Thieme

Comparison of Physical Activity Levels in Rheumatic Diseases

Vergleich des körperlichen Aktivitätsniveaus bei rheumatischen Erkrankungen

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ABSTRACT

Objectives The aim of this study was to evaluate levels of physical activity in patients with rheumatoid arthritis, osteoarthritis and fibromyalgia and to compare the results with both healthy subjects and each other.

Methods A group of 50 rheumatoid arthritis patients, 95 osteoarthritis patients, 82 fibromyalgia patients and 110 healthy subjects were included in this study. Physical activity levels were assessed by the International Physical Activity Questionnaire (IPAQ).

Results There were significant differences in walking and total physical activity scores in IPAQ between the rheumatoid arthritis (RA), osteoarthritis (OA), fibromyalgia (FMS) patients and the control group ($p < 0.05$). 36.6 % of the fibromyalgia group, 28.4 % of the osteoarthritis group, 38 % of the rheumatoid arthritis group and 22.7 % of the healthy subjects were found to be inactive. 45.1 % of the fibromyalgia group, 42.1 % of the osteoarthritis group, 46 % of the rheumatoid arthritis group and 36.4 % of the healthy subjects were found to be insufficiently active.

Conclusion As a result, when compared to healthy people, physical activity levels were significantly decreased in patients with rheumatoid arthritis, osteoarthritis, fibromyalgia. The decreases in the physical activity levels were clearer in patients with rheumatoid arthritis than in patients with osteoarthritis and fibromyalgia. Recommending regular physical activity should be integral to rheumatic disease management and walking offers a potentially accessible, inexpensive, and acceptable physical activity intervention.

ZUSAMMENFASSUNG

Zielsetzung Ziele dieser Studie waren die Beurteilung des körperlichen Aktivitätsniveaus bei Patienten mit rheumatoider Arthritis, Arthrose und Fibromyalgie sowie ein Vergleich der Ergebnisse zwischen den einzelnen Krankheitsbildern und mit gesunden Probanden.

Methoden Es wurden 50 Patienten mit rheumatoider Arthritis, 95 Patienten mit Arthrose, 82 Patienten mit Fibromyalgie sowie 110 gesunde Probanden in die Studie aufgenommen. Mithilfe des IPAQ-Fragebogens („International Physical Activity Questionnaire“) wurde das körperliche Aktivitätsniveau ermittelt.

Ergebnisse Die Auswertung des IPAQ ergab bei den Scores für Gehen und körperliche Gesamtaktivität signifikante Unterschiede zwischen den Patienten mit rheumatoider Arthritis (RA), Arthrose („Osteoarthritis“, OA), Fibromyalgie (FMS) und der Kontrollgruppe ($p < 0,05$). 36,6 % der Fibromyalgie-Patien-

ten, 28,4 % der Arthrose-Patienten, 38 % der Patienten mit rheumatoider Arthritis und 22,7 % der gesunden Probanden wurden als inaktiv eingestuft. Bei 45,1 % der Fibromyalgie-Patienten, 42,1 % der Arthrose-Patienten, 46 % der Patienten mit rheumatoider Arthritis und 36,4 % der gesunden Probanden wurde ein unzureichendes Aktivitätsniveau festgestellt.

Schlussfolgerung Die Ergebnisse zeigen, dass das körperliche Aktivitätsniveau bei Patienten mit rheumatoider Arthritis, Arthrose oder Fibromyalgie im Vergleich zu gesunden Personen deutlich reduziert war. Bei Patienten mit rheumatoider Arthritis trat die Reduktion des körperlichen Aktivitätsniveaus stärker zutage als bei Patienten mit Arthrose oder Fibromyalgie. Regelmäßige körperliche Aktivität sollte im Rahmen der Behandlung rheumatischer Erkrankungen immer empfohlen werden. Hierfür bietet sich insbesondere das Walken an, da es potenziell quasi immer und überall möglich ist, keine hohen Kosten mit sich bringt und eine akzeptable Form der körperlichen Aktivität darstellt.

Introduction

Physical inactivity is a serious health problem worldwide, and a complication of rheumatic diseases, despite various data reporting the beneficial effects of physical activity (PA) on all-cause mortality [1, 2]. PA is defined as body movement generated by skeletal muscles those results in energy expenditure [3]. Regarding the PA assessment methods used in studies, objective (accelerometers), subjective (surveys) and criteria methods (doubly labeled water technique) were observed. Accurate measurement of total daily energy expenditure is possible using the doubly labeled water technique [4]. However, this technique is not available in all centers. Alternative methods to assess PA include the use of triaxial accelerometers and patient questionnaires. Self-reported questionnaires that are subjective evaluations are not usually expensive by objective methods and can be applied easily by researchers [5], [6]. Pain, restricted mobility, fatigue, reduced muscle mass, strength and endurance, are more commonsymptoms inpatients with rheumatic diseases [7]. For these reasons, patients with rheumatic diseases usually face activity limitations, participation restrictions in their daily life, and have more sedentary life style than healthy people. The most important consequence of a sedentary lifestyle is reduction physical fitness and physical activity levels. Furthermore, diseases can result from being physically inactive, following activity limitations, and having participation restrictions results in. It is a vicious cycle that leads to the progressive reduction in quality of life. Studies show that patients with rheumatic diseases are more inactive than healthy controls [8–13, 15–17]. Rheumatoid arthritis, which is an inflammatory disease, and the non-inflammatory rheumatic diseases like osteoarthritis and fibromyalgia syndrome are recognized as the most common rheumatic diseases in Turkey [18, 19]. Although epidemiologic studies on rheumatic diseases in Turkey are quite limited it is known that this group of patients (OA, FMS, RA) mostly experience pain and activity limitations, and frequently consults physiotherapy departments in Turkey. In our country, these groups of patients consult for the physiotherapy clinics in order to reduce pain and activity limitations [19–21]. However, behavioral methods adapting and increasing the habit of physical activity are not usually included in rehabilitation programs. The new studies recommend that healthcare professionals should encourage people with rheumatic conditions to participate in regular physical activity to improve aerobic fitness and increase the quality of life [22]. The first step in this issue is to determine the level of physical activity in people with rheumatic disease. Nevertheless, there is surprisingly little research available comparing daily life physical activity between patients with rheumatic diseases and healthy controls. In the literature researchers have generally investigate the level of physical activity of the healthy population and some chronic diseases such as a cancer, obesity and cardiovascular diseases. Also large parts of the research have been designed regarding different exercise programs' effekt the symptoms of the disease in order to investigate the effectiveness of the physical activity programs [23–29]. To our knowledge, as yet, there is no study that investigates the physical activity levels of patients with rheumatic diseases. The main purpose of this study was to evaluate levels of the physical activity in patients with rheumatoid arthritis, osteoarthritis and fibromyalgia syndrome, and to compare the results with healthy subjects and each other.

Materials and Methods

Participants

50 rheumatoid arthritis patients, 95 osteoarthritis patients and 82 fibromyalgia patients aged 40–60 years, with a disease duration of ≥ 1 year, according to the ACR criteria (American College of Rheumatology) at the Baskent University Hospital, Department of Physical Medicine and Rehabilitation outpatient clinics and 110 healthy subjects (control) of the same age group were consecutively enrolled into the study between September 2011 and May 2013 (▶ **Fig. 1**).

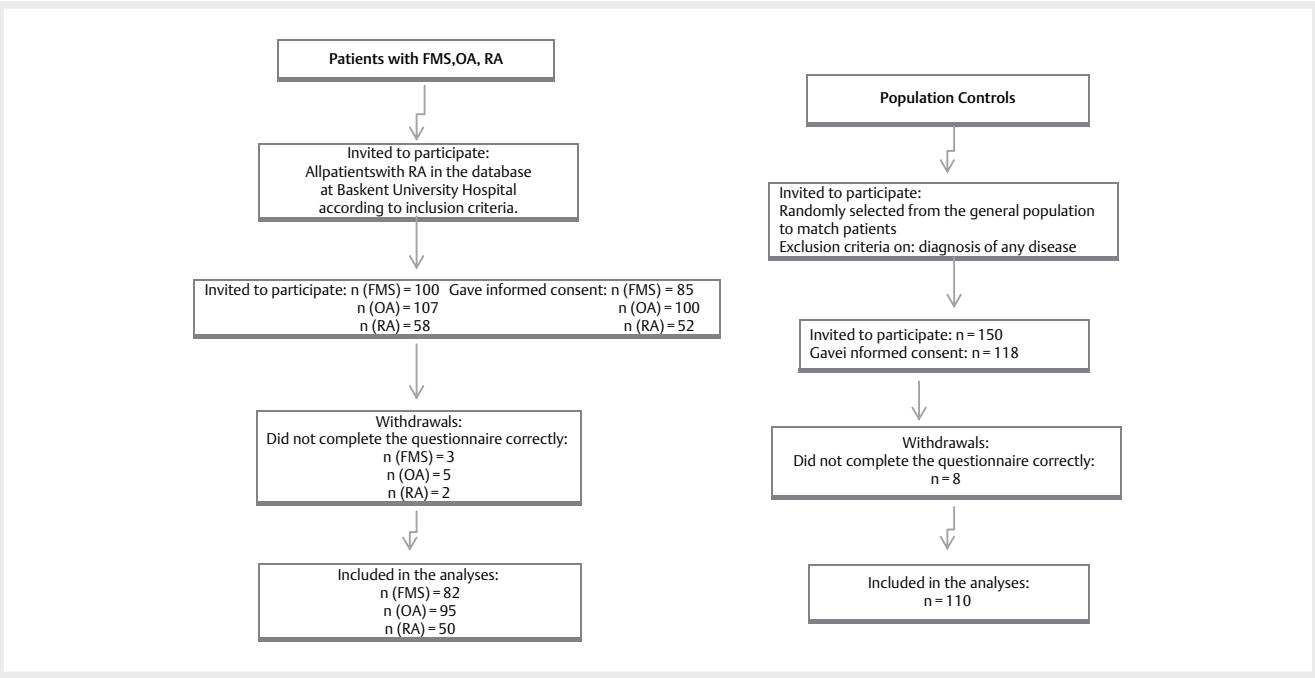
Exclusion criteria were: Neurological deficits, significant osteoporosis, severe negative consequences for physical and/or mental functioning, malignancy, severe cardio respiratory diseases, new passing operation of orthopedic, neurologic and other reasons, exacerbation period of rheumatoid arthritis patients, physical activity barriers, and being non-cooperative.

It was determined that the subjects included in the healthy group had not taken any medication.

The study was approved by the Ethics committee at Medicine and Health Sciences Research Council of Baskent University, Ankara, Turkey, reference number KA11\227. Written informed consents were obtained from all the participants.

Instruments

1. Socio demographic characteristics were recorded as including age, sex, employment status, and education level categorized as low (primary school or intermediate school), intermediate (secondary school), and high (university). Disease duration and exercise habits, smoking habits and joint involvements were also recorded.
2. Pain was evaluated with the by the visual analogue scale (VAS) that shown a pain intensity measurement [30].
3. Physical activity assessment.



▶ **Fig. 1** Flow of participant inclusion. FMS, OA, RA and CO. FMS = Fibromyalgia Syndrome, OA = Osteoarthritis, RA = Rheumatoid Arthritis CO = Control Groups.

Physical activity levels were evaluated by the Long Form of the International Physical Activity Questionnaire Turkish Version (IPAQ) [31]. The IPAQ long form consists of 27 questions. IPAQ is a scale to be recorded at different levels of physical activity time in the last week. It consists of 5 dimensions of physical activity; housework, work/occupation related, walking/bicycling, exercise, and leisure time activities as well as an open question about number of hours sitting per day. In each of the 4 domains the number of days per week and time per day spent in both moderate and vigorous activity are recorded. Practical examples of culturally relevant activities of moderate and vigorous intensity are given. In this study, moderate intensity was defined as 3–6 MET (Metabolic Equivalent Task) and vigorous intensity was defined as > 6 MET. One MET is equal to the energy expenditure during rest, and is approximately equal to 3.5 ml O2 kg in adults. The outcome measures used were: MET hours per week and hours reported in moderate- and vigorous intensity activity per week. The PA data from the questionnaire was transformed into energy expenditure estimates as MET using published values. To calculate the weekly physical activity (MET-h/week), the number of hours dedicated to each activity class was multiplied by the specific MET score for that activity. The individuals whose score is lower than 600 MET are described as inactive, between 600–1 500 MET are described as minimal active and higher than 3 000 MET are described as active [32].

Statistical Analysis

The results of tests were expressed as the number of observations (n), mean ± standard deviation, median and min-max values. The results of the homogenity (Levene's Test) and normality tests (Shapiro Wilk) were used to decide which statistical methods to apply in the comparison of the study groups. Normally distributed and with homogeneous variances groups were compared 2 groups by Student's t test and compared 3 or more groups by Analysis of Variance (ANOVA). According to those tests results parametric test assumptions were not available for some variables, so the comparisons of 2 independent groups were performed by Mann-Whitney U test, comparisons of three independent groups were performed by Kruskal Wallis test. Multiple comparison tests, the adjusted Bonferroni test was used. Categorical data was analysed with Fischer's Exact Test and Chi-square test. Expected to be less than 25 % of cells in cases for inclusion in the analysis of those cells „Monte Carlo Simulation Method" and the values were determined. All statistical analyses were performed with the SPSS software (SPSS Ver. 17.0; SPSS Inc., Chicago IL, USA). p value of < 0.05 was considered statistically significant.

Results

Characteristics of the participants:

The patients' mean of gender, age, body mass index, and duration of disease, educational status, marital and employment status comparisons between the 4 groups are shown in ▶ **Table 1**. There were significant differences between the groups in duration of disease and gender ($p < 0.05$). All the patients' mean age, body mass index, education level, and marital status were found to be similar ($p < 0.05$). The smoking and exercise habits of all groups are shown in ▶ **Table 1**. 22 % of fibromyalgia patients, 30 % of rheumatoid arthritis patients, 34,7 % of osteoarthritis patients, and 35,5 % of healthy individuals had exercise habits.

▶ **Table 1** Physical and demographic characteristics on FMS, OA, RA and control group (CO).

	FMS	OA	RA	CO	Total	P value
Cases Number n (%)	82 (24,3)	95 (28,2)	50 (14,8)	110 (32,6)	337	
Gender n (%)						
Female	59 (72)	58 (61,1)	44 (88)	71 (64,5)	232 (68,8)	**0,006**
Male	23 (28)	37 (38,9)	6 (12)	39 (34,5)	105 (31,2)	
Age (X ± SD)	53,62 ± 7,12	52, 98 ± 6,83	51,98 ± 9,50	51,7 ± 8,37	52,59 ± 7,86	0,365
BMİ (X ± SD)	27,26 ± 4,13	26,78 ± 4,07	25,66 ± 3,23	26,22 ± 3,95	26,55 ± 3,95	0,102
Duration of disease (years) (X ± SD)	7,54 ± 5,61	7,61 ± 5,37	10,56 ± 7,38			**0,008**
Education Statue n (%)						
Primary School	12 (14.6)	11 (11.6)	17 (34.0)	16 (14.5)		
Secondary School	13 (15.9)	20 (21.1)	4 (8.0)	5 (13.6)		
High School	16 (19.5)	28 (29.5)	14 (28.0)	40 (36.4)		**0,007**
University	38 (46.3)	31 (32.6)	14 (28.0)	38 (34.5)		
Others	3 (3.7)	5 (5.3)	1 (2.0)	1 (.9)		
Martial Statue n (%)						
Married	57 (69,5)	73 (76,8)	37 (74,0)	91 (82,7)		
Single	8 (9,8)	10 (10,5)	3 (6,0)	(7,3)		
Divorced	5 (6,1)	3 (3,2)	4 (8,0)	3 (2,7)		0,316
Widow	12 (14,6)	9 (9,5)	5 (10)	8 (7,3)		
Live separately	0 (0)	0 (0)	1 (2,0)	0 (0)		
Working Statue n (%)						
Working	28 (34,1)	35 (36,8)	18 (36,0)	49 (44,5)		
Not Working	21 (25,6)	30 (31,6)	18 (36,0)	30 (27,3)		0,481
Retiring	33 (40,2)	30 (31,6)	14 (28,0)	31 (28,2)		
Not Working Because Of Disease	0 (0)	0 (0)	0 (0)	0 (0)		
Smoking Statue n (%)						
Smoking	53 (64,6)	42 (44,2)	21 (42,0)	54 (49,1)		
Not Smoking	25 (30,5)	38 (40,0)	22 (44,0)	48 (43,6)		**0,029**
Quit Smoking	4 (4,9)	15 (15,8)	7 (14,0)	8 (7,3)		
Exercise Habit n (%)						
Yes	18 (22,0)	33 (34,7)	15 (30,0)	39 (35,5)		0,935
No	64 (78,0)	62 (65,3)	35 (70,0)	71 (64,5)		
Pain (VAS) (X ± SD)	5,05 ± 2,58	4,54 ± 2,42	4,67 ± 2,42			0,324

p≤ 0,05. Values are reported as mean ± standart deviation(SD) or number of participants (%) unless otherwise specified. BMI = Body Mass İndex. FMS = Fibromyalgia Syndrome OA = Osteoarthritis RA = Rheumatoid Arthritis CO = Control Groups.VAS = Visual Analogue Scale

Comparison of Physical activity levels of patients with RA, OA and FMS

36.6 % of the FMS group, 28.4 % of the OA group, 38 % of the RA group and 22.7 % of the healthy subjects were found to be inactive. 45.1 % of the fibromyalgia group, 42.1 % of the osteoarthritis group, 46 % of the rheumatoid arthritis group, and 36.4 % of the healthy subjects were found to be insufficiently active (▶ **Table 2**).

There were no significant differences in all parameters in the IPAQ scores between the rheumatoid arthritis, osteoarthritis, and fibromyalgia patients ($p > 0.05$). ▶ **Table 3** shows the mean values of the IPAQ scores and comparisons of the physical activity levels of the patients with rheumatic diseases.

Comparisons between Rheumatic Diseases and Healthy Controls

There were significant differences in walking physical activity scores in IPAQ between all groups compared with the healthy controls ($p < 0.05$). ▶ **Table 4** shows the comparisons between rheumatic diseases and healthy controls. It was found that walking and total IPAQ scores were statistically lower than healthy controls in the FMS and RA groups ($p < 0,05$) while there were significant differences in walking physical activity scores in IPAQ between the osteoarthritis and control groups ($p = 0.05$).

Discussion

A review of the literature found a limited body of research comparing physical activity levels in rheumatic diseases [12–16]. Our study was planned in such a way that our findings can draw attention to the importance of physical activity level in people with rheumatic diseases in Turkey and to direct clinical guidelines.

In a compilation study conducted in 2012, Tierney et al., reported that patients with RA can have lower physical activity levels than healthy individuals or normative data [12]. Elkan et al., evaluated physical activity levels of RA patients using short-form IPAQ and reported that 21 % of RA population had low physical activity levels [35].

Similar to the studies in the literature, 38 % of patients with RA evaluated in our study were found to be inactive and have lower physical activity levels than healthy individuals. A detailed analysis of our results revealed that active patients were those who had a better course of disease. It was found that joint pain was one of the most important complaints of RA patients and the severity of pain showed variations in a day or from day to day. It was observed that many patients limited the activities in which they have difficulty such as walking, housework and shopping, while some of them continued to perform their activities to fulfill their roles as mothers or employees, which increased their symptoms. Transport and leisure activities of RA patients, who even have to limit their daily life activities at home and at work, increasingly decrease. It can be stated that physical activity levels of RA patients gradually decrease when compared to healthy individuals due to activity limitations.

There is a limited body of research on the evaluation of physical activity levels of OA patients and majority of these studies focus on determining the factors affecting physical activity levels of knee and hip OA patients [26, 33–35]. Interestingly, although osteoarthritis has a higher prevalence than rheumatoid arthritis, the studies mostly concentrated on rheumatoid arthritis. Although numerous studies investigated the effects of exercise and physical activity on disease symptoms and physical aptitude in osteoarthritis patients, there is a limited body research on determining physical activity level [20, 23, 24, 34]. A review of the studies analyzing physical activity levels of osteoarthritis patients revealed that the patients were 40 and older [36, 37]. Since joint degeneration of osteoarthritis develop with old age. In our study, we determined inclusion criteria as the ages between 40 and 60 for rheumatoid arthritis and fibromyalgia patients groups in addition to osteoar-

▶ **Table 2** Percentage of physical activity levels in FMS, OA, RA and CO.

	FMS	OA	RA	CO
İnactivity n (%)	30 (36,6)	27 (28,4)	19 (38,0)	25 (22,7)
Moderate activity n (%)	37 (45,1)	40 (42,1)	23 (46,0)	40 (36,4)
Vigorous activity n (%)	15 (18,3)	28 (29,5)	8 (16,0)	45 (40,9)

p ≤ 0,05; FMS = Fibromyalgia Syndrome OA = Osteoarthritis RA = Rheumatoid Arthritis CO = Control Groups. Number of participants (%)

▶ **Table 3** Comparison of physical activity levels in FMS, OA, RA and CO.

IPAQ Sub parameters MET-min/week (X ± SD)	FMS	OA	RA	CO	P value
Walking PA	1 010,53 ± 1 589,57	1 349,44 ± 2 064,42	1 100,25 ± 1 623,51	2 175,22 ± 3191,71	**0,030**
Moderate PA	993,87 ± 1 618,01	890,19 ± 1 223,44	597,00 ± 1 103,21	1 110,73 ± 1997,24	0,298
Vigorous PA	308,76 ± 935,02	546,64 ± 1 701,76	197,68 ± 493,74	1 114,76 ± 3643,97	0,054
Total PA	2 257,15 ± 3 081,29	2 732,91 ± 3 314,97	1 817,91 ± 2 060,75	4 137,30 ± 6595,91	0,060

p ≤ 0,05. FMS = Fibromyalgia Syndrome OA = Osteoarthritis RA = Rheumatoid Arthritis CO = Control Groups. Values are reported as mean ± standart deviation (SD). IPAQ = International Physical Activity Questionnaire. MET-min/week = Metobolic Equivalent- (Minute/Week). PA = Physical Activity

▶ **Table 4** p value of physical activity levels between rheumatic diseases and CO.

	FMS-OA p value	FMS-RA p value	OA-RA p value	OA-FMS p value	FMS-CO p value	RA-CO p value	OA-CO p value
Walking PA	0,999	0,999	0,999	0,999	**0.005**	**0,047**	**0,005**
Moderate PA	0,999	0,999	0,999	0,999	0,999	0,372	0,999
Vigorous PA	0,999	0,999	0,999	0,999	0,119	0,178	0,599
Total PA	0,999	0,999	0,999	0,999	**0,029**	**0,020**	0,076

p ≤ 0,05. FMS = Fibromyalgia Syndrome OA = Osteoarthritis RA = Rheumatoid Arthritis CO = Control Groups. PA = Physical Activity

thritis, to include patients with similar age groups. Our study included individuals at this age group.

In their study to determine the factors affecting physical activity, Rosemann et al., evaluated patients with osteoarthritis in lower extremities using IPAQ. The researchers found that 55 % of patients were inactive, 38 % were slightly active and 7 % were active. They reported that physical activity levels of OA patients were lower than those of healthy population and that increasing physical activity was important in treatment. There are a few studies carried out in Turkey to evaluate physical activity levels of osteoarthritis patients. These studies reported that physical activity levels of OA patients were low [38, 39].

Evaluation of physical activity level of osteoarthritis patients in our study showed that 28 % were inactive, 42 % were minimal active and 29 % were active. In Turkey, osteoarthritis patients are admitted to physiotherapy clinics generally due to the complaints of pain and activity limitation. While the physiotherapist evaluate normal joint movement and muscle force in involved joint region, evaluation of physical activity level and suggestions for physical activity are generally overlooked. Patients should acquire the habit of doing regular physical activity.

A wide range of symptoms such as low pain threshold, sleep disorders, fatigue, anxiety, depression, decreased physical function capacity accompany the disease in patients with FMS. It is reported that this limitation can result from decreased physical activity level [40]. Therefore, it is important to evaluate physical activity level when determining treatment program for FMS patient group. While much of the literature focused on the relationship between physical activity and health, some studies focused on determining physical activity suggestions and analyzing the factors affecting physical activity. McLoughlin et al., compared physical activity levels of FMS patients and healthy individuals using IPAQ and found that FMS patients were less physically active than healthy individuals. They found statistically significant differences in IPAQ walking, severe and total scores [41].

In our study, we evaluated physical activity levels of FMS patients using IPAQ. We found that 37 % of the patients were inactive. Comparison of FMS patients and healthy individuals showed a statistically significant difference in IPAQ walking and total scores. FMS patients were found to be less physically active than healthy individuals.

A review of the literature showed only a few studies comparing physical activity levels of RA, OA and FMS patients. In their study conducted in 2006, Grene et al., analyzed the factors affecting physical activity levels of rheumatoid arthritis and osteoarthritis patients and recorded sitting-reaching, exercise, housework and leisure activities in a day using Physical Activity and Disability Survey (PADS). The researchers found that RA patients had higher leisure activity times than OA patients [42]. Raftery et al., on the other hand, evaluated physical activity level of FMS and RA patients using accelerometer and reported that physical activity levels of 2 groups were similar [43].

Comparison of RA, FMS and OA groups in our study showed similar physical activity levels. The patients in all three groups are believed to have similar low physical activity levels since they avoid physical activity fearing that it will increase pain and fatigue complaints and since they are not provided adequate suggestions for physical activity.

Conclusion

The importance of physical activity in healthy individuals and patients with chronic diseases has been emphasized in recent years in Turkey. Ministry of Health carries out studies regarding physical activity in chronic diseases (diabetes, hypertension, coronary diseases usw.) in adult, pediatric and geriatric individuals [27–29]. However, it was observed that both patients and healthcare personnel are unconscious towards physical activity in rheumatic diseases. Healthcare professionals such as rheumatologists, physiotherapists, rheumatology nurses should provide guidance to increase physical activity with a multidisciplinary approach to help patients have a healthy life style. Our study evaluated physical activity levels in rheumatoid arthritis, osteoarthritis and fibromyalgia patients and showed that physical activity levels were low in these patient groups. This study is believed to draw attention to the importance of physical activity in rheumatic diseases and to contribute to formation of clinical guidelines in the future.

Conflict of interest

None.

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