

## STUDY ON THE IMPACT OF PHYSIOTHERAPY EXERCISE ON RHEUMATOID ARTHRITIS PATIENTS

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### ABSTRACT

**Background:** Rheumatoid arthritis (RA) is a chronic inflammatory disease with a prevalence around 0.8 (range: 0.3–1.0) per 100 adults, and a peak in onset of disease between 55 years and 64 years of age. It has a high societal impact due to treatment requirements and losses in productivity which, mainly affects the synovium of peripheral joints, with significant impact on quality of life, regarding the social, economic and psychological aspects. **Objective:** The study carried to assess the impact of physiotherapy exercise on rheumatoid arthritis patients. **Patients and methods:** The sample consisted of 50 cases 42 of them are females, and 8 of them are males, patients' age ranges from 22-75 years. In this research the impact of physiotherapy on quality of life in patients with rheumatoid arthritis was investigated using the Index of disease activity: Disease Activity Score (DAS) and Health Assessment Questionnaire (HAQ). **Results:** The study demonstrated significant increment between baseline and post exercise between (5.06±0.844) and (4.764±0.973) respectively (P -value 0.01) for DAS scores and (1.144±0.111) baseline and (1.085±0.148) post-exercise (P- value= 0.014) for HAQ scores. This increment was as a result to exercise which helps to decrease disability, functional capacity impairment and joint count. The positive impact on both functional capacity and disability is likely to be clinically relevant.

**Keywords:** Rheumatoid Arthritis, Disease Activity Score -28 (DAS-28), Health Assessment Questionnaire (HAQ), Physiotherapy.

### INTRODUCTION

Rheumatoid arthritis (RA) is a chronic inflammatory disease with a prevalence of around 0.8 (range: 0.3–1.0) per 100 adults, and a peak in onset of illness between 55 years and 64 years of age. It has a high societal impact due to treatment requirements and losses in productivity [1].

RA mainly affects the synovium of peripheral joints, with significant impact on the quality of life, regarding the social, economic and psychological aspects [2]. The name early RA comprehends the first few weeks or months of joint symptoms or signs (usually less than 12 months), with the first twelve weeks of disease manifestations being the critical period [3].

Rheumatoid arthritis (RA) is a chronic, autoimmune inflammatory disease of unknown cause. An external trigger (cigarette smoking, infection, or trauma) that triggers an autoimmune reaction, leading to synovial hypertrophy and chronic joint inflammation along with the potential for extra-articular manifestations, is theorized to occur in genetically susceptible individuals [4].

In most patients with RA, the onset is insidious, often beginning with fever, malaise, arthralgias, and weakness before progressing to joint inflammation and swelling [5].

Signs and symptoms of rheumatoid arthritis may include the following [4]:

- Persistent symmetric polyarthritis (synovitis) of hands and feet (hallmark feature)
- Progressive articular deterioration
- Extra-articular involvement
- Difficulty performing activities of daily living (ADLs)
- Constitutional symptoms

The physical examination should address the following:[6]

- Upper extremities (metacarpophalangeal joints, wrists, elbows, shoulders)
- Lower extremities (ankles, feet, knees, hips)
- Cervical spine

During the physical examination, it is crucial to assess the following:

- Stiffness

- Tenderness
- Pain on motion
- Swelling
- Deformity
- Limitation of motion
- Extra-articular manifestations
- Rheumatoid nodules

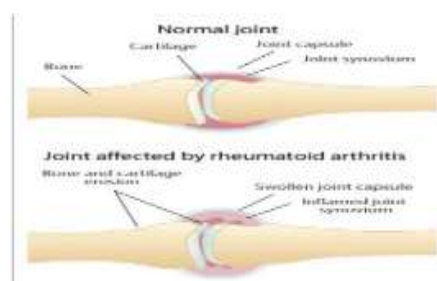


Fig. 1: A: Normal joint, B: Joint affected by rheumatoid arthritis

### Risk factors

Factors that may increase the risk of rheumatoid arthritis include [7]

- Gender: Women are more likely than men to develop rheumatoid arthritis.
- Age: Rheumatoid arthritis can occur at any age, but it most commonly begins between the ages of 40 and 60.
- Family history: It associated with increasing the risk of the disease.
- Smoking: Cigarette smoking increases the risk of developing rheumatoid arthritis, particularly if one has a genetic predisposition for developing the disease. Smoking also appears to be associated with greater disease severity.
- Environmental exposures: Although uncertain and poorly understood, some exposures such as asbestos or silica may increase the risk of developing rheumatoid arthritis. Emergency workers exposed to dust from the collapse of the

World Trade Center are at higher risk of autoimmune diseases such as rheumatoid arthritis.

- Obesity: People who are overweight or obese appear to be at somewhat higher risk of developing rheumatoid arthritis, especially in women diagnosed with the disease when they were 55 or younger.

**The aim of the study is to assess the impact of physiotherapy on rheumatoid arthritis patients.**

## PATIENTS AND METHODS

This study was conducted at Baghdad Teaching Hospital/ Baghdad for six months extending from 1<sup>st</sup> October 2018 to 31<sup>st</sup> March 2019, the sample consisted of 50 cases 42 of them are females, and 8 of them are male, patients' age ranges from 22-75 years.

**In this research, the impact of physiotherapy on quality of life in patients with rheumatoid arthritis was investigated.**

Participants had to meet the following eligibility criteria: (1) were aged 22-75 years, (2) had RA and meet the diagnostic criteria of American College of Rheumatology (ACR) (3) presented no major variations in drug therapy in the past six months (4) did not present severe disability that seriously compromised independence in activities of daily living and mobility.

The exclusion criteria were the following: (1) previous participation in rehabilitation in the past two years, (2) major variations in drug therapy at any time during the trial (3) orthopedic surgery during the trial (4) the usage of an anti-TNF drug, (5) the usage of >15 mg prednisone daily, (6) (7) severe disabling rheumatoid hand deformities.

A consent for participating in this study was taken from all the patients at this stage. A structured questionnaire was applied to each patient to obtain information on age, gender, comorbidities include smoking, heart diseases, lung diseases, diabetes mellitus and hypertension, Index of disease activity: Disease Activity Score In 28 Joints (DAS-28) [8], Health Assessment Questionnaire (HAQ) [9].

Exercises that used were a combination of endurance and resistance training. Each participant had three sessions of exercises per week. DAS-28 and HAQ scores were calculated after 24 weeks of exercises for each patient.

### Exercises for patients include

- Shoulder and back: active range of motion (AROM), rotation, mobilization.
- Elbow: rotation
- Wrist, finger: AROM
- Hip: hip hitches, abductor strengthening, rotation
- Knee: isometric quadriceps strengthening
- Ankle: mobilization

### Statistical analysis

To investigate any change that occur in quality of life in this study groups, statistical analysis was performed using t-test to compare questionnaires scores between baseline and six months post-exercise using Disease Activity Score In 28 Joints (DAS-28) and Health Assessment Questionnaire (HAQ) score, all results were expected as ( mean  $\pm$  SD ), the results are considered statistically significant when (P-value  $\leq$  0.05)[10]

## RESULTS AND DISCUSSION

The study comprised fifty patients with rheumatoid arthritis (RA), forty-two (84%) were females and eight(16%) were males , patients' age group ranges from 22-75 years with mean age(53.2 $\pm$ 10.4) and body mass index(27.58 $\pm$ 12.32) as the condition is two to three times more common in women [10,11] ,it's estimated that 70% of the RA affected by the disease are women .

Rheumatoid arthritis is a chronic, autoimmune inflammatory disease with a female predominance [10,11]. Among all the study

group fifteen(30%) patients were smokers as smoking is a risk factor for rheumatoid arthritis, It has been suggested that the risk of developing RA is almost twice as high in smokers than in non-smokers. More recent studies indicate that the risk is especially high in males who are rheumatoid factor positive, and in both male and female were heavy smokers Smoking boosts inflammation, and RA involves inflammation that's out of control because the immune system attacks the own healthy tissues by mistake, so synovium, the tissue that lines the joints, can get inflamed and thickened. Tobacco smoke includes lots of nasty substances like free radicals. They put stress on the body and can trigger inflammation [12]. The associations of RA with advancing age, smoking, and obesity are consistent with prior studies indicated that advanced age, insurance, regular smoking, diabetes, obesity, and osteoporosis were positively associated with RA. The association of RA with age is well-known, with a peak onset among adults in their sixties [13,14,15]. Why aging is associated with the development of RA is unclear, but current research suggests that immune senescence that occurs with aging can lead to chronic inflammation and immune-mediated tissue damage[16], approximately 66% of persons with RA are obese and apart from the destructive effect of excessive weight on already damaging joints, fat affects the disease process[14]. Excessive fat leads to greater production of inflammatory proteins that increase the joint inflammation due to the disease itself [14]. Obesity and diabetes mellitus are related, and a population-based study in Korea also showed an association between diabetes and RA [15]. The present data indicated obesity conferred a 3-fold increased risk of RA. A recent meta-analysis that included 11 studies found that compared with individuals with a BMI under 30, obese individuals had a significantly increased risk of RA (RR = 1.25, 95% CI [1.07–1.45]) [17]. Compared to normal-weight subjects, the pooled RR for RA in obese individuals was 1.31, and in overweight individuals was 1.15 Body mass index (BMI) was extracted from NHANES examination data. A BMI <18.5 kg/m<sup>2</sup> was defined as underweight, between 18.5 and 24.9 kg/m<sup>2</sup> as normal, between 25-29.9 kg/m<sup>2</sup> as overweight, and  $\geq$ 30.0 kg/m<sup>2</sup> as obese. [10], heart diseases were detected in ten (20%) patients, the increased risk of cardiovascular disease and cardiovascular-related mortality in subjects with RA is well established. Studies have reported that patients with RA exhibit a doubled risk of myocardial infarction and 60% increased risk of cardiovascular mortality compared with the general population. An increased prevalence of traditional risk factors, such as diabetes mellitus, hypertension, obesity, smoking, and physical inactivity, may explain, in part, this excess cardiovascular risk in RA. However, innate as well as adaptive immune mechanisms shared by RA and cardiovascular disease, namely atherosclerosis, have emerged as potential contributors to the heightened cardiovascular risk observed in these patients[18], while twelve(24%) patients had lung diseases and both can be complication of the disease or its treatment, diabetes mellitus is recognized as the most associated comorbidity in this study as fourteen(28%) patients were diabetic and six(12%) patients were hypertensive as shown in table(1), both hypertension and diabetes are common complications of drugs that commonly used in RA treatment like steroids and immune suppressants , the present results were in agreement with other researchers [11].

Table (2) shows the averaged for each component of DAS-28 and HAQ score of study group (mean  $\pm$  SD), the study demonstrated significant increment between baseline and post-exercise between (5.06 $\pm$ 0.844) and (4.764  $\pm$ 0.973) respectively (P-value 0.01) for DAS scores and (1.144 $\pm$  0.111) baseline and (1.085 $\pm$  0.148) post-exercise (P value= 0.014) for HAQ scores [21].

Exercise decreases disability, functional capacity impairment and joint count. The positive impact on both functional capacity and disability is likely to be clinically relevant [22,23].

RA is the second-most common joint disease, causing various physical impairments either as a result of the disease or due to inactivity [24].

RA patients are hesitant to get involved in any form of exercise because of fear of pain and disability. These fears are unfounded as research has shown that regular and controlled exercise for

those whose disease is under control decreases joint pain and stiffness and improves joint mobility, strength and aerobic capacity without exacerbating pain or disease activity in persons with RA [6]. The flexibility findings of this study support the results of previous studies done on patients with RA [25].

**Table 1: Demographic characteristics of the study group**

Variable		Number (n=50)	Percentage (%)
Age (Years)	Mean $\pm$ SD	53.2 $\pm$ 10.4	--
	Range	22-75	--
Gender	Male	8	16
	Female	42	84
Comorbidity	BMI	27.58 $\pm$ 12.32	--
	Smoking	18	36
	Heart diseases	15	30
	Diabetes Mellitus	14	28
	Lunge disease	12	24
	osteoporosis	10	20
	Hypertension	6	12

**Table 2: Averaged scores for each component of DAS and HAG scores in patients with RA (Mean  $\pm$ SD)**

Score	Baseline	Six months post exercise	P -value
DAS	5.06 $\pm$ 0.844	4.764 $\pm$ 0.973	0.01
HAG	1.144 $\pm$ 0.111	1.085 $\pm$ 0.148	0.014

## CONCLUSION

Rheumatoid arthritis (RA) is a long-term autoimmune disorder that primarily affects joints. It typically results in warm, swollen, and painful joints. Rheumatoid Arthritis affects female patients commonly, and smoking is a risk factor for this disease, participating in exercise program improved selected measures of functional and physical status of patients with RA.

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