Comparison of Physical Activity Levels in Rheumatic Diseases

Vergleich des körperlichen Aktivitätsniveaus bei rheumatischen Erkrankungen

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Schlüsselwörter
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Bibliography
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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.
ten, 28,4 % der Arthrose-Patienten, 38 % der Patienten mit rheumatoi
der Arthritis und 22,7 % der gesunden Probanden wurden als inak-
tiv eingestuft. Bei 45,1 % der Fibromyalgie-Patienten, 42,1 % der
Arthrose-Patienten, 46 % der Patienten mit rheumatoischer Arthritis
und 36,4 % der gesunden Probanden wurde ein unzureichendes Ak-
tivitätsniveau festgestellt.

Schlussfolgerung Die Ergebnisse zeigen, dass das körperliche Aktivi-
tätsniveau bei Patienten mit rheumatoider Arthritis, Arthrose oder Fi-
bronvalgie im Vergleich zu gesunden Personen deutlich reduziert war.
Bei Patienten mit rheumatoider Arthritis trat die Reduktion des körper-
lichen Aktivitätsniveaus stärker zutage als bei Patienten mit Arthrose
oder Fibromyalgie. Regelmäßige körperliche Aktivität sollte im Rahme
ner 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
akzeptable Form der körperlichen Aktivität darstellt.

Introduction

Physical inactivity is a serious health problem worldwide, and a com-
plication 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 (sur-
evies) 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 ques-
tionnaires. Self-reported questionnaires that are subjective evaluations
are not usually expensive by objective methods and can be ap-
plied easily by researchers [5], [6]. Pain, restricted mobility, fatigue,
reduced muscle mass, strength and endurance, are more common-
symptoms in patients 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 activ-
ity levels. Furthermore, diseases can result from being physically in-
active, following activity limitations, and having participation restric-
tions results in. It is a vicious cycle that leads to the progressive re-
duction 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 fibro-
myalgia syndrome are recognized as the most common rheumatic
diseases in Turkey [18, 19]. Although epidemiologic studies on rheu-
matic diseases in Turkey are quite limited it is known that this group
of patients (OA, FMS, RA) mostly experience pain and activity limi-
tations, and frequently consults physiotherapy departments in Tur-
key. In our country, these groups of patients consult for the physio-
therapy 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 pro-
grams. 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. Neverthe-
less, 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 inves-
tigate 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 regard-
ing different exercise programs' effect the symptoms of the disease
in order to investigate the effectiveness of the physical activity pro-
grams [23–29]. To our knowledge, as yet, there is no study that in-
vestigates the physical activity levels of patients with rheumatic dis-
ces. 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 Rheu-
matoLOGY) at the Baskent University Hospital, Department of Phys-
ical 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 osteo-
porosis, severe negative consequences for physical and/or mental
functioning, malignancy, severe cardio respiratory diseases, new
passing operation of orthopedic, neurolologic and other reasons, ex-
carceration period of rheumatoid arthritis patients, physical activ-
ity 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, Anka-
ra, Turkey, reference number KA11227. 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].

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 homogeneity (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.

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

<table>
<thead>
<tr>
<th>IPAQ Sub parameters</th>
<th>FMS</th>
<th>OA</th>
<th>RA</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivity n (%)</td>
<td>30 (36.6)</td>
<td>27 (28.4)</td>
<td>19 (38.0)</td>
<td>25 (22.7)</td>
</tr>
<tr>
<td>Moderate activity n (%)</td>
<td>37 (45.1)</td>
<td>40 (42.1)</td>
<td>23 (46.0)</td>
<td>40 (36.4)</td>
</tr>
<tr>
<td>Vigorous activity n (%)</td>
<td>15 (18.3)</td>
<td>28 (29.5)</td>
<td>8 (16.0)</td>
<td>45 (40.9)</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>IPAQ Sub parameters</th>
<th>FMS</th>
<th>OA</th>
<th>RA</th>
<th>CO</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking PA</td>
<td>1 010.53 ± 1 589.57</td>
<td>1 349.44 ± 2 064.42</td>
<td>1 100.25 ± 1 623.51</td>
<td>2 175.22 ± 3 191.71</td>
<td>0.030</td>
</tr>
<tr>
<td>Moderate PA</td>
<td>993.87 ± 1 618.01</td>
<td>890.19 ± 1 223.44</td>
<td>597.00 ± 1 103.21</td>
<td>1 110.73 ± 1 997.24</td>
<td>0.298</td>
</tr>
<tr>
<td>Vigorous PA</td>
<td>308.76 ± 935.02</td>
<td>546.64 ± 1 701.76</td>
<td>197.68 ± 493.74</td>
<td>1 114.76 ± 3 643.97</td>
<td>0.054</td>
</tr>
<tr>
<td>Total PA</td>
<td>2 257.15 ± 3 081.29</td>
<td>2 732.91 ± 3 314.97</td>
<td>1 817.91 ± 2 060.75</td>
<td>4 137.30 ± 6 595.91</td>
<td>0.060</td>
</tr>
</tbody>
</table>

p ≤ 0.05. FMS = Fibromyalgia Syndrome OA = Osteoarthritis RA = Rheumatoid Arthritis CO = Control Groups. Values are reported as mean ± standard deviation (SD). IPAQ = International Physical Activity Questionnaire. MET-min/week = Metabolic Equivalent (Minute/Week). PA = Physical Activity

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

<table>
<thead>
<tr>
<th>IPAQ Sub parameters</th>
<th>FMS-OA p value</th>
<th>FMS-RA p value</th>
<th>OA-RA p value</th>
<th>OA-FMS p value</th>
<th>FMS-CO p value</th>
<th>RA-CO p value</th>
<th>OA-CO p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking PA</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.005</td>
<td>0.007</td>
<td>0.005</td>
</tr>
<tr>
<td>Moderate PA</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.005</td>
<td>0.372</td>
<td>0.999</td>
</tr>
<tr>
<td>Vigorous PA</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.019</td>
<td>0.178</td>
<td>0.599</td>
</tr>
<tr>
<td>Total PA</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.999</td>
<td>0.029</td>
<td>0.020</td>
<td>0.076</td>
</tr>
</tbody>
</table>

p ≤ 0.05. FMS = Fibromyalgia Syndrome OA = Osteoarthritis RA = Rheumatoid Arthritis CO = Control Groups. PA = Physical Activity
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 lifestyle. 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.

References
