Original Article
DOI: 10.5152/tftrd.2015.87894
Turk J Phys Med Rehab 2015;61:197-202

Comparison between Depression Levels of Women with Knee Osteoarthritis, Rheumatoid Arthritis, and Fibromyalgia Syndrome: A Controlled Study

Halim YILMAZ[1], Gülten KARACA[1], Halime Almula DEMİR POLAT[2], Halil Ekrem AKKURT[1]

[1]*Clinic of Physical Medicine and Rehabilitation, Konya Training and Research Hospital, Konya, Turkey*
[2]*Clinic of Physical Medicine and Rehabilitation, Afyon State Hospital, Afyon, Turkey*

Abstract

Objective: To determine the level of depression in women with rheumatoid arthritis (RA), fibromyalgia syndrome (FMS), and knee osteoarthritis (OA) and its related factors.
Material and Methods: One hundred forty-two patients with RA, 136 with FMS, 139 with knee OA, and 152 healthy women were included in this study. The clinical findings of the women were analyzed via the visual analog scale (VAS), Beck Depression Inventory (BDI), Fibromyalgia Impact Questionnaire (FIQ), tender point counts (TPC), Disease Activity Score-28 (DAS-28), Health Assessment Questionnaire (HAQ), and Western Ontario and McMaster Universities Arthritis Index (WOMAC).
Results: BDI scores in women with knee OA, RA and FMS were higher than controls ($p<0.001$). When a BDI score of ≥17 was evaluated in favor of depression, the rates of depression were 31.7%, 39.4%, 44.9%, and 9.2% in the knee OA, RA, FMS, and control groups, respectively. A positive correlation was determined between BDI, and VAS and WOMAC scores in knee OA group; BDI, and VAS, DAS-28 and HAQ scores in RA group; and, BDI, and TPC and FIQ scores in FMS group ($p<0.001$).
Conclusion: Depression is commonly seen as a symptom in women with knee OA, FMS, and RA. Despite the association between the severity of disease and level of pain in women with knee OA and RA, the level of depression is only related to disease severity in women with FMS. Within the diagnosis, treatment, and follow-up, the existence of depression should be suspected in knee OA, FMS and RA patients, and appropriate treatment regimens related to depression should be planned.
Keywords: Depression, knee osteoarthritis, rheumatoid arthritis, fibromyalgia syndrome

Introduction

Depression is a commonly encountered disorder. One in every five individuals experiences depression during their life. Depression is observed two times more frequently in women than in men; women need medical assistance for depression at a higher rate. As depression may deteriorate the course of a chronic disorder, a chronic disorder may also influence the level of depression. In addition, physical disorders are reported to increase during depression (1,2). Knee osteoarthritis (OA), fibromyalgia syndrome (FMS), and rheumatoid arthritis (RA) are among the most significant disorders affecting more women than men and where pain is observed as the most important symptom (3-5). In the diagnosis and treatment of these disorders, the existence of depression is generally neglected. In our study, we aimed to investigate the level of depression and its related factors in women with knee OA, FMS, and RA.

Material and Methods

Under the criteria of the American College of Rheumatology, 139 knee OA, 142 RA, and 136 FMS patients comprised our patient group, and 152 healthy women were included in

Address for Correspondence: Halim Yılmaz, MD, E-mail: drhalimyilmaz@hotmail.com
Received: April 2013 Accepted: October 2014

Cite this article as:
Yılmaz H, Karaca G, Demir Polat HA, Akkurt HE. Comparison between Depression Levels of Women with Knee Osteoarthritis, Rheumatoid Arthritis, and Fibromyalgia Syndrome: A Controlled Study. Turk J Phys Med Rehab 2015;61:197-202.

the control group (6-8). All participants were informed about the purpose of the study and gave written consent to participate. According to the Kellgren–Lawrence radiological scoring (KLRS), women with knee OA of grades I, II, III, and IV were included in the study. Those who were diagnosed more than six months earlier; who underwent physical treatment for knee OA within the last six months; who were treated with steroid injections on the knees; with a history of rheumatologic disorders other than RA, chronic diseases, major psychiatric disorders, cervical radiculopathy or myelopathy, pregnancy, knee surgery, and limited knee range of motion (ROM); using antidepressants and anxiolytic drugs; and chronic alcohol users were excluded from the study. The sociodemographic features of the participants were determined, and all participants were physically examined. Weight and height were measured; body mass index (BMI-kg/m^2) was thus calculated. Pain severity and depression levels were determined with the visual analog scale (VAS) and Beck Depression Inventory (BDI). Those with a BDI score of ≥17 were evaluated in favor of depression (9). Tender point counts (TPC) and clinical severity of the disease were evaluated with digital palpation and the Fibromyalgia Impact Questionnaire (FIQ), respectively, in the FMS group, (10). FIQ is a 10-item questionnaire and measures factors such as wellness, fatigue, morning stiffness, pain, sleeping, anxiety, depression, and professional and physical status. Each item is scored on a scale ranging from 0 to 10. As the scores received from the scale increase (maximum 100), it shows that daily activities are further affected and impairment is at a higher rate (10). In the RA patients, the score of disease activity was defined with the Disease Activity Score-28 (DAS-28), a test evaluating the swelling and tenderness of 28 joints, erythrocyte sedimentation rate, and general health status on VAS (6). The rates of disability related to the activities of daily life were measured with the Health Assessment Questionnaire (HAQ), consisting of eight different fields, each including 2–3 questions with a total of 20 questions. These fields in HAQ are related to dressing and self-care, rising, eating, walking, hygiene, access to needs, grip, and daily activities. HAQ is used to measure the difficulties of patients in performing certain activities (11). The functional status of knee OA patients was evaluated using the Western Ontario and McMaster Universities Arthritis Index (WOMAC), comprising three categories where pain, stiffness, and physical function are assessed. This test is composed of questions related to pain (five questions), stiffness (two questions), and physical function (17 questions). The Turkish version of WOMAC OA was prepared, and its reliability and validity were indicated (12,13).

Statistical Analysis

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS, Version 20.0, IBM, New York, USA). Descriptive statistical data were given as mean ± standard deviation and percentage. To compare the sociodemographic and clinical features of the groups, analysis of variance was used. If significant differences were observed among the groups, post hoc analysis was performed via Tukey's honest significant difference test. For patients with and without depression, t test was used to compare clinical parameters for normally distributed data and Mann–Whitney U test for not normally distributed data. To calculate correlations between the BDI scores and independent variables in the groups, Spearman's Rho correlation

Table 1. Sociodemographic data of patient and control groups

	Knee OA (n=139)	RA (n=142)	FMS (n=136)	Controls (n=152)		p
Age (years)	45.72±5.62	43.87±7.37	44.01±6.88	44.66±5.40		0.062
BMI (kg/m^2)	29.33±5.16	28.70±5.55	28.48±4.86	29.79±4.57		0.107
Duration of complaints (months)	51.17±41.39	58.57±56.74	47.13±37.36	-		0.111
BDI scores (0-63)	12.96±9.35[b, c, d]	16.20±10.41[a, d]	16.42±6.91[a, d]	8.20±6.55[a, b, c]		<0.001
VAS scores (0-10 cm)	6.81±2.76[b]	5.89±2.34[a, c]	6.57±1.42[b]	-		<0.001
Profession					χ^2	p
Employed	5 (3.6%)	12 (8.5%)	11 (8.1%)	7 (4.6%)	6.35	0.385
Unemployed	134 (96.4%)	130 (91.5%)	125 (91.9%)	145 (95.4%)		
Educational status					χ^2	p
Illiterate	15 (10.8%)	22 (15.5%)	14 (10.3%)	21 (13.8%)	10.64	0.301
Primary school (8 years)	96 (69.0%)	100 (70.4%)	84 (61.8%)	96 (63.2%)		
High school (11 years)	15 (10.8%)	9 (6.3%)	22 (16.2%)	20 (13.1%)		
College (≥12 years)	13 (9.4%)	11 (7.8%)	16 (11.7%)	15 (9.9%)		

[a]p<0.05 according to the knee OA group
[b]p<0.05 according to the RA group
[c]p<0.05 according to the FMS group
[d]p<0.05 according to the controls
OA: osteoarthritis; RA: rheumatoid arthritis; FMS: fibromyalgia syndrome; BMI: body mass index; BDI: Beck Depression Inventory; VAS: visual analog scale

analysis was performed. In the evaluation of other factors affecting depression among the patient groups, two-way analysis of variance was used. To determine whether the factor effective in the formation of depressive symptoms in patients in the three groups originated from the types of disorders or the severity of the VAS score, logistic regression analysis was performed. Logistic regression analysis was not performed in controls because they comprised healthy individuals and lacked VAS scores. p values of <0.05 were accepted to be statistically significant.

Table 2. Levels of depression in patient and control groups

	Depression			
	No		Yes	
Groups	n	%	n	%
Knee OA	95	68.3%	44	31.7%
RA	86	60.6%	56	39.4%
FMS	75	55.1%	61	44.9%
Controls	138	90.8%	14	9.2%*

*Chi-square=50.89, df=3, p<0.001
OA: osteoarthritis; RA: rheumatoid arthritis; FMS: fibromyalgia syndrome

Table 3. Clinical features in patients with depression (BDI≥17) and without depression (BDI<17)

Groups	BDI<17	BDI≥17	p*
Knee OA (n=139)	**(n=95)**	**(n=44)**	
VAS scores (0-10)	6.07±2.65	8.41±2.30	<0.001
WOMAC scores (0-96)	45.50±23.83	62.97±14.53	<0.001
KLRS (0-4)	1.99±0.79	2.52±0.82	<0.001
RA (n=142)	**(n=86)**	**(n=56)**	
VAS scores (0-10)	5.24±2.21	6.88±2.20	<0.001
HAQ scores (0-3)	1.06±0.77	1.67±0.67	<0.001
DAS-28	3.05±1.12	4.07±1.13	<0.001
FMS (n=136)	**(n=75)**	**(n=61)**	
VAS scores (0-10)	6.68±1.46	6.44±1.36	ns
TPC (0-18)	14.21±2.63	15.69±2.35	0.002
FIQ scores (0-100)	59.58±13.99	72.14±14.97	<0.001

*Mann–Whitney U Test
ns: non-significant; BDI: Beck Depression Inventory; OA: osteoarthritis; VAS: visual analog scale; WOMAC: Western Ontario and McMaster Universities Arthritis Index; KLRS: Kellgren–Lawrence Radiological Scoring; HAQ: Health Assessment Questionnaire; DAS28: Disease Activity Score-28; TPC: tender point counts; FIQ: Fibromyalgia Impact Questionnaire

Results

The clinical and sociodemographic features of the patients and controls are presented in Table 1. Data related to age, BMI, duration of complaints, and professional and educational status in both groups were similar (p>0.05) (Table 1). According to KLRS, of all the knee OA patients, 23.0% had grade-I knee OA, 43.2% had grade-II, 28.8% had grade-III, and, 5.0% had grade-IV. The mean WOMAC score of the knee OA patients was 51.04±22.78. In the RA group, the mean scores of DAS-28 and HAQ were 3.45±1.23 and 1.3±0.79, respectively. The mean TPC and FIQ scores of the FMS group were 14.87±2.61 and 65.22±15.69, respectively. The mean BDI score was statistically higher in the RA, FMS, and knee OA groups than in the control group. The highest mean BDI score was detected in the FMS group, and the highest mean VAS score was seen in the knee OA group (p<0.001) (Table 1). When the BDI score of ≥17 was evaluated in favor of depression, the levels of depression in the knee OA, RA, FMS, and control groups were found to be 31.7%, 39.4%, 44.9%, and 9.2%, respectively (p<0.001) (Table 2). The levels of depression were higher in the patients than in the controls; however, no difference was observed among the patient groups for depression (p>0.05). The mean VAS, KLRS, and WOMAC scores in the knee OA group with the BDI score of ≥17; the mean VAS, DAS-28, and HAQ scores in the RA group with the BDI score of ≥17; and the mean TPC and FIQ scores in the FMS group with the BDI score of ≥17 were determined to be significantly higher than those with the BDI score of <17 (p<0.001) (Table 3). No difference was observed in terms of the mean VAS scores between the FMS group with the BDI score of ≥17 and the group with the BDI score of <17 (p>0.05) (Table 3). A positive correlation was detected between the BDI score and the VAS, DAS-28, and HAQ scores in the RA group; between the BDI score and the TPC and FIQ scores in the FMS group; and between the BDI score and the VAS, KLRS, and WOMAC scores in the knee OA group (p<0.001) (Table 4). In the logistic regression analysis, types of disorders and the VAS score were found to be effective in the formation of depressive symptoms (p<0.05) (Table 5).

Table 4. Correlation between BDI scores and disease parameters among patient groups

		Knee OA			RA			FMS		
		VAS	WOMAC	KLRS	VAS	DAS-28	HAQ	VAS	TPC	FIQ
BDI scores (0-63)	rs	0.518	0.474	0.382	0.476	0.444	0.472	-0.033	0.289	0.401
	p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ns	<0.001	<0.001

ns: non-significant; OA: osteoarthritis; RA: rheumatoid arthritis; FMS: fibromyalgia syndrome; BDI: Beck Depression Inventory; VAS: visual analog scale; WOMAC: Western Ontario and McMaster Universities Arthritis Index; KLRS: Kellgren–Lawrence Radiological Scoring; DAS-28: Disease Activity Score-28; HAQ: Health Assessment Questionnaire; TPC: tender point counts; FIQ: Fibromyalgia Impact Questionnaire

Table 5. Effect of diseases and VAS score on depressive symptoms in patient groups

							95% C.I. for Exp (B)	
	B	S.E.	Wald	df	Sig.	Exp (B)	Lower	Upper
Knee OA			8.577	2	0.014			
RA	0.653	0.272	5.748	1	0.017	1.921	1.126	3.275
FMS	0.723	0.264	7.484	1	0.006	2.061	1.228	3.460
VAS groups	0.269	0.052	27.055	1	0.000	1.309	1.183	1.449
Constant	-2.709	0.437	38.391	1	0.000	0.067		

OA: osteoarthritis; RA: rheumatoid arthritis; FMS: fibromyalgia syndrome; VAS: visual analog scale

Discussion

Our study indicates that depression is a commonly encountered finding in RA, knee OA, and FMS and that the level of depression is associated with disease and pain severity. In the RA and knee OA groups, the level of depression was associated with the severity of disease and pain. In women with FMS, however, the level of depression was associated with the severity of disease and not with the severity of pain. In literature, studies on correlations between the frequency of depression and RA, FMS, and knee OA have controversial findings among themselves. It is reported that FMS is accompanied by co-morbid anxiety and depression at different levels, as well as widespread chronic pain, allodynia, hyperalgesia, and decreased threshold of pain, because of the psychosocial features of patients (4,14). Chronic pain in FMS is considered to result in psychiatric disorders by affecting hormonal and psychic balance. In studies, it is reported that depression was detected between 22.2% and 51.9% of FMS patients (15-19) and that women with FMS, in particular, are affected by co-morbid depression (19). Psychological changes in FMS negatively influence the perceptions for disease severity, functional ability, and pain tolerance (14). In different studies, the severity of depressive symptoms was reported to be higher in FMS patients than healthy individuals and was associated with disease severity (20,21), pain severity (22), and TPC (23). In our study, depression was found to be a common symptom in the FMS patients and was associated with disease severity. However, no association was detected between the level of depression and severity of pain in women with FMS. In other words, our findings indicated that depression is a common symptom in women with FMS and is associated with disease severity rather than pain severity. Therefore, during examination, FMS patients should be evaluated for TPC, and the existence of depression should also be taken into account.

Along with increasing mean longevity, the significance of OA has increased more in terms of public health. In knee OA, it is considered that limited daily activities, socioeconomic problems, loss of social support, and social isolation facilitate depression (24,25). In literature, there are various studies relating pain and disability due to OA with depression in knee OA patients. In some studies, a strong correlation was reported between level of depression and disability in knee OA patients (2,26-28). In a study performed by Lin et al. (29), it was reported that an improvement in pain was related to OA and disability, and a decrease in depressive symptoms and an increase in the quality of life and general health status were reported in OA patients treated with antidepressants or psychotherapy due to their depression at the end of the first year, when compared with controls. Likewise, a significant correlation was observed between the level of depression and pain and disability due to OA in our knee OA patients. As opposed to the strong association between disability and depression, there are other studies that indicate no association between the two factors (12,30). Because of a lack of a medical treatment to cure OA at present, the therapeutic modality of OA should be targeted to alleviate pain, develop functions, and increase the quality of life. In cases where knee OA is accompanied by depression, the treatment of depression should also be considered, in addition to decreasing pain severity and weight, as treatment options.

Rheumatoid arthritis is a chronic, systemic, and inflammatory disease progressing with the destruction of joints, disability, and morbidity because of synovial inflammation. In RA patients, pain due to the condition, physical disability, uncertainty of the course of the disease, and loss of social activities were reported to cause the development of depression by being effective alone or as a whole (31). In studies, the rate of depression was reported to range from 28% to 62.5% in RA patients (32-36). In addition, considering that RA is an autoimmune disease, psychiatric factors may be expected to affect the course of the disease through the immune system. In previous studies, both stress and depression were shown to be influential on the immune system in RA patients (37). The association between the disease parameters of RA and depression was investigated, and different findings were obtained. Behnam et al. (38) reported that the general prevalence of depression was higher in RA patients and was related to women and serum inflammatory signs. Altan et al. (35) stated that depression was related to disease activation parameters such as pain, swelling, and number of tender joints in RA patients. In another study by Söderlin et al. (31), morning stiffness in RA patients was determined to be associated with the level of depression. In some studies, disease activation signs in RA patients could not directly be associated with the severity of depression (39,40). However, our findings show an association between the level of depression and severity of disease in RA patients; in other words, the effects of the disease are felt at a higher rate in RA women with depression. Additionally, we

found that the depression level in women with RA was positively associated with the functional level detected via pain and HAQ. Therefore, the existence of depression should be kept in mind while evaluating RA patients, and the treatment of depression should be an indispensable part of the modalities.

Although the number of our participants is high, our study has some limitations. First, our participants were not evaluated via structured psychiatric interviews. Second, the study group comprised only women participants, so our findings cannot be generalized to the entire population. To obtain more comprehensive findings involving all individuals, studies including both genders are needed.

Conclusion

Depression is a common symptom in women with knee OA, FMS, and RA, and while associated with disease severity and level of pain in women with knee OA and RA, the level of depression is related to only disease severity in women with FMS. Therefore, during the diagnosis, treatment, and follow-up, the existence of depression should be suspected in knee OA, FMS and RA patients, and appropriate treatment regimens related to depression should be planned.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Meram Medical School of Konya University.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - H.Y.; Design - H.Y., H.A.D.P.; Supervision - H.Y.; Resource - H.Y., G.K.; Materials - H.Y., H.E.A.; Data Collection and/or Processing - H.Y., H.D.A.P.; Analysis and/or Interpretation - H.Y., H.E.A.; Literature Review - H.Y., H.A.D.P.; Writer - H.Y.; Critical Review - H.Y., H.E.A.; Other - H.Y., G.K.

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

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

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