



## **Assess the effectiveness of underwater exercises on symptom experience of patients with rheumatoid arthritis undergoing treatment in a selected hospital.**

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### **ABSTRACT**

**Introduction:** Rheumatoid arthritis (RA) , a chronic illness with debilitating symptoms can affect day to day living in any individual affected by it. Under water exercise is a safe, cheap and efficient treatment modality to control the severity of symptoms of patients with RA. The present scenario lacks education and practice of underwater exercises as a part of holistic treatment of disease. The present study was carried out with the objectives to compare the symptom experience before and after underwater exercise programme among RA patients and to determine the association of difference in symptom experience with selected baseline variables.

**Materials & Methods:** A pre experimental one group pre test post test research design with purposive sampling technique was used to collect data from 56 patients diagnosed with RA in immunology OPD of selected hospital, Bangalore. VAS (visual analogue scale), DAS 28 (Disease activity score) and Indian HAQ-DI (Health assessment questionnaire- disability index) were used to assess symptom experience such as pain, disease activity and functional disability during pretest and post test.

**Results:** There was a significant reduction of mean scores of pain, disease activity and functional disability of pre test from  $43.46 \pm 20.86$  to  $23.25 \pm 14.46$ ,  $4.38 \pm 1.05$  to  $3.55 \pm 0.87$  at p value of  $<0.001$  and  $0.73 \pm 0.52$  to  $0.60 \pm 0.40$  at p value  $<0.002$  respectively. There was a statistically significant association between difference in pain with education ( $p=0.011$ ) and dependency with regard to ADL ( $p=0.031$ ), difference in disease activity with performance of exercises ( $p=0.040$ ) and performance of under water exercises ( $p=0.021$ ).

**Conclusion:** Combining conventional therapy with repeated underwater exercise may improve control on severity of symptoms among patients with RA.

**Keywords:** RA, Under water exercise, VAS, DAS 28, Indian HAQ-DI .

## **INTRODUCTION**

Rheumatoid arthritis a chronic, systemic, articular inflammatory autoimmune disorder which is crippling in nature affects 0.5% - 1% of population all over the world.<sup>1</sup> Patients diagnosed with rheumatoid arthritis have reported severe morning stiffness, pain, swelling and tenderness of the involved joints which can lead to long term disabilities. The current approach to treatment of patients with rheumatoid arthritis is to attempt to stall or interrupt the inflammatory symptoms associated with the advancement of joint deterioration, minimize the occurrences of intense pain episodes and restricted joint mobility and to subside the condition



into a remission phase.<sup>2</sup> Exercise is an integral part of an arthritis treatment plan. Over the past decades there has been growing evidence of the health benefits of physical activity for patients with rheumatoid arthritis.<sup>3</sup>

Underwater exercises or aquatic exercises with warm water has become very popular with arthritis patients because the warmth of the water soothes their bones and joints and buoyancy of water reduces strain on already aching joints. Under water exercises has been shown to increase muscle strength, increase range of motion, improve aerobic capacity, reduce pain and improve function.<sup>(3,4)</sup>

Even though patients are taught some normal exercises, the practice of underwater exercises is non-existent widely. The National Health Policy also has emphasized the convergence of different modalities in holistic treatment of disease. Further there appears to be a paucity of research studies done so far in India on the effectiveness of underwater exercises on symptom experience of patients with rheumatoid arthritis. The researcher during her own experience in caring for patients with rheumatoid arthritis observed a marked reduction in the quality of life of these patients and there is a lack of adequate education given to them regarding benefits of under water exercises in the form of demonstration.

Hence the study was carried out to compare the symptom experience before and after underwater exercise programme among RA patients and to determine the association of difference in symptom experience with selected baseline variables. It was assumed that Patients with rheumatoid arthritis may experience symptoms such as pain, tenderness, swelling and functional disability and underwater exercises may be an effective method in reducing the severity of symptom experience of patients with rheumatoid arthritis.

## **MATERIALS & METHODS**

After obtaining administrative approval from authority, a pre experimental one group pre test post test study was carried among 60 patients attending Immunology OPD and fulfilling the inclusion and exclusion criteria were selected using purposive sampling technique. The purpose of the study was explained and informed consent obtained. Structured interview schedule was used to elicit the baseline data such as socio demographic variables (age, gender, education, occupation and socio economical status) and health care related variables(



duration of RA, performance of exercises and under water exercises, treatment modality, dependency with regard to ADL and comorbidities. Pre test was conducted on to assess symptom experience such as pain, disease activity and functional disability using VAS, DAS28 and Indian HAQ-DI respectively, which took about 20-30 minutes.

Under water exercises were taught on a one to one basis to the subjects using a basin and warm water of temperature 35<sup>0</sup>c which was measured using a lotion thermometer. The subjects were asked to perform the same exercises at home atleast 8-10 times twice a day by adjusting the temperature of water to a tolerable level. A log book was given which they were advised to maintain truthfully. Contact numbers were obtained and the investigator maintained telephonic contact twice a week to ensure that the subjects performed the exercises.

Post test assessment of symptom experience was done during the next follow up which was a month later by administering the same tools only for those subjects who fulfilled 90% compliance. Out of the 60 subjects enrolled in the study, there was an attrition of 4 due to non compliance to the exercise regime. Thus post test was administered to 56 subjects.

## **RESULTS**

### **1.Socio demographic and health care related variables**

Findings of the study revealed that 57.14% of the subjects were in the age group of  $\leq 50$  years and only 42.85% were above 50 years with a mean age of 48.32. Females constituted 91.1% of the subjects while only 8.9% were males. 28.6 % of patients had done their high school education, 21.4% were graduates and 14.3% were illiterates. In terms of occupation, 80.35% of the subjects were semi skilled and 10.71% were unskilled and only 8.92% were skilled. 57.14% of the patients were having income of  $>15,000$  and 42.85% had income  $\leq 15,000$ . 69.64 % of subjects had duration of RA less than 6 years and only 30.35% of subjects had duration of disease more than or equal to 6 years. 87.5% of subjects were on combination of DMARDS and NSAIDS. Only 12.5% were on DMARDS and steroids. 39.28 % of subjects were having only single co-morbidities like diabetes mellitus, hypertension, RA deformity and 19.64% were having more than one comorbidities.

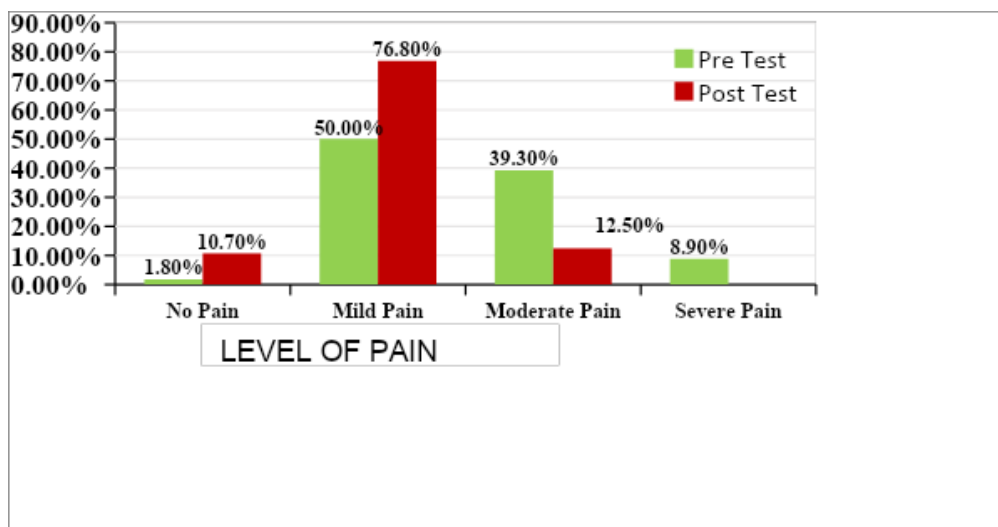


**2. Comparison of pre test and post test scores of symptom experience**

**Table 2a:- Mean, standard deviation and paired ‘t’ test to compare the pre test and post test scores of patients with urinary incontinence.**

S.No.	Items	Mean	SD	Paired t Test	p Value
1	Pre-Test	43.46	2.03	8.7	<0.001*
2	Post- test	23.25	1.8		

There is significant decrease in the mean scores of pain after doing under water exercise. The mean pre test scores of pain is  $43.46 \pm 20.868$  and mean post test scores of pain is  $23.25 \pm 14.46$ . The obtained t value is 10.30, which is significant at  $p < 0.05$  level (p value  $< 0.001$ ).



**Figure 1: Comparison of pre and post test level of pain.**

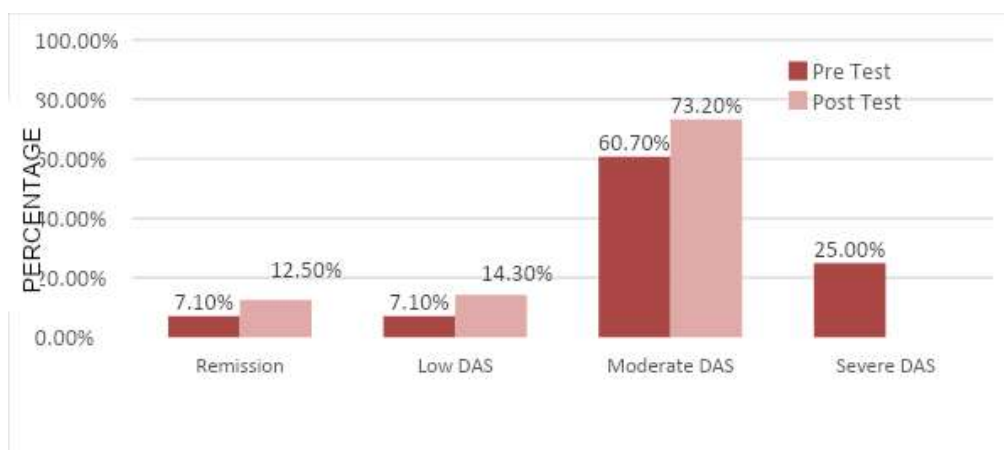


Figure 1 :It depicts that in pre test 8.9% of patients had severe pain which reduced to 0% in the post test, 39.30% of patients had moderate pain which reduced to 12.50% in the post test, 50% patients had mild pain in the pre test which increased to 76.80% in the post test. During post test 10.70 % of subjects had no pain as compared to 1.80% in pre test .

**Table 2b:- Mean, standard deviation and Wilcoxon signed rank test to compare the pre test and post test scores of disease activity.**

S.No.	Items	Mean	SD	Wilcoxon Signed rank test	p Value
1	Pre-Test	4.38	1.05	5.69	<0.001*
2	Post- test	3.55	0.87		

There is significant decrease in the mean scores of disease activity after doing under water exercise. The mean pre test scores of disease activity is  $4.38 \pm 1.05$  and mean post test scores of pain is  $3.55 \pm 0.87$ . The obtained t value is 5.69, which is significant at  $p < 0.05$  level (p value <0.001).



**Figure 2: Comparison of pre and post test level of disease activity**

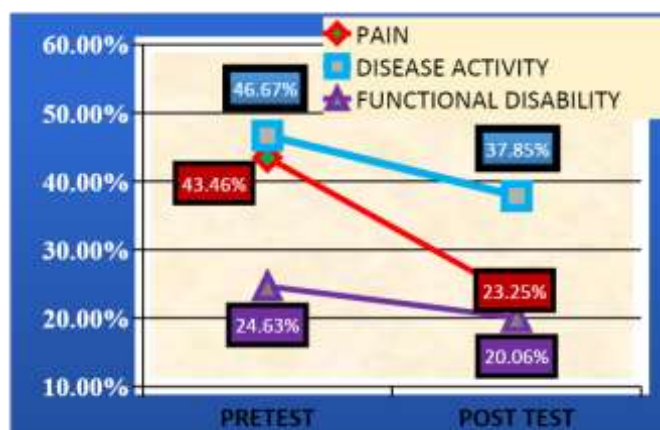


Figure 2: It depicts that in pre test 25% of patients had severe disease activity, while in post test none of the patients had severe disease activity. 60.70% of patients had moderate disease activity which increased to 73.20% in the post test, 7.10% of patients had low disease activity which increased to 14.30% in post test In post test 12.50% showed remission as against only 7.10% in the pre test.

**Table 2c:- Mean, standard deviation and Wilcoxon signed rank test to compare the pre test and post test scores of functional disability**

S.No.	Items	Mean	SD	Wilcoxon Signed rank test	p Value
1	Pre-Test	0.73	0.52	3.11	<b>0.002*</b>
2	Post- test	0.6	0.40		

There is significant decrease in functional disability after doing under water exercises. The mean pre test scores of functional disability is  $0.73 \pm 0.52$  and mean post test scores of functional disability is  $0.60 \pm 0.40$ . The obtained z value is 3.111 which is significant at  $p < 0.05$  level ( p value is 0.002).



**Figure 3: Comparison of symptom experience before and after under water exercises.**



Figure 3: It is evident that during post test mean percentage scores of pain has declined from 43.46% to 23.25%, disease activity has declined from 46.67% to 37.85% and functional disability has declined from 24.63% to 20.06%.

### **3. Association of difference in symptom experience with selected baseline variables.**

This study reveals that there is statistically significant association exists between difference in pain with education ( $p=0.011$ ) and dependency with regard to ADL ( $p=0.031$ ), difference in disease activity with performance of exercises ( $p=0.040$ ) and performance of under water exercises ( $p=0.021$ ). There is no statistically significant association between difference in functional disability with any of the baseline variables.

## **DISCUSSION**

In the current study majority (57.14%) of patients were in the age group of  $\leq 50$  years with a mean age of 48.32. Also with regard to gender, 91.1% were females. This was supported by a similar study done in Brasília where the results showed that out of 72 patients were evaluated, 90.27% were females with a mean age of  $50.2 \pm 13.3$  years which indicates that women are at high risk for developing RA due to hormonal or sex related genetic factors.<sup>5</sup> In the present study, most of them were semiskilled (80.35%) workers which was supported by another study conducted in Ankara found that out of 49 subjects, 38 subjects (77.55%) were not working out of which 24 (48.9%) subjects were housewives could be due to a fact that most of the subjects included in the study were females and majority of them were housewives.<sup>6</sup>

In the present study mean pain scores reduced from  $43.46 \pm 20.868$  to  $23.25 \pm 14.46$  at statistically significant ( $p < 0.001$ ) value. A similar study that supported the present study was conducted in British Columbia found that mean pain score was  $38.6 \pm 24.90$ . The study also revealed that a large majority of respondents (70.3%) reported that since they started the aquatics program, their pain has decreased significantly.<sup>7</sup> Similar were the findings in another randomized controlled study in UK. All patients demonstrated a significant reduction in their evaluative/affective pain scores between pre and post test ( $p < 0.005$ ).



In current study mean score of disease activity reduced from  $4.38 \pm 1.05$  to  $3.55 \pm 0.87$  ( $p < 0.001$ ). A randomized controlled study supporting to the present study was conducted in Manchester revealed that the mean and standard deviation of DAS of subjects in hydrotherapy group was reduced from  $4.28 \pm 1.78$  to  $2.49 \pm 1.24$  after 6 weeks of intervention.<sup>3</sup> Mean scores of functional disability reduced from  $0.73 \pm 0.52$  to  $0.60 \pm 0.40$  ( $p = 0.002$ ). A similar study supporting the present study was conducted in Manchester revealed that the mean HAQ scores of disability index was reduced from  $1.9 \pm 0.6$  to  $1.1 \pm 0.7$  during post test ( $P < .001$ ) in hydrotherapy group. The present study revealed that there was significant association between levels of education ( $p = 0.011$ ) with difference in pain score of patients with RA.<sup>3</sup> Subjects who were illiterate had more difference in pain scores after doing underwater exercises. But this findings was contradicting to the findings given in an article where they found that the patients with a high educational level had slightly less pain (VAS-pain) at baseline and during the first year receiving standard care.<sup>8</sup>

### **Implications for nursing**

Simple, cheap and effective technique of under water exercise can be used as a part of nursing care while approaching the patients with RA. Nursing personnel appointed in the clinical immunology and rheumatology clinic can be trained to assess the symptom experience of client objectively. Seminars, workshops and CNE programmes can be conducted by the nurse educators to train the staff nurses and student nurses. VAS, DAS 28 and Indian HAQ-DI scores can be taught to students to perform objective assessment of patients with RA. Protocols and policies for OPD nurse to demonstrate underwater exercises can be implemented.

### **Limitations of the study**

Compliance was assessed using reported practice only. Even though the intervention of underwater exercises were only limited to both hands, the investigator was forced to assess other joints as per the tool (DAS 28) in addition to joints of the hand. Since the sample was limited in size, generalization of the findings is limited. Patients received only one time exposure to the teaching given by the researcher. Intervention time was limited to one month which can be increased to yield more better results.





## **Recommendations**

- Replication of the study can be done with a large sample and using true experimental design to validate and generalize the findings.
- Effectiveness of same intervention can be done on different symptoms of RA such as morning stiffness, tenderness etc.
- A descriptive study can be done to assess the symptom experience and quality of life of patients with RA.

## **CONCLUSION**

Since rheumatoid arthritis, a crippling disease of joints is one of the common medical problem that can lead to long term disabilities among patients affected by it. Under water exercises is an effective mode of strategy to control the severity of symptoms of disease, these study findings emphasize the need to inculcate the practice of under water exercises among patients with RA. The process of the study was a benefiting and enriching experience to the researcher. It was helpful to prove the positive impact of under water exercises on symptom experience of patients with RA.

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