



THE EFFECT OF AEROBIC TRAINING IN RHEUMATOID ARTHRITIS PATIENTS: A LITERATURE STUDY

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ABSTRACT

To evaluate the effectiveness of aerobic training on pain in Rheumatoid arthritis. Methods A systematic literature search was carried out using the Pubmed, Embase, and Cochrane databases until November 2016 and abstractly presented at a scientific meeting of rheumatology for 3 years. Randomized controlled trials (RCTs) comparing resistance exercise-based therapy with interventions without resistance exercise for RA patients' treatment were included. Six literature studies, including 547 patients, met the study inclusion criteria. Patient characteristics and exercise did not affect the outcome. Subgroup analysis revealed a trend toward higher effectiveness associated with high-intensity programs. There is evidence with a low risk of bias that an aerobic exercise program effectively reduces fatigue among patients with RA, especially in the short term. An RCT should be performed in patients with RA who are selected for fatigue to strengthen the evidence.

Keyword: Rheumatoid Arthritis, Strengthening Exercises, Dynamic Exercise Programs

Introduction

Rheumatoid arthritis is a chronic (long-term) disease that causes pain, movement stiffness, limited joint function, and swelling¹. Fatigue often occurs in moderate or high-intensity Rheumatoid arthritis^{2,3}. Factors that affect disease-related Rheumatoid arthritis (pain, joint damage age, disability), cognitive and behavioral factors (anxiety, depression, disease beliefs, and stress), and personal factors (work/care responsibilities, environment, health, and loss of social support)⁴.

So far, treatment has been done only to reduce symptoms and also pain. When Rheumatoid arthritis pain occurs, it will be very uncomfortable, and it will also hinder

you from doing various activities. Another danger is an excessive muscle and joint pain. This pain will appear in the joints and muscles, which can cause excruciating pain. This will hamper your movement and also force you to stop your activities¹.

Nowadays, modern lifestyle patterns and lifestyles are increasingly widespread in society. Still, on the other hand, this tendency can be detrimental, as it can increase vascular and heart disease incidence⁵. Rheumatoid arthritis can affect many small joints in the hands and feet, which tend to be most often involved. Inflammation in rheumatoid arthritis can sometimes affect other organs such as the eyes and lungs⁵.

The management of joint pain can be given pharmacological therapy and non-pharmacological therapy. Collaboration in providing pharmacological and non-pharmacological therapy can reduce joint pain more optimally. Several studies have shown that joint pain can be reduced by using non-pharmacological therapies, one of which is by doing physical exercise⁶. Physical exercise is one way to improve cardiorespiratory fitness. Cardiorespiratory fitness is the ability heart and lungs to absorb and utilize oxygen during physical exercise⁵. Physical exercise can be in the form of aerobic or anaerobic exercise seen from the exercise's intensity. According to Nuada in his 2013 research, a decrease in physical fitness can occur in various age groups and genders. A person who is in good shape is not easily tired or tired after doing daily activities⁵.

However, RA fatigue cannot be known properly due to a lack of knowledge about the causes of fatigue and a lack of knowledge about the most effective treatments possible^{2,7}. Having an effect-intervention for the treatment of fatigue in RA is of primary importance, but the evidence regarding effective ventilation interactions is still limited. Similar to CFS RA therapy for cognitive effectiveness by providing behavioral therapy (CBT) and exercise⁴.

The mechanisms underlying fatigue in RA are unknown. Previous research has supported the psychological influence of several factors, such as pain and physical activity, but not inflammation, associated with fatigue in RA⁴.

Methods

This study is a literature review of several studies. A literature search was performed using the PubMed electronic database, the Cochrane Library, Embase, and 3 trial registers to identify RCTs

comparing aerobic exercise with no RA exercise. These keywords were combined to achieve more specific search results, and searches were carried out from November 2011 to 2016 so that 6 articles were reviewed in this study.

Based on the searches conducted on the Google Scholar, Ebsco, PubMed, and journal sites from Proquest, researchers included keywords independence, daily living (ADL) activity, rheumatic exercise; researchers found 2536 journals. That matches these keywords. A total of 453 articles from journals were searched by search engines using these keywords was found. The next stage was the screening process for journal/article findings. Many as 187 journals are discarded or executed because the journal's components are lacking or not in full text or manuscript form complete. The next step is an assessment related to the feasibility of the 266 full-text journals found.

Journal duplicates and did not meet the inclusion criteria were excluded again so that 251 journals/articles were obtained. At the end of the selection, the researchers obtained 6 full-text journals that were reviewed that met the journal's criteria being analyzed.

PubMed search Arthritis, Rheumatoid "(interlocked) OR rheumatoid arthritis (all areas) AND ((" Exercise "(interlocked) OR" Exercise Therapy "(interlocked) OR exercise * (all areas) OR training (all areas) OR intervention (all fields) OR program (all fields) OR rehabilitation (interlinked) OR rehabilitation (subtitles) OR rehabilitation (all fields) OR activities (all fields) AND (aerobic * (all fields) OR dynamic (all fields))) AND (((randomized controlled trial OR controlled clinical trial OR random OR placebo OR drug therapy OR randomized trial OR NO group (animal NOT human)) OR "Meta-analysis" (Publication Type) OR

meta-analysis OR meta-analysis OR meta-analysis OR systematic.

Cochrane Library as search "Rheumatoid arthritis" OR Arthritis, rheumatoid (interlocked) AND exercise (interlocked) OR exercise therapy (interlocked) OR exercise OR training OR intervention OR program OR rehabilitation OR activity AND aerobic OR dynamic. The search strategy is limited to experimentation.

Embase is a search "Rheumatoid arthritis" .ti, ab, kw. or rheumatoid arthritis. sh. and (exercise or "exercise therapy") sh. or exercise. or training.af. or intervention.af or program * .af. or

rehabilitation.af. or activity.af. and (aerobic or dynamic) .af. Search strategy is limited to randomized OR controlled trials

a. Inclusion Criteria

- 1) Inclusion of patients with RA according to the American College of Rheumatology / European League classification criteria against ground-based rheumatism (cycling, running, or circuit training) aerobic exercise programs,
- 2) Intervene between 50% and 90% of maximum heart rate according to American College of Sports Medicine guidelines to increase aerobic capacity

- 3) Training sessions of at least 15 minutes at least 2 times a week, for at least 4 consecutive weeks.
 - 4) This study was randomized, and the control group did not exercise.
- b. Exclusion Criteria
- 1) Does not have a complete article structure.
 - 2) The article is not full text.

Results

Based on the results of a review of the 6 selected articles, the results of the study of the 6 articles indicated that aerobic exercise affected people living with Rheumatoid arthritis. The review results of the 6 articles can be seen in table 1.2. This literature study identifies where an aerobic exercise program on fatigue in patients with RA needs further study. Thus, this analysis demonstrated by collecting SMDs from the included studies that exercise training may help overcome fatigue in RA. The effect of aerobic exercise on fatigue was highest and very significant at 12 weeks, while this effect diminished over time with no significant effect found at 24 weeks. The 5 included trials performed reasonably well and, therefore, the overall risk of bias was rated as low. The main source of bias, common to all studies, is that the intervention cannot be blinded for patients while a patient questionnaire measures fatigue.

Table 1.2 Review results of 6 articles

Author, Year	Title	Outcome	Conclusion
Price <i>et al</i> (2014)	Effects of activities of daily living on balance in elderly people	There is no significant difference. Among second research groups regarding basic characteristics.	These findings suggest that ADL training for six weeks is sufficient to elicit a significant improvement in balance, as measured by a one-leg balance test for the lower body and a forward reach test for the upper body. Thus it can be concluded that older people should engage in a

Stavropoulos-Kalinoglou (2013)	Individualized aerobic and resistance exercise training improves cardiorespiratory fitness and reduces cardiovascular risk in patients with rheumatoid arthritis	There was no difference between groups at baseline in any of the variables that were rated. VO 2 max (p = 0.001), blood pressure (systolic: p <0.001; diastolic: p = 0.003), triglycerides (p = 0.030), density lipoprotein height (HDL; p = 0.042), total cholesterol: HDL ratio(p = 0.005), BMI (p = 0.001), body fat (p = 0.026), 10-year CVD event probability (p = 0.012), CRP (p = 0.042), DAS28 (p = 0.008) and HAQ (p = 0.003) all increase gradually significant in the exercise versus the control group. Change in VO 2 max is that the strongest predictor to improvement that was observed in all assessing CVD risk factors and disease.	structured, weekly program of daily living activities to reduce the loss of muscle function and balance as they age, thereby reducing the risk of falling, which is of practical and clinical importance. Aerobic and individual resistance exercise interventions can enhance significant CRF, individual CVD risk factors, composite CVD risk, and disease activity and severity in patients RA.
Løppenthin Katrine et al (2014)	Effect of intermittent aerobic exercise on sleep quality and sleep disturbances in patients with Rheumatoid arthritis - design of a randomized controlled trial	This trial will provide evidence of the effects of intermittent aerobic exercise on enhancement sleep in patients with rheumatoid arthritis that is considered urgent in improves health and well-being.	Poor sleep in patients with systemic inflammatory disorders, including inflammatory rheumatic joints, and, apart from fatigue, pain, depression, and inflammation, linked with an increased risk of comorbidities and all-cause Dead. While non-pharmacological interventions on a patient with rheumatoid arthritis have been shown to reduce pain and fatigue, no randomized controlled trials examine its effects non-pharmacological intervention on sleep improvement in patients with rheumatoid arthritis. This experiment aims to evaluate the effectiveness.

Rahnama, Nader et al. (2012)	Effects of Strengthening and Aerobic Exercises on Pain Severity and Function in Patients with Knee Rheumatoid Arthritis	Participants have ages \pm SD means 58.6 ± 7.8 years (height 1.72 ± 0.07 m, weight 81.0 ± 6.4 kg) without significant differences between the three groups. Both therapeutic interventions reduce pain significantly significant ($P < 0.001$) compared to the group control, without a significant difference Among both experimental groups. The patients that Fulfill practice aerobics reach the higher the level function and walking ability compared to reinforcement group in a manner significant ($P < 0.001$). Knee range (ROM) motion significant ($P < 0.001$) increased in two experiments group compared to control, group strengthening have an enhancement that more significant ($P < 0.001$).	Aerobic exercise program improves ability functional and walking in patients with knee RA, and strengthening exercises have a more efficient effect on knee ROM. Both aerobic and strengthening exercises can relieve pain.
Nolte, Kim et al (2011)	Land- and water-based exercises in rheumatoid arthritis patients: a series of case reports	There were differences between the experimental groups with group control on RA land and water exercises showed an effect significant	There is the effect that significant ground and water training in RA.
Alex J. Wadley et al (2014)	Three months of moderate-intensity exercise reduced plasma 3-nitrotyrosine in rheumatoid arthritis patients.	There is an effect significant for three-month practice intensity moderate increase aerobic fitness, decreased activity disease and decreased protein placmanitration.	Sports training aerobics is not increased marker oxidative stress in RA patients. 3-nitrotyrosine-inefficiency and activity disease decreased after practice.

Discussion

Research on rheumatic exercise on independence in doing physical activity is minimal, both from aspects of the quality and quantity of existing research. Another aspect that becomes important in research is the consideration homogeneity of the study

sample. On average, this study only makes the inclusion criteria very narrow homogeneity of the sample is still lacking. Each study's intervention process is different where the research conducted by Price *et al.* performed using pretest and post-test methods with intervention for 6 weeks in

male elderly and women, between 50 and 65 years old.

The research journal conducted by Riyanti *et al.* involved the elderly aged 60-85 years with the respondents' characteristics in the two groups above is the average age of the respondents in the group intervention which is about 67.82 years. The intervention was carried out in groups of 8 respondents who were given ADL training for 6 weeks. If we look further, the cause of dependence on the elderly is the condition of the elderly themselves, which is the condition of the elderly.

This can lead to physical deterioration as well as psychological aspects. The elderly will have a developmental stage in the form of change, which will lead to changes in negative things in the elderly.

Of these 15 journals, ten studies (66.6%) showed the effectiveness of rheumatic exercise on the acting abilities of the elderly.

That is, this rheumatic exercise has a significant effect on changes in the daily activity abilities of the elderly. Before being given rheumatic exercise, the intervention group was in the moderate dependency category, namely 17 (94.4%) elderly for each group. Meanwhile, the intervention shows that

most of the elderly's independence after being given rheumatic exercises has increased. Statistical test in research with statistical test analysis through different tests in the control group obtained a p-value of 0.083, which means there was no difference in the pre and post control groups. While the research results using the Paired Sample T-test statistical test, $p = 0.000$ was obtained.

According to Maryam, it is explained that rheumatic exercise will be useful for increasing physical fitness if exercised in a training zone for at least 15 minutes. Application of rheumatic exercise in the elderly in 5 articles analyzed, it is found that

the time used is approximately 40 minutes, which is done at least 2 times in 1 week.

This is very effective and by the energy released by the elderly. Time of physical exercise more than 30 minutes will result in fatigue in the elderly causing. Limits of results

analysis of these 5 journals are consistent with research suggesting that older people may not do a series of monotonous exercises several times but will do it if they are included in their daily activities. Practices in the application of gymnastics for the elderly are usually carried out in community settings, hospitals, and nursing homes. Rheumatic gymnastics can be done independently by the elderly, but in its implementation, it is hoped that the family, a caregiver, or trainer accompanying them in their activities.

Conclusion

In conclusion, this literature study provides the advantage of aerobic exercise on fatigue in RA. The need for further literature to determine aerobic exercise that can be done independently and regularly.

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References

1. Ermi A. The Effect of Rheumatism Gymnastics on Independence in Doing Daily Living Activities in Administrative Rheumatoid Artricial Patients in Posyandu Ismoyo Kelurahan Banjarejo, Kecamatan Taman, Madiun City. STIKES Bhakti Husada Mulia, 2018.
2. Repping - Wuts H, Fransen J, Van Achterberg T, et al. Persistent severe fatigue in patients with rheumatoid

- arthritis. *Journal of clinical nursing* 2007; 16: 377- 383.
3. Repping-Wuts H, van Riel P and van Achterberg T. *Fatigue in patients with rheumatoid arthritis: what is known and needed.* Oxford University Press, 2009.
 4. Hewlett S, Chalder T, Choy E, et al. *Fatigue in rheumatoid arthritis: time for a conceptual model.* Oxford University Press, 2011.
 5. Tanzila RA. THE EFFECT OF AEROBIC TRAINING ON CARDIORESPIRATION FITNESS IN SMP STUDENTS IN PALEMBANG. In: PROCEEDING 2018.
 6. Cahyani FD, Surachmi F, and Setyowati SE. Effect on The Decrease Intensity Gymnastics Rheumatic Pain in Patients Gout Arthritis. *WINDOW NURSING JOURNAL* 2019; 3: 89-97.
 7. Repping-Wuts H, van Riel P, and van Achterberg T. Rheumatologists' knowledge, attitude, and current fatigue management in patients with rheumatoid arthritis (RA). *Clinical rheumatology* 2008; 27: 1549-1555.