

Fatigue Among Elderly Patients with Knee Osteoarthritis and Its Association with Functional Status, Depression and Quality of Life

Diz Osteoartritli Yaşlı Hastalarda Yorgunluğun Fonksiyonel Durum, Depresyon ve Yaşam Kalitesi ile İlişkisi

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Abstract

Objectives: Aims of the present study were to investigate fatigue in the patients with knee osteoarthritis, to evaluate association of fatigue with depression and clinical parameters such as radiological grade, functional status and pain; and to determine its impact on quality of life.

Materials and Methods: Eighty patients (60 women, 20 men) with knee osteoarthritis, aged between 65 and 80 were included in the study. Radiological grade of osteoarthritis was determined by Kellgren-Lawrence grading scale. Western Ontario and McMaster Universities Index of Osteoarthritis (WOMAC) was used for assessing functional status. Fatigue Symptom Invento (FSI) was used for evaluating fatigue, Nottingham Health Profile (NHP) for quality of life, and Beck Depression Scale (BDS) for depression. Pain severity was measured by using Visual Analog Scale (VAS)-pain.

Results: Patients reported their daily patterns of fatigue as follows: mostly fatigued in the evenings (30%), not at all fatigued (21.3%), mostly fatigued in the mornings (20%), no consistent daily pattern of fatigue (17.5%), mostly fatigued in the afternoons (11.3%). Intensity of fatigue, duration of fatigue and interference with quality of life subgroups of FSI were found to be significantly correlated with WOMAC, VAS-pain, BDS, and pain, energy, and emotional reactions subgroups of NHP ($p<0.05$). Physical mobility and sleep subgroups of NHP were only correlated with intensity of fatigue and duration of fatigue ($p<0.05$). There was no statistically significant correlation between FSI subgroups and social isolation subgroup of NHP ($p>0.05$) Logistic regression analysis revealed the significant impact of radiological grades on FSI ($p<0.05$).

Conclusion: Fatigue is common in elderly patients with knee osteoarthritis and associated with poor quality of life regarding pain, functional status, sleep, energy and emotional functions. Since fatigue is a complex symptom; it should be assessed by using a comprehensive questionnaire such as FSI.

Key words: Aged, depression, fatigue, osteoarthritis, quality of life

Öz

Amaç: Bu çalışmanın amacı diz osteoartritli yaşlı hastalarda yorgunluk düzeylerini araştırmak, yorgunluğun depresyon ve radyolojik evre, fonksiyonel durum ve ağrı gibi klinik parametrelerle ilişkisini değerlendirmek ve yaşam kalitesi üzerine etkisini saptamaktır.

Materyal ve Metot: Çalışmaya diz osteoartritli, 65-80 yaşları arasında seksen hasta (60 kadın, 20 erkek) alındı. Osteoartritin radyolojik evresi, Kellgren-Lawrence evreleme skalası ile saptandı. Western Ontario ve McMaster Üniversiteleri Osteoartrit İndeksi [Western Ontario and McMaster Universities Index of Osteoarthritis(WOMAC)] fonksiyonel durumu belirlemede kullanıldı. Yorgunluk Semptom Envanteri [Fatigue Symptom Inventory (FSI)] yorgunluğu, Nottingham Sağlık Profili [Nottingham Health Profile (NHP)] yaşam kalitesini ve Beck Depresyon Skalası [Beck Depression Scale (BDS)] ise depresyonu değerlendirmede kullanıldı. Ağrı şiddeti, Görsel Analog Skala [Visual Analog Scale (VAS)]-ağrı ile ölçüldü.

Bulgular: Hastalar günlük ağrı biçimlerini şu şekilde ifade ettiler: daha çok akşamları yorgun (%30), tam olarak yorgun değil (%21,3), daha çok sabahları yorgun (%20), sabit bir günlük ağrı biçimi yok (%17,5), daha çok öğleden sonraları yorgun (%11,3). FSI'nin yorgunluk şiddeti, yorgunluk süresi ve yaşam kalitesine etkisi alt grupları WOMAC, VAS-ağrı, BDS ve NHP'nin ağrı, enerji ve emosyonel reaksiyonlar alt grupları ile belirgin olarak koreleydi ($p<0,05$). NHP'nin fiziksel mobilite ve uyku alt grupları sadece yorgunluk şiddeti, yorgunluk süresi ile koreleydi ($p<0,05$). FSI alt grupları ile NHP'nin sosyal izolasyon alt grubu arasında istatistiksel olarak anlamlı bir korelasyon yoktu ($p>0,05$). Lojistik regresyon analizi; radyolojik evrelerin FSI üzerine anlamlı etkisini ortaya koydu ($p<0,05$).

Sonuç: Yorgunluk diz osteoartritli yaşlı hastalarda yaygındır ve ağrı, fonksiyonel durum, uyku, enerji ve

emosyonel fonksiyonlar açısından kötü yaşam kalitesi ile ilişkilidir. Yorgunluk kompleks bir semptom olduğundan FSI gibi kapsamlı bir anket ile değerlendirilmelidir.

Anahtar kelimeler: Yaşlı, depresyon, yorgunluk, osteoartrit, yaşam kalitesi

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Date of submission: 30.07.2015

Date of acceptance: 14.01.2016

Introduction

Osteoarthritis (OA) is a degenerative joint disease characterized by the loss of cartilage leading to pain, stiffness and decreased function of the affected joint. ¹It is the most common form of arthritis, affecting over 60% of geriatric population, leading to disability.²

Fatigue is defined as ‘a sense of persistent tiredness or exhaustion which disturbs the individual’.³ It is among common symptoms in chronic diseases including rheumatic diseases such as rheumatoid arthritis, ankylosing spondylitis, systemic lupus erythematosus and fibromyalgia. ⁴⁻⁷ Fatigue is an important outcome for patients with rheumatic disorders and it is associated with poor quality of life (QoL).^{8,9}

Fatigue in OA has been mentioned in very limited number of studies in the literature. Our study aimed to examine fatigue levels in the patients with knee osteoarthritis, to evaluate association of fatigue with depression and clinical parameters including radiological grade, functional status and pain; and as well as to determine its impact on QoL.

Materials and Methods:

A total of 80 patients (60 women, 20 men) with knee OA, aged between 65 and 80 applying to outpatient physical medicine and rehabilitation clinic were included in the study. Patients who have rheumatic diseases such as fibromyalgia, rheumatoid arthritis, ankylosing spondylitis and endocrine diseases such as hypogonadism, thyroid and parathyroid disorders and malignancies were excluded.

Turkish version of Fatigue Symptom Inventory (FSI) was used for determining fatigue levels of the patients. ¹⁰ FSI is a 14-item measure which was designed to measure fatigue intensity (four items), duration (two items), its interference with QoL (seven items) and day time patterning of fatigue (one item). Interference items measure how much fatigue affected the individual’s general activity level, ability to bath, dress, work, and concentrate, social participation, and emotional status during the previous week. Duration items are used for evaluating the number of days fatigued and amount of time fatigued. Final item is necessary for measuring daily pattern of fatigue.^{11,12} FSI is given in Appendix 1.

Radiological grade of OA was evaluated by using Kellgren-Lawrence (K/L) grading scale as follows: Grade 1: doubtful narrowing of joint space and possible osteophytic lipping; Grade 2: definite osteophytes and possible narrowing of joint space; Grade 3: moderate multiple osteophytes, definite narrowing of joint space, some sclerosis, and possible deformity of bone contour, and Grade 4: large osteophytes, marked narrowing

of joint space, severe sclerosis, and definite deformity of bone contours.^{13, 14} Functional status was assessed by using Western Ontario and McMasters Universities Index of Osteoarthritis (WOMAC).¹⁵ WOMAC A was used for evaluating knee pain, WOMAC B for stiffness and WOMAC C for the difficulty related to functional activities. Nottingham Health Profile (NHP)¹⁶ was used for assessing QoL, and Beck Depression Scale (BDS)¹⁷ for depression. Pain severity was measured by using 10 cm Visual Analog Scale (VAS)-pain.¹⁸

All of the patients signed the informed consent form. The study protocol was approved by the Medical Research Ethics Committee of Medical Faculty. The study conforms to the provisions of the World Medical Association's Declaration of Helsinki.

Statistical Analyses

Descriptive statistics [mean, median, SD (Standard deviation), minimum, maximum and frequencies] were used for assessing the demographics and clinical parameters. Logistic regression analysis was used for assessing the effect of radiological grading on fatigue levels. The presence of correlation was determined by Pearson's correlation coefficient. A value of $p < 0.05$ was accepted as statistically significant. All analyses were performed using IBM Statistical Package for the Social Sciences (SPSS) for Windows, Version 21.0 (Armonk, New York, USA).

Table 1. Fatigue, pain, depression and quality of life of the patients

	minimum	maximum	mean	standard deviation
VAS-pain	0	10	4.88	3.13
WOMAC-A	0	20	9.57	6.64
WOMAC-B	0	6	2.23	1.83
WOMAC-C	0	49	18.05	14.86
WOMAC TOTAL	0	83.31	31.25	24.45
Intensity of fatigue	0	9	3.51	2.67
Duration of fatigue	0	9.25	3.59	2.61
Interference with QoL	0	8	3.55	2.18
BDS	0	53	18.53	17.13
NHP-pain	0	100	46.06	31.25
NHP-physical mobility	0	100	40.46	31.14
NHP-energy	0	100	35.00	40.87
NHP-sleep	0	100	36.61	36.54
NHP-social isolation	0	80	10.50	21.10
NHP-emotional reactions	0	100	37.03	33.77

VAS: Visual analog scale,

WOMAC: Western Ontario and McMasters Universities Index of Osteoarthritis,

QoL: Quality of life, BDS: Beck Depression Scale,

NHP: Nottingham Health Profile

Results

Demographic and clinical characteristics of the patients

A total of 80 patients (60 women, 20 men) were included in the study. Mean age was 69.41±4.96 (65-80). Radiologic grades of the patients were as follows: grade 1 [12 patients (15%)], grade 2 [34 patients (42.5%)], grade 3 [29 patients (36.3%)], and grade 4 [5 patients (6.3%)]. Demographic and clinical data of the patients are given in Table 1.

Daily patterns of fatigue

Daily patterns of fatigue of the patients were as follows: mostly fatigued in the evenings [24 patients (30%)], not at all fatigued [17 patients (21.3%)], mostly fatigued in the mornings [16 patients (20%)], no consistent daily pattern of fatigue [14 patients (17.5%)], mostly fatigued in the afternoons [9 patients (11.3%)].

Table 2. The relation of FSI subgroups with functional status, depression and quality of life

		Intensity of fatigue	Duration of fatigue	Interference with QoL
VAS-pain	r	0.859**	0.722**	0.354*
	p	<0.001	<0.001	0.001
WOMAC A	r	0.878**	0.751**	0.370*
	p	<0.001	<0.001	0.001
WOMAC B	r	0.847**	0.740**	0.359*
	p	<0.001	<0.001	0.001
WOMAC C	r	0.855**	0.740**	0.351*
	p	<0.001	<0.001	0.001
WOMAC TOTAL	r	0.867**	0.748**	0.359*
	p	<0.001	<0.001	0.001
BDS	r	0.961**	0.820**	0.474**
	p	<0.001	<0.001	<0.001
NHP-pain	r	0.500**	0.414**	0.259*
	p	<0.001	<0.001	0.020
NHP-physical mobility	r	0.560**	0.538**	0.142
	p	<0.001	<0.001	0.209
NHP-energy	r	0.817**	0.633**	0.355*
	p	<0.001	<0.001	0.001
NHP-sleep	r	0.318*	0.323*	0.131
	p	0.004	0.004	0.247
NHP-social isolation	r	0.099	0.109	0.129
	p	0.380	0.334	0.253
NHP-emotional reactions	r	0.918**	0.724**	0.383**
	p	<0.001	<0.001	<0.001

VAS: Visual analog scale,

WOMAC: Western Ontario and McMasters Universities Index of Osteoarthritis,

BDS: Beck Depression Scale,

NHP: Nottingham Health Profile,

*:p<0.05(significant), **:p<0.001(highly significant)

The relation of FSI subgroups with functional status, depression and quality of life

Intensity and duration of fatigue, and interference with QoL subgroups of FSI were found to be positively correlated with WOMAC A, WOMAC B, WOMAC C, WOMAC total, VAS-pain, BDS, and pain, energy, and emotional reactions subgroups of NHP ($p < 0.05$). Physical mobility and sleep subgroups of NHP were only correlated with intensity of fatigue and duration of fatigue ($p < 0.05$). There was no correlation between FSI subgroups and social isolation subgroup of NHP ($p > 0.05$) (Table 2).

The impact of radiological grading on FSI subgroups

Logistic regression analysis revealed the significant impact of radiological grades on FSI subgroups including intensity and duration of fatigue and interference with QoL ($p < 0.05$). β coefficients and adjusted R^2 values are given in Table 3.

Table 3. The impact of radiological grading on FSI subgroups

	Intensity of fatigue (Adjusted R^2:0.559)		Duration of fatigue (Adjusted R^2:0.364)		Interference with QoL (Adjusted R^2:0.102)	
Variable	Beta	p value	Beta	p value	Beta	p value
Radiological grading	0.751	<0.001	0.610	<0.001	0.337	0.002

Discussion

Fatigue is among the most disabling symptoms in the patients with osteoarthritis. In previous studies, the rate of clinically significant fatigue in the patients with OA has been reported as about 41%.¹⁹ In our study, we investigated fatigue in the patients with knee osteoarthritis by using FSI which enables to evaluate different aspects of fatigue in detail. Additionally, we assessed the factors such as radiological grading, physical impairment and depression, which may be in association with fatigue domains including fatigue intensity, duration and its interference with QoL.

Our patients described diurnal variation of their fatigue. Most of the patients (30%) reported that they were fatigued mostly in the evenings. The other rates for daily pattern of fatigue were as follows: not at all fatigued (21.3%), fatigued in the mornings (20%), no consistent daily pattern of fatigue (17.5%), fatigued in the afternoons (11.3%). Based on our findings, fatigue in knee OA seems to peak in the evenings due to increased standing time during the day.

We found that all fatigue domains including intensity and duration of fatigue and its interference with QoL were positively correlated with physical impairment. Wolfe reported a relationship between WOMAC and fatigue scores in the study conducted in 348 patients with knee and hip osteoarthritis.²⁰ Similarly, Allen et al. found an association between pain subgroup of WOMAC and VAS-fatigue in the study where 291 patients with knee and hip OA were assessed.²¹ In both of these studies, differently from our study, the researchers evaluated fatigue by using VAS-fatigue, which is

inadequate in determining different facets of fatigue. On the other hand, Stebbings et al. assessed fatigue of OA patients in New Zealand by using Multidimensional Assessment of Fatigue-Global Fatigue Index and reported a statistically significant correlation between fatigue and physical disability.²²

In our study, we found a strong correlation between fatigue and severity of pain. This association was previously reported by Zautra et al. in the study where fatigue was assessed by using 100 mm VAS-fatigue.²³ They suggested that pain was among the strongest predictors of fatigue. On the other hand, Power et al. performed a study in 46 patients with symptomatic OA, and demonstrated that pain was associated with fatigue levels which were assessed by using Functional Assessment of Chronic Illnesses Therapy (FACIT)-Fatigue.²⁴ Fishbain et al. suggested that association between pain and fatigue may be due to an etiological relationship.²⁵

We found that fatigue was strongly correlated with depression. Our findings were consistent with previous studies in the literature. Zautra et al. reported higher levels of depression in the patients with greater fatigue in the study conducted in 76 patients with OA.²³ Similarly, Power et al. reported that depression was linked with fatigue in the patients in the same range of ages.²⁴ In another study conducted in New Zealand, a correlation was found between fatigue and depression in OA patients with a mean age of 66. On the other hand, Allen et al. reported the same relationship in their study sample.²¹

In our study, fatigue subgroups including intensity of fatigue and duration of fatigue were found to be associated with QoL in terms of pain, physical mobility, sleep, energy and psychological functions. Interference with QoL was correlated with only pain, energy and psychological functions. Social function domain of QoL was not linked with fatigue. This might be due to our study sample involving mostly women. In Turkey, social life of elderly women comprises daytime next-door neighbor visit, a simple activity which does not cause fatigue. Our findings were compatible with the concept that fatigue has a negative effect on QoL. Similarly, Wolfe et al. and Allen et al. reported strong associations between fatigue and general health perception in the patients with OA.^{19,21} Similarly, in a study from Canada, it was reported that mental health was affected by fatigue in the patients with symptomatic OA.²⁴

Fatigue is common in the patients with knee OA and associated with poor QoL in terms of pain, functional status, sleep, energy and emotional functions. Since fatigue is a complex symptom; its assessment requires a multidimensional questionnaire such as FSI.

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