

Benefits of exercise on physical and mental health in rheumatoid arthritis patients

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Abstract

Purpose: Physical inactivity and depression are common among RA patients. Many variables are associated with different levels of mental health, including physical activity. Therefore, this study was designed to demonstrate the benefits of moderate-intensity exercises on physical activity and mental health in RA patients compared to their sedentary counterparts. We also studied the correlation between physical activity and mental health variables, including depression. **Methods:** A total of 22 RA patients were recruited of both sexes and divided on the basis of training status into the following two groups: training group (2 men and 8 women) aged 67±13 years (mean±SD) and sedentary group (11 women and one man) aged 67±9.8 years. The training group attended 45 minutes training sessions, three-five times a week for 6 months. All patients were taking currently treatment with at least one or more disease-modifying antirheumatic drugs (DMARDs) or biologic agents. Blood samples were collected from all patients in order to assess serum C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). The Disease Activity Score (DAS 28) was recorded in all subjects. Physical and mental health was assessed using the Medical Outcomes Study Short Form-36 Health Survey (SF-36). **Results:** Age, sex, disease duration, DAS28 and pain intensity (VAS) were not significantly different between the groups ($p>0.05$). Physical and mental health outcomes significantly improved after 6 months of moderate aerobic training ($p<0.05$). Quality of life was better in the trained subjects, which showed a better life satisfaction and a higher level of physical and social function. In addition, we found that physical activity was negatively correlated with mental and emotional health especially in the training group ($p=0.003$). **Conclusion:** Our results indicate that higher levels of physical activity were associated with improved mental health. Moreover, physical and mental health outcomes significantly improved after 6 months of moderate aerobic training in RA patients.

Keywords: Rheumatoid arthritis, physical activity, mental health.

Rezumat

Scop: Inactivitatea fizică și depresia sunt frecvente în rândul pacienților cu poliartrită reumatoidă (RA). Se cunosc mai multe variabile care pot fi asociate cu sănătatea mentală, inclusiv activitatea fizică. Prin urmare, acest studiu își propune să demonstreze beneficiile exercițiilor fizice de intensitate moderată asupra sănătății fizice și mentale la pacienții cu PR, comparativ cu omologii lor sedentari. De asemenea, ne propunem să analizăm corelația dintre activitatea fizică și sănătatea mentală, inclusiv depresia. **Metode:** Au fost luați în studiu 22 de pacienți, de ambele sexe, cu PR care au fost împărțiți în funcție de nivelul lor de pregătire fizică în două grupuri: grup activi fizic (2 bărbați și 8 femei) cu vârsta de 67 ± 13 ani (medie ± DS) și grup sedentar (11 femei și un barbat) cu vârsta de 67 ± 9.8 ani. Grupul de pacienți activi fizic au participat timp de 6 luni, de trei-cinci ori pe săptămână la un program de antrenament de 45 de minute. Toți pacienții luați în studiu erau în tratament cu cel puțin unul sau mai multe medicamente antireumatice modificatoare de boală (DMARDs) sau cu agenți biologici. Au fost colectate probele de sânge la toți pacienții, pentru a evalua proteina serică C reactivă (CRP) și viteza de sedimentare a hematiilor (VSH). A fost determinat scorul de activitate al bolii (DAS 28) la toți subiecții. Sănătatea fizică și mentală a fost evaluată cu ajutorul chestionarului SF-36. **Rezultate:** Vârsta, sexul, durata bolii, DAS28 și intensitatea durerii (VAS) nu au fost semnificativ diferite între cele 2 grupuri ($p> 0,05$). Rezultatele chestionarului de evaluare a sănătății fizice și mentale s-au îmbunătățit semnificativ după 6 luni de antrenament aerobic moderat ($p<0,05$). Calitatea vieții a fost mai bună în cazul subiecților activi fizic, care au prezentat o satisfacție de viață mai bună și un nivel mai ridicat al funcției fizice și sociale. În plus, activitatea fizică a fost corelată negativ cu sănătatea mentală și emoțională mai ales în grupul subiecților antrenați ($p=0,003$). **Concluzii:** Rezultatele noastre indică faptul că un nivel ridicat de activitate fizică se asociază cu îmbunătățirea sănătății mentale. Mai mult, sănătatea fizică și mentală s-au îmbunătățit semnificativ după 6 luni de antrenament aerobic moderat la pacienții cu PR.

Cuvinte cheie: artrita reumatoidă, activitate fizică, sănătate mentală

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Introduction

Rheumatoid arthritis (RA) is an autoimmune connective tissue disease of unknown etiology characterized by symmetric erosive synovitis causing severe joint damage. In addition, several organs such as lung, vessels and the hematopoietic system may be involved.

Depression is commonly reported in RA patients (1) and has been associated with increased pain (2), fatigue (3), reduced health-related quality of life (4), increased levels of physical disability (5). Yet up to 42% of RA patients develop mild-to-severe depressive symptoms (6)

Factors that have been linked to depression in RA patients include: duration of illness, pain, functional deficit, socioeconomic and psychological factors (6). However, the relationship between depression and pain, fatigue or disability, seems to be bidirectional. Thus it has been shown that fatigue, pain and physical disability are predictive factors for depression in RA patients (7,8). Moreover, depression predicts pain among patients with inflammatory arthritis (9).

Depression also impacts physical activity and may cause fear of movement, deconditioning of the body, loss of natural endorphins and consequently increased pain.

In fact several studies have demonstrated that exercise training can decrease depressive symptoms in adults with RA and could be recommended as part of an overall treatment plan that may also include education and/or pharmacotherapy (10).

Although, there are divergent opinions about which type of exercise is recommended to maintain physical and mental health, most agree that moderate to high-intensity exercise programs are safe and beneficial in RA patients. Furthermore, moderate or high-intensity exercises were found to improve aerobic capacity, muscle strength, stiffness and functional ability (11-14).

However, a recent study suggests caution in prescribing long-term high-intensity exercises to RA patients who have significant radiologic damage of large joints.

Currently there is a wide range of exercise options for individuals with RA including strength training, aerobic and range of motion (flexibility) exercises.

The present study is aiming to demonstrate the benefits of moderate-intensity exercises on physical activity and mental health in RA patients compared to their sedentary **counterparts**.

Material and methods

We investigated 22 patients who met the American College of Rheumatology criteria for RA disease. Participants were categorized on the basis of age, sex and training status into the following two groups: training group (2 men and 8 women) aged 67 ± 13 years (mean \pm SD) and sedentary group (11 women and one man) aged 67 ± 9.8 years.

A written informed consent for participation was obtained from each subject prior to enrolment. All subjects completed a comprehensive screening medical evaluation, including a medical history, physical examination and resting ECG.

The training group attended 45 minutes training sessions, three-five times a week for 6 months.

Physical activities allowed were the following: aquagym, walking, cycling or aerobic class participation. All patients were instructed to record the exercise intensity by using a Polar RS800 heart rate monitor in order to adjust and maintain the intensity at 60–85% of the individual maximum heart rate calculated by using the formula $220 - \text{age}$. The sedentary group did not receive any intervention.

Patients were included in this **study** only if they met all of the **following criteria**:

1. Adults aged > 40 years,
2. Definite diagnosis of RA according to the 1987 ACR criteria,
3. Active disease (DAS28 VSH > 2.4),
4. Disease duration more than 1 year,
5. Treatment with at least one or more disease-modifying antirheumatic drugs (DMARDs) or biologic agents but no cortisone,
6. Subjects were able to tolerate physical exercises.

The exclusion criteria's were: cardiopulmonary diseases, hypertension, diabetes treated by insulin, impaired cognitive function, neuromuscular disease, claudication, severe musculoskeletal problems affecting the lower extremity or spine.

Blood samples were collected from all patients in order to assess serum C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR).

The Disease Activity Score (DAS 28) was calculated based on factors like the number of tender, swollen joints, laboratory tests of inflammation and the patient's general health.

All subjects completed a well known questionnaire of general health status - the Medical Outcomes Study Short Form-36 Health Survey (SF-36). This question-

nnaire measures 8 health dimensions: physical functioning (PF), role limitations due to physical health (RP), body pain (BP), general health perceptions (GH), vitality (VT), social functioning (SF), role limitations due to emotional health (RE), mental health (MH).

Pain intensity was self completed by each patient on a single-item scale (Visual Analog Scale). This scale is most commonly anchored by “no pain” (score of 0) and “pain as bad as it could be” or “worst imaginable pain” (score of 10). Respondents were asked to report “current” pain intensity or pain intensity “in the last 24 hours.”

All results were expressed as the mean±SD. Comparisons between groups were evaluated with a paired t-test. The relationship between the measured variables was evaluated by linear regression, performed with GraphPad Prism version 5. A p value <0.05 was considered necessary for establishing statistical significance between values

Results

The characteristics of the study population are included in Table 1.

Table I. The characteristics of the study population

	Sedentary group (SG)	Trained group (TG)	p
Age (years)	67±9.8	67±13	0.47
Female/Male	11//1	8/2	0.22
Disease duration (years)	12±7.3	14±11	0.25
DAS28	3.9±1.4	3.3±1.1	0.13
Pain VAS	3.3±1.4	3.2±1.1	0.34
SF 36 PCS	32±5	39±11	0.03*
SF 36 MCS	32±5.4	39±13	0.04*

Mean values ± standard deviation

In the sedentary group 30% patients were treated with DMARDs while 70% subjects received biologic drugs. Contrary, in the training group 38% subjects were taking biologic drugs and 62% patients - DMARDs.

Consequently, the lower adherence to the biologics drugs observed in the training group can be explained due to the appearance of side effects that led to **withdrawal** of the **biologic** drugs.

Age, sex, disease duration, DAS28 and pain intensity (VAS) **were not significantly different** between the

groups (p>0.05) (Table 1). The mean value of disease activity remains > 2.6 in both groups.

Physical and mental health outcomes were improved in the training group (p <0.05)(Fig. 1, 2).

After completing the comparative study, correlation analyses were performed separately within the two groups.

In the sedentary group we found that physical activity was negatively correlated with mental health variables, including depression (p=0.02) (Tables 3, 4, Figure 3).

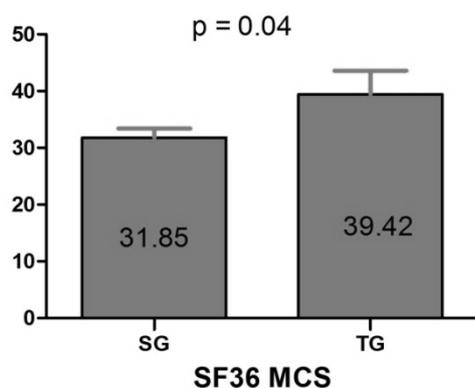


Figure 1. Mental health outcomes in sedentary compared to trained subjects

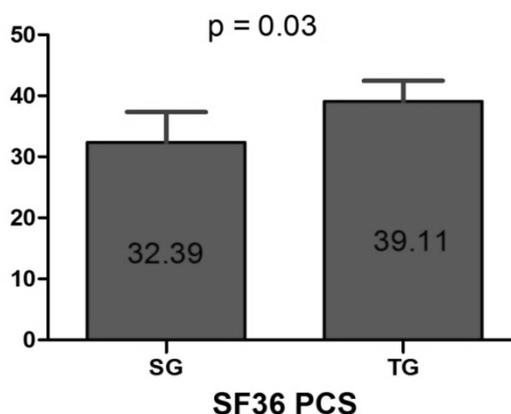


Figure 2. Physical health outcomes in sedentary compared to trained subjects

Table 3. Correlation between SF36 PCS and studied parameters in sedentary subjects

	Variable	R ²	p
SF36 PCS SG	Age	0.14	0.11
	Sex	0.09	0.16
	Disease duration	0.03	0.42
	VAS	0.18	0.08
	DAS28	0.12	0.13
	SF36 MCS	0.34	0.02*

Table 4. Correlation between SF36 MCS and studied parameters in sedentary subjects

	Variable	R ²	p
SF36 MCS SG	Age	0.017	0.34
	Sex	0.076	0.19
	Disease duration	0.013	0.36
	VAS	0.032	0.30
	DAS28	0.002	0.45
	SF36 PCS	0.34	0.02*

Table 5. Correlation between SF36 PCS and studied parameters in trained subjects

	Variable	R ²	p
SF36 PCS SG	Age	0.61	0.06
	Sex	0.15	0.13
	Disease duration	0.18	0.12
	VAS	0.13	0.15
	DAS28	0.09	0.19
	SF36 MCS	0.63	0.003**

Table 6. Correlation between SF36 MCS and studied parameters in trained subjects

	Variable	R ²	p
SF36 MCS SG	Age	0.67	0.07
	Sex	0.009	0.30
	Disease duration	0.32	0.05
	VAS	0.11	0.17
	DAS28	0.08	0.20
	SF36 PCS	0.63	0.003**

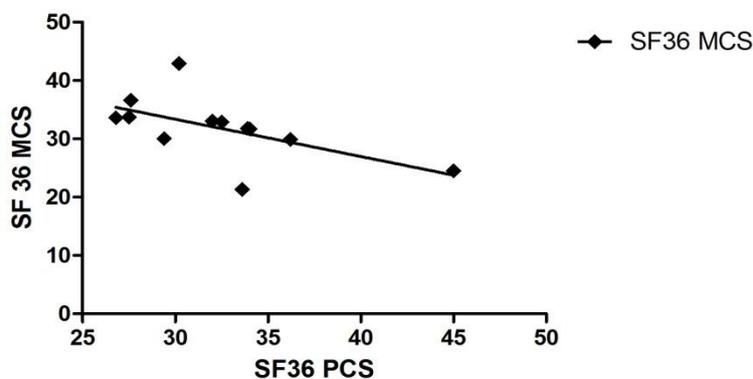


Figure 3. Correlation between SF36 PCS and SF36 MCS in trained subjects

After 6 months of moderate aerobic training, the subjects included in the training group recorded better physical and health measures outcomes than their counterparts. We observed that physical activity was negatively correlated with mental and emotional health (Tables 5, 6) ($p=0.003$).

Discussion

This study was designed to demonstrate the benefits of moderate-intensity exercises on physical activity and mental health in RA patients compared to their sedentary counterparts. We studied the correlation between physical activity and mental health variables, including depression.

Many studies have found that physical activities are negatively associated with mental disorders, especially depression, anxiety and mood disturbance (15, 16). The benefits of exercise for patients with RA have been demonstrated in a variety of well-controlled studies.

Regular aerobic exercise (such as walking, swimming, supervised aerobic exercise classes and cycling) has been shown to improve muscle function, the stability of joints, endurance and physical functioning and performance. Additionally, aerobic exercise can result in improvements in pain control and overall quality of life for patients with RA.

Resistance training may be particularly important because they have been shown to be useful in preventing bone loss (osteoporosis) which can result from the RA disease process as well as from long-term steroid treatment.

In our study physical and mental health outcomes significantly improved after 6 months of moderate aerobic training. Quality of life was better in the trained subjects, which showed a better life satisfaction and a higher level of physical and social function.

Moreover, we found that physical activity was negatively correlated with mental and emotional health especially in the training group.

Our finding that training exercise improves physical and mental scores in RA patients was consistent with other results showing that increased physical activity reduced depression (10-14).

Given these findings, it seems warranted to advise patients with RA to remain physically active and to incorporate regular physical activity into their everyday life.

Active RA patients can achieve and maintain optimal health and physical functioning. Regular exercise can be useful in managing many of the symptoms that affect people with RA including fatigue, stiffness, pain and depression. In RA, training programs as part of an overall treatment plan may also include combined range of motion, strength and aerobic exercises.

In light of the reviewed studies, the goal for the intensity level of the aerobic exercise should be moderate to hard (i.e., 60–85% of maximum heart rate), and exercise be performed 3 times weekly for a duration of 30–60 minutes.

Focused research is required to identify the optimal regimens, timing and intensities for exercise that will facilitate long-term adherence to an active lifestyle of RA patients.

Conclusions

Rheumatoid arthritis has a significant impact on quality of life and is associated with a high incidence of mental disorders including depression.

In our study physical and mental health outcomes significantly improved after 6 months of moderate aerobic training in RA patients.

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