

Evaluation of the Relationship Between Anxiety, Obsessive-Compulsive Disorder and Clinical Parameters in Patients with Young Knee Osteoarthritis

İ Aysel Gürcan Atıcı¹, İ Yaşar Keskin², İ Sevdâ Bağ³

¹Metin Sabancı Baltalimanı Bone Diseases Training and Research Hospital, Clinic of Physical Therapy and Rehabilitation, İstanbul, Turkey

²Bezmialem Vakıf University Faculty of Medicine, Department of Physical Medicine and Rehabilitation, İstanbul, Turkey

³University of Health Sciences Turkey, İstanbul Training and Research Hospital, Clinic of Psychiatry, İstanbul, Turkey

ABSTRACT

Introduction: In this study, we wanted to evaluate the variability relationship between the criteria used in the disease course of anxiety and obsessive-compulsive disorder (OCD) in a group of patients with knee osteoarthritis (OA).

Methods: We assessed 104 patients who were diagnosed with grade 2-4 knee OA and fifty healthy individuals. Their sociodemographic characteristics were recorded. Maudsley Obsessive-Compulsive Inventory (MOCI) was used to measure the type and extent of obsessive-compulsive symptoms, Beck Anxiety Inventory (BAI) was used to assess emotional status, Short Form-36 (SF-36) was used to assess the quality of life, visual analogue scale (VAS) was used to assess pain severity and Western Ontario McMaster Questionnaire Index (WOMAC) and Lequesne index were used to assess physical activity.

Results: BAI was higher in old patients (13.6±9.94) than in young patients (12.4±5.91) and healthy individuals (7±6.4) (p<0.001). A positive correlation was found between the BAI and MOCI scores and between VAS and WOMAC scores of patients with knee OA, and a negative correlation was found between SF-36 physical and mental scores in these patients.

Conclusion: Anxiety was more common in patients with knee OA. There was a relationship between OCD and clinical parameters and quality of life in patients with knee OA, but there was no significant difference when patients with knee OA were compared with healthy individuals.

Keywords: Knee, osteoarthritis, obsessive-compulsive disorder, anxiety, quality of life

Introduction

Osteoarthritis (OA) is a slowly escalating, non-inflammatory, chronic joint disease characterized by increased cartilage destruction, osteophyte formation and subchondral sclerosis observed in the load-bearing synovial (diarthrodial) joints. It is most common in the knee and hip joints. Over the past 20 years, the prevalence of knee OA has doubled, regardless of weight and patient age (1,2). When people aged 60 and over are screened, the incidence of symptomatic knee OA is 11-50%, and its importance in terms of public health increases as the incidence increases with age (3).

When the literature was searched, it was seen that different factors affect the course of the disease in people with knee OA (4,5).

Additionally, in studies that were compared with other rheumatological diseases and only with osteoarthritis, the rate of depression was found to be frequent in the osteoarthritis group and was associated with pain severity (6). Obsessive-compulsive disorder (OCD) is one of the psychiatric

disorders in the group of neurotic diseases that occur with compulsions accompanied by ruminative thoughts. The fact that osteoarthritis is a long-term disease group causes its psychiatric symptoms.

OCD is one of the psychiatric disorders in the group of neurotic diseases that occur with compulsions accompanied by ruminative thoughts. The fact that osteoarthritis is a long-term disease group causes its psychiatric symptoms (7,8).

The main idea of this study was to determine the connection between anxiety, OCD levels and clinical parameters in patients with young knee OA.

Methods

Participants

We included 54 patients aged ≤50 years and 50 patients aged more than 50 years who was accepted our outpatient clinic and were diagnosed with grade 2-4 knee OA according to Kellgren-Lawrence criteria and



Address for Correspondence: Aysel Gürcan Atıcı MD, Metin Sabancı Baltalimanı Bone Diseases Training and Research Hospital, Clinic of Physical Therapy and Rehabilitation, İstanbul, Turkey
Phone: +90 505 773 31 55 **E-mail:** drburakatci@hotmail.com **ORCID ID:** orcid.org/0000-0001-9490-5406

Cite this article as: Atıcı AG, Keskin Y, Bağ S. Evaluation of the Relationship Between Anxiety, Obsessive-Compulsive Disorder and Clinical Parameters in Patients with Young Knee Osteoarthritis.

İstanbul Med J 2022; 23(2): 107-12.

©Copyright 2022 by the University of Health Sciences Turkey, İstanbul Training and Research Hospital/İstanbul Medical Journal published by Galenos Publishing House.

Received: 03.11.2021

Accepted: 07.04.2022

50 healthy individuals as the control group. Age, gender and body mass index (BMI) were recorded. The diagnosis of knee OA was made according to the American College of Rheumatology (ACR) criteria. Patients were evaluated radiologically using the criteria of the Kellgren-Lawrence Radiographic Scale (KLRS) evaluation system (9). Radiographs (X-rays) were taken while standing and putting pressure on the knee, and anterior-posterior and lateral knee X-rays were examined.

Patients with knee OA according to the ACR criteria without any abnormal results in complete blood count, blood biochemistry, erythrocyte sedimentation rate and urine tests, did not have a neurological or psychiatric disease, did not use any anxiolytic and antidepressant drugs, did not suffer from chronic alcohol consumption and did not have clinical findings of multi-organ failure, such as liver and kidney failure, were included in the study. Patients with previous knee surgery, with a history of trauma and those with rheumatic findings in previous examinations were excluded from the study. All study group patients were diagnosed with knee OA 6 months before the study or earlier. The study was explained to the patients in our study and their consent was obtained written consent was taken from the patients. Bezmialem Vakıf University Non-Interventional Clinical Research Ethics Committee approval was received for the study (approval number: 13/234, date: 02.07.2019).

Measurement

The pain level of the patients is determined according to the visual analog scale (VAS) marker (0: no pain, 10: very severe pain) (10). The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was applied to measure the functional level of the patients and morning stiffness. The WOMAC index consists of three parts and 24 items. Questions in each section receive 1 to 5 points. An increase in the score indicates that the patient's pain, morning stiffness and condition deteriorate (1: none, 2: mild, 3: moderate, 4: severe, and 5: very severe).

The Lequesne index was used to evaluate pain, especially at night, morning stiffness, pain when walking, pain when getting up from an armless chair, maximum walking distance, and activities of daily living (climbing up and down stairs, squatting, and walking, uneven ground) (2). Scores were interpreted as follows: 1-4 points, mild (grade 1); 5-7 points, intermediate (grade 2); 8-10 points, severe (grade 3); 11-13 points, very severe (grade 4) and ≥ 14 points, extremely severe (grade 5).

Short Form-36 (SF-36) was used to assess the patients' quality of life and health status. Developed by Ware in 1987, SF-36 includes 36 statements and two main sections (physical and mental dimensions) that evaluate eight concepts: physical function, physical role restriction, pain, vitality/fatigue, social function, emotional role restriction, mental health and perceived general health. The scores of each sub-dimension and two main dimensions in the scale range from 0 to 100 (11). SF-36 scores positively, and higher scores indicate a higher quality of life. The Turkish version of the SF-36 was applied to patients with both OA and chronic low back pain and was found to be valid and reliable (12). The Physical Component Score (PCS) with the scores of the first four subscales and the Mental Component Score with the scores of the last four subscales were

calculated to facilitate the association of the scale with many findings. data from the general population and a special calculation method (13). Thus, physical and mental quality of life scores were obtained.

Beck Anxiety Inventory (BAI) was determined to determine anxiety levels in the study group. BAI is a marker designed by Beck et al. (14). It is used to determine the anxiety level of people. It consists of 21 questions scored between 0 and 3. Ulusoy et al. (15) determined his Turkish proficiency with his work. In this scale, 0-7 points indicate very little, 5-8 points less, 16-25 points moderate and 26-63 points severe level.

The Maudsley Obsessive-Compulsive Inventory (MOCI) is designed to define obsessive-compulsive indications for both healthy and psychiatric persons. It consists of four subscales: checking, washing, doubt and slowness. A fifth subscale, "rumination", has been added to the adapted version. The calculated scores range from 0 to 37 points, and high scores indicate more obsessive-compulsive indications (16). Erol and Savasir (17) adapted the inventory to Turkish.

Statistical Analysis

Statistics were Performed Using IBM SPSS for Windows, Version 22.0 (IBM) (Corporation, Armonk, NY, USA). The continuous variables used in the study were evaluated with the Shapiro-Wilk test normality test in terms of conformance to the normal distribution. In particular, the mean and standard deviations of the data were determined. The Kruskal-Wallis test was used to determine the differences between each group for continuous variables, and the Bonferroni corrected Mann-Whitney U test was applied as post hoc for comparisons among the groups with significant differences. Chi-square test or Fisher's exact test was used to compare the categorical variables. The relationship with each other was evaluated by Spearman's rho correlation coefficient. A p-value of <0.05 was considered statistically significant.

Results

A total of 154 cases were included in the study. The clinical and sociodemographic characteristics of patients with knee OA and patients in the control group are presented in Table 1. There was no difference among KLRS scores in patients with knee OA. There was no difference in BMI between young knee OA, old knee OA and without knee OA individuals ($p=0.342$).

There was a significant difference in the WOMAC and Lequesne knee total scores between the groups, but no difference was found between young and old patients with knee OA ($p=0.33$ and $p=0.75$, respectively). Although the BAI score was higher in elderly patients with OA (13.6 ± 9.94) compared with young patients with OA (12.4 ± 5.91) and control group patients (7 ± 6.4), the overall anxiety level was higher in patients with knee OA compared with the control group ($p < 0.001$). Both PCS and MCS of SF-36 were similar between both knee OA groups and lower compared with the control group ($p=0.18$ and $p=0.34$, respectively). However, similar results were obtained for mental health in all groups. In young patients with knee OA, the effect on physical roles was more prominent ($p=0.04$). There was no statistically significant difference in the total and subgroup MOCI scores between the groups (Table 1).

Table 1. Descriptive and analytical data of the groups

	Normal (n=50)		Young knee osteoarthritis (n=54)		Elderly knee osteoarthritis (n=50)		P
	(Mean ± SD)	Median (IQR)	(Mean ± SD)	Median (IQR)	(Mean ± SD)	Median (IQR)	
Age, years	42.26±5.18	43 (39-46)	43.17±5.34	45 (40-47)*	60.36±5.61	61 (55-64)§	<0.001
BMI (kg/m ²)	29.13±5.45	30 (24-33)	30.22±5.92	29 (26-35)	31.25±5.15	31 (27-35)	0.212
Gender (n, %), females	37 (74)	-	53 (98)	-	39 (78)	-	0.002
Radiological scoring (KLRS)							
The right knee	-	-	2.9±0.52	3 (3-3)	2.8±0.51	3 (3-3)	0.768
The left knee	-	-	2.9±0.46	3 (3-3)	2.9±0.52	3 (3-3)	0.897
VAS	-	-	6.9±2.06	7 (5-9)	6.2±1.67	6 (5-7)	0.116
WOMAC	4±4.94	2 (0-5)	44.4±21.66	45 (26-62)*	38.6±20.4	36 (24-54)§	<0.001
Lequesne knee total	1.8±1.97	1 (0-3)	16.4±11.26	14 (8-23)	10.9±4.35	12 (7-14)	<0.001
SF-36							
Physical functioning	87.7±18.19	95 (85-100)	48.2±20.9	45 (35-65)*	41.1±23.17	40 (25-60)§	<0.001
Role-physical	86.7±30.86	100 (100-100)	19.2±30.55	0 (0-33)*	36.7±42.19	17 (0-67)§	<0.001
Role-emotional	74±37.67	100 (33-100)	38.2±45.97	0 (0-100)*	54±44.61	67 (0-100)§	<0.001
Vitality	57.1±19.25	55 (45-75)	43.1±19.94	45 (30-50)	47.8±19.57	48 (35-60)§	0.002
Mental health	68.6±14.77	68 (60-80)	61±18.82	60 (48-76)	62.1±16.43	56 (48-72)	0.052
Social functioning	81±20.55	88 (75-100)	54.1±26.24	50 (38-75)*	61.6±25.4	50 (50-75)§	<0.001
Bodily pain	82±15.38	90 (78-90)	40±19.74	45 (30-55)*	44.1±25.17	43 (33-68)§	<0.001
General health	66.9±14.46	70 (55-75)	50.1±19.52	52 (35-65)*	55.2±18.4	55 (40-65)§	<0.001
Physical component summary score	76.4±17.58	80 (61-91)	37.4±20.63	33 (20-55)*	45.2±24.42	42 (25-64)§	<0.001
Mental component summary score	74.6±11.3	77 (66-83)	51.3±15.29	52 (38-62)*	55.8±16.89	57 (44-65)§	<0.001
BAI	7±6.4	6 (3-9)	12.4±5.91	12 (8-16)*	13.6±9.94	12 (5-18)§	<0.001
MOCI							
Checking	2±1.55	2 (1-3)	2.7±2.1	3 (1-4)	2.9±2.13	3 (1-4)	0.146
Washing	4.3±2.17	4 (2-6)	4.7±2.53	4 (3-7)	4.5±2.66	4 (3-6)	0.766
Slowness	1.9±1.4	2 (1-3)	2.6±1.71	3 (1-4)	2.5±1.84	2 (1-4)	0.117
Doubling	3.2±1.36	3 (2-4)	3.5±1.61	4 (3-4)	3.1±1.6	3 (2-4)	0.328
Rumination	2.7±2.01	3 (1-4)	3.6±2.37	4 (2-6)	3.2±2.36	3 (1-5)	0.115
Total	12.7±5.37	12 (9-16)	14.8±6.97	15 (9-21)	13.9±7.67	14 (7-19)	0.257

*p<0.01 young knee osteoarthritis vs normal group, §: p<0.01 elderly knee osteoarthritis vs normal group, SD: Standard deviation, IQR: Interquartile range, OA: Osteoarthritis, BMI: Body mass index, KLRS: Kellgren-Lawrence Radiographic Scale, VAS: Visual analog scale, WOMAC: Western Ontario and McMaster University Osteoarthritis Index, SF-36: Short Form-36, BAI: Beck Anxiety Inventory, MOCI: Maudsley Obsessional-Compulsive Inventory

There was a positive correlation between the BAI and VAS ($r=0.27$, $p=0.004$) and WOMAC ($r=0.278$, $p=0.004$) scores of patients with knee OA ($p=0.004$). There was a negative correlation between the BAI and SF-36's PCS ($r=-0.375$, $p<0.001$) and MCS ($r=-0.455$, $p<0.001$) scores, while there was no correlation between the BAI and Lequesne knee total score. There was a positive correlation between the MOCI total score and Lequesne knee total score ($r=0.199$, $p=0.044$), VAS ($r=0.235$, $p=0.016$) and WOMAC ($r=0.306$, $p=0.002$) scores of patients with knee OA, and there was a negative correlation between the MOCI total score and SF-36 PCS ($r=-0.384$, $p<0.001$) and MCS ($r=-0.542$, $p<0.001$) scores (Table 2).

The checking, washing, slowness and rumination subgroups and total scores of MOCI were higher in both young and old patients with knee OA. Only the doubting subgroup score was higher in the control and young knee OA groups (Figure 1, 2).

Discussion

In our study, we investigated the relationship between anxiety and disease markers in patients with knee OA. The quality of life level of the study group with knee OA was significantly lower than that of the control group (except for the mental health subgroup) in our study. However, BAI scores of the knee OA group were significantly higher than those of the control group. When the MOCI scores of each group were compared, no significant difference was found. A positive correlation was found between BAI and MOCI scores and VAS and WOMAC scores in the knee OA group. There was also a negative correlation between the BAI and MOCI and SF-36 scores.

Knee pain is very common in societies and the most common cause is knee OA. The main reason for its increased incidence is increased life

Table 2. Correlation analysis of Maudsley Obsessional-Compulsive Inventory and Beck Anxiety Inventory with VAS, WOMAC, Lequesne knee total, SF-36 physical component summary score and mental component summary score in patients with gonarthrosis

	VAS		WOMAC		Lequesne knee total		SF-36 PCS		SF-36 MCS	
	r	p	r	p	r	p	r	p	r	p
BAI score	0.278	0.004	0.278	0.004	0.098	0.323	-0.375	<0.001	-0.455	<0.001
MOCI score										
Checking	0.233	0.017	0.317	0.001	0.157	0.112	-0.297	0.002	-0.498	<0.001
Washing	0.128	0.196	0.214	0.029	0.187	0.059	-0.378	<0.001	-0.439	<0.001
Slowness	0.127	0.198	0.272	0.005	0.151	0.127	-0.223	0.023	-0.448	<0.001
Doubting	0.202	0.039	0.185	0.06	0.087	0.383	-0.256	0.009	-0.377	<0.001
Rumination	0.252	0.01	0.373	<0.001	0.267	0.006	-0.428	<0.001	-0.562	<0.001
Total	0.235	0.016	0.306	0.002	0.199	0.044	-0.384	<0.001	-0.542	<0.001

VAS: Visual analog scale, WOMAC: Western Ontario and McMaster University Osteoarthritis Index, BAI: Beck Anxiety Inventory, SF-36: Short Form-36, PCS: Physical Component Summary Score, MCS: Mental Component Summary Score, MOCI: Maudsley Obsessional-Compulsive Inventory

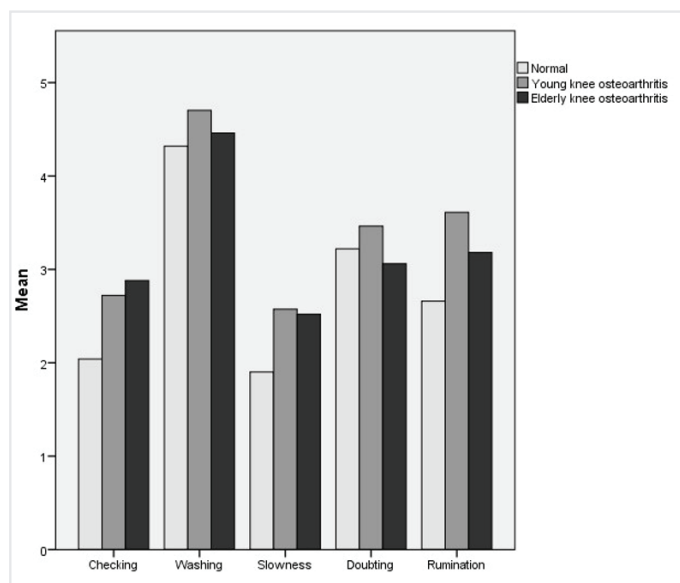


Figure 1. Maudsley Obsessional-Compulsive Inventory subscales distribution according to the group

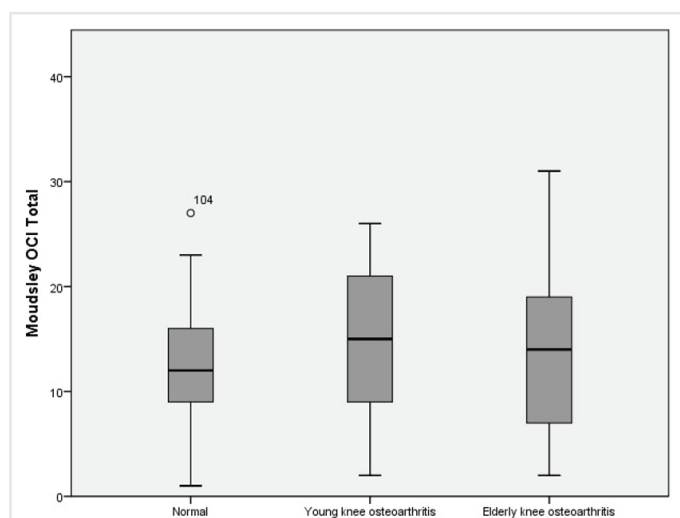


Figure 2. Boxplot of Maudsley Obsessional-Compulsive Inventory total score according to the group
OCI: Obsessional-Compulsive Inventory

expectancy, sedentary life, and increased weight gain, especially due to inactivity. Osteoarthritis, which can be seen not only in old age but also in middle age, causes socioeconomic losses. The constant pain-induced inactivity of these cases both triggers weight gain and enters a vicious circle by increasing the limitations of movement and leading to psychosocial regressions. In many studies in the literature, it has been shown that patients with knee OA have psychological problems due to limited daily activities, socioeconomic problems, and inability to participate in social life comfortably (6,18-21).

The loss of mobility and pain in patients with knee OA can cause mental deterioration, or can mental deterioration in these patients cause pain and decreased mobility in patients? Some studies recommend considering psychiatric evaluations for patients with OA because the prevalence of anxiety in these groups is high, thereby affecting the treatment process (22). Many studies in the literature have shown the two-way relationship of psychiatric disorders such as depression and anxiety with chronic pain. While depression is the most common psychiatric disease in all chronic pain cases, the most common mental symptom is anxiety. Although anxiety can increase the perception of pain, the pain itself can also cause anxiety (23-25).

Unlike the depression, anxiety can begin before the onset of pain in chronically painful patients. This makes the link between anxiety pain stronger than the link between depression and pain in a painful patient (26,27).

In a study examining patients with arthritis types other than OA, symptoms of depression and anxiety were shown to be associated with reduced mobility, pain, and treatment success (27). In this study, we evaluated the anxiety levels of young and elderly patients with knee OA and compared the findings with healthy individuals, the effect of anxiety on quality of life and the possible effect of OCD in patients with chronic knee OA. Anxiety was considered present if patients scored 8 or more on the BAI (28,29). Apart from increasing the feeling of pain, anxiety also negatively affects the quality of life. In this study, patients with knee OA had higher anxiety levels than the control group. There was a positive correlation between anxiety level and the WOMAC OA index. There was also a negative correlation between the patients' BAIs and MOCI scores and the mental and physical components of the SF-36.

Developing fear and increasing anxiety in patients support the fear-avoidance model in joint system patients. The fear-avoidance theory is based on the view that a person perceives pain in one of two ways: 1) This means that the more severe the acute pain, the more the patient does not perceive it as a threat. The person faces pain. As a result, patients recover faster. 2) Pain is perceived as threatening and the person exhibits pain-induced maladaptive behaviors such as fear, avoidance, and hypervigilance. This situation increases the functional loss in long-term follow-up and leads to more pain (30). For these reasons, patients' concerns should also be evaluated at the stage of treatment regulation.

In another study conducted with knee patients with OA over 65 years of age, a correlation was found between the proportion of joints in which pain was felt, morning stiffness, disability due to the pain threshold, and well-being. In anxiety and depression disorders, diagnosis and initiation of treatment as soon as possible may increase the response of patients with osteoarthritis to treatment (31).

Among anxiety disorders, especially OCD should be examined. OCD is the fourth most common psychiatric illness (32,33). The prevalence of subclinical OCD is observed as frequently as OCD. Both patients with OCD and patients with subclinical OCD state that their quality of life is impaired (34). Patients with OCD have an increased awareness of pain-induced stimuli (35). OCD can be considered an etiological factor in chronic pain (26).

Various questionnaires, such as WOMAC and Lequesne, are used to objectively evaluate the disease stage and treatment in patients with OA (11). In our study, the WOMAC index, in which the patient evaluated himself as multidimensional, showed low scores in the control group and high scores in the patient groups; there was no significant difference between the existing study groups in the study. However, the Lequesne index conducted in the form of interviews showed higher scores in the younger knee OA patient group. In the study by Basaran et al. (11), WOMAC observed that it was more sensitive than Lequesne in evaluating knee OA in Turkish patients and recommended this test to be performed. Scopaz et al. (35) In a study of 182 patients with knee OA, as assessed by WOMAC (self-reported function), high anxiety was associated with poor physical function.

Patient's health status, wishes and expectations reflect his/her personal and sociocultural characteristics; limitations in his/her ability to fulfill these wishes and expectations owing to his/her health status and the patient's response to these limitations and emotional status play a role in determining the health-related quality of life (36-38). SF-36 is one of the most frequently used scales for evaluating the general health status. In this study, PCS and MCS scores of SF-36 were low in both knee OA groups and were similar. In young patients, the effects on both physical and emotional roles were more pronounced, but the mental health results were similar in all groups. A limitation of this study is that the educational status and occupation of patients were not recorded because differences in these characteristics may affect the SF-36 MCS scores.

There is no study in the literature examining the quality of daily life of patients with knee pain and anxiety. However, the correlation between the physical effects of conditions such as anxiety and treatment

compliance in these patients has not been examined. For these reasons, we believe that the role of mood changes in such diseases should be investigated more comprehensively.

Study Limitations

The first limitation of our current study is that it includes the situation during the study period by making an observational study by taking sections that include a certain period in a long-term disease. Another is that the drugs used and other concomitant diseases are not taken into account.

Conclusion

Anticipating risky situations that may increase the incidence of disease in knee OA diagnosed at a young age and informing the patients about this issue contributes to the preservation of joint health and increase the quality of life in the future. In our study, we found an increase in anxiety in individuals with knee OA. BAI score was higher in elderly patients with OA (13.6 ± 9.94) compared with young patients with OA (12.4 ± 5.91) and control group patients (7 ± 6.4), the overall anxiety level was higher in patients with knee OA compared with the control group ($p < 0.001$). However, in our study, when patients with knee pain were evaluated together with the control group, no significant difference was found between joint function and quality of life. As a result, the relationship between OCD and knee OA can be determined by more comprehensive and detailed studies.

Ethics Committee Approval: Bezmialem Vakif University Non-Interventional Clinical Research Ethics Committee approval was received for the study (approval number: 13/234, date: 02.07.2019).

Informed Consent: The study was explained to the patients in our study and their consent was obtained written consent was taken from the patients.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions: Surgical and Medical Practices - A.G.A., Y.K.; Concept - A.G.A., Y.K.; Design - A.G.A., Y.K., S.B.; Data Collection or Processing - A.G.A., Y.K.; Analysis or Interpretation - A.G.A., Y.K., S.B.; Literature Search - A.G.A., Y.K., S.B.; Writing - A.G.A., Y.K.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Nguyen US, Zhang Y, Zhu Y, Niu J, Zhang B, Felson DT. Increasing prevalence of knee pain and symptomatic knee osteoarthritis: survey and cohort data. *Ann Intern Med* 2011; 155: 725-32.
2. Wallace IJ, Worthington S, Felson DT, Jurmain RD, Wren KT, Maijanen H, et al. Knee osteoarthritis has doubled in prevalence since the mid-20th century. *Proc Natl Acad Sci U S A* 2017; 114: 9332-6.
3. Felson DT, Naimark A, Anderson J, Kazis L, Castelli W, Meenan RF. The prevalence of knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study. *Arthritis Rheum* 1987; 30: 914-8.

4. Hurley MV, Rees J, Newham DJ. Quadriceps function, proprioceptive acuity and functional performance in healthy young, middle-aged and elderly subjects. *Age Ageing* 1998; 27: 55-62.
5. Sharma L, Cahue S, Song J, Hayes K, Pai YC, Dunlop D. Physical functioning over three years in knee osteoarthritis: role of psychosocial, local mechanical, and neuromuscular factors. *Arthritis Rheum* 2003; 48: 3359-70.
6. Çetin N, Öztıp P, Bayramođlu M, Saraçgil SN, Özcürümez G. Relation between pain, disability and depression in patients with knee osteoarthritis. *Turk J Rheumatol* 2009; 24: 196-201.
7. Creamer P, Lethbridge-Cejku M, Costa P, Tobin JD, Herbst JH, Hochberg MC. The relationship of anxiety and depression with self-reported knee pain in the community: data from the Baltimore Longitudinal Study of Aging. *Arthritis Care Res* 2014; 12: 3-7.
8. Freeling P, Rao BM, Paykel ES, Sireling LI, Burton RH. Unrecognised depression in general practice. *Br Med J (Clin Res Ed)* 1985; 290: 1880-3.
9. Kellgren JH, Lawrence JS. Radiological assessment of osteo-arthrosis. *Ann Rheum Dis* 1957; 16: 494-502.
10. Bellamy N, Buchanan WW. Outcome measurement in osteoarthritis clinical trials: the case for standardisation. *Clin Rheumatol* 1984; 3: 293-303.
11. Basaran S, Guzel R, Seydaoglu G, Guler-Uysal F. Validity, reliability, and comparison of the WOMAC osteoarthritis index and Lequesne algofunctional index in Turkish patients with hip or knee osteoarthritis. *Clin Rheumatol* 2010; 29: 749-56.
12. Jenkinson C, Coulter A, Wright L. Short form 36 (SF36) health survey questionnaire: normative data for adults of working age. *BMJ* 1993; 306: 1437-40.
13. Koçyiđit H, Aydemir O, Fişek G, Ölmez N, Memiş A. Reliability and Validity of the Turkish Version of Short Form-36 (SF-36). *Journal of Medicine and Treatment* 1999; 12: 102-6 (Turkish).
14. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol* 1988; 56: 893-7.
15. Ulusoy M, Sahin NH, Erkmen H. Turkish Version of the Beck Anxiety Inventory: Psychometric Properties. *J Cogn Psychother* 1998; 12: 163-72.
16. Hodgson RJ, Rachman S. Obsessional-compulsive complaints. *Behav Res Ther* 1977; 15: 389-95.
17. Erol N, Savasir I. Maudsley Obsessive-Compulsive Question List. In: 24th National Psychiatric and Neurological Sciences Congress Scientific Program Abstracts Book: Turkish Psychological Association Ankara, Turkey; 1988.p.107-14.
18. McAlindon TE, Cooper C, Kirwan JR, Dieppe PA. Determinants of disability in osteoarthritis of the knee. *Ann Rheum Dis* 1993; 52: 258-62.
19. Hurley MV, Mitchell HL, Walsh N. In osteoarthritis, the psychosocial benefits of exercise are as important as physiological improvements. *Exerc Sport Sci Rev* 2003; 31: 138-43.
20. Salaffi F, Cavalieri F, Nolli M, Ferraccioli G. Analysis of disability in knee osteoarthritis. Relationship with age and psychological variables but not with radiographic score. *J Rheumatol* 1991; 18: 1581-6.
21. Kim KW, Han JW, Cho HJ, Chang CB, Park JH, Lee JJ, et al. Association between comorbid depression and osteoarthritis symptom severity in patients with knee osteoarthritis. *J Bone Joint Surg Am* 2011; 93: 556-63.
22. Croft P, Lewis M, Hannaford P. Is all chronic pain the same? A 25-year follow-up study. *Pain* 2003; 105: 309-17.
23. Tunks ER, Crook J, Weir R. Epidemiology of chronic pain with psychological comorbidity: prevalence, risk, course, and prognosis. *Can J Psychiatry* 2008; 53: 224-34.
24. Livingston G, Watkin V, Milne B, Manela MV, Katona C. Who becomes depressed? The Islington community study of older people. *J Affect Disord* 2000; 58: 125-33.
25. Croft PR, Lewis M, Papageorgiou AC, Thomas E, Jayson MI, Macfarlane GJ, et al. Risk factors for neck pain: a longitudinal study in the general population. *Pain* 2001; 93: 317-25.
26. Knaster P, Karlsson H, Estlander A-M, Kalso E. Psychiatric disorders as assessed with SCID in chronic pain patients: the anxiety disorders precede the onset of pain. *Gen Hosp Psychiatry* 2012; 34: 46-52.
27. McWilliams LA, Goodwin RD, Cox BJ. Depression and anxiety associated with three pain conditions: results from a nationally representative sample. *Pain* 2004; 111: 77-83.
28. Matcham F, Norton S, Scott DL, Steer S, Hotopf M. Symptoms of depression and anxiety predict treatment response and long-term physical health outcomes in rheumatoid arthritis: secondary analysis of a randomized controlled trial. *Rheumatology (Oxford)* 2016; 55: 268-78.
29. Beck AT, Steer RA. Beck anxiety inventory - BAI: Psychological Corporation; 1993.
30. Leeuw M, Goossens ME, Linton SJ, Crombez G, Boersma K, Vlaeyen JW. The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. *J Behav Med* 2007; 30: 77-94.
31. Dave AJ, Selzer F, Losina E, Klara KM, Collins JE, Usiskin I, et al. Is there an association between whole-body pain with osteoarthritis-related knee pain, pain catastrophizing, and mental health? *Clin Orthop Relat Res* 2015; 473: 3894-902.
32. Sadock BJ, Sadock VA, Ruiz P. Kaplan & Sadock's Synopsis of Psychiatry: Behavioral Sciences/Clinical Psychiatry. Lippincott Williams & Wilkins; 2011.
33. Grabe HJ, Meyer C, Hapke U, Rumpf HJ, Freyberger HJ, Dilling H, et al. Prevalence, quality of life and psychosocial function in obsessive-compulsive disorder and subclinical obsessive-compulsive disorder in northern Germany. *Eur Arch Psychiatry Clin Neurosci* 2000; 250: 262-8.
34. Karno M, Golding JM, Sorenson SB, Burnam MA. The epidemiology of obsessive-compulsive disorder in five US communities. *Arch Gen Psychiatry* 1988; 45: 1094-9.
35. Scopaz KA, Piva SR, Wisniewski S, Fitzgerald GK. Relationships of fear, anxiety, and depression with physical function in patients with knee osteoarthritis. *Arch Phys Med Rehabil* 2009; 90: 1866-73.
36. Andresen EM, Meyers AR. Health-related quality of life outcomes measures. *Arch Phys Med Rehabil* 2000; 81(Suppl2): S30-45.
37. Dijkers MP. Individualization in quality of life measurement: instruments and approaches. *Arch Phys Med Rehabil* 2003; 84: S3-14.
38. Nazarinassab M, Motamedfar A, Moqadam AE. Investigating mental health in patients with osteoarthritis and its relationship with some clinical and demographic factors. *Reumatologia* 2017; 55: 183-8.