

Comparing the Efficacy of Exercise Interventions and Conventional Therapies in Enhancing Functional Mobility for Rheumatoid Arthritis Patients

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Abstract:

Introduction: Chronic autoimmune disease rheumatoid arthritis affects well-being and requires careful management. Flexible approaches are needed due to the disease's systemic and age-specific impacts. Exercise is encouraged by the limits of medicinal therapy. Social restrictions may promote inactivity, especially for RA patients, during the COVID-19 pandemic. Traditional settings have downsides, but home training may help. This study fills gaps on home-based exercise's effect on RA pain and mobility. Home-based chronic illness management and patient-centered treatment are emphasised in shifting healthcare dynamics. The study may improve rheumatoid arthritis treatment and teach doctors how to adapt.

Background: Rheumatoid arthritis (RA) affects 0.5% to 1.5% of the world's population and damages synovial joints. Joint destruction and systemic repercussions characterise this chronic inflammatory disease, which mostly affects women aged 30–55. The COVID-19 pandemic has changed RA management, leading to home-based activity programmes for patient safety and long-term health. RA management, COVID-19 difficulties, and flexible, patient-centered therapy are examined in this study.

Result: Systemic RA shortens life, damages joints, disables, and reduces quality of life. The global prevalence of RA is 0.5%–1.5%. RA patients struggle with COVID-19 control strategies that emphasise social distance and home activities. These programmes are useful for lowering socioeconomic restrictions. The study compares home exercise to standard therapy for RA patients' functional mobility. Six weeks of home-based or traditional exercises were given to 30 adults aged 30–60. Statistics showed significant improvements in both groups, notably household activities. This study proposes incorporating home exercise into professional practises for RA patients to improve pain management and quality of life, especially globally.

Conclusion: This study shows that RA patients need home-based fitness routines. Due to RA's chronic and systemic impact on joint health and the COVID-19 pandemic, home-based exercises are an effective treatment. In a six-week study of 30 30–60-year-olds, home-based and conventional treatments improved functional mobility and pain management. The home-based exercise group did well, confirming its efficacy. The study advises adding home-based exercise regimens to RA care to empower individuals to improve their quality of life and control health concerns

Keywords: RA, home-based exercise, functional mobility, pain reduction, patient-centric care, chronic disease management, COVID-19 pandemic, HAQ, VAS, TUG, physical therapy, quality of life, systemic disease, joint health, disease progression.

I. Introduction

As a chronic, progressive autoimmune disease, rheumatoid arthritis affects not only the joints but also has a significant

impact on people's general quality of life. Since the disease is systemic in nature due to the intricate interactions of genetic, environmental [1], and immunological components,

it is critical to investigate comprehensive management strategies. Given that RA peaks in females between the ages of 20 and 40 and in males between 30 and 50, it is critical to comprehend the distinct difficulties that each population group faces. Furthermore, RA progresses in stages, from early synovial inflammation to terminal phases characterized by joint dysfunction [2], which calls for a comprehensive strategy to management that takes into account each patient's changing needs at various stages of the disease. Even if they work well, traditional pharmaceutical treatments have drawbacks when it comes to medical management. Non-steroidal anti-inflammatory medicines (NSAIDs) can reduce pain and stiffness, however there are concerns over their possible toxicity [3]. Second-line medications, which try to delay the progression of the disease, include methotrexate and hydroxychloroquine, but they have their own set of drawbacks. In this context, the importance of non-pharmacological therapies—exercise in particular—becomes more apparent. Unprecedented difficulties have arisen since the COVID-19 epidemic began, especially for those who are taking care of chronic illnesses like rheumatoid arthritis [4]. The strict controls put in place to stop the virus's transmission have led to a paradoxical scenario where the need for social separation and isolation may unintentionally encourage a more sedentary way of living [5]. For those with RA who already struggle with mobility, this increases the risk of both discomfort and functional impairment. It is in this complex environment that the idea of at-home workouts presents itself as a possible remedy. Given the decreasing accessibility of traditional physical activity venues like supervised clinical settings, a careful examination of the viability and effectiveness of home-based exercise regimens is necessary [6]. By examining the effects of home-based activities on pain management and functional mobility in persons with rheumatoid arthritis, this study aims to close this important information gap [7]. This study intends to add to the expanding body of knowledge regarding RA management by carefully examining the statistical analyses and results. It also hopes to offer useful insights that can help individuals, researchers, and doctors alike. Through establishing a connection between conventional medical methods and novel, at-home therapies [8], this study aims to open doors for more individualised and easily accessible approaches to the overall care of patients with rheumatoid arthritis. The COVID-19 epidemic has forced a reevaluation of the management of chronic illnesses and caused significant disruptions to healthcare systems around the world [9]. People who already manage the challenges of a long-term autoimmune condition, such as rheumatoid arthritis, encounter particular challenges at these periods of

increased infection risk and social limitations [10]. There has never been a greater demand for flexible and patient-centered therapies. The subtle progression and systemic effects of rheumatoid arthritis can be rather debilitating for people who have it [11]. The erratic nature of symptoms, such as weariness, swelling, and joint discomfort, emphasizes the need for a comprehensive management strategy. Moreover, the systemic manifestations of RA, such as fever and weight loss, exacerbate the difficulties people encounter, affecting not just their physical health but also their general quality of life [12,13]. Following the epidemic, people with rheumatoid arthritis must now strike a careful balance between the need to remain socially isolated and the need to continue their physical activity. Conventional methods of controlling chronic diseases have been reevaluated considering the paradoxical requirement to maintain physical activity levels while complying with strict social distancing restrictions. Exercise programmes that can be done at home, which were previously thought of as supplements to in-person therapies, have gained attention as a possible pandemic remedy [14]. The purpose of this study is to investigate the effects of at-home exercise regimens designed especially for people with rheumatoid arthritis. Beyond the traditional domains of pharmacological therapies, the emphasis recognizes physical activity's potential as a modifiable factor in disease management [15,16]. The objective of this study is to provide insightful information about how home-based activities affect pain management, functional mobility, and overall quality of life. Rheumatoid arthritis care is a field that is always changing. This research is important not just because it may provide useful treatments for people suffering from rheumatoid arthritis during the present epidemic, but also because it has wider implications for managing chronic illnesses in a time when adaptation and flexibility are critical. Understanding the function of home-based interventions becomes crucial as healthcare paradigms change in order to maintain the wellbeing of people with chronic diseases. This research attempts to provide evidence-based suggestions that can influence the future of rheumatoid arthritis care in a world that is changing quickly by a thorough evaluation and interpretation of the study outcomes [17].

II. Background Study

The main target of rheumatoid arthritis (RA), a chronic inflammatory disease, is the synovial joints. RA is characterized by continuous inflammation. This is a systemic ailment that impacts not just the joints but also many organs and systems all over the body. Since RA affects 0.5% to 1.5% of people worldwide, it presents a serious public health concern that calls for a thorough

understanding of its effects as well as efficient management techniques. An abnormal immune response plays a role in the pathogenesis of RA, resulting in joint destruction, cartilage deterioration, and inflammation of the synovium. The clinical presentation is varied and includes systemic symptoms such weariness and weight loss as well as joint pain, edema, and stiffness. With a female-to-male ratio of 3:1, RA shows a preference for women and usually appears between the ages of 30 and 55. Because RA progresses, affected people frequently experience joint abnormalities, functional disability, and a reduced quality of life. In addition, RA's chronic inflammatory condition raises the possibility of comorbidities and shortens life expectancy. The effects of RA go beyond the physical and affect social and mental aspects of life. In the midst of the many difficulties that RA presents, the COVID-19[18] pandemic's advent has complicated the management of the disease. The epidemic forced previously unheard-of public health measures, including as lockdowns and social distance, which influenced the daily care and lifestyle decisions made by people with chronic illnesses. Notably, people with RA were particularly vulnerable since they had to deal with the added stress of controlling their inflammatory disease in addition to lowering their chance of contracting COVID-19. Conventional methods of addressing RA, including as in-person consultations, and supervised physical therapy sessions, experienced difficulties due to the epidemic. A reevaluation of home-based fitness programmes as a feasible and potentially successful alternative resulted from the pressing demand for flexible and patient-centered therapies. Once thought of as an adjunct to therapeutic interventions, the idea of at-home exercise became popular as people looked for alternatives to continue exercising [19] while following social distancing norms. Studies examining the effects of home-based exercise programmes on pain relief, functional mobility, and general well-being were started because of growing interest in the viability and effectiveness of these programmes in the context of managing RA. This study explores the relationship between managing RA, the COVID-19 pandemic's problems, and the possible benefit of home-based exercise for meeting the changing demands of RA patients. This study aims to contextualise the significance of examining alternative solutions that prioritise patient safety, flexibility, and long-term well-being in the face of changing healthcare environments by offering a thorough background [20].

III. Material & Method

Material

Watch: A timer that is used to track and manage how long exercises and therapies last.

Cones: Added to the planned and supervised aspect of the intervention, cones are used for a variety of workout routines and mobility activities.

Chair: A crucial piece of equipment for workouts meant to increase strength, mobility, and stability while offering support is an armrest-equipped chair.

Inch Tape: This tool is used to measure and track joint range of motion precisely, which is important when determining how successful a workout programme is.

B. Method

a. Type of Study: Experimental Research

The effect of at-home exercise regimens on functional mobility in rheumatoid arthritis patients was studied using an experimental approach.

b. Pre- and post-study designs:

The use of a pre-and-post design made it possible to evaluate the results both before and after the intervention. For tracking changes over time within the same group, this arrangement works well.

c. Study Period: One Year:

A thorough analysis of the long-term impacts and sustainability of the home-based fitness programme was made possible by the study's one-year duration.

d. Method of Sampling: Simple Random Sampling:

Simple random selection was used to choose the participants, guaranteeing that every member of the public had an equal chance of being a part of the research. The results can be more broadly applied thanks to this methodology.

e. Sample Size: thirty (15 per Group).

A procedure that accounts for means, standard deviations, and statistical factors was used to determine the sample size, guaranteeing a sufficient number of participants for a thorough investigation. Tuesday Location: KIMSDU Karad, Krishna College of Physiotherapy The home-based exercise programme was applied consistently and uniformly because the study was carried out in a controlled setting at Krishna College of Physiotherapy, KIMSDU Karad.

f. Analysis Plan:

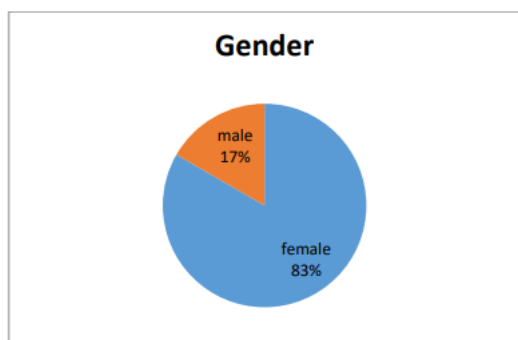
The paired t-test is utilised to examine the pre- and post-test outcomes for every group. The results between the two groups are compared using the unpaired t-test. SPSS software, a statistical tool that enables thorough examination of quantitative data, was used to complete the data analysis.

IV. Result

A. PRODUCTION VARIABLES: DISTRIBUTION BY Gender

Sr. no	Gender distribution	Total
1	Male	4
2	Female	26
Total		30

Table 1. Distribution by gender



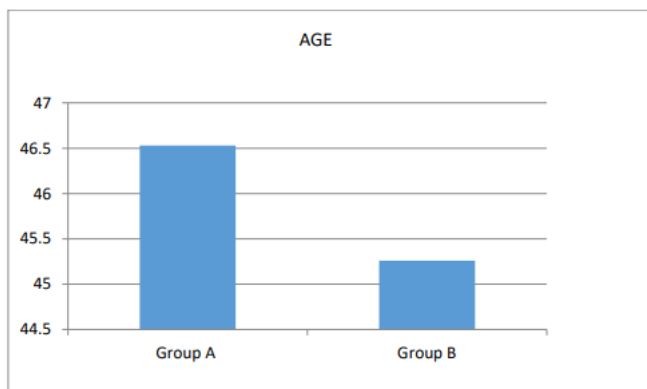
Graph 1. Distribution by gender

Out of the thirty subjects that were chosen based on the inclusion and exclusion criteria, fifteen distinct people were assigned to each of the groups. It can be seen from the graphical representation that the majority of the subjects in both groups were female.

B. Age wise Distribution

Age	Mean ± SD
Group A	46 ± 4.61
Group B	45.26 ± 5.02

Table 2. Age wise Distribution



Graph 2. Age wise Distribution

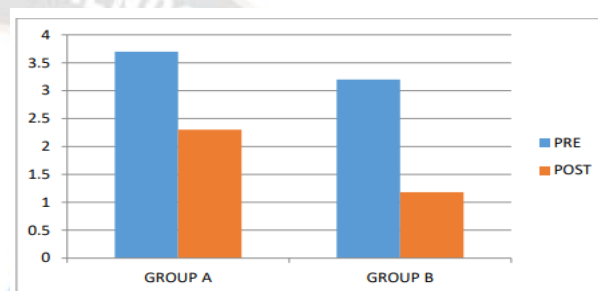
Within the age range of thirty to sixty years, there were thirty people that were included in the selected cohort. The average age of the members of Group B was 45.26 years old, whereas the mean age of Group A was 46 years old.

C. Outcome Measures

Among the members of the group 1. A visual analogue scale (where it stays)

Groups	Pre intervention Mean ±SD	Post intervention Mean± SD	P value	Interference
Group A	3.7 ± 0.60	2.35 ± 0.51	<0.0001	Considered extremely significant
Group B	3.2±0.48	1.18±0.25	<0.0001	Considered extremely significant

Table 3. Evaluation of the differences between the pre-interventional and post-interventional values of the visual analogue scale (VAS) at rest score for each group

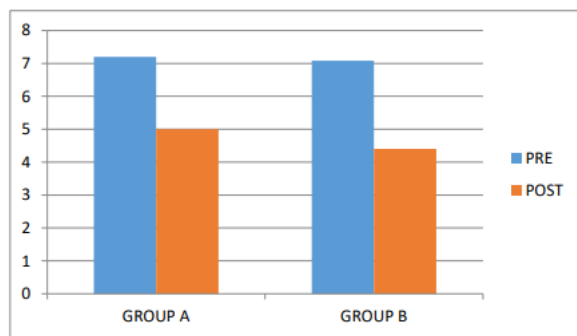


Graph 3. A comparison of the values of the visual analogue scale (VAS) from before and after the intervention was carried out at rest score within the group

An intra-group comparison using the Visual Analogue Scale (VAS) was carried out with the assistance of a paired t-test. In Group A, the VAS result was recorded at 3.7 ± 0.60 prior to the intervention, and after the intervention, it reduced dramatically to 2.3 ± 0.51 ($P < 0.0001$, $t = 10.49$), indicating a significant decrease. In a similar manner, the VAS result in Group B was 3.2 ± 0.48 prior to the intervention, but it dramatically fell to 1.18 ± 0.25 after the intervention ($P < 0.0001$, $t = 23.917$). The results of this study demonstrated that there was a highly significant difference between Group A and Group B, so emphasizing the tremendous impact that the treatments had on the virtual assessment scores.

Groups	Pre intervention Mean + SD	Post intervention Mean + SD	P value	Interference
Group A	7.2± 0.85	5± 0.89	<0.0001	Considered extremely significant
Group B	7.08 ±0.73	2.86±0.54	<0.0001	Considered significant

Table 4. a comparison of the values of the visual analogue scale (VAS) on activity score among the group before and after the intervention's implementation



Graph 4. A comparison of the values of the visual analogue scale (VAS) on activity score among the group before and after the intervention

V. Discussion

Rheumatoid arthritis (RA) is a systemic disease that significantly impacts a person's life in many ways. A reduction in life expectancy, persistent joint injury, disability, and a deterioration in quality of life are the outcomes of this progressive and chronic illness. The incidence of rheumatoid arthritis varies between 0.5% and 1.5% worldwide. Countries have imposed community control measures in response to the COVID-19 epidemic, stressing the value of social separation and minimising human interaction. People who have rheumatoid arthritis are especially recommended to follow stricter guidelines, which include staying away from social situations outside of their home. But these safety measures have unintentionally made people with rheumatoid arthritis live more inactive lives. Acknowledging the difficulties caused by the epidemic, there is an increasing need for simple-to-learn and safe home-based fitness regimens, particularly in contrast to hospital-based regimens. Exercise regimens that can be completed at home by patients with rheumatoid arthritis have proven to be both feasible and beneficial, providing a convenient form of treatment that each patient may follow on their own. Reducing the impact of exercise on an individual's socioeconomic situation is the main objective of home exercise. People can maintain their physical fitness while staying at home by incorporating easy motions into their daily routines by participating in home-based activities. These exercises offer a feasible choice during the present pandemic and are especially helpful for inactive people of all ages. The key to overcoming COVID-19's issues is to replace routine outdoor exercise regimens with at-home options. Whether at a park or the security of one's own home, sticking to a regular exercise regimen turns out to be a useful tactic to lessen the pandemic's negative psychological and physical effects. The purpose of this study is to look into how a home exercise programme affects

an adult's functional mobility who has rheumatoid arthritis. The goals include assessing how home exercise regimens and traditional therapy affect functional mobility in order to offer insightful information about the effectiveness of these therapies. The study takes gender variations in the sample into account and focuses on people with rheumatoid arthritis who have been diagnosed between the ages of 30 and 60. A sample of thirty subjects, a mix of males and females, were used in the study. They were split into two groups: Group B did home-based workouts while Group A received traditional exercises. Five sessions a week for six weeks was the treatment protocol. To assess the efficacy of the interventions, statistical methods were used, such as unpaired t-tests between groups and paired t-tests for intragroup comparisons. The study's findings showed that both groups' functional mobility and discomfort significantly improved, with home-based exercises showing particularly positive results. These results are consistent with earlier research highlighting the need of home-based interventions, particularly in light of the difficulties brought on by the COVID-19 pandemic. The study's conclusion, which acknowledges the usefulness of home exercise regimens in improving pain management and functional mobility in rheumatoid arthritis patients, calls for their incorporation into standard clinical procedures. Given the current state of global health, home-based exercise is a valuable and accessible choice due to its good impact on people's quality of life and general well-being.

VI. Limitation

A. Limited Sample Size:

The comparatively small sample size of this study is one of its main drawbacks. Due to the small sample size of only 30, the findings might not accurately reflect the wide range of rheumatoid arthritis patients. Greater statistical power and generalizability of the results would result from larger sample numbers.

B. Restricted Geographic Range:

The results may have less external validity because the study was limited to a certain geographic area. Numerous variables, including local demography, weather patterns, and medical procedures, can have an impact on rheumatoid arthritis. As such, the results might not be generalizable.

C. Brief Study Period:

The study had a one-year time constraint. Since rheumatoid arthritis is a chronic illness, long-term care is frequently necessary. An extended study period would offer valuable perspectives on the durability of the noted enhancements and the possibility of recurrence in the future.

D. Criteria for Exclusion:

A history of trauma, orthopaedic surgery, congenital anomalies, chronic kidney disease (CKD), and skin blemishes were among the specific exclusion criteria of the study. The overall variety of the sample may have been impacted by the exclusion of people with specific comorbidities or diseases due to these criteria.

E. One-person study environment:

Only Krishna College of Physiotherapy, KIMSUDU Karad, was the site of the study. Although this setting offers a controlled environment, it could not accurately reflect the differences in patient demographics and healthcare procedures encountered in various clinical or home settings.

F. Restricted Aftercare:

There was no thorough follow-up assessment included in the study. Subsequent assessments may have yielded significant insights into the enduring consequences of traditional and at-home fitness regimens, so facilitating a more comprehensive comprehension of the intervention's influence.

G. Measures of specific outcomes:

Particular outcome measures, including VAS, HAQ, and TUG, were the focus of the study. Although these metrics evaluate pain, functional impairment, and mobility, they might not fully account for the range of outcomes associated with rheumatoid arthritis, such as quality of life and psychological well-being.

H. socioeconomic elements:

The socioeconomic aspects that could affect the viability and efficacy of exercises performed at home were not sufficiently addressed in the study. Although not specifically examined, factors including living circumstances, social support, and resource availability can have a big influence on a patient's ability to stick to a home exercise programme.

I. The COVID-19 Pandemic Situation:

Although the study recognised how the COVID-19 pandemic affected the way of life for people with rheumatoid arthritis, it did not fully investigate the unique difficulties and regional variations in limits.

J. Balance of the Sample:

There may have been a gender bias in the study because 26 out of 30 participants were female. The results may not be as broadly applicable to male populations with rheumatoid arthritis due to the homogeneity of the sample.

VII. Conclusion

This study concludes that home-based fitness programmes can help RA patients overcome their many problems. RA, a chronic and systemic disease, causes disability, lower quality of life, and a shorter lifespan. The global incidence of RA emphasises the need for improved treatments. The

COVID-19 pandemic and limits have made home-based exercise a safe and accessible option for RA patients at risk. This study compared standard therapy to a home-based fitness programme for RA patients' functional mobility. The six-week trial of 30 30-60-year-olds showed positive results. Functional mobility and pain management improved in home-based and traditional exercise groups. However, the home-based exercise group performed best, demonstrating its efficacy and feasibility. The report acknowledges RA patients' socioeconomic stress, especially during the epidemic. Home-based workout programmes provide as a practical way to stay active while following safety rules. The findings support prior research on home-based RA treatment. These findings suggest that RA clinicians should include home-based fitness programmes in their routines. This method improves pain control, functional mobility, and patient empowerment, especially given global health issues. Innovative and accessible interventions are essential for enhancing Rheumatoid Arthritis patients' well-being as we navigate chronic diseases and public health problems.

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