Comparison the Effect of Dynamic Exercises and Warm Compresses on Rheumatoid Arthritis Patients' Disabilities and Self-Efficacy

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Abstract

Background: Rheumatoid arthritis (RA) is autoimmune disease that worsens over time leading to severe physical disabilities, and psychological disturbance. Dynamic exercises and warm compresses provide a promise in improving functional capacities and emotional well-being of RA patients. **The research aimed** to compare the effect of dynamic exercises and warm compresses on rheumatoid arthritis patients' disabilities and self-efficacy. **Research design**: Quasi-experimental methods. **Research Setting**: The research was applied in the main Minia University hospital at Rheumatology as well as Rehabilitation department. **Research sample**: One hundred twenty-nine patients made up the purposive sample for the study. Patients were equally classified into three groups of different therapies (dynamic exercises, warm compresses, and combined dynamic exercises and warm compresses) with forty-three patients per group. **Tools of data collection:** involved structured interview questionnaire sheet, Health Assessment Questionnaire-Disability Index, (HAQ-DI) and a Health Assessment Questionnaire -Visual Analogue Pain Scale (HAQ-VAS), Muscle Strength Scale and Self-Efficacy for Managing Chronic Disease Scale. **Results**: Show significant decrease in the level of disabilities after 16 -weeks of intervention to become 58.1%, 55.8%, and 67.4%, of the study groups respectively with mildly to moderately disability. As well, combined dynamic exercises and warm compresses group had the highest mean score of self-efficacy subscales post 16-week of intervention than both dynamic exercises and warm compresses groups. **Conclusion**: Combination therapy of dynamic exercises and warm compresses resulted in significant reduced in the functional disabilities and levels of pain, with greater increase in the muscle strength, and self-efficacy than each therapy used alone. **Recommendations:** Regular program's training to maintain the nurses in rheumatoid units updated with research-based techniques and an array of interventions for decreasing patients' disabilities and increase his self-efficacy.

Keywords: Disability, Dynamic exercises, Rheumatoid arthritis, Self-efficacy, Warm compresses.

Introduction:

Rheumatoid arthritis (RA) is a systemic, autoimmune, chronic inflammation condition that mostly affects the joints. Patients with RA typically exhibit pain and swelling in the symmetrical joint, daytime stiffness, and reduced joint function, which can result in varied degrees of functional disability and a reduction in quality of life (QOL). RA is the second-leading cause of disability; according to the World Health Organization (WHO), between 2020 and 2030, musculoskeletal-related disability will increase by 48%, which indicates that approximately 1.3% of Egyptians suffer from RA. Women are three to five times more likely to be diagnosed with RA than men (**WHO, 2020) and Ye et al. (2022).**

About 54.4 million adults in America, estimated at 25 percent of the population, have one or more types of arthritis **(Centers for Disease Control and Prevention, 2021)**. By 2040, this count is projected to increase to seventy-eight million **(Arthritis Foundation, 2019). Here, one** percent of the world's population suffers from RA, with between 5 and 50 new cases per 100,000 people worldwide each year. It caused around 49,000 fatalities worldwide in 2020, and the national prevalence indicates that it increases with age at a rate of roughly 1% and increases between the ages of 35 and fifty **(Symmons et al., 2021; Lozano et al., 2021).**

In addition, for millions of people with RA, concurrent functional disability is possible, which could result in unemployment, reduced

productivity at work, rising healthcare costs, and a lower QOL, as it has been observed that the risk of enhancing functional disability rises as the disease progresses. Pain, stiffness, edema, and soreness, which are thought to be the most distressing symptoms among RA patients and have a detrimental influence on their daily activities and QOL, are typically preceded by functional impairment of the hand joints **(Eldoushy, 2022).**

Raising physical activity as well as exercise may help RA symptoms and lessen the systemic severity of the signs. According to the growing body of research, physical activity is any skeletal muscle-driven movement of the body that requires energy to achieve. Exercise is a type of physical activity that provides physical fitness as its ultimate or interim objective. It is planned, systematic, repeated, and time-limited. Exercise modalities have been shown to be helpful in the treatment of RA, involving aerobic exercise, resistance training, and strength training **(Hu et al., 2020).**

Through the reduction of inflammatory cytokine expression, therapeutic exercise can promote biomolecular suppression of arthritis, which in turn reduces joint damage **(Fujii, et al., 2019).** Exercises that improve cardiorespiratory fitness and decrease disease activity and severity in RA patients can be accomplished through aerobic and resistance training. For individuals with RA, hand stretches and strengthening exercises were found to be both clinically useful and affordable **(Sul et al., 2020).**

By inhibiting the nerve motor impulse of the muscle, warm compresses can reduce the feeling of pain from severe to mild, with minimum discomfort or even no pain, while reducing joint spasm and promoting greater relaxation. Warm water compresses will reduce the viscosity of the blood and synovial fluid, allowing the circulating blood to more effectively deliver platelets and white blood cells (WBC) to the area of inflammation. WBC will eliminate the dead tissue and microorganisms in the vicinity of the inflammation. Reduced synovial fluid viscosity will aid in reducing friction among cartilage, bone, pannus, and nodus, which will lessen the prominence of proprioceptive nerves' joints **(Lorica, 2019)**.

Self-efficacy is among the most important talents that need to be developed. Improved physical function, higher levels of activity, and lower levels of handicap are all positively correlated with the person's perceptions about his or her capacity to reduce and control pain. It also correlates with less severe pain and better pain tolerance. Self-efficacy has been taken into consideration when personnel with chronic pain conduct activities, with a focus on the relationship between higher self-efficacy and a preponderance of pain-handling techniques, notably among RA patients (**Moreno et al., 2018).** Indeed**,** perceived self-efficacy is the awareness of one's ability to carry out a certain behavior. Based on social cognitive theory, it reflects an individual's personal confidence in their ability to engage in actions that could result in desired results (**Ritter & Lorig, 2014).**

Significant of study

According to the **Centers for Disease Control and Prevention, and the National Center for Health Statistics (2022)**, about 80% of arthritis patients have operational independence; however, with time and as the illness advances, substantial functional disabilities are typically noticed; as a result, a major goal of those patients' therapy is to prevent functional decline. Heat therapy must be utilized after the first phases of swelling and edema have resolved since it increases regional metabolic activity as well as blood flow while relaxing muscle spasms (**Karada, et al. 2019).**

Regular exercise has been authorized as a treatment strategy for RA. There is evidence that aerobic, stretching, and strengthening exercise improves muscle strength, practical ability, and psychological well-being, as well as reducing pain. Dynamic exercises may help people with RA by reducing the degenerative process that occurs in the RA joint, enhancing cartilage nutrition as well as remodeling, raising synovial blood flow, reducing edema; and strengthening muscles (**Ahmed, et al., 2022).** As well, warm compresses reduce pain and increase circulation to the inflamed tissue, reducing inflammation. It is important to keep a flexible outlook on life, be able to express

unpleasant feelings honestly, and avoid becoming overwhelmed by them. So, the present study can be utilized to decrease RA patients' disabilities and improve their self-efficacy as it enhances the chance for those patients to practice more dynamic exercises and warm compresses to control disease and improve their health status.

The research's aim:

To compare the effect of dynamic exercises and warm compresses on RA patients' disabilities and self-efficacy through

- Assess the ability to perform activities of daily living for all intervention groups.
- Assess muscle strength before and after different interventions.
- Assess the level of pain before and after different interventions.

Operational definition:

Functional disability refers to the loss of a joint's ability to function, whether partially or completely. The symptoms of upper and lower joints in this study include the main complaints of RA. Patients' pain, stiffness, swelling, and tenderness are regarded as the condition's most upsetting classic symptoms **(Lozano et al., 2021).**

Physical activity: any skeletal muscle-produced motion of the body that needs energy to perform. While exercise is a repetitive, planned, and structured type of physical activity with the improvement or maintenance of physical fitness as its first or second purpose **(Dasso et al., 2019),**

Self-efficacy is an individual's confidence in their ability to take important actions to complete a specified purpose **(Carey & Forsyth, 2018).** Every aspect of human endeavor is impacted by it. Self-efficacy has a significant impact on two things: the ability one really has to handle issues competently and the decisions one is most likely to make by knowing the beliefs one holds regarding their ability to impact conditions. In relation to investment skills such as those in health, education, and agriculture, these consequences are very evident and persuasive **(Wuepper & Lybbert, 2017).**

Dynamic exercises: Exercise modalities have been shown to be helpful in the treatment of RA, involving aerobic exercise, resistance training, and strength training **(Hu et al., 2020).**

Warm compresses: One of the non-pharmacological actions is the application of a warm compress by warming the skin on the affected area of the body using fluids and instruments **(Hariati, 2021).**

Methods

Research design

A quasi-experimental research design involved the manipulation of an independent variable without the random assignment of participants' conditions or orders of conditions. Among the important types are interrupted time series designs, pre-test-post-test designs, and nonequivalent group designs. **(Ali et al., 2020).**

Research hypothesis

H1: Combined dynamic exercises and warm compresses will be more effective in decreasing RA patients' disabilities and improving self-efficacy than single interventions alone.

Research Setting

This research was applied in the department of rheumatology, rehabilitation, and physical medicine, which is located on the second floor and consists of four rooms; each room contains six beds; and an out-patient clinic that contains three rooms for patients' examination and follow-up and is present on the ground floor at the main Minia University Hospital, which is located in Minia City and is affiliated with Minia University in Egypt.

Research Sample

Non probability (a purposive sample) consisted of 129 patients (male as well as female) with RA being recruited and allocated into three groups as followed; dynamic (aerobic and resistance) exercises group (n = 43), warm compresses group (n = 43), and combined dynamic exercises and warm compresses group (n= 43)

Sample size: Using Open Epi version 3, one hundred twenty-nine patients there were chosen at random to obtain the following equation's

% confidence interval and 5% error **(Dean, Sullivan, & Soe, 2015).**

Sample size n = [Np(1-p)] / [(d 2/Z 2 1-α/2*(N-1) + p*(1-p)]

Description:

N: Size of population

p: population's prevalence

d: limits of confidence

Considering that there are 4800 adults in the entire population.
14.5% of people with RA, with a 5% dropout rate.

Inclusion Criteria:

- Ages between 40 to 73 years.
- The patient must attend the scheduled outpatient follow-up appointments.
- Also 28 joints with a moderate disease activity score (das28 <5.1).

Exclusion criteria:

- Joint surgery within six months before participate in the study
- Refusal to engage in walking-based physical tests Uncontrolled chronic diseases and serious physical comorbidities such arrhythmia or ischemic heart disease that is unstable.
- Other infectious arthritis
- Current use of oral glucocorticoids analgesic therapy.
- History of regular exercise in the last 6 months.
- Previous diagnosis of peripheral nerve system involvement, amyloidosis, cancer, a vitamin B12 deficiency, extra symptoms of connective tissue diseases such sjögren's syndrome and/or vasculitis, and positive pathological reflexes.

Data collection tools:

Two tools and three scales were utilized in the present study:

Frist tool: A structured interview questionnaire sheet was developed after an extensive relevant review of the associated management of RA in health care agencies, the general guidelines recommended by the American College of Sports Medicine (ACSM) (2010), the European League Against Rheumatism Recommendations (EULAR, 2018), and the results of related published evidence. This included the following parts: **(Ayhan et al., 2020; Hurkmans et al., 2018)**

- **Part I: Socio-demographic characteristics of patients**, such as name, age, gender, marital status, occupation, level of education, etc.)
- **Part II: Medical data of the RA patients**, onset year of RA, joints affected by the disease, and disease duration.

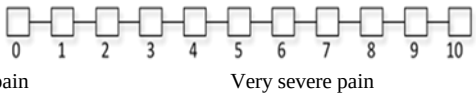
Second tool, the Health Assessment Questionnaire-Disability Index (HAQ-DI), was constructed by James and colleagues in 1978 under Stanford University auspices for assessing patients suffering from rheumatoid arthritis. This questionnaire was translated into Arabic by El Meidany et al. (2003) and adopted by the researcher. It assesses fine upper extremity movements, locomotor activities of the lower extremity, as well as activities that include both the upper and lower extremities. The questionnaire is self-reported or given face-to-face in a clinical setting. It takes about five minutes to achieve the scale. While the researchers collected it from patients face-to-face in a clinical setting. HAQ-DI covers 20 items in 8 domains for evaluating difficulty in applying daily living activities. Eight domains were included: dressing, arising, eating, walking, hygiene, reach, grip, and activities. There are two or three questions for each domain. There are four possible responses for the Disability Index questions: without any difficulty = 0, with much difficulty =2, with some difficulty = 1, and unable to do = 3. For each of these categories, patients report the amount of difficulty they have in performing two or three specific activities. An increasing score indicates worse functionality. **(Bruce & Fries, 2005; El Meidany et al., 2003).**

Scoring system

Each section is scored separately, and a single HAQ score is calculated from the average of the eight sections, which can range from zero to three scores.

- From zero to one equals mild to moderate difficulty.
- From one to two equal moderate disabilities to severe disabilities
- From two to three equal severe disabilities to very severe disabilities
- **First scale, the Health Assessment Questionnaire-Visual Analogue (HAQ-VAS) Pain Scale,** was developed by James (1978) and formulated for assessing the presence or absence of pain associated with RA and its severity. This scale provides information about the patient's pain over the last week, though the reported pain varied over the course of a day or from day to day.

Bruce & Fries, 2005; Sultanolu et al., 2021). **Scoring system:** The HAQ pain scale is composed of a doubly anchored, horizontal VAS, which is scored from zero (no pain) to one hundred (severe pain).



Second scale: Medical Research Council (MRC) Scale for Muscle Strength:

This scale is the most utilized for evaluating muscle strength. It was originally described by the Medical Research Council in 1943. This scale ranks from zero (no visible contraction) to five (normal muscle power). The scoring system for this scale when evaluating the patient indicates that 5 scores mean there is full muscle power, but 0 scores mean there is no muscle contraction. **Kleyweg, Van Der Meché, & Schmitz, 1991).** The MRC scores from six muscles in the upper and lower limbs on both sides were added to get this score, which varied from zero (quadriplegic) to sixty (normal). Each of the six muscular groups stated in the table must be assessed bilaterally and given a score between zero and five using the scale in the right-hand column in order to meet the criteria.

Muscle		Score 0 – 5	MRC scale for muscle strength (0-5)
Shoulder abductors	Left Right		Grade 5: Normal
Elbow flexors	Left Right		Grade 4: Movement against gravity and resistance
Wrist extensors	Left Right		Grade 3: Movement against gravity over (almost) the full range
Hip flexors	Left Right		Grade 2: Movement of the limb but not against gravity
Knee extensors	Left Right		Grade 1: Visible contraction without movement of the limb (not existent for hip flexion)
Foot dorsiflexors	Left Right		Grade 0: No visible contraction
Total (out of 60)			MRC grade for each muscle given in full numbers: (4+/4.5 =4) (4-=3) (5- = 4)

Third scale: self-efficacy for managing chronic disease 6-item Scale (SES6G):

This scale evaluates one's confidence in their capacity to control symptoms such as fatigue, pain, emotional distress, and others, to take action other than taking medication to lessen the effects of their condition, and to perform tasks and activities that might save them from needing to see a doctor. The SES6G consists of six items on a Likert scale that ranges from one (not at all confident) to ten (completely confident), with ten being the most confident. When asked to rate their level of confidence that they can currently complete specific jobs on a regular basis, respondents are asked (**Tobias Freund & MA, 2011). Scoring system:** By calculating the mean score across at least four of the six questions, the scale is interpreted, permitting a maximum of two missing item replies. Stronger values indicate stronger self-efficacy; means vary from one to ten **(Riehm et al., 2016).**

Content validity:

Five panels of experts in the fields of community nursing, rheumatology, psychiatric and mental health nursing, and nursing with more than ten years of experience in the field revised the study tools to evaluate their clarity, viability, and applicability.

Reliability:

Test-retest correlations proving reproducibility have varied from 0.87 to 0.99, while correlations across interview and questionnaire formats have ranged from 0.85 to 0.95. HAQ-DI has produced consistent and strong evidence of both its reliability and validity **(Bruce & Fries, 2005)**. The translated questionnaire demonstrated a high level of reliability and validity. Internal consistency for the subscales ranged from 0.941 to 0.948, while the standardized alpha (Cronbach's) value revealed a high value of 0.979. The maximal relative force readings and the median Medical Research Council score both had Spearman's correlation values of 0.78. **(Paternostro-Sluga, 2008).**

Internal consistency of the self-efficacy for treating chronic disease six-item scale (SES6G) was high (Cronbach's 0.87–0.91). **(Riehm et al., 2016).**

Pilot study:

It was applied to 13 participants, or ten percent of the total sample under examination, in order to gauge the instruments' applicability and clarity, assess the viability of fieldwork, and pinpoint any potential challenges the researcher might have that might prevent the gathering of data. There were no changes made. The representative participants were included in the basic sample.

Ethical considerations

The study was carried out with official approval from the authorities that were most convenient. Minia University Faculty of Nursing's Ethics Committee reviewed the study protocol and authorized the research. A form of free and informed consent was signed by each participant. Participants in the study had the option to decline participation or leave the study at any time without incurring any costs, and there was no risk to them while it was being conducted. Data collection and encoding were done while maintaining privacy, confidentiality, and anonymity.

Study fieldwork:

Study Field work is composed of preparatory, implementation, and evaluation phases.

Phase I: Preparatory Phase:

The current study began by preparing different data collection tools after reviewing the previous and current literature in the field of the actual study by viewing textbooks, journals, articles, periodicals, and the internet to get a clear picture of all dimensions related to the topic of research, such as **Freid, Ogdie, & Baker, 2020; Wen & Chai, 2021; and Ye et al., 2022).** This phase assisted in guiding, planning, and developing the study procedure, in addition to obtaining a formal paper agreement, which was taken for a duration of one month before conducting the study. The collection of study data was done on a daily basis (three days per week) during the morning shift. The total data collection was done over a period of 4 months, starting from the beginning of January to the beginning of May 2022, and then researchers obtained oral consent from those who accepted to participate in this study.

Implementation phase:

The researchers have started the collection of data upon RA patients' admission to the rheumatology department by teaching them all the instructions related to dynamic exercise and warm compresses to perform after the acute stage is finished and by identifying demographic characteristics. The researchers started the protocol application and taught the patients individually about RA, its causes, symptoms, and treatment, focusing on dynamic exercises and the method of applying warm compresses to RA patients. Video clips and a printed booklet containing instructions, a description of procedures with pictures and steps of the dynamic exercises and warm compresses according to the recommendations of the guidelines of the **American College of Sports Medicine (ACSM) (2010)** and the European League against Rheumatism Recommendations **(EULAR, 2018)**, which were translated into Arabic, were given to each participant to clarify the information. The number of sessions during the inpatient training period ranged between 4-5 sessions and varied according to each participant's understanding (two theory sessions and three practical sessions). The duration of every session lasted 30–45 minutes. The demonstration and re-demonstration were done to ensure that the participants and their relatives could follow this procedure perfectly. After discharge from the hospital and during the follow-up period of those participants in the Rheumatology out-patient clinic, the researchers met with the patients and their relatives during their attendance at the clinic and revised with them the previously learned steps of dynamic exercises and warm compresses. Throughout the 16-week study period, participants performed 48 sets of dynamic exercises and 48 sets of warm compresses (three sets per week), two of which were in a supervised environment under the researchers' supervision (Sunday and Wednesday); the third one took place.

<table>
<tr><th colspan="3">Enrollment of the study participants</th></tr>
<tr><th>Warm compresses group</th><th>Dynamic exercises group</th><th>Combined Dynamic and Warm compresses group</th></tr>
<tr><td rowspan="2"><u>I. Assessing the patient for:</u>
- The area to receive heat treatment for circulation.
- The skin sensation and integrity around the area to be treated
- Remove old dressing and carefully assess the open wound
- Determine history of diabetes mellitus or impairments in sensation.
- Before and after applying the warm compresses, the investigators assessing degree of pain by HAQ VAS Pain Scale.

II. Warm water compresses was applied for thirty minutes once per day with a water temperature of 50-60 C°</td><td colspan="2">10 minutes of warm-up and cool-down exercises consisting of range of motion exercises (ROM) were performed before each exercise session for both the dynamic exercises group and the combined dynamic exercise and warm compresses group to restore the heart rate around the normal level to prevent the sudden drop in blood pressure as well as nausea, fainting, and dizziness.</td></tr>
<tr><td>I. Dynamic exercises during the first 8 weeks of study duration (three non-consecutive days per week) consisted of:
a. Walking exercise for 30 minutes.
b. Resistance exercises for 40 minutes include wrist joint exercises, push-up exercises, sit-to-stand exercises, calf raises, and squats.</td><td>I. Dynamic exercises during the first 8 weeks of study duration (three non-consecutive days per week) consisted of:
a. Walking exercise for 30 minutes.
b. Resistance exercises for 40 minutes, include wrist joint exercises, push-up exercises, sit-to-stand exercises, calf raises, and squats

II. Warm water compresses was applied for thirty minutes with a water temperature of 50-60 C°.</td></tr>
<tr><td>Warm compresses was applied for thirty minutes once per day using water temperature of 50-60 C°.</td><td><u>Dynamic exercises</u> along the second 8- weeks of study duration (three non- consecutives days per week) consisted of:
a. Walking exercise for 30 minutes.
b. Resistance exercises using resistance band for 40 minutes, including: banded biceps curl, banded triceps curl, Seated row, Side steps, Squat and lift, and Lunges.
Frequency of resistance exercise at the second month was 10 repetitions per minute (RPM). This frequency increased at the third and fourth months to be 12 repetitions per minute (RPM).</td><td><u>Dynamic exercises</u> along the second 8-weeks of study duration (three non- consecutives days per week) consisted of:
a. Walking exercise for 30 minutes.
b. Resistance exercises using resistance band for 40 minutes, including: banded biceps curl, banded triceps curl, Seated row, Side steps, Squat and lift, and Lunges.
Frequency of resistance exercise at the second month was 10 repetitions per minute (RPM). This frequency increased at the third and fourth months to be 12 repetitions per minute (RPM).

II. Warm compresses using water was applied for thirty minutes once per day with a water temperature of 50-60 C°.</td></tr>
</table>

Evaluation phase:

The follow-up and evaluation phases for all study samples were performed at baseline, 8 weeks, and 16 weeks after applying the dynamic exercises and warm compresses through face-to-face interviews to evaluate the extent of disabilities, their muscle strength, pain, and self-efficacy by scale (I, II, and III). Also, investigators encouraged rheumatoid patients in the study sample to attend follow-up.

Statistical analysis

The statistical software for social sciences (SPSS) version 22 was used to arrange, classify, and analyze the collected data. For qualitative and quantitative variables, respectively, the mean and standard deviations of the data were reported using descriptive statistics. The paired t-test, chi-square test, and correlation r-test were the statistical tests that were applied. If the p-value was less than 0.05, high significance was assumed, and when the p-value was greater than 0.05, no statistical significance difference was taken into account.

Results

Table (1): Reveals that (48.8%, 46.5%, and 48.8%), respectively, of the dynamic exercises, warm compresses, and combined intervention groups, their ages varied between 60 to 69 years, with their mean ages as follows: 58.2±9.2, 59.9±9.8 and 58.2±9.2. Concerning gender, 60.5%, 58.1%, and 62.8%, respectively, of the three study groups are female. Regarding residence, 62.8%, 53.5%, and 69.8% of the study groups are living in rural areas, as are 67.4%, 65.1%, and 69.8% of the study groups who are married. Also, 34.8%, 32.6%, and 34.9% of patients are illiterate. Regarding their occupation, 60.5%, 55.8%, and 60.5% of study groups are housewives, and 62.8%, 55.8%, and 69.8% of

groups live with their families. There are no statistically significant differences between the study groups regarding sociodemographic characteristics**.**

Figure (1): Illustrates the duration of RA disease among the patients. It is found that 34.9%, 32.6%, and 30.2%, respectively, of the combined intervention groups with warm compresses and dynamic exercises have had RA for more than 6 years. There are statistically significant differences between the study groups regarding RA duration.

Figure (2): described that hand and wrist joints represents 100% of joint affections across the entire study sample. Moreover, the shoulder and ankle joints are less affection (83.7%, 81.3%, and 83.7%) and (88.3%, 86%, and 90.6%) respectively among the dynamic exercises, warm compresses and combined intervention groups. Furthermore, the hip joint is the least affected joint among the entire study sample (60.4%, 58.1% and 62.7%). (As can be seen from the table above, all groups express complaints from multiple joints at once.)

Table (2): Shows that 72.1%, of the dynamic exercises group, 67.4% of warm compresses group, and 72.1% of combined intervention group have grade 3 of MRC for shoulder abductor at baseline. While, there is an increase in the scores of MRC in all groups after 16-weeks of intervention, with 65.1% of the dynamic group, 62.8% of the warm compresses group, and 69.8% of the combined group having grade 4. Regarding elbow flexors, 53.5%, 53.5%, and 51.2%, respectively, of the three groups have grade 2 MRC at baseline, but after 16-week intervention, it is shown that 65.1% of both dynamic and warm compresses groups, and 67.4% of the combined intervention group have achieved grade 4. Concerning the wrist joint, 69.8% of the dynamic exercises group and 67.4% of both the warm and combined intervention groups have grade 2 at baseline, while after a 16-week intervention, it is seen that 58.1%, 55.8%, and 67.4%, respectively, of the three groups have grade 4. Same table reveals that there are highly statistical significant differences in combined group and statistical significant differences in dynamic and warm compresses groups.

Table (3): Regarding hip flexors, this table depicts that 62.8%, 65.1%, and 65.1%, respectively, of the three study groups have Grade 3 at baseline, but there is increase in their muscle strength scores in all groups after 8 and 16 weeks of intervention. It is observed that post 16-weeks of intervention; 83.7%, 81.4%, and 83.7% of the three groups their muscles have Grade 4. Regarding knees extensors, 62.8%, 60.5%, and 62.8% respectively of the three groups had Grade 2 of MRC at baseline, but after a 16-week intervention, it showed that 76.7%, 72.1%, and 79.1% respectively of the three groups had Grade 4. Concerning the foot dorsiflexors, 69.8% of both dynamic and combined intervention groups have Grade 2, but 62.8% of the warm compresses group has Grade 3 at baseline, while after the 16-week intervention, it is seen that 58.1% of the dynamic and combined intervention groups have Grade 4 muscle strength, but 65.1% of the warm group have Grade 4. There are statistical significant differences among the three study groups regarding muscle strength of the lower limbs.

Table (4): It is evident from the above table that patients' disabilities, as measured by the HAQ-DI questionnaire, decreased after applying all forms of care, particularly the combined intervention (dynamic exercise plus warm compresses). This is demonstrated by the fact that 46.5%, 44.2%, and 46.5% respectively of the three study groups, had severe to very severe disabilities at baseline measurement, while, all these groups show significant decrease in the level of disabilities after 16 -weeks of intervention to become 58.1%, 55.8%, and 67.4%, respectively with mildly to moderately disability. There are highly statistical significant differences in the combined group, and statistical significant differences in dynamic and warm compresses group regarding HAQ-DI scores.

Table (5): demonstrates that all study groups have moderate pain at baseline, but there is a decrease in pain level at 8 weeks and 16 weeks after all types of intervention, especially combined intervention. After 16-weeks of intervention, it was observed that 69.8% of the dynamic exercises and warm compresses groups have mild pain, while 72.0% of the combined intervention group has mild pain. There are highly statistical significant differences in the combined group and statistical significant differences in dynamic and warm compresses groups regarding visual analog pain scale.

Table (6): Shows that there is a statistical significant differences between both dynamic exercises and warm compress with self-efficacy. It was observed that, the highest mean scores of self-efficacy subscales for combined group after 16-week intervention compared to dynamic exercises and warm compresses groups.

Table (7): Summarized that, there are a highly statistical significant positive correlation between MRC, HAQ-ID and Self-Efficacy post 16-week intervention in combined intervention group than the dynamic group and warm compresses groups.

Table (1): Frequency & Percentage Distribution of Socio-Demographic Characteristics of the Study Patients (N = 129)

Socio-Demographic Characteristics	Dynamic Exercises group n=43		Warm Compress group n=43		Combined intervention group n=43		X^2	P
Items	**N**	**%**	**N**	**%**	**N**	**%**		
Age								
-40-49	6	14	5	11.6	6	14.0	1.10	0.890
-50-59	11	25.6	10	23.3	11	25.6		
-60-69	21	48.8	20	46.5	21	48.8		
-70 and more	5	11.6	8	18.6	5	11.6		
Mean ± SD	58.2±9.2		59.9±9.8		58.2±9.2			
Gender								
-Male	17	39.5	18	41.9	16	37.2	2.8	0.100
-Female	26	60.5	25	58.1	27	62.8		
Residence								
- Rural	27	62.8	23	53.5	30	69.8	2.67	0.874
-urban	16	37.2	20	46.5	13	30.2		
Marital status:								
- single	1	2.3	1	2.3	1	2.3	4.45	0.100
- Married	29	67.4	28	65.1	30	69.8		
- Divorced/separated	3	7.0	3	7.0	3	7.0		
- Widow	10	23.3	11	25.6	9	20.9		
Educational levels								
-illiterate	15	34.8	14	32.6	15	34.9	2.26	0.993
- Read and write	14	32.6	14	32.6	13	30.2		
- Diploma	11	25.6	9	20.8	11	25.5		
- High education	3	7.0	6	14.0	4	9.4		
Occupation								
- House wife	26	60.5	24	55.8	26	60.5	2.22	0.973
- Office work	10	23.3	15	34.9	10	23.3		
- Employ	2	4.7	3	7.0	2	4.7		
- Retired	5	11.6	1	2.3	5	11.6		
Living condition								
- Living with family	27	62.8	24	55.8	30	69.8	2.36	0.975
- Living alone	1	2.3	0	00.0	1	2.3		
- Living with relatives	15	34.9	19	44.2	12	27.9		

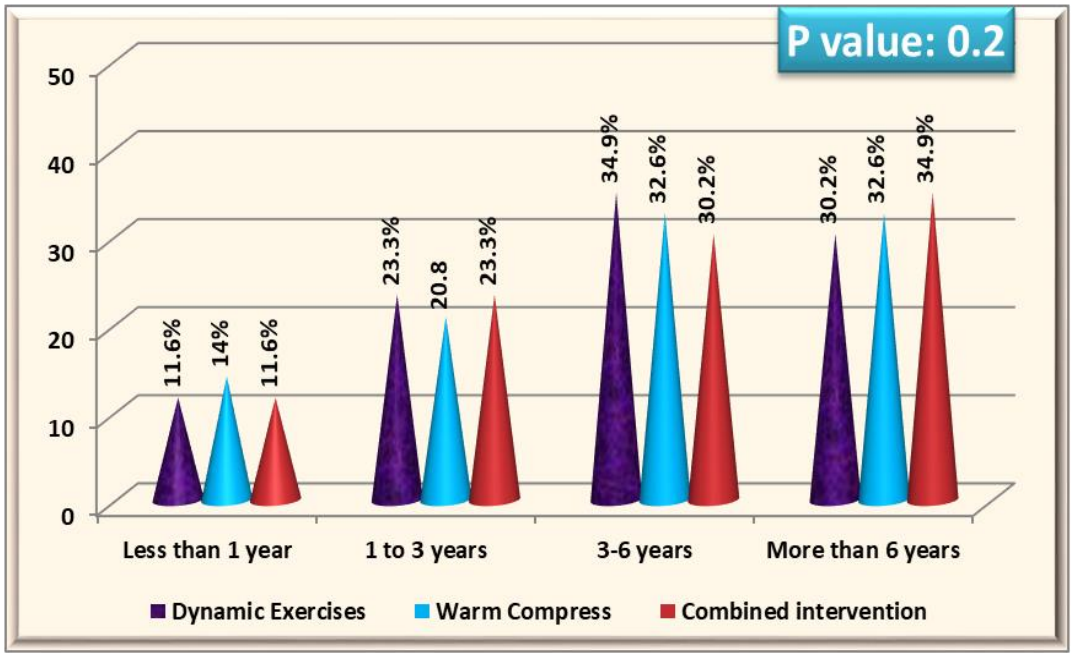


Figure (1): Frequency & Percentage Distribution of Disease duration among Study patients (N = 129)

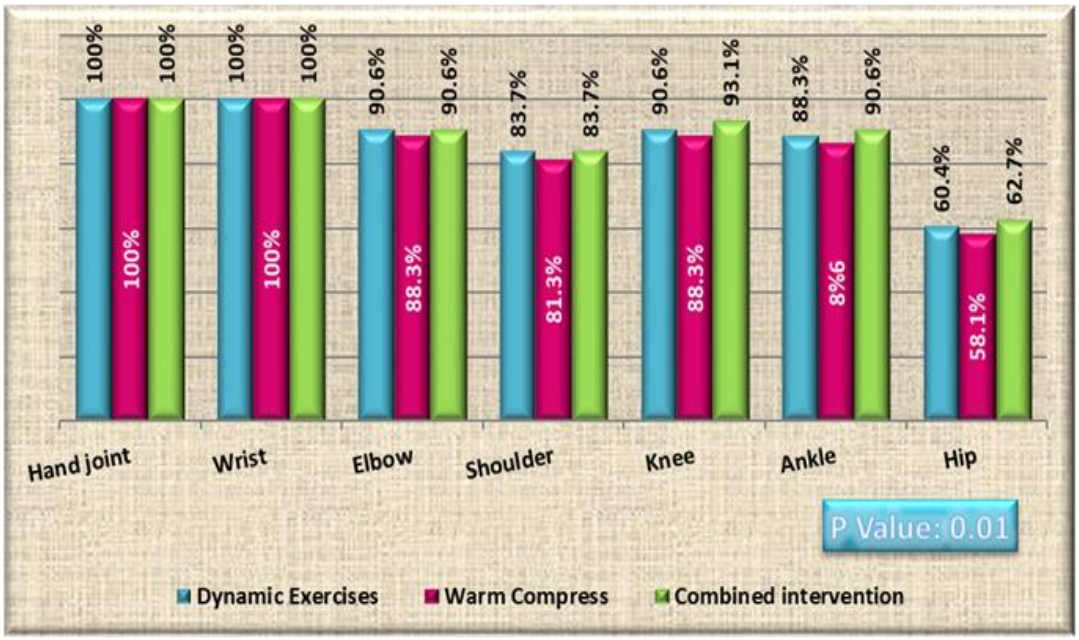


Figure (2): Frequency Distribution of Rheumatoid Arthritis Patients According to their Percentages of the Joint Affection (N = 129)

Table (2): Comparison between the Study Groups Regarding their Muscle Strength Scale (MRC) of Upper Limbs at Baseline, 8 week and 16 Weeks of intervention (n = 129)

Variables	Dynamic Exercises n=43						Warm Compresses n=43						Combined intervention n=43					
	Baseline		8 week		16 week		Baseline		8 week		16 week		Baseline		8 week		16 week	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
-Shoulder abductor																		
-Grade 2: movement of limb but not against gravity																		
	12	27.9	0	00.0	0	00.0	14	32.6	0	00.0	0	00.0	12	27.9	0	00.0	0	00.0
-Grade 3. movement of limb against gravity over the full range																		
	31	72.1	25	58.1	6	14.0	29	67.4	27	62.8	9	20.9	31	72.1	17	39.5	3	7.0
--Grade 4. movement of limb against gravity and resistance																		
	0	00.0	18	41.9	28	65.1	0	00.0	16	37.2	27	62.8	0	00.0	26	60.5	30	69.8
-Grade 5: Normal																		
	0	00.0	0	00.0	9	20.9	0	00.0	0	0	7	16.3	0	00.0	0	00.0	10	23.2
Elbow flexors																		
--Grade 2.movement of limb but not against gravity																		
	23	53.5	4	9.3	0	00.0	23	53.5	6	14.0	0	00.0	22	51.2	3	7.0	0	00.0
-Grade 3. movement of limb against gravity over the full range																		
	20	46.5	19	44.2	8	18.6	20	46.5	18	41.9	8	18.6	21	48.8	20	46.5	6	14.0
--Grade 4. movement of limb against gravity and resistance																		
	0	00.0	20	46.5	28	65.1	0	00.0	19	44.2	28	65.1	0	00.0	20	46.5	29	67.4
-Grade 5: Normal																		
	0	00.0	0	00.0	7	16.3	0	00.0	0	00.0	7	16.3	0	00.0	0	00.0	8	18.6
Wrist extensors																		
---Grade 2.movement of limb but not against gravity																		
	30	69.8	9	20.9	0	00	29	67.4	9	20.9	0	00.0	29	67.4	4	9.3	0	00.0
-Grade 3. movement of limb against gravity over the full range																		
	13	30.2	20	46.5	18	41.9	14	32.6	21	48.8	19	44.2	14	32.6	23	53.5	14	32.6
--Grade 4. movement of limb against gravity and resistance																		
	0	00.0	14	32.6	25	58.1	0	00.0	13	30.2	24	55.8	0	00.0	16	37.2	29	67.4
-Grade 5: Normal																		
	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0
X^2 (P value)	17.5 (0.03)*						12.3(0.05)*						31.1(0.002)**					

NS= not significant * p = ≤.05 (statistical significance) ** p = ≤.01 (highly statistical significance).

Table (3): Comparison between the Study Groups Regarding their Muscle Strength Scale of Lower Limbs along 16 Weeks of intervention (n = 129)

Variables	Dynamic Exercises n=43						Warm Compresses n=43						Combined intervention n=43					
	Baseline		8 week		16 week		Baseline		8 week		16 week		Baseline		8 week		16 week	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
-Hip flexors																		
-Grade 2.movement of limb but not against gravity																		
	16	37.2	0	00.0	0	00.0	15	34.9	0	00.0	0	00.0	15	34.9	0	00.0	0	00.0
-Grade 3. movement of limb against gravity over the full range																		
	27	62.8	10	23.3	2	4.7	28	65.1	11	25.6	3	7.0	28	65.1	7	16.3	2	4.7
--Grade 4. movement of limb against gravity and resistance																		
	0	00.0	31	72.1	36	83.7	0	00.0	30	69.8	35	81.4	0	00.0	33	76.7	36	83.7
-Grade 5: Normal																		
	0	00.0	2	4.7	5	11.6	0	00.0	2	4.7	5	11.6	0	00.0	3	7.0	5	11.6
Knee extensors																		
--Grade 2.movement of limb but not against gravity																		
	27	62.8	11	25.6	1	2.3	26	60.5	14	32.6	0	00.0	27	62.8	9	20.9	0	00.0
-Grade 3. movement of limb against gravity over the full range																		
	16	37.2	32	74.4	6	14.0	17	39.5	29	67.4	9	20.9	16	37.2	34	79.1	4	9.3
--Grade 4. movement of limb against gravity and resistance																		
	0	00.0	0	00.0	33	76.7	0	00.0	0	00.0	31	72.1	0	00.0	0	00.0	34	79.1
-Grade 5	0	00.0	0	00.0	3	7.0	0	00.0	0	00.0	3	7.0	0	00.0	0	00.0	5	11.6
Foot dorsiflexors																		
---Grade 2.movement of limb but not against gravity																		
	30	69.8	9	20.9	0	00	16	37.2	3	7.0	0	00.0	30	69.8	9	20.9	0	00.0
-Grade 3. movement of limb against gravity over the full range																		
	13	30.2	20	46.5	18	41.9	27	62.8	8	18.6	0	00.0	13	30.2	20	46.5	18	41.9
--Grade 4: movement of limb against gravity and resistance																		
	0	00.0	14	32.6	25	58.1	0	00.0	32	74.4	28	65.1	0	00.0	14	32.6	25	58.1
-Grade 5: Normal																		
	0	00.0	0	00.0	0	00.0	0	00.0	0	0	15	34.9	0	00.0	0	00.0	0	00.0
X^2 (P value)	29.9 (0.01)*						10.2(0.02)*						43.6(0.000)**					

NS= not significant * p = ≤.05 (statistical significance) ** p = ≤.01 (highly statistical significance).

Table (4): Comparison between The Three Study Groups in Relation to Their Health Assessment Questionnaire -Disability Index (HAQ-DI ((n = 129)

Variables	Dynamic Exercises n=43						Warm Compresses n=43						Combined intervention n=43					
	Baseline		8-week		16-week		Baseline		8-week		16-week		Baseline		8-week		16-week	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
From zero to one equal mild to moderate difficulty.																		
	7	16.3	19	44.2	25	58.1	8	18.6	8	18.6	24	55.8	7	16.3	21	48.8	29	67.4
From one to two equal moderate to severe disability.																		
	16	37.2	21	48.8	18	41.9	16	37.2	17	39.5	19	44.2	16	37.2	19	44.2	14	32.6
From two to three equal severe disability to very severe disability																		
	20	46.5	3	7.0	0	00.0	19	44.2	18	41.9	0	00.0	20	46.5	3	7.0	0	00.0
X^2 (P value)	10.5 (0.01)*						4.2 (0.04)*						13.5 (0.001)**					

NS= not significant * p = ≤.05 (statistical significance) ** p = ≤.01 (highly statistical significance).

Table (5): Comparison between The Three Study Groups Regarding Their Health Assessment Questionnaire -Visual Analog (HAQ -VAS) Pain Scale (N = 129)

Variables	Dynamic Exercises n=43						Warm Compresses n=43						Combined intervention n=43					
	Baseline		8- week		16-week		Baseline		8- week		16- week		Baseline		8- week		16- week	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
No pain (0)	0	00.0	0	00.0	7	16.3	0	00.0	0	00.0	7	16.2	0	00.0	0	00.0	7	16.2
Mild pain (10-30)	0	00.0	16	37.2	30	69.8	0	00.0	16	37.2	30	69.8	0	00.0	33	76.7	31	72.0
Moderate pain (40-60)	43	100.0	27	62.8	6	14.0	43	100.0	27	62.8	6	14.0	43	100.0	10	23.3	5	11.8
Sever pain (70-100)	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0	0	00.0	00.0	00.0	0	00.0
X^2 (P value)	25.7(0.02)*						18.7(0.05)*						46.1.8(0.001)**					

NS= not significant * p = ≤.05 (statistical significance) ** p = ≤.01 (highly statistical significance).

Table (6): Comparison between the Three Study Groups Regarding to Self- Efficacy for Managing Chronic Disease (N = 129)

statement	Dynamic Exercises n=43			Warm Compress n=43			Combined intervention n=43		
	Baseline	8 week	16 week	Baseline	8 weeks	16 weeks	Baseline	8 week	16 week
	Mean ± SD	Mean ±SD	Mean ± SD	Mean ± SD	Mean ± SD score	Mean ± SD	Mean ± SD	Mean ± SD score	Mean ± SD score
Keep the fatigue caused by your disease from interfering with the things you want to do?	2.9±1.0	4.7±1.8	**7.5±0.7**	2.9±1.0	3.6±2.9	**6.7±2.5**	2.9±1.0	5.2±1.0	**7.7±1.0**
keep the physical discomfort or pain of your disease from interfering with the things you want to do?	2.9±1.0	4.5±2.1	**7.5±0.7**	2.9±1.0	4.0±2.6	**5.8±3.3**	2.7±0.8	5.0±1.1	**7.9±0.5**
Keep the emotional distress caused by your disease from interfering with the things you want to do?	2.9±1.0	4.5±2.1	7.5±0.7	2.9±1.0	3.7±2.8	5.6±3.4	2.6±0.8	5.2±1.0	**8.1±0.6**
Keep any other symptoms or health problems you have from interfering with the things you want to do?	2.9±1.0	4.7±1.8	7.5±0.7	2.9±1.0	3.9±2.6	5.8±3.1	2.8±0.7	5.4±0.9	**8.1±0.9**
Can the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?	2.4±0.5	6.4±0.5	8.8±0.5	2.4±0.5	5.1±1.1	7.3±3.3	2.4±0.5	7.5±0.7	**9.1±0.6**
Can do things other than just taking medication to reduce how much your illness affects your everyday life?	2.4±0.5	6.4±0.5	8.8±0.5	2.4±0.5	5.4±0.5	6.3±0.5	2.4±0.5	7.5±0.6	**9.1±0.6**
F Value -P Value	**29.1 (0.01))***			**23.1 (0.05)***			**33.7 (0.000)****		

NS= not significant * p = ≤.05 (statistical significance) ** p = ≤.01 (highly statistical significance).

Table (7): Correlation between Muscle Strength, Health Assessment Questionnaire-Disability Index, Self-Efficacy for Managing Chronic Disease among Three Groups After 16-Week Intervention

Variables	Dynamic Exercises n=43		Warm Compresses n=43		Combined intervention n=43	
	r	P	r	P	r	P
MRC	0.226	0.01*	0.438	0.05	0.462	0.002**
HAQ-ID	0.184	0.02*	0.287	0.04*	0.429	0.001**
Self-Efficacy	0.792	0.01*	0.117	0.03*	0.888	0.001**

NS= not significant * p = ≤.05 (statistical significance) ** p = ≤.01 (highly statistical significance).

Discussion:

In relation to the data of socio-demographic, results of the present research showed that about half of the study sample their ages was ranged between 60 to 69 years; also more than half of them were females, in addition, approximate two thirds of the participants were married, moreover, more than half of the studied sample was from rural area. From the researcher's point of view, RA is more likely increases with age, as the cartilage that maintain and lubricates the ends of the joints wear and become thinner until one-bone rubs up opposite another causing of function loss and disability, as well as, RA percentages is higher in women than men. These results were in the line with **Sarhan, et al., (2022)** who reported that most of the participants were females as well, married. Also, **Lange, et al., (2019),** documented that most of the study sample their ages were more than 65 years, as well as female and married. On the other hand, **Elsayed Hussein et al., (2022),** documented that more than fifty- percent of the studied sample were lived in urban area.

In respect to the duration of the disease, findings of the actually research demonstrated that around one third of the sample had duration of disease from three to six years or above six years, which were parallel with **Elsayed, Hussein et al., (2022)** who clarified that, most of the participants had five years or above for the duration of disease, Furthermore, **Moghadam, et al., (2018),** found that the highest percent of the participants had five years or above for the duration of disease.

Regarding to joint affected by RA, the research data revealed that the hand joints, wrist, elbow, and knee represent the highest percentages of joints to be affected by RA across the entire study sample, as well as, shoulder and ankle joints are less affection, then the hip joint is the least affected. This may be contributed to, RA disease attacks small joints as well as synovial joints mostly on both sides of the body such as small joints of the hands and wrist, in addition, RA tends to affect many joints at once. These results are congruent with different studies performed by (**Guo, et al., 2018; Cai, et al., 2018**; **Carbone, et al., 2020),** all of these studies showed that, hand joints involving the metacarpophalangeal, and the proximal interphalangeal joints as well as, wrist joint are commonly affected by RA. Also, other joints can be affected as knees, elbows, ankles, as well as shoulders, also the joints of metatarsophalangeal, cervical spine, and the joints of temporomandibular

Concerning to the muscle strength of the upper as well as lower limbs, findings of the current research summarized that there was obvious raising in the mean scores of the muscle strength in the all studied groups post 16-weeks of intervention, in which the highest scores were for combined intervention group followed by dynamic exercises group then warm compresses group. The researcher opinion was; resistance and aerobic exercises (walking) improve aerobic fitness, muscle strength, as well as the stability, and range of motion of the joints. Moreover, warm compresses increase the circulation to inflammatory area through the vasodilation effect, so, enhancing tissue oxygenation in the muscle, and the diffused process will run smoothly, which increase the tissue metabolism, nutrition transfers and raising substances of residual. All of those will assist recovery of the tissues which is troubled by inflammation. These results were agreed with, **Sul, et al., (2020),** who mentioned that twelve weeks of strengthening the entire body exercises improve lower and upper-limbs strength, so exercise is assist adjuvant management for patients with RA. Also the same line, **Lange, et al., (2019)**, who concluded that patients with RA benefit from moderate- to high-intensity exercise, which is also perceived as manageable and helpful for the transition to independent activity. This finding supports the advice to include physical activity in the regular care of RA in persons over the age of 65. In addition, these findings are consistent with, **Wen & Chai, (2021) ,** who discussed that a multicomponent approach utilizing various rehabilitative techniques that include exercises and heat stimulation are necessary. Fortunately, with the right guidance, people with RA can safely exercise, increase their general physical fitness, and feel better overall while performing activities of daily life.

Regarding to HAQ-DI (questionnaire). Results of present research suggested that, the

mean scores of disability in RA patients decreased significantly from the baseline to post 16-weeks of intervention in which combined intervention group had the least mean scores of disability, followed by dynamic exercises group then warm compress group, these findings may be due to physical exercises especially resistance exercises and walking are safe and low in cost, in addition, exercises increase the strength and mass of the muscles that support the joints so, decrease the load on the joints, which in turn decrease level of pain and fatigue, as well as activity of disease, through its anti-inflammatory mechanism as well as, disease symptoms, depression and anxiety, and improve activity performance of the patients. Also, warm compresses are effective in reducing pain and inflammation, So, combining exercises with warm compresses possess more positive synergetic effects on the patients' disabilities. These results agree with, **Golus, et al., (2018); Srikesavan, et al., (2019),** who revealed that physical exercises as well as warm compresses are the core components of RA rehabilitation which are prescribed to improve functions and QOL and thereby reduce disability. The authors summarized that, the effects of different combined interventions of strength exercises and heat application with regular frequencies for RA patients are superiors to single intervention.

Concerning the HAQ VAS Pain Scale, findings of the actually study reflected that, the mean scores of pain for RA patients decreased from the baseline to post 16-weeks of intervention in which combined intervention group had the least mean scores of pain, followed by dynamic exercises group then warm compresses group. This could be attributed to combined intervention (dynamic exercises plus warm compresses) reduce the joint damage, influence on the processing of central pain as well as pain sensitivity, in addition, a well-balanced period and frequency of dynamic exercises increase endurance of the muscle supported the joints as well as, increase the joints flexibility and the functional ability, Also, warm compresses reduce inflammation and increase blood supply to inflamed joint so, combined intervention have a great pain-relieving effect than single intervention alone. Which in the same context with **Lorica, (2019),** who explained the impact of warm compresses in reduction the RA pain was through the physiologic answer of the body to the warm in the form of vasodilation, decreased of blood viscosity and reduced muscle tension of the inflamed area, as well as, raising tissue metabolism and permeability of the capillary, also, warm compresses decrease the joint spasm and promote maximum relaxation as well, lowering the viscosity of the synovial fluid which will assist the synovial fluid to surround the joint, so, it will reduce the friction among cartilage and bone. Further, **Li & Wang, (2022),** added that many therapeutic settings, exercise is a successful RA treatment. Exercise training over comparatively longer time frames, such twelve weeks or more, can lessen RA disease activity. Moreover, in the same vein the study conducted by **Proschinger, et al., (2022),** who illustrated that short-term physical activity can be medical advantage for patients with RA as well as in pain reduction.

Regarding to self-efficacy, the current research noticed that there is a significant raising in self-efficacy sub-items mean scores post 16-week intervention among the three study groups, with more raising in the combined intervention group when compared to the two other groups. This may be contributed by combined intervention group had more increasing and improvement in the muscle strength mean scores, with low pain and disabilities levels as well, increasing the knowledge and coping with the disease that enhance their self-treatment and well-being status of the participants that reflect positively on their self-efficacy. In this respect, **Moghadam, et al., (2018),** mentioned that, the mean scores of self-efficacy of the intervention group who shared in a training exercises programs composed of thirty-minute sessions per week for eight consecutive weeks, were significantly increased in all dimensions after three months of the intervention opposite with the control group. In addition, these line with **Khanna, et al., (2019),** who described that detection the requirements affected patients with chronic as well as debilitating illness such as RA, assist to consequently organizing and assess of self-care treatment programs chance

for those patients that is essential to raise their self-efficacy. Furthermore, **Moghadam et al., (2018),** concluded that increasing RA patients' awareness of their disease and ways to adapt to it, training programs are an excellent tool for boosting self-efficacy in individuals with chronic diseases like RA.

Finally, the Correlation between MRC, HAQ-ID, Self-Efficacy among The Three Groups After 16-Week Intervention. There is a highly statistically significance positive correlation between MRC, HAQ-ID and Self-Efficacy post 16-week intervention in combined intervention group than the dynamic and warm compresses groups. because there is a consistent link between self-efficacy, arthritis pain and disability, and muscle strength in inflammatory arthritis. Which agreed with, **Toyoshima, et al., (2021),** who captured that, engaging in a regular dynamic exercises program help in decreasing pain and fatigue, improving joint mobility and muscular strength, as well as, improving mental and activity performance, cardiovascular health, psychological well-being and reducing morning stiffness and rheumatoid cachexia. In addition to, **Lorica, (2019),** explained that, warm compresses soothing stiff inflamed joints and tired muscles, as well as, it was good for making body ready for exercises or activity, and increasing blood flow, which pull in more oxygen and nutrients to the joints and muscles, so, ease the joints, increase range of motion, and reduce stiffness., with increasing functional abilities for performing activity of daily living with increasing quality of life for those patients which in its role reflected on the patients' psychological status and self-efficacy. So, concurrent dynamic exercises with warm compresses afford many advantages to RA patients

Limitation of the study

There was a controlled number of clinical trials that were emerging about dynamic exercises, warm compresses and its effect on self-efficacy with limited similar outcomes are addressed. Limited information was provided in similar studies protocol adherence and how the interventions were acceptable. In addition to, there few studies that investigated the relationship between dynamic exercises, warm compresses and its effect on self-efficacy.

Conclusion

We can draw the following conclusions from the current research's findings: Conjunction dynamic exercise with warm compresses, resulted in greater improvements in disabilities, muscular strength, and self-efficacy as well as, decreasing pain levels, than each therapy used alone.

The researchers provide the following suggestions.

Raising the awareness among rheumatoid patients and caregivers regarding the importance of dynamic exercise, warm compresses, and reflection on improving disabilities.

Regular program's training to maintain nurses in rheumatoid units updated with research-based techniques and an array of interventions for decreasing patients' disabilities repeated of the present research using a bigger sample from various geographic locations to obtain results that are generalizable.

Well-planned, structured rehabilitation program that is relevant to their unique needs should be designed to determine its effect on RA patients' functional capacities and self-efficacy.

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