions such as symptom duration, date of diagnosis, and pain severity were not evaluated with specific measures in the study. In future studies, the effects of symptoms on daily living can be evaluated in detail by using symptom checklists and specific pain scales.

CONCLUSION

The current study is the first to examine the perceived activity performance levels of individuals with PF and the problems they experience in performance areas. The findings of the study show that the perceived performance level and satisfaction level of individuals with PF in their daily activities affect the quality of life of individuals. In addition, the most important symptom affecting activity performance was determined as pain. While organizing rehabilitation programs for individuals with PF, it is thought that together with symptomatic interventions, activity-based interventions to increase activity performance and satisfaction level will be beneficial for individuals' well-being and quality of life.

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