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Promoting physical activity in patients with rheumatoid arthritis

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Chapter 2

Are patients with rheumatoid arthritis less physically active than the general population?

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Abstract

Background. Although promoting physical activity (PA) and exercise among patients with rheumatoid arthritis (RA) is highly advocated nowadays, little is known about actual PA levels of these patients. In particular, the literature investigating how these PA levels are in proportion to the levels among the general population is scarce.

Objective. To compare the self-reported PA levels of patients with RA with those of the general Dutch population.

Methods. A sample of 400 RA patients were sent the Short QUestionnaire to ASsess Health-enhancing PA (SQUASH) comprising 10 questions about PA. From these data the proportions meeting the Dutch public health recommendation for PA (i.e. moderate PA for 30 minutes on ≥ 5 days/week) and the total number of minutes of PA per week were calculated. These data were compared with similar data from a representative sample of the general Dutch population.

Results. 252 patients returned the questionnaire (response 63%). The proportions of RA patients meeting the PA recommendation were similar to those of the general population (57% in categories 45–64 years; 59% in categories ≥ 65 years and 58% in the total groups). The average number of minutes of PA per week was significantly lower in the RA population compared to the general population in the category 45–64 years (1836 vs. 2199, respectively, $p=0.001$), whereas the difference in the category ≥ 65 years was not significant (1115 vs. 1218 minutes, respectively, $p=0.33$).

Conclusions. The proportion of RA patients meeting the Dutch PA recommendation was similar to the general Dutch population. However, with respect to the average number of minutes of PA per week, the RA patients were less physically active. Since patients with RA have an increased risk of chronic conditions such as osteoporosis or cardiovascular diseases of their arthritis, it remains a matter of utmost importance for health care professionals such as rheumatologists, physical therapists, and clinical nurse specialists to promote physical activity in daily clinical practice and guide patients in achieving and maintaining a healthy lifestyle.

Introduction

Extensive research has shown that regular physical activity decreases mortality and morbidity from a number of chronic diseases including diabetes, cancer and coronary heart disease (1;2). It is therefore recommended that every individual should accumulate at least 30 minutes of moderate-intensity physical activity on five or more days of the week (1;3). Persons with arthritis may, apart from the general health gains, benefit from additional, disease specific advantages such as reduced pain, improved muscle function and delayed onset of disability (4–6). Moreover, because of their arthritis these persons have an increased risk of chronic conditions such as osteoporosis or cardiovascular disease. Therefore, the application of the moderate physical activity recommendation to persons with arthritis is nowadays more and more advocated (7;8).

So far, little is known about physical activity levels among persons with arthritis. Four large studies conducted in the US have shown that persons with arthritis have lower levels of physical activity than persons without arthritis (9–12). Three of these studies also compared these levels with levels of the general population. It was demonstrated that the proportions of people with arthritis meeting the physical activity recommendations were slightly lower than those of the general population with differences ranging from 2% to 7% (9–11). These studies did not distinguish between different arthritis diagnoses. In a Swedish study including only patients with rheumatoid arthritis (RA) (13), it was found that the physical activity levels of patients with RA, categorised as very low, low average, high and very high, did not differ from those of the general population. In that study, both women and men with RA reported slightly higher levels of physical activity compared to the norm data of the Swedish population. However, all of the above-mentioned studies categorised the physical activity measures, assessing whether or not the individuals meet pre-defined levels of physical activity.

Only one study compared the actual amount of physical activity, expressed as energy expenditure, between patients with RA and healthy controls (14). In that study, energy expenditure was measured by means of doubly labelled water and it was demonstrated that the energy expenditure of patients with RA was significantly lower than that of healthy controls, which was mainly caused by lower physical activity levels among these patients.

Given the limited knowledge on physical activity levels of patients with RA in general, and the exact time spent on physical activity in particular, the purpose of the present study was to

compare self-reported physical activity levels of patients with RA with the levels of the general Dutch population.

Materials and Methods

This study was part of a larger study on lifestyle, health care usage and information needs among patients with RA. The study had a cross-sectional design and was conducted in April 2004 in the Leiden University Medical Center (LUMC) in the Netherlands. Subjects included a random sample of patients with a rheumatologist-confirmed diagnosis of RA according to the 1987 ACR criteria (15). The sample was obtained from a registry of 1500 RA patients who had been visiting the LUMC rheumatology outpatient clinic in the past 15 months. The registry was sorted in ascending order by the date of their forthcoming visit to the outpatient clinic. Patients were selected from this registry. The selection procedure continued until the target sample of 400 eligible patients was reached. Of all eligible patients, age and sex was recorded. All eligible patients received a questionnaire by postal mail together with a letter explaining the aim of the study and a response envelope. If after 4 weeks the questionnaire had not been returned, the patient was contacted by telephone, asking him or her to return it.

Demographic variables included in the questionnaire were gender, age, educational level (categorised as primary, lower secondary, upper secondary, and tertiary education (16)), and marital status (unmarried, married, widowed, and divorced).

Physical activity was measured with the Short QuesTionnaire to ASsess Health-enhancing physical activity (SQUASH), which proved to be fairly reliable and reasonably valid (17). This Dutch questionnaire contains 10 questions about the number of days spent per week, the average time spent per day and intensity regarding four activity categories: commuting activities, leisure time activities, household activities and activities at work and school. The questionnaire categorises all activities into light, moderate and vigorous intensity activities, based on MET (metabolic equivalent) values defined by Ainsworth's compendium of physical activities (18) and the respondents' age. The respondents were asked to refer to an average week in the past months. Completing the SQUASH takes about 3–5 minutes. In case of missing answers, patients were contacted by telephone to complete the missing values.

The total amount of minutes of physical activity per week was calculated by multiplying frequency (days/week) by duration (min/day) for every type of activity category and then summing up the results of the four categories. Furthermore, the total number of days per week on which the respondents had at least 30 minutes of moderate-intensity physical activities was calculated, allowing the definition of whether an individual met the Dutch public health recommendation for physical activity (reporting such activities ≥ 5 days a week) (3) or not.

The data of the RA patients as described above were compared with data of the general Dutch population. These data were retrieved from two different databases. The reason for using two different databases was the fact that database comprising data on physical activity did not include socio-demographic characteristics of that sample. The data regarding socio-demographic characteristics of the general population were derived from a database collected by Statistics Netherlands (in Dutch: CBS) in 2004 (Database 1). These data are retrieved from population registers of municipalities within the Netherlands. The data regarding the physical activity levels of the general population were derived from a nationwide survey on general health and lifestyle, also collected by Statistics Netherlands in 2004 (Database 2). This survey, which includes the SQUASH questionnaire as mentioned above, is carried out on a continuous basis over the year and contains a representative sample of the total general Dutch population drawn from the municipal population registers. This database includes data on physical activity levels on an aggregated level, presented according to sex, age group, education, employment status and living situation. The data from both databases are accessible through a public database on the Statistics Netherlands' website and are available on an aggregated level only (<http://statline.cbs.nl/>).

The study was judged to be no medical research in the sense of the Medical Research Involving Human Subjects Act (in Dutch: WMO) by the Medical Ethics Review Committee of the LUMC. For this reason it was not necessary to obtain individual informed consent (the participants were free to either fill in the questionnaire or not).

Statistical analysis

Based on the literature it was estimated that the proportions of people aged 45 years or older meeting the physical activity recommendation was about 50% in the general population and 40% in the RA population (12). The target sample size to detect this difference of 10% with $\alpha=5\%$ and

a power of 90% ($\beta=10\%$), would be 259 patients. With an estimated response rate of about 65% (19) we planned to send 400 RA patients a questionnaire.

All analyses were performed using the Statistical Package for the Social Sciences (SPSS 12.0 for Windows, Chicago IL, USA]. Descriptive statistics were used to summarise demographic characteristics and frequencies of the concerning variables.

Data from the general population are available in percentages only. With respect the data concerning the Dutch physical activity recommendation, Chi-square tests were used to compare the observed percentages of the RA population with the percentages of the general population. To analyze differences with respect to the total number of minutes of physical activity per week a one sample T-test was used. For all analyses, a p-value of less than 0.05 (two-tailed) was adopted as the criterion for statistical significance.

Results

Of the 400 patients who received the questionnaire, 204 filled in and returned it within 4 weeks. The remaining 196 patients were called up by telephone. Of these patients, 53 could not be reached after trying at least 2 times on different days of the week. Of the remaining 143 patients who were contacted, 83 said they did not want or were not able to fill in and return the questionnaire and 60 patients said they would fill in and return the questionnaire within the next few days. Finally, 252 patients sent back the questionnaire, yielding a response rate of 63%. Twenty (8%) patients had to be excluded from the present study because they were younger than 45 years and formed a too small group to compare with the matching age group from the national survey. The mean (SD) age of the 232 eligible respondents was 62.6 (9.2). Additional characteristics of both the participating patients with RA as well as the general Dutch population are described in Table 1. Compared to the general population, the RA population comprised significantly more females, more people within the age group of 65 years and older and more people with a lower education level.

Table 1. Study characteristics of the RA population and the general Dutch population with the same age range (≥ 45 years) #

	RA population (n=232)	General population (n=6428441) †	P-value
Females	165 (71)	(53)	<0.001*
Age group			
45–64 years	135 (58)	(65)	0.03*
≥ 65 years	97 (42)	(35)	
Education level			
Primary	55 (24)	(25)	<0.001*
Lower secondary	110 (48)	(25)	
Upper secondary	36 (16)	(32)	
Tertiary	30 (13)	(17)	
Marital status			
Unmarried	14 (6)	(8)	0.10
Married	173 (75)	(68)	
Widowed	31 (13)	(13)	
Divorced	14 (6)	(10)	

For the RA population the values represent the number (%) of patients; for the general population only percentages are being reported.

† Data of the general population are retrieved from database 1 (see description in Methods section).

* $p < 0.05$, Chi-square test.

Concerning the characteristics of responders and non-responders, there were no significant differences according to gender (number (%) of females: 182 (72) and 104 (70%) respectively; $p=0.68$) or age (mean (SD): 60.5 (11.5) and 62.4 (14.7) years, respectively; $p=0.17$).

Regarding the proportions of persons meeting the Dutch public health recommendation for physical activity, similar results were obtained for the total RA group and the general population (58% in both populations, see Table 2). In addition, the analyses per sex, age group, level of education, marital status, employment status and living situation revealed no significant differences between the RA population and the general population.

With respect to the average amount of physical activity per week, it was found that for the total groups, RA patients were less physically active than the general population: 1535 compared to 1869 minutes per week ($p<0.001$), a relative difference of $334/1869 = 18\%$. Both males and females from the RA population reported significantly less minutes of physical activity per week than the males and females from the general population. In addition, the mean number of

minutes of physical activity per week in the age category 45–64 years was significantly lower in the RA population compared to the general population, whereas there were no significant differences in the age category ≥ 65 years. The differences in the age category 45–64 years remained significant in a separate analysis among females but not among males (difference females: 346 min./wk, $p=0.004$; difference males: 287 min./wk, $p=0.20$; data not shown).

Analysis of the differences between the RA population and the general population by education level showed that in general the RA patients reported less minutes of physical activity per week, with the differences within the pre-vocational and vocational colleges and universities levels being significant.

Furthermore, the classification of physical activities based on Ainsworth's compendium into light, moderate and vigorous intensity activities, shows that the mean time spent within the various activity categories was lower among the RA population compared to the general population all but one categories (Table 3). Significant differences were found within the moderate activity category for both age groups and in the light activity category for the age group 45–64 years.

Discussion

This study showed that the proportion of patients with RA meeting the Dutch physical activity recommendation was similar to that of the general Dutch population. However, with respect to the total minutes of physical activity per week, the RA patients were less physically active compared to the general population.

With respect to the comparison of proportions of people meeting physical activity recommendations, our results are in line with those of previous studies, where the differences were consistently small (9–12). In contrast, with respect to the absolute amount of time spent on physical activity, indeed significant differences were seen, which finding is similar to those of the one other study that compared energy expenditure among RA patients and healthy people (14). The discrepancy between the outcomes of the two methods we used indicates that measuring physical activity by means of classifying individuals into two categories (meeting recommendation or not) may be a too rough and in inaccurate method to compare physical activity levels.

Table 2. Proportions of persons meeting the Dutch public health recommendation for physical activity and the mean number of minutes of physical activity per week reported both for the RA population (n=232) as well the general population with the same age range (≥ 45 years)

	RA population		General population †		P-values	
	Meeting recommendation (%)	Minutes per week (mean (SD))	Meeting recommendation (%)	Minutes per week (mean)	Meeting recomm.	Minutes per week
Total	58	1535 (1190)	58	1869	0.95	<0.001*
Sex						
Male	67	1495 (1242)	58	1929	0.13	0.01*
Female	55	1551 (1172)	58	1812	0.37	0.01*
Age group						
45–64 years	59	1836 (1214)	59	2199	0.95	0.001*
≥ 65 years	57	1115 (1023)	57	1218	0.95	0.33
Education level						
Primary	49	1274 (1221)	43	1322	0.36	0.78
Pre-vocational	62	1359 (1201)	60	1747	0.73	0.01*
Junior general secondary	64	1918 (1181)	61	1730	0.72	0.30
Senior general secondary	64	1691 (1147)	60	1983	0.63	0.14
Vocational colleges, universities	53	1701 (1030)	65	2196	0.18	0.01*
Employed	65	2577 (988)	56	2433	0.19	0.29
Living alone	46	1244 (1243)	53	1456	0.32	0.26

† Data of the general population are retrieved from database 2 (see description in Methods section).

* $p < 0.05$, Chi-square test (meeting recommendation) or one sample T-test (minutes per week)

Table 3. Total time spent on light, moderate and vigorous activities (minutes per week) of the RA population (n=232) and the general Dutch population within two age ranges

Type of activity #	RA population (mean (SD))	General population † (mean)	P-value
45–64 years			
Light	1297 (1009)	1495	0.01*
Moderate	369 (543)	517	0.01*
Vigorous	170 (257)	187	0.44
≥ 65 years			
Light	634 (795)	618	0.85
Moderate	231 (244)	304	0.01*
Vigorous	250 (417)	296	0.28

† Data of the general population are retrieved from database 2 (see description in Methods section).

Classification based on the Ainsworth's compendium of physical activities (18) (light intensity: <4 MET for ages 18–54 years and <3 MET for ages ≥ 55 years; moderate intensity: 4–6,5 MET for ages 18–54 years and 3–5 MET for ages ≥ 55 years; vigorous intensity: ≥6,5 MET for ages 18–54 years and : ≥5 MET for ages ≥ 55 years) (18)

* =p<0.05, one sample T-test

With respect to the proportions meeting the physical activity recommendations, there are a number of reasons why it is difficult to compare the proportions found in previous studies with the proportions found in our study. Firstly, the definitions used in the US studies included vigorous physical activity, with people meeting the physical activity recommendation if they participated in either moderate-intensity activity at least 30 minutes per day on 5 or more days per week *or* vigorous-intensity activity at least 20 minutes per day on at least 3 or more days per week. The definition of the Dutch public health recommendation for physical activity does not include vigorous activities. If vigorous activities had also been included in the present study, it is conceivable that the percentages of people meeting the physical activity recommendations would have increased in both the patient and the general population, while it remains unknown to what extent this would have influenced the difference between the two groups. Secondly, direct comparisons may be biased because the studies from the US included people who reported (doctor-diagnosed) arthritis, whereas we confined our study population to only those persons with rheumatologist-diagnosed RA. Thirdly, in all 3 studies from the US, data were gathered among patients and healthy persons by means of the same survey, whereas in our study, despite the use of similar questionnaires, different recruitment methods were used among patients and the general population.

Despite the potential shortcomings of direct comparisons among the data from the present study and the data from other studies, the proportions of people meeting the physical activity recommendations appear to be higher in the present study than in any of the abovementioned papers. It could be hypothesised that cultural differences may play a role in this observation. For example, riding a bicycle or walking is a rather common means of transportation in many European countries, whereas it is less incorporated in other cultures such as the one in North America. Moreover, in general, European residents appear to enjoy a healthier lifestyle than people from the US (20;21).

With respect to the average amount of minutes of physical activity per week, little data are available for comparison. In the present study it was found that RA patients were physically active for 1535 minutes per week, which equals 25.6 hours per week. Similar results were found by Greene et al (22) who reported people with OA or RA being physically active for 23.8 hours per week and by Semanik et al (23) who reported 23 hours per week of physical activity among people with RA. However, in the studies by Greene et al (22) and Semanik (23) et al no comparisons with the general population were made.

The study of Roubenhoff et al (14), in which the total energy expenditure of both RA patients as well as health controls was measured by means of doubly labelled water, showed that the results found in this study resembles our results. The mean energy expenditure among RA patients found in this study was 9133 kJ/day compared to 10477 kJ/day among the controls, a relative difference of 13% ($1344/10477$). In our study the relative difference between RA patients and the general population regarding the total time spent on physical activity was 18%, indicating that the less time spent on physical activity by the RA patients found in our study appeared to be on the same scale as the lower total energy expenditure found by Roubenhoff and his colleagues.

A limitation of the present study, was the selection of patients, who were all recruited in one specific region in the Netherlands (Leiden). Therefore, our data may not be a representative sample of all Dutch RA patients. Moreover, as is the case in most of the available studies on this topic, data were gathered by means of self-report, and self-reports are subject to biases.

Furthermore, one should bear in mind that the general population in our study included patients with RA as well, as RA occurs in 0.5–1.0% of the adult population (24). When physical activity levels of the RA population would have been compared with levels of a population with patients with RA excluded, the differences we found may have been larger.

Another limitation of this study was the fact we had access to data of the general Dutch population on an aggregated level only. Because raw data of this population were not available and the fact that these data had to be retrieved from two separate databases in some cases we could not present the data the way we wanted it to be presented. In addition, this limitation restricted the statistical analyses we were able to conduct. Performing multivariable analyses and identifying potential confounding effects would have been very much desirable in this epidemiologic study. However, in order to be able to perform such statistical analyses, a different type of study would be needed. In such a study data from a large and representative sample of the general population should be collected containing questions about both physical activity levels as well as the presence of (doctor diagnosed) arthritis. However, such studies often have a large time span and in general are rather costly.

In conclusion, the results of our study showed that, although the proportion of patients with RA meeting the recommendations for physical activity was almost equal to the proportion found in the general population, the amount of minutes of physical activity per week was significantly lower among the RA population. If physical activity levels would have solely been assessed by measuring whether people meet the physical activity recommendation or not, the difference could have been overlooked. This is worrisome, as patients with RA have an increased risk of a number of chronic conditions such as cardiovascular diseases and osteoporosis because of their arthritis. Therefore, it remains very important for health care professionals such as rheumatologists, physical therapists, and clinical nurse specialists to promote physical activity among these patients in their daily clinical practice. Strategies to increase physical activity levels should include helping patients to overcome individual, disease-related and general barriers for physical activity which have been proven to play a role among patients with RA, such as fears for aggravating the disease, pain, fatigue, lack of motivation, lack of perceived benefits and self-efficacy (25–28). Moreover, patients should be encouraged to incorporate physical activity in activities of daily life (ADL) as much as possible, as such strategies have proven to produce beneficial long-term effects (29;30) and to be more cost-effective than structured physical activity programs (31). Furthermore, if physical activity interventions are to be more widely adopted in RA care, training in skills for health care professionals such as group facilitation, problem solving, goal setting, and cognitive-behavioural techniques need to be enhanced (32).

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