

Project Title

RA-ACTIVE – Novel Virtual Multidisciplinary Patient Activation and Group Therapy Program for Rheumatoid Arthritis Patients at Tan Tock Seng Hospital: A 12-month Pilot Study

Project Lead and Members

Project lead: Ong Hao Xu

Project members: Quek Li Xian, H'ng Wei Hern, June Lim, Dr Mona Manghani, Heng Choon Poh

Organisation(s) Involved

Tan Tock Seng Hospital

Healthcare Family Group Involved in this Project

Medical, Allied Health

Applicable Specialty or Discipline

Rheumatology, Allergy and Immunology; Physiotherapy; Psychology

Project Period

Start date: 01/01/2021

Completed date: 31/12/2023

Aims

To investigate the effect of multidisciplinary virtual patient activation and group therapy programme on chronic stable rheumatoid arthritis patients

Background

Rheumatoid Arthritis (RA) is the commonest inflammatory arthritis, affecting 1% of the Singaporean population. As a result of their disease, patients typically suffer joint pain, reduced muscle strength, and impaired muscle function resulting in significant functional disability (1). In addition to articular features of the disease, RA is associated

with increased morbidity and mortality from cardiovascular disease (CVD) and decrease in bone mineral density.

Patients with RA were found to be less active and have poor aerobic fitness (2-4). Previous studies also revealed that at least 50% patients suffer from loss of lean mass (5). RA patients tend to be sedentary and have poor cardiorespiratory fitness. (6) Poor cardiovascular health is the main cause of death in RA. (7) Therefore, the requirement of aerobic exercise as part of the treatment is crucial.

There is growing body of evidence that strongly suggests that exercise is effective in management of patients with RA and does not produce adverse events. Regular brisk walking, even in short bouts improves aerobic fitness and reduces aspects of CVD risk in healthy adults. Walking, cycling, water-based exercise and dancing have all been studied in RA patients. Improvements in aerobic power and positive changes in depression, anxiety, and fatigue with no deterioration in disease activity in RA patients have been reported. (8-9) There is strong evidence for the benefits of resistance training on improvements on RA disease activity (10). Resistance training has been shown to be safe and effective in patients with RA, in increasing lean mass, reducing fat mass, and improving strength and function (11). This form of training has been shown to increase tendon stiffness and strengthen connective tissue (12-13). In addition to this resistance training involving large muscle groups of the upper and lower extremities as well as hand strengthening exercises have shown to be effective. (14) Strengthening exercises are recommended for all stages of RA. (15) The European League Against Rheumatism (EULAR) has recommendations on physical activity in RA that were published in 2018. The recommendations advocate for promotion of physical activity as integral part of standard of care throughout the course of disease in people with RA, exercise interventions to include clear personalized aims, which should be evaluated over time, preferably by use of a combination of subjective and objective measures (including self-monitoring when appropriate), as well as, for health care providers to consider different types of delivery for RA (e.g. supervised, individual/group, face-to-face/online, booster strategies) in line with people's preferences.

However, RA patients often suffer from chronic joint ailments, fatigue and intermittent joint flare-ups, it is challenging for patients to start a successful exercise program on their own and guidance from health professional may be required. This population of patients would require joint protection education, close monitoring to prevent flare up, and have other existing co-morbidities that would require clinical knowledge to ensure safe and effective exercise, in order to acquire intended health benefits of exercising.

Besides, RA is a chronic illness that requires lifelong medication, and often have higher rates of depression, anxiety and other mood problems (16). Despite the effectiveness of pharmacological treatment in significantly reducing symptoms of the disease such as pain and disability, for many people with RA, psychological distress and poor quality of life persist in spite of such treatments (17).

According to the literature and based on experience, many RA patients also demonstrate low adherence to physical activity recommendations and lowered physical activity levels for reasons such as lack of knowledge, motivation and psychological barriers. The literature has also shown that patients with RA often experience pain, fatigue and psychological distress such as anxiety and depression associated with their condition. (17) These psychological factors also have an impact on patient's RA outcome. Psychological interventions within the context of a multidisciplinary approach is important but an overlooked adjunctive treatment option. Thus, a multidisciplinary approach incorporating psychological interventions within the care of RA patients, can help to improve overall disease activity, function and emotional well-being. Psychological interventions can help patients to increase motivation and learn problem solving skills as well as increase their self-efficacy to self-manage their RA.

Currently, RA patients are referred for physiotherapy (PT) and/or psychology sessions targeting specific problem areas on an as required basis in TTSH. The patients usually arrange for their PT/Psychology appointments separately after their doctor's visit and wait at least 2 to 3 weeks prior to seeing the therapist. Those RA patients referred to physiotherapy often decline or default appointments. This is usually due to barriers such as multiple existing hospital appointments, long waiting times and limited resources (both time and/ or money) and low self-motivation. RA patients usually suffer from chronic joint symptoms and fatigue, which provides an uphill task for them to start a successful exercise program on their own. At present, there are also no structured group exercise programs in existence in Singapore designed specifically for patients RA.

As many patients with RA have a below average physical capacity, exercise training should be initiated at a lower intensity with precautions in place to protect joints. A clinician-guided structured home-based exercise program specific for RA patients is therefore necessary.

The COVID 19 crisis has highlighted the need for innovative healthcare. During this pandemic, most patients especially the frail and elderly have been advised to stay home. Many of the stable RA patients have had their regular appointments with their doctors postponed. The delivery of remote healthcare is needed so that our patients receive timely care. The use of telemedicine has met some of the urgent needs during this pandemic.

As a result of Singapore's DORSCON Orange restriction on healthcare workers' movement, redeployment to the frontlines and the introduction of the circuit breaker, both the Department of Rheumatology, Allergy and Immunology, and the Physiotherapy Department at Tan Tock Seng Hospital had to decrease its clinic load by 70%. During this period, the rheumatology department adopted basic telemedicine by conducting telephone consultations instead of face-to-face consultations for a subgroup of chronic stable patients, provided free delivery of medications and thereby reduced non-essential follow-up visits. The physiotherapy department also began providing physiotherapy via videoconferencing for patients who needed timely

rehabilitation. The psychology department have also began providing psychological interventions via videoconferencing to a select group of stable patients to reduce barriers such as inconvenience and to provide timely intervention. The rheumatology department are currently in the process of further developing a rheumatology telemedicine service, whilst the physiotherapy and psychology department are continuing to provide videoconferencing to patients who are require rehabilitation and suitable for remote consultation. Tele-health group exercise on patients have not been explored.

The use of group exercise has been shown to aid adherence, improve motivation and functional performance of patients (18). Studies have shown telehealth interventions to be more effective and time-saving, as well as associated with a high degree of patient satisfaction. (19) Although OA telehealth has been well established such as the PEAK program for knee osteoarthritis by the University of Melbourne (20); there is no structured telehealth exercise program available for patients with RA. In view of current COVID situation, it is advisable to minimise non-essential visits to hospital especially for high-risk patients. A telehealth exercise program would satisfy this unmet need without increase risk of infection in patients. We aim to come together to develop and implement a blended approach virtual multidisciplinary care for chronic stable RA patients, where patients will be followed-up with mix of face-to-face and coordinated virtual consultations with their primary rheumatologist, nurse clinician, physiotherapist and clinical psychologist. Patients with chronic stable RA condition will be reviewed by their primary rheumatologist and suitable patients will be referred for the patient activation and group exercise program. By offering a blended approach of face-to-face and remote physical activity through a telehealth platform, we hope to improve physical fitness (i.e. muscle strength and aerobic endurance) for patients with RA through a structured exercise and education program. We also hope to improve utilisation and accessibility of allied health services (i.e. physiotherapy and psychology) to patients with RA and to remove barriers for patients to attend allied health services.

Methods

Recruitment:

Participants were recruited from a Tan Tock Seng Hospital, Singapore between the period of July 2021 to September 2021. Patients who meet the inclusion and exclusion criteria were offered enrolment into virtual patient activation and group therapy program.

Inclusion/exclusion criteria:

Patients with RA enrolled in the telemedicine RA multidisciplinary clinic. These patients will have a diagnosis of RA according to the ACR 1987 or 2010 criteria, > 50 years and able to speak, read and understand English. Patients will need to be on stable DMARD therapy over the last 3 months and have “low disease activity” as defined by a DAS 28 score ≤ 3.2 with inactive lower limb joints.

Patients will be excluded if they have active disease requiring DMARD escalation, are incapable of answering electronic questionnaires (RAPID 3, patient satisfaction survey)

or unwilling to be followed up via telehealth. Patients with previous history of falls within the last 6 months or high cardiovascular risk determined by rheumatologist to be unsafe to participate in an exercise program will also be excluded.

Participation:

The participants who were recruited will participate in a weekly, 30 minutes virtual exercise session in a group of between 3 to 5, for a total period of 8 weeks, led by a senior physiotherapist. During the first week, a rheumatologist will conduct a brief welcome speech, followed by a patient education on rheumatoid arthritis, and an introduction to the program. followed by a guided virtual exercise session led by a physiotherapist. There will also be an exercise video specially tailored for patients with RA that is utilised during the virtual tele group sessions. These would be demonstrations of exercises based on patients' level of function. A physiotherapist will be present at all times to lead and guide the exercise session, to progress the exercises safely and provide goals settings and instructions to further improve strength and physical function. On weeks 2, 4 and 7, a psychologist conducted a separate 30minutes session with each group to work on behavioural intervention such as goals setting, motivation, and stress management. At the end of 8 weeks, the participants will return to the clinic within a 4 weeks window period to arrange.

Results

21 participants have been recruited for this RA-ACTIVE programme. 1 participant dropped out and 1 lost to follow up, therefore, 19 participants completed the programme, giving us a 90.1% attendance rate.

The RA-ACTIVE program had shown promising results in improving care and improving patient's physical outcomes.

6MWT, Times stand test and HADS had shown significant improvement from baseline to 12 months.

6MWT had showed a significant mean improvement in distance from 331.86m to 393.11m (+64.2m) with p-value=0.005; while the timed stand test had shown a significant mean improvement in repetitions from 11.38 to 13.00 with p-value=0.016.

The A-score from HADS showed a significant mean improvement from 4.67 to 2.79 with pvalue=0.024 and D-score from 3.86 to 2.32 with p-value=0.008.

Subjective measures for visual analogue scale (VAS) from EQ5D-5L and RAPID3 were both insignificant, with VAS having an improvement of 73.10 to 69.16 (p=0.887) and RAPID3 from 6.086 to 6.147 (p=0.948).

Please refer to the tables below for each outcome measure for the detailed analysis from baseline to 12 months with comparison.

	Baseline 0 Month	At 3 months	At 6 months	At 12 Months
Distance Walked (in meters)	331.86	391.053	416.184	393.11
	0 to 3 Months	3-6 months	6-12 months	0-12 months
P-Value	0.000	0.094	0.432	0.005

	Baseline 0 Month	At 3 months	At 6 months	At 12 Months
Timed Stand test (no. of times)	11.38	13.53	14.26	13.00
	0 to 3 Months	3-6 months	6-12 months	0-12 months
P-Value	0.002	0.189	0.032	0.016

HADS	Baseline 0 Month	At 3 months	At 6 months	At 12 Months
A Score	4.67	4.42	4.84	2.79
	0 to 3 Months	3-6 months	6-12 months	0-12 months
P-Value	0.374	0.849	0.004	0.024

	Baseline 0 Month	At 3 months	At 6 months	At 12 Months
D Score	3.86	4.21	3.53	2.32
	0 to 3 Months	3-6 months	6-12 months	0-12 months
P-Value	0.839	0.217	0.008	0.008

	Baseline 0 Month	At 3 months	At 6 months	At 12 Months
VAS from EQ5D-5L (score of health today)	73.10	76.68	69.79	69.16
	0 to 3 Months	3-6 months	6-12 months	0-12 months
P-Value	0.139	0.018	0.219	0.887

	Baseline 0 Month	At 3 months	At 6 months	At 12 Months
RAPID3 score	6.086	5.653	6.958	6.147
	0 to 3 Months	3-6 months	6-12 months	0-12 months
P-Value	0.002	0.189	0.032	0.016

RA- ACTIVE program has shown to produce significant results in most of the outcome measures at the end of the program albeit the small sample size and has achieved the initial intention to improve patient's health, mood fitness within a multidisciplinary care setting while at the same time, improving engagement, participation and access of care.

Regarding the patient interview survey, all participants have found the program helpful in terms of strength and mobility, motivation to exercise, physical and mental well-being and understanding of their own body. They were also happy that the exercises can be done in the comfort of their own home

Lessons Learnt

There will be considerations to work with a larger population size to account for variables in the study as mentioned in the outcome.

Secondly, exercises may be modified accordingly to each participants' physical fitness and tolerance levels

Conclusion

The study had demonstrated that RA-ACTIVE- a novel virtual multidisciplinary patient activation and group therapy program was successful in improving the function of individual with RA. It had enabled patients who faced challenges to attend appointments outside of their home, or preferred to have therapy in the comfort of their home to have access to a suite of holistic healthcare. This programme had shown potential to be an alternative to traditional model of care which could provide equally high quality and effective treatment for RA patient.

Additional Information

This project is funded by the Centre for Allied Health & Pharmacy Excellence (CAPE).

Project Category

Care & Process Redesign, Access to Care, Care Continuum, Chronic Care, Technology

Keywords

Rheumatoid Arthritis, Exercises, Telehealth

Name and Email of Project Contact Person(s)

Name: Ong Hao Xu

Email: hao_xu_ong@ttsh.com.sg



Novel Virtual Multidisciplinary Patient Activation and Group Therapy Program for Rheumatoid Arthritis Patients at Tan Tock Seng Hospital: a feasibility pilot study

Authors: Ivy Ho W.F, June Lim W.P, Lim H.L, Nicholas Kan W.M, Manghani M, Quek L.X, Ong H.X
Presenting author: Ong H.X E-mail: hao_xu_ong@ttsh.com.sg

Background

RA-ACTIVE is a first-of-its-kind virtual telehealth program in Singapore, designed to deliver off-site, evidence based care for Rheumatoid Arthritis (RA) patients.

Aim

To improve RA patients' health, mood and fitness within a multidisciplinary care setting

Methods

Subjects were patients seen from August 2021 to December 2021 in Rheumatology, Allergy and Immunology Department in Tan Tock Seng Hospital, Singapore. Subjects were recruited by their primary Rheumatologists.

Inclusion criteria

- Diagnosis of RA according to the ACR 1987 or 2010 criteria
- > 50 years and able to speak, read and understand English
- Stable DMARD therapy over the last 3 months
- "low disease activity" as defined by a DAS 28 score ≤ 3.2 with inactive lower limb joints.

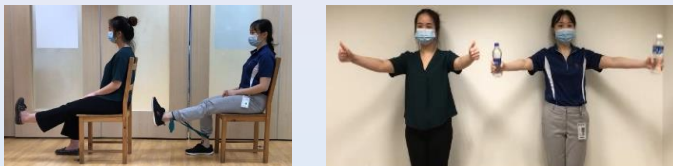
Exclusion Criteria

- Incapable of answering electronic questionnaire
- Previous history of falls within the last 6 months
- Cardiovascular risk determined by rheumatologist to be unsafe to participate in an exercise program

Programme

- RA-Active is delivered seamlessly over a period of 8-weeks:
 - A structured content delivery of patient education by a Rheumatology physician
 - Guided virtual physical activity by physiotherapists, and patient activation component targeting motivation and behavioural changes by psychologist

Figure 1: Methods



Session 2

- Psychoeducation
- Values
- Goal setting



Session 4

- Strategies to manage your emotions and negative thoughts.
- Stress management
- Relaxation and Mindfulness



Session 7

- Review goal achievement
- Identify barriers to goal achievement
- Problem solving
- Maintaining changes

Figure 2: Example of RA-ACTIVE Program

Outcome Measures

Taken at baseline, 3,6 and 12 months post study:

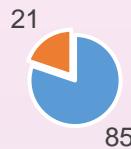
- Timed Stand Test
- Hospital Anxiety and Depression Scale (HADS)
- Distance walked: 6-minutes walk test (6MWT)
- EQ5D-5L health related quality of life questionnaire
- RAPID3 score

Taken for the 8 weeks of zoom:

- Self- reported physical activity and step count
- Self -reported questionnaire on physical activity

Results

Subjects



Gender

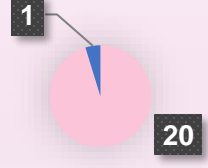


Figure 3: Participants demographics

- 436 patients were screened
- Mean age 60.7 years old
- Waiting time from recruitment to start of program is 19.6 days

Total Subjects:	n = 21
Completed program	19 (90.1% attendance rate)
Dropped out	1
Lost to follow up	1

Figure 4: Participants attendance

Outcome Measures	Mean Improvement (Baseline to 12-months)
HADS score	A (Anxiety) score improvement from 4.57 – 2.79 (p-value=0.024). D (Depression) score improvement from 3.86 – 2.32 (p-value=0.008)
Timed stand test	Improvement in repetitions from 11.38 to 13.0 (p-value = 0.016)
6MWT	Improvement in distance walked from 331.86m to 391.11m. (p-value = 0.005)
RAPID3 score	6.086 to 6.147 (p-value=0.948)
EQ5D-5L (VAS)	73.10 to 69.16 (p=0.887)

Figure 5: Outcomes

From the patient interview survey, participants found the program helpful in terms of strength and mobility, motivation to exercise, physical and mental well-being and body awareness.

Implications

This new RA-ACTIVE program has shown significant results in transforming care. Based on the findings, RA-ACTIVE has shown positive results in patients' mood, strength and function