Online supplementary material S3: Details of included studies

Contents

Abbreviations

AS	Ankylosing spondylitis
CBT	Cognitive behavioural therapy
PsA	Psoriatic arthritis
RA	Rheumatoid arthritis
SLE	Systemic lupus erythematosus
axSpA	Axial spondyloarthritis
SSc	Systemic sclerosis
SS	Sjogren's syndrome
IA	Inflammatory arthritis

Ambrosino et al., 2020	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=40) ≈ experimental group (n=20): 65% female; control group (n=20): 60% female ≈ experimental group: 27.05 years; control group: 27.85 years ≈ No information about disease duration 1987 ACR revised criteria All subjects had been treated with a ‘‘biologic’’ agent.
Intervention(s)	Home videogame-based exercise (exergaming)
Intervention(s) characteristics	Participants (Group A) were provided the videogame system, including the Wii-Fit console, balance board, and discs with games software, and were asked to daily record the duration of game playing and to call the study coordinator in case of technical or health issues. The Nintendo Wii-Fit system is based on physical rules of virtual reality, in which players’ movements correspond to virtual movements congruous with those generated by players’ actions. To select videogames able to adequately stimulate muscle activity, three healthy volunteers, chosen among the hospital staff, underwent surface electromyography for the upper and lower limbs during the execution of 15 games available on the Wii-Fit fitness program. By assessing the muscle activation spikes, we identified the exergames that were able to determine the activation of the target muscle groups in RA; surface electrodes were applied correspondingly to upper (deltoid muscle, biceps, triceps brachii, extensor digitorum) and lower limbs (quadriceps femoris muscle, tibialis anterior, medial gastrocnemius, extensor digitorum, abductor hallucis). The five exergames that activated in absolute number more muscle clusters were selected for use in the study. Participants were asked to play the five preselected Wii-Fit games (running, skiing, balloons shooting, bike slalom, balls moving through labyrinth) for 10 minutes per game, once/ daily, throughout the period of hospitalization (Group A and B) and at home (Group A only). Videogames required to perform a wide range of exercises for upper and lower arms, including shoulder flexion/extension, abduction/adduction, internal/external rotation, circumduction, elbow flexion/ex- tension, forearm pronation/supination, hand digit motion, weight shift back and from side-to-side, and knee and ankle flexion/extension. The Nintendo Wii-Fit system is an interactive and movement-based gaming system in which the player is re- presented as an avatar within the virtual environment. The system uses a handle game-controller and a pressure- sensitive platform on which the player can stand and actively shift his/her weight during playing. Moreover, to perform digit/hand training, the balance platform can be set for slight weights, simulating activities of manual dexterity (e.g., balls moving through a labyrinth). A television display is used to output the game playing. The additional videogame-based training was administered to all study patients during hospitalization (from T0– T1). At discharge (T1), subjects were randomized into two groups with a 1:1 allocation: Group A (experimental group), including subjects who continued the same Wii-Fit training at home for additional 8 weeks, and Group B (control group), including subjects instructed to maintain their habitual activity during the 8-week follow-up.
Professional that promoted the interventions	Subjects (experimental group) continued the same Wii-Fit training at home for additional 8 weeks and were asked to daily record the duration of game playing and to call the study coordinator in case of technical or health issues.
Intervention(s) setting	Home
Control	Standard care
Outcomes of interest (types and measuring instruments)	Fatigue - Functional Assessment of Chronic Illness Therapy (FACIT) Fatigue was a secondary outcome
Effectiveness results	At T2 assessment, Group A patients experienced a significant improvement of fatigue with a 19.1% FACIT improvement as compared with T1. Group B patients reported a 53.4% reduction in FACIT values from T1 to T2. Percentage changes in FACIT outcome measure after a 4-week in-hospital traditional/exergaming combined rehabilitation program in the experimental group (patients who continued Wii-Fit training at home for additional 8 weeks): 61.2%, and in the control group (patients who maintained their habitual physical activity after discharge): 71.4%; p: 0.602 A multivariate analysis showed that, after adjusting for all major clinical and demographic characteristics, the extended home-based virtual reality training was an independent predictor of Δ% FACIT (β=-0.505; P<0.001).
Safety results	Not stated
Main results	Patients who maintained adequate levels of physical activity at home through exergaming also experienced a persistent improvement of GH, perceived quality of life, and fatigue. In keeping with this, the extended home training was found to be an independent predictor of the changes in these functional measures.
Follow-up	After baseline assessment 4 weeks, and after randomisation additional 8 weeks
Conclusions	This study showed that RA patients may benefit from home exergaming as an additional rehabilitative approach which, by encouraging a greater physical activity engagement, may allow to maintain the benefits of traditional multidisciplinary rehabilitation.

Aranow et al., 2021	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=18) ≈ 100 % Female ≈ Treatment group: 45.7 years; control group: 54.2 years ≈ Disease duration: not stated 1997 Revised ACR or SLICC classification criteria
Intervention(s)	Transcutaneous auricular vagus nerve stimulation
Intervention(s) characteristics	Transcutaneous auricular vagus nerve stimulation (taNVS), a spring- loaded clip consisting of opposing conductive silicone electrodes was placed around the left ear with one electrode on the concha and the other behind the ear. Stimulation pulses (30 Hz frequency, 300 μs pulse width) were generated by a commercial transcutaneous electrical nerve stimulation (TENS) unit (Roscoe TENS 7000), and the amplitude was increased to the maximum amount tolerated by the subject without pain. To evaluate the effect(s) and durability of taVNS, subjects received comprehensive assessments at baseline, day 5 and day 12 by a physician blinded to the subject's treatment;
Professional that promoted the interventions	To evaluate the effect(s) and durability of taVNS, subjects received comprehensive assessments at baseline, day 5 and day 12 by a physician blinded to the subject's treatment; all patient assessments were performed by an investigator who was not present during the stimulation.
Intervention(s) setting	Hospital
Control	Sham stimulation (SS), the battery was removed from the TENS unit, the electrode clip placed on the ear lobe (a location without vagus nerve innervation) and the dial on the TENS unit advanced. SS was then delivered for 5 minutes.
Outcomes of interest (types and measuring instruments)	Fatigue - FACIT F (Functional Assessment of Chronic Illness Therapy Fatigue Subscale); Fatigue was a <u>secondary outcome</u>
Effectiveness results	Subjects receiving taVNS also experienced a significant improve - ment of fatigue compared with subjects receiving to SS and the odds of achieving a meaningful reduction in fatigue was 54.6 times greater in subjects receiving taVNS compared with those receiving SS (p=0.014), 10 of 12 taVNS subjects and 0 of 6 SS subjects achieved a meaningful reduction in fatigue. The change of reported pain at day 5 from baseline correlated significantly with the change in fatigue (r=0.69, p=0.013). Change in patient-reported fatigue measure by the FACIT- F from baseline to day 5 (day 5–day 1) in subjects receiving SS or taVNS (0.00 (–2.00 to 1) and 11.00 (4.50 to 16.00), respectively, p=0.003).
Safety results	taVNS was well tolerated with no adverse events attributed to the stimulation. There were no reports of headache, light-headedness, tinnitus, ear irritation or changes to the external skin of the outer ear.
Main results	Subjects receiving taVNS had a significant decrease in pain and fatigue compared with SS and were more likely (OR=25, p=0.02) to experience a clinically significant reduction in pain. PtGA, joint counts and PGA also improved. Pain reduction and improvement of fatigue correlated with the cumulative current received. In general, responses were maintained through day 12. Plasma levels of substance P were significantly reduced at day 5 compared with baseline following taVNS but other neuropeptides, serum and whole blood- stimulated inflammatory mediators, and kynurenine metabolites showed no significant change at days 5 or 12 compared with baseline.
Follow-up	12 days
Conclusions	taVNS resulted in significantly reduced pain, fatigue, and joint scores in SLE. SLE inflammatory symptoms are responsive to VNS and that substance P is affected by the cholinergic anti-inflammatory pathway.

Austin et al., 1996	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=58) ≈ 96% Female ≈ 51.2 years ≈ Disease duration: 6.5 years a verifiable diagnosis of SLE and be age 21 years or older
Intervention(s)	A 6-month telephone counselling intervention using either a treatment counselling (TC)
Intervention(s) characteristics	The TC intervention utilized a written counselling protocol to standardize the sessions. The counsellor targeted 6 patient behaviors: self- care activities in managing fatigue, patient's communication skills, removing barriers to medical care, medication self-management, symptom monitoring, and stress control methods. This structured protocol was devised over a 6-month period with input from rheumatologists, health educators, counsellors, and patients, and was based on our experience in assisting arthritis patients by telephone. The protocol was pre- tested on small groups of patients and was revised several times prior to its use in the study. Each subject in the TC group was counselled only by telephone by a single counsellor who had a certification in reality therapy counselling, had a master's degree in rehabilitation counselling, and was experienced in arthritis information dissemination. Each subject in the SM group was interviewed only by telephone by a trained staff member. This staff member used the SM protocol, which was a modified version of the AIMS2. The SM group received the same number of telephone sessions and amount of contact time as the TC group. Each session contained a question-and-answer format emphasizing a review of function that consisted of fatigue, physical function, self-care activities, social activity, support from family, flare-ups, joint pain, mood, and tension. The items of the SM protocol were much more extensive and detailed than the items used for symptom monitoring in the TC protocol. The steps taken to ensure that no direct or indirect counselling was inadvertently given to the SM group included the selection of SM staff who had no training in counselling and minimal knowledge of SLE, specific training given to SM staff both on the proper use of the SM protocol and on how to handle patient questions, and spot checks of the conversations between SM staff and the study subjects by the investigators.
Professional that promoted the interventions	TC intervention: counsellor who had a certification in reality therapy counselling, had a master's degree in rehabilitation counselling, and was experienced in arthritis information dissemination SM intervention: a trained staff member
Intervention(s) setting	Not stated (by telephone)
Control	Symptom monitoring (SM) strategy.
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Scale (FSS), Fatigue Self-Efficacy Scale (FSES) Fatigue was a primary outcome.
Effectiveness results	There was no difference in the 6-month FSS scores between groups. Paired t-tests indicated that the mean FSS scores significantly improved (adjusted $P < 0.05$) for the combined TC and SM groups. The within-group effect sizes for FSS were 0.55, 0.44, and 0.50 for TC group, SM group, and combine groups, respectively. There was no difference between groups in the 6-month Fatigue Self-Efficacy Scale scores. Paired t-tests indicated that the mean Fatigue Self-Efficacy Scale scores significantly improved (adjusted $P<0.05$) for the combined TC and SM groups. Fatigue severity and physical function at 6 months were significantly associated ($P<0.01$) with each other and with affect, pain, and fatigue self-efficacy. Affect was also significantly associated ($P<0.01$) with fatigue self-efficacy. The correlation (0.58) of the fatigue severity and physical function follow-up scores adjusted for baseline score was also significantly different ($P<0.01$) from 0 which indicated that the changes in fatigue were directly related to changes in physical function.
Safety results	Not stated
Main results	At the 6-month follow-up, the mean Arthritis Impact Measurement Scales 2 (AIMS2) Physical Function scale and AIMS2 Social Support scale scores were significantly improved ($P<0.05$) for the TC group compared to the SM groups. The mean FSS score, AIMS2 Affect score, and AIMS2 Pain score were significantly improved ($P<0.05$) for both groups.
Follow-up	6 months
Conclusions	Telephone interventions, especially using the TC approach, can be effective for improving the functional status of persons with SLE. The findings of this study provide some support for including routine telephone contact in guidelines for the management of SLE as well. The main findings of this study were that 1) physical function and social support were significantly improved for persons diagnosed with SLE who received telephone counselling using the TC approach compared to the SM approach; 2) fatigue, fatigue self-efficacy, and affect were improved using either the TC or SM approach; 3) the only mediating factor strongly associated with better health outcomes was fatigue self-efficacy; and 4) social support was moderately associated with health outcomes. The telephone interventions also appeared to have a positive but nonsignificant effect on the level of arthritis pain reported by the participants.

Avaux et al., 2016	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=42) ≈ 95% Female ≈ Age: Supervised training: 43, Home training: 37, Control: 46 years ≈ Disease duration: Supervised training: 16, Home training: 12, Control: 16 years ACR classification criteria
Intervention(s)	Supervised training group (STG)
Intervention(s) characteristics	Patients randomized in two intervention groups (STG and HTG) were asked to exercise 3 h per week for 12 weeks. The training consisted in (i): endurance exercises (walking or bicycle) with the aim of achieving between 60 and 80% of the theoretical maximal heart rate; and (ii): strengthening exercises (with elastoband or weights for both upper and lower limbs). Patients included in the STG and the HTG were asked to record the numbers of training hours. The control group (CG) did not participate in the information session and was asked not to change their level of physical activity. Between month 3 and 9, both STG and HTG were encouraged to continue their training program on their own.
Professional that promoted the interventions	The STG trained in the hospital-based revalidation center under the supervision of the multidisciplinary team, while the HTG exercised at home on their own.
Intervention(s) setting	Hospital and home
Control	Standard care
Outcomes of interest (types and measuring instruments)	Fatigue - Krupp's fatigue severity scale (FSS) Fatigue was a primary outcome.
Effectiveness results	Patients included in the STG and the HTG significantly improved their FSS at month 3, while this was not the case in the CG. At month 9, this improvement remained statistically significant compared to baseline.
Safety results	Not stated
Main results	Both STG and HTG, but not the CG, statistically improved their FSS at month 3. By contrast, the PWC75%/kg and the Borg's scale did not improve in none of the groups. Surprisingly, compliance was similar and low (±50%) in both exercise groups. Moreover, less compliant patients improved their fatigue as much as more compliant patients
Follow-up	9 months
Conclusions	The current study demonstrates that participation of lupus patients to an exercise program, whether home-based or supervised, has a positive effect on their fatigue, as measured by the Krupp's FSS at the end of the 12-week training program. The effect was maintained, although to a lesser extend at 9 months. Whether a level of improvement of 0.7 on the FSS is clinically relevant remains a matter of debate. Patients included in the STG and the HTG similarly improved their fatigue, irrespectively of their level of compliance, raising the possibility that the beneficial effect on fatigue was not only exercise related.

Azeez et al., 2020	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=52) ≈ 85% Female ≈ Age, median: Exercise group: 58.5, Control: 63 years ≈ Disease duration, median: Exercise group: 2, Control: 9 years 1987 ACR criteria or diagnosis documented in the medical notes by a consultant rheumatologist
Intervention(s)	Personalized exercise programme
Intervention(s) characteristics	Patients in the intervention group were enrolled for a 3-month personalized exercise programme, prescribed by the study physiotherapist and had three sessions with the physio- therapist during the period of study. On their first visit, they were given an exercise prescription based on their baseline cardiovascular fitness test and strength measurements. They had two follow-up visits to the physio-therapist, at four weekly intervals to assess their progress, and, if needed, the exercise prescription was escalated. The type of cardiovascular exercise prescribed (walking, cycling or swimming) depended on the patient' s preferences and perceived ability and on the physiotherapist's assessment of their ability to attain fitness goals. The strength training programme consisted of series of exercises for major muscle groups and grip strength. Exercises for the upper body included biceps curls, triceps extensions and shoulder press. Exercises for the lower body included leg squats. Resistance bands and balls were used for grip strength.
Professional that promoted the interventions	Physiotherapist
Intervention(s) setting	Not stated
Control	The control group received standard care, which involved advice on benefits of exercise in rheumatoid arthritis and outlining recommendations by ACSM and American Heart Association guidelines for physical activity in older adults (men and women age ≥ 65 years) and adults age 50 to 64 years with clinically significant chronic conditions and/or functional limitations.
Outcomes of interest (types and measuring instruments)	Fatigue - Multidimensional Assessment of Fatigue (MAF), global fatigue index (GBI) Fatigue was a <u>secondary outcome.</u>
Effectiveness results	In the exercise group, GFI improved from 13.2 to 10.9 (p=0.047), compared to 24.8 to 24.8 (p=0.96).
Safety results	Not stated
Main results	Significant improvements in C-reactive protein (p=0.025), fatigue scores (p=0.047) and truncal fat (p=0.004) were observed in the exercise group compared with controls. Median waist circumference was significantly reduced (94.0 to 91.4 cm, p<0.0001). Improvements were also seen in aerobic capacity (23.2 to 27.6 ml/kg/min, p=0.002) and in median right (12.0 to 13.0 kg, p=0.025) and left grip strength (8.0 to 10 kg, p=0.005). Cognitive function improved in the exercise group, with median Montreal Cognitive Assessment score 25.5 at 0 months compared to 28.0 at 3 months (p=0.001).
Follow-up	3 months
Conclusions	Significant improvements were observed for all primary outcome measurements (waist circumference, VO_2Max, grip strength and MoCA), as well as CRP, fatigue (GFI) and HAQ scores. Exercise has a significant and positive impact on cognitive function in RA. Furthermore, physical activity is safe and effective in chronic inflammatory joint disease and is recommended as a vital component in the holistic management of these patients.

Bachmair et al., 2022	
Participants characteristics (number, age, disease criteria, details)	RA (n=202), axSpA (n=72), CTD (n=78) and other inflammatory rheumatic disease (n=14) (totally=367 patients) ≈ 75% Female ≈ Age: 57.5 years ≈ Disease duration: 11.4 years Diagnosis by rheumatologist
Intervention(s)	Cognitive behavioural approaches (CBA) and personalised exercise programmes (PEP)
Intervention(s) characteristics	The CBA and PEP active treatments were therapist based, with accompanying manuals. They were adapted, with patient involvement, from previous fatigue-specific cognitive behavioural and exercise interventions to ensure that they were suitable for remote delivery via telephone and were applicable to the broad spectrum of inflammatory rheumatic diseases. CBA was a psychological intervention that targeted unhelpful beliefs and behaviours and aimed to replace them with more adaptive ones. PEP was an exercise programme that was individually tailored and combined with a graded exposure behavioural therapy that was aimed to normalise misperceptions of effort and enhance exercise tolerance.
Professional that promoted the interventions	Health professionals
Intervention(s) setting	Home (interventions were delivered by telephone)
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Chalder Fatigue Scale the Fatigue Severity Scale Fatigue was a primary outcome.
Effectiveness results	The analysis of Chalder Fatigue Scale included 101 participants in the PEP group, 107 in the CBA group, and 107 in usual care group. For Fatigue Severity Scale analysis, there were 101 participants in the PEP group, 106 in the CBA group, and 107 in the usual care group. Chalder Fatigue Scale and Fatigue Severity Scale scores improved over time in both intervention groups. At 56 weeks, both PEP and CBA reduced fatigue severity measured by the Chalder Fatigue Scale (PEP: adjusted mean difference -3.03 [97.5% CI=-5.05 to –1.02], p=0.0007; CBA: -2.36 [-4.28 to -0.44], p=0.0058), and fatigue impact measured by the Fatigue Severity Scale (PEP: -0.64 [-0.95 to -0.33], p<0.0001; CBA: -0.58 [-0.87 to -0.28], p<0.0001) compared with usual care. These differences were equivalent to a fatigue severity effect size of -0.52 (97.5% CI= -0.88 to -0.16) for PEP and -0.42 (-0.77 to -0.07) for CBA, and a fatigue impact effect size of -0.63 (-0.93 to -0.32) for PEP and -0.57 (-0.86 to -0.28) for CBA, using the standardised mean difference scale. Multiple imputation sensitivity analyses gave similar results and remained significant even in the most conservative scenario in which missing data from the active treatment groups were assumed to remain unchanged, by contrast to the usual care alone comparator in which the observed intention-to-treat improvements were assumed (at 56 weeks Chalder Fatigue Scale: PEP -1.53 [-3.01 to -0.05] and CBA -1.76 [-3.25 to -0.27]; at 56 weeks Fatigue Severity Scale: PEP -0.43 [-0.69 to -0.17] and CBA -0.43 [-0.69 to -0.17]. The adjustment for participants receiving at least three sessions of active treatment enhanced the effect size of PEP on fatigue severity (Chalder Fatigue Scale mean difference -4.44 [97.5% CI= -5.66 to -3.21], p<0.0001), but had no impact on the treatment effect of PEP on fatigue impact or CBA effect size on either primary outcome.
Safety results	Safe
Main results	Analyses for Chalder Fatigue Scale included 101 participants in the PEP group, 107 in the CBA group, and 107 in the usual care group and for Fatigue Severity Scale included 101 in PEP, 106 in CBA, and 107 in usual care groups. PEP and CBA significantly improved fatigue severity (Chalder Fatigue Scale; PEP: adjusted mean difference -3.03 [97.5% CI= -5.05 to -1.02], p=0.0007; CBA: -2.36 [-4.28 to -0.44], p=0.0058) and fatigue impact (Fatigue Severity Scale; PEP: -0.64 [-0.95 to -0.33], p<0.0001; CBA: -0.58 [-0.87 to -0.28], p<0.0001); compared with usual care alone at 56 weeks. No trial-related serious adverse events were reported.
Follow-up	56 weeks
Conclusions	CBA and PEP delivered by telephone provided statistically and clinically significant reductions in fatigue severity and impact for a wide range of patients whose disease was otherwise stable. The treatments were well tolerated, their benefits were maintained 6 months after treatment completion, and they were successfully delivered by members of the rheumatology multidisciplinary teams after specialist training.

Bogdanovic et al., 2015	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=60) ≈ 100% Female ≈ Age: 43.4 years ≈ Disease duration: 6.8 years ACR criteria
Intervention(s)	Aerobic training on a bicycle ergometer
Intervention(s) characteristics	First group had aerobic training on a bicycle ergometer for a period of 15 minutes, 3 times per week for 6 weeks, while the second group of 30 women performed isotonic exercises (to stretch and lengthen muscles and improve the range of motion) for 30 minutes, 3 times per week during the same period. Muscle strength and flexibility were combined with a focus on concentration, balance, breathing and relaxation. Training has the objective of building up strength in the entire body with an emphasis on the abdominal and the back muscles.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	Isotonic exercises
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Scale (FSS) Fatigue was a primary outcome.
Effectiveness results	Fatigue was present in all patients (FSS score 53.8±5.7) before starting the physical activity. After conducting physical activity, fatigue was present in 11 patients (18.3%), while 49 patients (81.7%) did not show fatigue (FSS score 29.1±7.8). There was a statistically significant difference in fatigue before and after the physical activity ($p<0.001$). Patients with physical activity on the bicycle ergometer, fatigue was present in all patients (FSS value 53.6±6.3; min 39, max 63) before starting the exercise. After conducting physical activity, fatigue was present in 6 patients (20%), while 24 patients (80%) did not show fatigue (FSS value 29.2±7.9; min 18, max 45). Patients with physical activity on isotonic exercises, fatigue was present in all patients before starting the exercise (FSS value 53.6±6.3; min 39, max 63). After conducting physical activity fatigue was present in 5 patients (16.7%), while 25 patients (83.3%) did not show fatigue (FSS value 29.2±7.9). There was no significant difference in reducing fatigue measured by FSS scale and BDI questionnaire values after different types of physical activity ($p>0.05$).
Safety results	Not stated
Main results	At baseline FSS score was 53.8±5.7 and after the physical activity FSS score was 29.1±7.8 (FSS ≥ 36; fatigue is present). The largest number of patients (66.7%) was in a moderate depressed state at the baseline, while after physical activities 61.7% of patients, had a mild mood disturbance. There were significant differences ($p<0.001$) in values of all areas of quality-of-life questionnaire SF36 before and after the implementation of physical activity. The type of physical activity had no influence in FSS and BDI values. Continuous physical activity, regardless of its type, significantly improved quality of life of SLE patients.
Follow-up	6 weeks
Conclusions	SLE patients, even in the stable condition of the disease, feel fatigue, different degrees of depressed behaviour - from mild to severe, and a decreased quality of life by all parameters. The implementation of prescribed physical activity, regardless of the type, leads to a significant reduction of fatigue and depressive behaviour and improved quality of life, without deteriorating the activity of underlying disease. Regardless of the conflicting opinions, constant physical activity should be an integral part of the therapeutic approach to SLE patients.

Cagliyan et al., 2007	
Participants characteristics (number, age, disease criteria, details)	AS patients (n=46) ≈ 21% Female ≈ Age: 36 years ≈ Disease duration: 7.6 years for Group 1, and 7.5 years for Group 2 Modified New York criteria
Intervention(s)	Home exercise under supervision of physiotherapist
Intervention(s) characteristics	The first group performed their exercises at home (6 months) while the second group did their exercises under the supervision of a physiotherapist at the hospital 2 hours a week for 3 months. The exercises were taught to the first group, and they were advised to do the exercises for 3 months at their home. Meanwhile the patients were checked via tele- phone calls whether they were doing their exercises or not, and in case of need they were motivated on the task. The second group continued their exercise program for 3 months, 2 times weekly, for 1 hour under the supervision of a physiotherapist. Joint range of motion (ROM) and flexibility exercises of the cervical, thoracic, and lumbar spine, stretching of the shortened muscles, strengthening, respiration and posture exercises were given to all of the patients.
Professional that promoted the interventions	Patients themselves or physiotherapist
Intervention(s) setting	Home or hospital
Control	Home exercise
Outcomes of interest (types and measuring instruments)	Fatigue - Multidimensional Assessment of Fatigue Scale (MAF) Fatigue was a secondary outcome.
Effectiveness results	At the end of 3rd and 6th months, the second group improved according to MAF with respect to baseline ($p<0.01$). On the other hand, the groups were not different from each other ($p>0.05$).
Safety results	Not stated
Main results	In group 1 significant improvement was observed at rest and during activity pain ($p<0.005$). Functional improvement was better in the second group within 3 months. Since group 1 had a good range of cervical rotation, group 2 improved better ($p<0.01$).
Follow-up	3 or 6 months
Conclusions	Spinal ranges of motion, functional status, depression, and quality of life improved in group 2 patients remarkably. Group exercise had a decreasing effect on pain, activity of disease and fatigue. While home exercises improved spinal activity, it had no effect on functional status, disease activity, depression, and fatigue.

Cetin et al., 2020	
Participants characteristics (number, age, disease criteria, details)	Systemic sclerosis (SSc) patients (n=28) ≈ 93% Female ≈ Age: Tai Chi group: 53.4 years, home exercise group: 52.6 years ≈ Disease duration: Tai Chi group: 41.1 months, home exercise group: 35.1 months 2013 Classification Criteria for SSc
Intervention(s)	Tai Chi exercise program
Intervention(s) characteristics	Tai Chi training was supervised by an experienced and certified physiotherapist. Tai Chi exercise program was created by selecting the first-basic 10 forms from 24 short forms of Yang style. The forms' name: Beginning, Parting the Horse's Mane, Stork Spreading Its Wings, Brushing Your Knees and Stepping, Playing The Pipes, Fending Off the Monkey, Grasping the Sparrow's Tail Left, Grasping the Sparrow's Tail Right, Simple Whip, Moving Hands Like Clouds-Conclusion. Patients with SSc were taught each form for 1 week and combined with the previous form each week. All forms were completed at 10 weeks. Each session took 1 h (15 min for warming up exercises, 30 min of Tai Chi forms, and 15 min for cooling down exercises). The 14 patients of SSc in this group were divided into two groups of 7. The patients of SSc performed the forms 10 times in each session. The forms were carefully taught in each session by providing the necessary posture. Movements were performed slowly, continuously and by transferring weight from one leg to the other leg. During the exercises, patients were rested at any time. Since the movements were performed slowly, the mistakes were corrected immediately. The home exercise group received a 1-h home program for 2 days a week. The first and last 15 min of the exercise program consisted of warm-up and cooling exercises. After warm-up exercises, stretching for shoulder, hamstring, and erector spinae muscles, strengthening exercises for abdominal and back muscles were performed 10 times each for 30 min. Each of the exercise was explained and demonstrated in detail by the experienced physiotherapist. The patients were checked whether they did the exercises by weekly phone calls and a message was sent to the physiotherapist on the day of the exercises.
Professional that promoted the interventions	Patients themselves or physiotherapist
Intervention(s) setting	Home or hospital
Control	Home exercise
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Scale (FSS), Fatigue Impact Scale (FIS) Fatigue was a primary outcome.
Effectiveness results	According to comparison of delta values to groups, FSS was 1.84 ± 0.60 and 0.25±0.91 in Tai Chi group and home exercise group, respectively ($p<0.001$). Additionally, FIS was 35.50±27.71 and 0.64±4.27 in Tai Chi group and home exercise group, respectively ($p<0.001$).
Safety results	Safe
Main results	When the pre-treatment and post-treatment in-group evaluation results were examined, a statistically significant difference was observed in all parameters in Tai Chi group compared to pre-treatment ($p<0.05$); there was a significant difference in the Trunk Lateral Endurance Test and Pittsburg Sleep Quality Index in the home exercise group ($p<0.05$).
Follow-up	10 weeks
Conclusions	Tai Chi has a positive effect on endurance, balance, sleep quality, fatigue, anxiety, and depression in patients with SSc. Tai Chi should be included in rehabilitation programs as a safe alternative type of exercise to improve trunk endurance, balance, sleep quality and reduce fatigue, anxiety, and depression in patients with SSc.

Chen et al., 2021	
Participants characteristics (number, age, disease criteria, details)	Sjogren's syndrome (SS) patients (n=42) ≈ 98% Female ≈ Age: Tai Chi group: 53.4 years, home exercise group: 52.6 years ≈ Disease duration: Tai Chi group: 41.1 months, home exercise group: 35.1 months Classification criteria of the American European Consensus Group
Intervention(s)	Traditional Chinese medicine (TCM)
Intervention(s) characteristics	Patients assigned to the treatment group at the baseline orally received 6 g of Gan-Lu-Yin (GLY) per day after breakfast, and 6 g of Jia-Wei-Xiao-Yao-San (JWXYS) combined with 1 g of SuanZao-Ren-Tang (SZRT) and 1 g of Ye-Jiao-Teng (YJT) after dinner every day for 12 weeks. A placebo with one-tenth the dose of the TCM formula and the same appearance was orally administered to patients in the control group every day. Concentrated herbal medicines were manufactured by Chuang Song-Zong pharmaceutical factory, and all met Good Manufacturing Practice requirements. Participants were not permitted to take other traditional Chinese herbal medicines during the study. However, if patients had begun taking the following permitted medications more than 2 weeks before the screening, they were required to remain at a stable dose throughout the 12-week study period: cholinergic medications (Salagen or Exozac), immune modulators (Plaquenil, methotrexate, or biologics), hypnotics, and anxiolytics (Stilnox, Antivan, or Xanaz), antidepressants, non-steroidal anti-inflammatory drugs, and analgesics (tramadol, Ultracet, or Panadol). Only for safety purposes could the dosage be changed, and such modification was made by the investigator.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - EULAR Primary Sjogren's Syndrome Patient-Reported Index (ESSPRI) score-fatigue scale, Multidimensional Fatigue Inventory (MFI) Fatigue was a primary outcome.
Effectiveness results	Change of ESSPRI-fatigue scale was -0.93±2.5 in placebo and -0.75±2.68 in TCM group.
Safety results	Safety profiles revealed that this formula could be tolerated by patients with primary SS, although frequent mild adverse events in the gastrointestinal system were reported.
Main results	At week 12, the ESSPRI scores of both groups had improved. The ESSPRI score of the treatment group decreased by 0.62 (P=0.557) and that of the placebo group decreased by 0.91 (P=0.557). However, no significant difference was observed between the two groups. Sleep duration in the PSQI was −0.61, which exhibited an improvement of more than the −0.21 compared with the placebo group (P=0.914).
Follow-up	At week 12, the ESSPRI scores did not indicate the efficacy of the TCM formula in treating patients with SS. However, the PSQI scores revealed that this formula could prolong the sleep duration of patients. We also discovered that this formula could decrease the serum level of IgG and blood pressure at the end of the study. Only few mild adverse events were observed.
Conclusions	At week 12, the ESSPRI scores did not indicate the efficacy of the TCM formula in treating patients with SS. However, the PSQI scores revealed that this formula could prolong the sleep duration of patients. This study also discovered that this formula could decrease the serum level of IgG and blood pressure at the end of the study. Only few mild adverse events were observed.

Daltroy et al., 1995	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=37), SLE patients (n=34) ≈ 93% Female ≈ Age 37 years ≈ Disease duration: not stated ACR Criteria for both diseases
Intervention(s)	Minimally supervised home aerobic training
Intervention(s) characteristics	The Treatment group participated in a 12 week home cardiopulmonary conditioning programme. Stationary bicycles were provided for the exercisers. Each subject was asked to exercise three times per week for 30 min, achieving a heart rate of 60-80% of the maximum heart rate achieved on the ETT. A physical therapist or research assistant contacted the patient once a week to update logs of exercise, report of symptoms and perceived fatigue. Pulse meters were provided to help patients monitor their heart rates and as a compliance-enhancing strategy. The physical therapist instructed the patient at home when setting up the bike and made a second visit 2-3 weeks later at an exercise session to check the patient's ability to follow the regimen correctly. At the end of the first 12-week exercise programme, all patients were invited to continue for another 12 weeks conditioning programme. This programme basically simulated an individual prescription for aerobic exercise. Each patient was instructed in an individualized programme based on 60-80% of the maximum heart rate achieved on ETT2. The programme was not supervised, and bicycles were not provided. Rather, the patients were encouraged to utilize their own and local resources, as they would in a typical clinical prescription. They were asked to exercise three times a week for 30 min. Options most frequently chosen were walking, jogging, bike riding and swimming. All subjects were given exercise logs to complete and return at the end of 12 weeks and were contacted monthly to check on compliance. At the end of the second 12-week period, all patients underwent endurance testing and psychometric evaluation.
Professional that promoted the interventions	A physical therapist or research assistant contacted the patient once a week to update logs of exercise, report of symptoms and perceived fatigue.
Intervention(s) setting	Not stated
Control	Patients were encouraged to maintain their current level of activity during the 12-week programme. The Control patients also filled out questionnaires and were contacted once a week as an attention control, by the same physical therapist.
Outcomes of interest (types and measuring instruments)	Fatigue - MAC Fatigue Scale (sum of four visual analogue scales) and Profile of Mood States (POMS) Fatigue Scale Fatigue was a primary outcome.
Effectiveness results	Intervention effect: first 12 weeks: Fifty-eight (82%) of the original 71 subjects completed the first 12-week phase. When controlling for baseline values, the exercise group did better than controls on all outcomes: exercise tolerance, fatigue, depression, and helplessness. However, none of the differences achieved statistical significance at the P=0.01 level, and a multivariate test for overall intervention effect was not significant (F=1.17; 5,43 df; P=0.34). The lupus exercise group did better than the lupus control group on three of five measures (ETT, POMS fatigue and helplessness). Intervention results: second 12 weeks: Fifty-three patients elected to continue in the second 3-month period of the study, and subjects were followed once a month for 3 months by telephone call. Subjects in both groups scored similarly on depression, fatigue, and helplessness. Subjects reporting greater physical activity at baseline tended to report less fatigue at baseline on both the POMS (Spearman's r=-0.34, P=0.004) and MAC (Spearman's r=-0.25, P=0.04) fatigue scales. Significant (Spearman's r=0.18, P=0.23). Controlling for other baseline and 3-month measures, the two most important predictors of self-reported exercise during months 4-6 were fatigue score at 3 months (r with MAC fatigue=-0.44, P=0.001) and self-reported activity at baseline (Spearman's r=0.40, P=0.004).
Safety results	Exercise can be safely prescribed.
Main results	Exercise subjects (with bicycles) did better than controls, but not significantly, on all outcomes measures (exercise tolerance test, fatigue, depression, and helplessness) at 3 months. Bicycles were reclaimed at 3 months and all subjects in both groups given instructions for home exercise. Exercise in the second 3 months was predicted primarily by baseline exercise habits and fatigue.
Follow-up	24 weeks
Conclusions	Minimally supervised exercise resulted in small, but statistically non-significant, improvements in fitness, depression, fatigue, and helplessness. This contrasts with larger effects found in previous studies of supervised aerobic conditioning in patients with systemic rheumatic diseases, including our own. Taken together with other studies, our results suggest that in patients with stable disease, exercise can be safely prescribed and encouraged, with the expectation that some patients will increase their levels of activity, to their benefit.

Danoff-Burg et al., 2006	
Participants characteristics (number, age, disease criteria, details)	RA (n=54) or SLE patients (n=21), ≈ 83% Female ≈ Age 51.2 years ≈ Disease duration: 15 years Classification criteria not stated
Intervention(s)	Benefit finding (BF) and standard expressive writing (EW)
Intervention(s) characteristics	Participants wrote alone in a private room in the laboratory for 20 min in accordance with their assigned instructions. Follow-up questionnaires were completed through the mail 1-month and 3-month following the final writing session. Instructions for the EW group were based on Pennebaker (1989) and encouraged participants to express their ''deepest thoughts and feelings'' about their experience with rheumatic disease. Participants in the BF group were instructed to focus on ''any positive thoughts and feelings'' regarding their illness experience. Participants in the FC group were instructed to provide ''a detailed account of the facts'' about their illness and its treatment, without reference to emotion.
Professional that promoted the interventions	Patients themselves
Intervention(s) setting	Nos stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue – VAS-fatigue (0-100 mm) Fatigue was a primary outcome.
Effectiveness results	No significant main effects for group were found at the 1-month follow-up on the outcomes of fatigue, disability, depression, or positive mood. At the 3-month follow-up, a significant main effect for group was found on the dependent variable of fatigue, $F(1, 54)=5.88$, $p=0.005$. Post hoc tests revealed lower levels of fatigue in the BF group, $F(1, 56)=12.49$, $p=0.001$, and the EW group, $F(1, 56)=4.42$, $p=0.04$, relative to the FC group. The BF and EW group did not differ significantly from each other.
Safety results	Not stated
Main results	At three months, fatigue was lower in the BF and EW groups than in the control group. BF appeared effective in reducing pain levels for participants with high trait anxiety, whereas EW appeared effective for participants with low trait anxiety. No significant group effects were found for psychological functioning or disability.
Follow-up	3 months
Conclusions	In the present sample, reduction in fatigue three months following the intervention was evident among participants assigned to standard EW and among participants assigned to write about perceived benefits of their illness, relative to those in the control group. Average levels of fatigue and pain experienced by participants in the control group remained stable over time, indicating that the observed intervention effects were not due to amplification of symptoms among controls. Although improvement in symptoms of fatigue was apparent three months following the intervention, it was not apparent at the 1-month follow-up. Similarly, for the outcome variable of pain, a significant interaction between writing group and trait anxiety emerged only at the 3-month follow-up.

Dardin et al., 2022	
Participants characteristics (number, age, disease criteria, details)	Primary Sjogren's syndrome (pSS) patients (n=56) Gender: not stated ≈ Age: Resistance training group: 62.7, Control group: 58.1 years ≈ Disease duration: Resistance training group: 19, Control group: 13.8 years American-European criteria
Intervention(s)	Resistance training (RT)
Intervention(s) characteristics	Before commencing the intervention, to become acquainted with the equipment, exercises, and environment, the volunteers participated in familiarization sessions twice a week, for 2 weeks. During the familiarization sessions, the participants performed the same exercises as in the intervention period, but the exercises were easier to perform, and no load was calculated. During the intervention period, the sessions consisted of three sets (10 repetitions each) at 60 to 80% of 1 repetition maximum (1RM) of the bench-supported single- arm row, dumbbell side lateral raise, horizontal dumbbell chest press, unilateral forehead dumbbell triceps extension, dumbbell biceps curl, knee extension, knee flexion, hip abduction, hip adduction, ankle plantar flexion in the leg press machine, and squats with dumbbells. The rest intervals lasted 1 min between the sets and the exercises
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	Usual care and were instructed not to perform any kind of regular physical exercise for 16 weeks. They also received instructions regarding disease control, pain management, sleep hygiene, and activities of daily living.
Outcomes of interest (types and measuring instruments)	Fatigue – Profile of Fatigue and Discomfort-Sicca Symptoms Inventory (PROFAD-SSI), Functional Assessment of Chronic Illness Therapy (FACIT)- Fatigue, and EULAR Sjögren's Syndrome Patient Reported Index (ESSPRI) Fatigue was a primary outcome.
Effectiveness results	There were statistically significant differences between final and baseline measurements in the RTG for most of the outcomes (FACIT-Fatigue, PROFAD-Physical, ESSPRI-fatigue). For fatigue assessed with the PROFAD-Phys, the RTG showed significantly greater improvements than the CG (−1.68 versus -0.61, respectively, $p<0.01$). Regarding the secondary outcomes, fatigue assessed with the ESSPRI showed significantly greater improvements in the RTG than in the CG (−3.88 versus 0.13, respectively; $p=0.001$). No between-group differences were found after the training period for fatigue assessed with the FACIT.
Safety results	RT is also a relatively low cost and safe intervention (no data).
Main results	RT effectively improved fatigue, pain, functional capacity, emotional aspects, vitality, and subjective perception of disease activity by the patient. No between-group differences were found in the ESSPRI mental score, ESSDAI, SF- 36-Physical Aspects, SF-36-General Health, SF-36-Social aspects, and SF-36-Mental Health after the training period.
Follow-up	16 weeks
Conclusions	Resistance exercises are easily adaptable and may be easier to adhere to for more debilitated patients who are not compliant with aerobic exercise. RT is also a relatively low cost and safe intervention. RT leads to improvements in fatigue, functional capacity, and vitality in pSS patients, even after adjustments for pain and sleep. These findings are unique and suggest that RT may be important not only for improving functional capacity but also in helping to counteract fatigue and vitality in pSS patients.

Davies et al., 2012	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=23), patients treated with corticosteroids 100% Female ≈ Age: Low GI diet: 44, Low Cal diet: 48 years Disease duration: not stated ACR criteria
Intervention(s)	Low glycaemic index (Low GI) diet
Intervention(s) characteristics	A total of 11 subjects were assigned to the Low GI diet whereby carbohydrate intake was limited to 45 g per day of low GI food, without restricting the consumption of fat and protein. There was no calorie restriction, and the estimated composition of the diet was 10–15% of daily calories from carbohydrate, 25% from protein and 60% from both saturated and unsaturated fat. Twelve subjects were assigned to a conventional Low Cal diet with calorie restriction of 2000 kcal per day, approximately 50% of calories from carbohydrate, 15% from protein and 30% from fat. Dietary compliance was assessed by two methods. Firstly, subjects kept weekly food diaries which were checked by the dietician at their appointments and, secondly, subjects were questioned during their weekly telephone call with the dietician with regard to the type and amount of foods and drinks consumed at each meal and snack in relation to whether they were following the Low GI or the Low Cal diet.
Professional that promoted the interventions	All patients were advised on dietary treatment by the same dietician. Dietetic support was given in the form of a weekly telephone call to the subject, side effects were noted and any queries about the diet were answered.
Intervention(s) setting	Not stated
Control	Calorie restricted (Low Cal) diet
Outcomes of interest (types and measuring instruments)	Fatigue – Fatigue Severity Scale (FSS Fatigue was a primary outcome.
Effectiveness results	11 subjects allocated to the Low GI diet and 12 sub- jects to the Low Cal diet groups. Fatigue was reported by seven of the Low GI diet group compared with four in the Low Cal diet group and the FSS reduced from 4.9 0.9 to 4.4 1.2 in the Low GI diet group ($p < 0.03$) and from 4.7 1.5 to 4.4 1.7 in the Low Cal diet group ($p < 0.03$)
Safety results	There were no serious adverse effects from either diet. Headaches were a prominent feature early on in both groups although they seemed to abate in the second week of the study. Five Low GI diet sub- jects complained of constipation whilst three Low Cal diet subjects experienced increased bowel frequency and bloating. None of the subjects on the Low GI diet were in ketosis by urinalysis and renal function was unchanged.
Main results	Weight loss in both treatment groups was significant (mean SD: Low GI diet 3.9 0.9 kg; Low Cal diet 2.4 2.2 kg, $p<0.01$ from baseline in each group). There were also significant improvements in waist and hip measurements. However, the difference in weight loss and waist and hip measurements between the two diet groups was not statistically significant. There was a statistically significant reduction in Fatigue Severity Scale in both diet groups, ($p<0.03$). Both Low GI and Low Cal diets were well tolerated, resulting in no serious adverse effects or increase in disease activity.
Follow-up	6 weeks
Conclusions	Significant weight loss is achievable over 6 weeks in a diet-specific trial in subjects with stable SLE, who are on low dose prednisolone. Both diets were equally tolerable and did not cause flares in disease activity. Our results suggest that dietary manipulation may significantly improve fatigue in subjects with SLE.

Davis et al., 2015	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=143) 68.5% Female ≈ Age: 54.3 years Disease duration: not stated Physician confirmed diagnosis of RA
Intervention(s)	Cognitive– behavioural therapy for pain (CBT-P), mindful awareness and acceptance treatment (M), and arthritis education (E).
Intervention(s) characteristics	The CBT-P, M, and E groups followed a parallel format: Each treatment included eight modules that were delivered in weekly 2-hr group meetings and addressed themes that defined the content of that intervention. The CBT-P and M treatments included experiential activities designed to enhance targeted skills, whereas the E group received information regarding pain and stress management but did not practice skills to manage pain or emotional difficulties. The CBT-P treatment focused explicitly on increasing pain management skills to enhance cognitive coping and functional health and limit fatigue symptoms in response to pain, following a standard cognitive-behavioural format. Included among the topics covered to provide cognitive and behavioural strategies to manage daily pain were (a) relaxation training, (b) autogenic training, (c) cognitive coping with pain, (d) activity pacing and managing daily activities, and (e) managing intense pain episodes. The M treatment focused on developing two distinct sets of skills: one to reduce the negative impact of pain and stress episodes on mood, symptoms, and functioning and the other to enhance positive affective engagement. The inclusion of training to boost positive engagement, a focus not included in many mindfulness programs, is based on research pointing to the value of drawing on positive resources to interrupt automatic responding to pain and other stressors. The E group provided didactic information regarding the etiology, pathophysiology, and treatment of RA and healthy lifestyles and physician–patient communication. The E condition intentionally omitted information on coping practices and did not engage participants in any experiential activities or skill rehearsal exercises.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	Patients were randomized to 1 of the 3 treatment conditions, including (CBT-P), (M) or (E).
Outcomes of interest (types and measuring instruments)	Fatigue – VAS-fatigue (0-100 mm) Fatigue was a primary outcome.
Effectiveness results	The M group also showed pre–post improvement in relations between pain episodes and changes in disability and fatigue (Time ts<-2.69, ps<0.008). M yielded greater improvements than did CBT-P and E in pain-related changes in fatigue (Group x Time x ΔPain ts<-2.35, ps<0.02). RD moderated pre- to posttreatment changes in pain reactivity for a single daily outcome, fatigue (RD x Group x Time x ΔPain F=6.56, p<0.0002). Follow-up analyses within each RD group revealed that for individuals with a history of recurrent depression, M yielded greater improvements than did CBT-P and E in pain-related changes in fatigue (Group x Time x ΔPain ts<-3.59, ps<0.0003). In contrast, for individuals without a depression history, improvements from pre- to posttreatment were comparable across groups (Group x Time x ΔPain ts<1.95, ps>0.06).
Safety results	Not stated
Main results	Multilevel models compared groups in the magnitude of within-person change in daily pain and stress reactivity from pre- to posttreatment. M yielded greater reductions than did CBT-P and E in daily pain-related catastrophizing, morning disability, and fatigue and greater reductions in daily stress-related anxious affect. CBT-P yielded less pronounced declines in daily pain-related perceived control than did M and E.
Follow-up	8 weeks
Conclusions	Mindful awareness and acceptance treatment targeting regulation of emotion yields benefits in the management of daily pain and stress that are broader than those offered by a cognitive-behavioral approach or arthritis education. Mindfulness limited the effects of pain flares on catastrophizing, fatigue, and disability, and of stress on anxious affect. However, despite its emphasis on boosting positive engagement, it did not help individuals sustain serene affect in the face of pain and stress episodes. On the other hand, CBT limited the effects of pain flares on perceived control. Although small in magnitude, the effects demonstrated here reflect changes in day-to-day processes, and the benefits to overall functioning may increase as small daily changes are compounded over time.

Durcan et al., 2014	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=78) 62.5% Female ≈ Age: Intervention group: 59 years, Control group: 61 years Disease duration: Intervention group: 11 years, Control group: 16 years ACR criteria
Intervention(s)	Home-based exercise program
Intervention(s) characteristics	A 12-week home exercise program was prescribed for the intervention group. Participants were assessed by a doctor and senior physiotherapist at baseline and then every 3 weeks for the duration of the program. Functional limitation was assessed by HAQ. A full physical examination was carried out by a physiotherapist to identify deficiencies or functional limitations in muscular fitness, range of motion, and coordination of affected joints. Specific exercises were prescribed to target the individual deficiencies identified. Resistance exercise was prescribed 3 times per week, and dosage was prescribed and increased according to the American College of Sports Medicine (ACSM) guidelines for healthy individuals, based on their advice for sedentary persons beginning a resistance program. Range of motion exercise was prescribed in functional patterns to be done daily. In addition to these strengthening and stretching exercises, a walking program was devised according to ACSM guidelines on physical activity. Based on their CV expenditure prior to our study and their functional capability as measured by a 6-min walk test, a program was devised that included incremental targets for daily walks based on step count and rate of perceived exertion. Patients were given daily step count targets and advised on the level of exertion for which they should be aiming. They were instructed that they should be moderately short of breath on exertion, i.e., unable to comfortably hold a conversation while walking.
Professional that promoted the interventions	Doctor and senior physiotherapist
Intervention(s) setting	Home
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue – Fatigue Severity Scale (FSS) Fatigue was a primary outcome.
Effectiveness results	Differences were seen after 12 weeks in both the intervention and control groups. In those who took part in the exercise intervention, there was a statistically significant improvement in fatigue. The changes seen in both the control and intervention groups are analysed. On comparison of the control group to the intervention group, there were significantly greater improvements in pain, stiffness, subjective sleep quality, and fatigue in the intervention group (intervention group: 11.2, control group: 0.1, p=0.04).
Safety results	Not stated
Main results	In the exercise intervention group, there was a statistically significant improvement in HAQ (p=0.00), pain (p=0.05), stiffness (p=0.05), sleep quality (p=0.04), and fatigue (p=0.04). In our control group, there was a statistically significant improvement demonstrated in their overall perceptions of the benefits of exercise, but none of the other variables.
Follow-up	12 weeks
Conclusions	An exercise program resulted in significant improvement in sleep quality and fatigue. This is particularly interesting given the importance of fatigue as an outcome measure in RA and gives us yet another reason to prescribe exercise in this population.

Durmus et al., 2009	
Participants characteristics (number, age, disease criteria, details)	AS patients (n=43) ≈ 81% Female ≈ Age: Intervention group: 37 years, Control group: 42 years ≈ Disease duration: Intervention group: 9 years, Control group: 10 years Modified New York criteria
Intervention(s)	Home-based exercise program
Intervention(s) characteristics	Patients were asked to practice these exercises at home individually for 7 days a week for 12 weeks and were called weekly by the researcher and checked whether they were performing the program or not. The conventional exercise program consisted of 20 exercises for muscle relaxation, flexibility, muscular strength, stronger breathing, and straight posture (cervical lateral flexion, cervical rotation, cervical flexo-extension, thoracic rotation, thoracic lateral- flexion, thoracic flexo-extension, thoracic muscles stretching, hamstring muscles stretching, gastrocnemius muscle stretching, stretching of quadriceps muscle, psoas muscle stretching, posterior pelvic girdle gliding, active flexion of the upper cervical spine, superior abdominal stretching, inferior abdominal stretching, lumbar spine rotation, coxofemoral abduction, shoulder abduction, anteroposterior-pelvic girdle gliding, anteroposterior lumbar and thoracic gliding).
Professional that promoted the interventions	Patients themselves at home (Exercises were taught by the same physiotherapist)
Intervention(s) setting	Home
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue – Short Form 36 (SF-36) and multidimensional assessment of fatigue (MAF) Fatigue was a primary outcome.
Effectiveness results	There was also no significant difference between the groups in terms of fatigue. Both groups showed significant improvements in MAF score (intervention group: before treatment (BT):2.07±0.77, after treatment (AT):1.30±1.08, p=0.001; control group: BT:2.02±0.76, AT:1.73±0.74, p=0.001). After therapy, there were statistically significant differences in MAF score between the two groups in favor of Group 1 (intervention group: 1.30±1.08, control group: 1.73±0.74, p=0.003).
Safety results	Not stated
Main results	The results of the present study showed greater improvements in QOL, fatigue, depression, functional capacity, and disease activity in the exercise group than the control group. However, the benefits of the exercise treatment were greater than those of the medical treatment, on these clinical parameters. The improvement in the control group in our study may be related to the medical treatment.
Follow-up	12 weeks
Conclusions	Home-based exercise programs are very effective in improving QOL and reducing fatigue. Because of these advantages, HEP should be advised for the management program in AS in addition to medical treatments.

Evans et al., 2013	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=43) 100% Female ≈ Age: 28 years ≈ Disease duration: Revised 1987 ACR criteria or juvenile idiopathic arthritis (JIA)
Intervention(s)	Iyengar Yoga Program
Intervention(s) characteristics	The intervention consisted of 6 weeks of classes held twice per week. The classes were 1.5 hours in duration (total dose = 18 hours). A make-up class was available at the end of the program. Classes had a maximum of 7 students, lead by an experienced IY teacher and assisted by at least one junior teacher. To standardize delivery, a working list of poses was developed with a senior Iyengar yoga teacher, who served as an advisor to the study. Classes were held in the UCLA Pediatric Pain Program Yoga Studio which is equipped with standard IY equipment, including ropes fastened securely to the walls, blankets, bolsters, and blocks. A full range of yoga postures were taught to the students, including supine poses, passive backbends, standing poses, supported inversions, twists, seated postures and forward bends. The postures were taught with props. The classes were sequenced over time and as students developed skills, more challenging postures were introduced. Individual limitations were addressed as needed for pain, range of motion in particular joints, and fatigue. For example, three students had severe limitations in the mobility of the joints in their hips, knees, shoulders and wrists that prevented them from getting up and down off the floor. Rather than using the floor as a base, as is typically the case during supine and seated postures, we raised the floor by using several chairs for support. In another example of the range of modifications that were used, students who could not bend their knees hung from the wall ropes in a modified straight legged version of rope headstand. In cases where students had shoulder, elbow and wrist problems, supine poses were performed with supportive blankets under their arms. Classes were held during a week-day evening and on a weekend afternoon to ensure that employed participants and full-time students had access to classes. Homework was suggested, but not required, and interested participants were invited to take props home for the duration of the intervention.
Professional that promoted the interventions	Experienced IY teacher and assisted by at least one junior teacher
Intervention(s) setting	Yoga studio
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue – Functional Assessment of Chronic Illness Therapy Fatigue Subscale (FACIT-Fatigue) Fatigue was a secondary outcome.
Effectiveness results	Results from analyses evaluating post-treatment group differences on the primary outcome measure, significant findings favoring the yoga group were seen for the FACIT fatigue scale (Yoga group: baseline mean (BM): 32.3±11.1, post mean (PM): 40.2±6.4; control group: BM: 29.1±15, PM: 29.7±11.9; effect (F): 5.87).
Safety results	Safe (No adverse events were reported)
Main results	Relative to the usual-care waitlist, women assigned to the yoga program showed significantly greater improvement on standardized measures of HRQOL, pain disability, general health, mood, fatigue, acceptance of chronic pain and self- efficacy regarding pain at post treatment. Almost half of the yoga group reported clinically meaningful symptom improvement. Analysis of the uncontrolled effects and maintenance of treatment effects showed improvements in HRQOL general health, pain disability and weekly ratings of pain, anxiety and depression that maintained at follow-up.
Follow-up	2 months
Conclusions	The findings suggest a brief IY intervention is a feasible and safe adjunctive treatment for young people with RA, leading to health-related quality of life (HRQOL), pain disability, fatigue, and mood benefits. Moreover, improvements in quality of life, pain disability and mood persisted at the 2-month follow-up.

Evers et al., 2002	
Participants characteristics (number, age, disease criteria, details)	Early RA patients (n=59) ≈ 71 % Female ≈ 55.2 years ≈ Disease duration 3.1 years ACR Criteria
Intervention(s)	Tailor-made Cognitive-Behavioural Therapy treatment
Intervention(s) characteristics	The treatment modules were developed from standardized CBT protocols. The pain and function disability module consisted of progressive relaxation, attention diversion, stimulation of physical exercising in daily life in the face of the current physical condition, activity pacing, problem-solving, adjustment of goal setting to the current physical condition, identification of pain-provoking cues in daily life, and cognitive restructuring of dysfunctional pain cognitions. The fatigue module included activity-pacing, adjustment of goal setting to the current physical condition, setting priorities and structured planning of daily activities and time off, and cognitive restructuring of activity demands. The negative mood module consisted of problem-solving, cognitive restructuring of depressogenic and anxious cognitions, identification of stress-provoking cues in daily life, stimulating pleasurable activities and restructuring of goal setting in the face of the current physical condition, emotional processing of the changes RA has brought about in daily life and finding benefits. The social module finally included identification of social stress provoking cues in daily life, cognitive restructuring of social anxious cognitions, stimulating social activities in the face of the current physical condition, and social skills training including help-seeking behaviour and communication about RA. In all treatment modules, the final booster session dealt with relapse prevention and further improvement of the attained goals.
Professional that promoted the interventions	Two therapists trained in the treatment modules and supervised by a cognitive-behaviour supervisor.
Intervention(s) setting	Not stated
Control	Standard care
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue scale (eight items) of the Checklist Individual Strength Fatigue was a <u>secondary outcome</u>
Effectiveness results	Fatigue significantly decreased in the CBT condition at post-treatment and follow-up assessment (t=3.09, P<0.01 and t=3.14, P<0.01, respectively), but not in the control condition (t=1.18, P=0.25 and t=-1.44, P=0.16, respectively). Effect sizes were 0.55 and 0.48 for fatigue at post-treatment and follow-up assessment.
Safety results	Not stated
Main results	Beneficial effects of CBT on physical, psychological, and social functioning. Specifically, fatigue and depression were significantly reduced at post-treatment and at the 6-month follow-up in the CBT condition in comparison to the control condition, while perceived support increased at follow-up assessment.
Follow-up	6 months
Conclusions	Results indicate the effectiveness of tailor-made CBT for patients at risk in relatively early RA, and supply preliminary support for the idea that customizing treatments to patient characteristics may be a way to optimize CBT effectiveness in RA patients.

Feldthusen et al., 2015	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=70) ≈ 89 % Female ≈ 53.5 years ≈ Disease duration: intervention group: 14.2 years, control group: 11.6 years Diagnostic code M05 or M06 according to the International Classification of Diseases-10
Intervention(s)	Person-centered physical therapy
Intervention(s) characteristics	12-week intervention of person-centered physical therapy. The goal was, in partnership between participant and physical therapist, to devise a mutually agreed self-care plan that guided the participant in managing her/his fatigue, and to effectively do so over time. The intervention was initiated with an individual person-centered meeting. A self-care plan was jointly developed and focused on tailoring health-enhancing physical activity and balancing life activities. Health-enhancing physical activity refers to the recommendations for adults, i.e., moderately-intense aerobic physical activity >30min, five days/week, or vigorous aerobic physical activity >20min, three days/week or some combination. Balancing life activities refers to the way a person's intentions, resources and environment match her/his life goals. The physical therapist's role was to support and coach each participant in developing a self-care plan, according to her/his resources, context, will and needs, and to tailor physical activity as well as specific exercises according to her/his disease-specific, personal- and environmental needs. Follow-up meetings and phone contacts were scheduled according to each person's preferences.
Professional that promoted the interventions	Physical therapist and 2 trained and experienced nurses
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue – VAS-fatigue (0-100 mm), Bristol Rheumatoid Arthritis Fatigue- Multi- Dimensional Questionnaire (BRAF-MDQ)-Swedish version. Fatigue was a primary and secondary outcome.
Effectiveness results	The intervention-group reported reduced general fatigue from baseline to post-test (p=0.042). The between-group effect-size at post-test was 0.37 and median difference between the groups was consistent with being clinically important at both post-test and follow-up (medians 12 and 13). Within-group analyses between baseline and post-test showed improvements in general fatigue for both intervention and reference group (p<0.001; p=0.003) which was sustained at follow-up. These changes are considered clinically important for both groups (medians 23 and 11 intervention and reference groups, respectively). Trends towards improvements were observed across multidimensional aspects of fatigue (p=0.023–p=0.048) except for the Cognition sub-score (p=0.52); greater leg strength/endurance (p=0.024) and increased physical activity (p=0.023). At follow-up, improvement was observed for leg strength/endurance (p=0.001). Trends toward improvement remained for the physical (p=0.041) and living-related (p=0.031) aspects of fatigue, anxiety (p=0.015), and physical activity (p=0.019). In addition, trends were observed for self-rated health (p=0.010) and self-efficacy (p=0.046). Multidimensional aspects of fatigue improved within both groups (p<0.001–p=0.009), except for the sub-score Emotion in the reference-group (p=0.066). At follow-up, improvements were observed for all multi-dimensional aspects of fatigue within the intervention-group (p<0.001) and for all multi-dimensional aspects of fatigue (p<0.01) except sub-scores for Living (p=0.046) and Emotion (p=0.019) within the reference-group.
Safety results	Not stated
Main results	At post-test, general fatigue improved more in the intervention-group than reference- group (p=0.042). Improvement in median general fatigue reached minimal clinically important difference between and within groups at post-test and follow-up. Improvement was also observed for anxiety (p=0.0099) and trends toward improvements was observed for most multidimensional aspects of fatigue (p=0.023–p=0.048), leg strength/endurance (p=0.024) and physical activity (p=0.023). Compared with the reference-group at follow-up, intervention-group improvement was observed for leg strength/endurance (p=0.001) and the trends toward improvements persisted for physical (p=0.041) and living-related (p=0.031) aspects of fatigue, physical activity (p=0.019) and anxiety (p=0.015) and self-rated health (p=0.010) and self-efficacy (p=0.046).
Follow-up	12-week intervention, with 6-month follow-up
Conclusions	Person-centered care focuses on partnership building and includes sharing of information, deliberation, and decision-making between patient and practitioner. Person-centered physical therapy that focuses on health-enhancing physical activity and balancing activities in daily life in persons with RA was shown to reduce general fatigue. Therefore, we conclude that person-centered physical therapy shows promise as a strategy to augment the self-management of fatigue related to this condition.

Ferwerda et al., 2017	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=133) 64% Female ≈ 56.3 years ≈ Disease duration: not stated A rheumatologist-certified diagnosis of RA
Intervention(s)	Tailored- guided internet-based cognitive-behavioural treatment
Intervention(s) characteristics	The intervention consisted of an internet-based cognitive-behavioural intervention tailored to the individual's goals and characteristics. During the face-to-face intake sessions, therapists explored main issues put forward by the patients and outcomes of the trial pre-treatment questionnaires, and treatment goals were mutually determined. The intervention was further explained, and patients and therapists made choices and arrangements on practical issues such as frequency of contact (weekly or biweekly). Hereafter, the internet-based intervention started. Patients completed at least one of 4 tailored intervention modules (pain and functional disability, fatigue, negative mood, or social functioning). Each treatment module consisted of several assignments and psychoeducational texts. Therapists selected relevant texts and assignments within each treatment module based on the treatment goal and patient characteristics. All 4 modules contained cognitive strategies such as cognitive restructuring of dysfunctional thoughts, problem solving, and goal setting in the light of the somatic condition, applied to the specific subject (eg, pain, fatigue, negative mood, and social functioning). Furthermore, the pain module contained cognitive strategies such as identification of pain-provoking cues in daily life and attention diversion, and behaviourally oriented strategies such as activity pacing, stimulation of physical exercise in daily life, and progressive relaxation techniques. The fatigue module contained cognitive strategies such as identification of fatigue patterns, planning and structuring daily activities and relaxation, setting priorities, and cognitive restructuring of activity demands, and behavioural strategies such as activity pacing. Within the negative mood module, cognitive strategies such as emotional processing of RA-related changes during daily life and benefit finding, and behavioural strategies such as increasing the frequency of attainable, pleasurable activities in patients were applied. Finally, the social functioning module contained cognitive strategies such as the identification of social stress–provoking cues and more behaviourally oriented strategies such as stimulating patients to communicate to relevant others about their RA and its consequences, and training of social skills.
Professional that promoted the interventions	Patients themselves with observing of therapists
Intervention(s) setting	Not stated (an internet-based)
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue – fatigue scale of the Checklist Individual Strength (CIS) Fatigue was a primary outcome
Effectiveness results	A trend was found indicating a somewhat larger reduction in fatigue in the intervention than the control group throughout the year of follow-up (F=3.5, p=0.06, d=0.24), whereas groups did not differ on pain (P=0.35). No significant differences between the intervention and control groups were found for the composite score on physical functioning (P=0.17).
Safety results	Not stated
Main results	Patients who received the internet-based intervention reported a larger improvement in psychological functioning compared with the control group, indicating less depressed mood (p<0.001, d=0.54), negative mood (p=0.01, d=0.38), and anxiety (p<0.001, d=0.48) during the 1-year follow-up period. Regarding physical functioning, a trend was found for the intervention group reporting less fatigue than the control group (p=0.06, d=0.24), whereas no effect was found on pain. No effects were found for the impact of RA on daily life, except for the intervention group experiencing fewer role limitations due to emotional problems (p<0.001, d=0.53).
Follow-up	12 months
Conclusions	This study offers support for the effectiveness of a tailored-guided internet-based tailored cognitive-behavioral intervention for patients with RA who have a psychological risk profile as an addition to standard rheumatological care, specifically in the domain of psychological outcomes. Further study on increasing adherence and consideration of specific intervention ingredients is warranted, especially related to tailoring to the specific needs of patients. This study is a positive step towards the implementation of evidence-based effective online interventions in multidisciplinary health care for patients with RA.

Garcia et al., 2014	
Participants characteristics (number, age, disease criteria, details)	Spondylitis patients (n=30) 53.33% Male ≈ 46.9 years ≈ Disease duration: 7.2 years Diagnosed by a rheumatoid doctor according to the criteria of the European Spondylarthropathy Study Group
Intervention(s)	Aquatic fitness plus relaxation program (3 sessions per week).
Intervention(s) characteristics	24 sessions of the physical exercise program in the aquatic environment. All sessions were carried out in a heated swimming pool at 27-30°C, in 3 sessions of 50 min per week for 8 weeks. The program that was used consisted, following this order, in the application of: relaxation technique, based on the ability to be aware of when a muscle is tense and when it is relaxed (10 min); breathing technique, consisting of asking participants to be aware of the sensations experienced when air enters and exits through the nose (10 min); active-type joint mobility exercises, specifically asking them to perform joint movements at the maximum joint range in all planes of space (5 s duration for each movement), starting with the neck and then the upper limbs (shoulders, elbows and wrists) and lower limbs (hips, knees and ankles), and after each movement the patients always returned to the initial or resting position (5 min); strength-resistance work for the hip muscles with a training 3 times a week, during the 8 weeks of intervention, in which the loads were increased from 50 to 70% of the maximum resistance (15 min); and finally aerobic exercises by means of unison and homolateral hip and shoulder flexion movements, keeping in both cases the elbow and knee flexed (first with one part of the body and then with the other, taking as a reference the 60-65% of the maximum heart rate controlled by pulsometer) (20 min).
Professional that promoted the interventions	Not stated.
Intervention(s) setting	Heated swimming pool.
Control	The control group did not undergo any type of physical or psychological therapy and continued with normal activities of daily living.
Outcomes of interest (types and measuring instruments)	Bath Ankylosing Spondylitis Functional Index, Bath Ankylosing Spondylitis Disease Activity Index, Health Questionnaire SF-12 and Sigma PC31 (Sigma-Elektro GmbH, Neustadt, Germany) Heart Rate Monitor. Fatigue was a secondary outcome.
Effectiveness results	Mann-Whitney U test results were significant for quality of life (physical function [p=0.05]), BASFI (p=0.015), BASDAI (p=0.048; fatigue [p=0.032], neck, back and hip pain [p=0.045], pain or swelling in other joints [p=0.032] and morning stiffness on awakening [p=0.019]). Compared to baseline values, the group receiving a supervised aquatic exercise program showed post-intervention improvements in quality of life (p=0.011); physical function [p=0.016]), BASFI (p=0.017) and BASDAI (neck, back and hip pain [p=0.05], pain or swelling in other joints [p=0.031] and morning stiffness on awakening [p=0.018]), while the no intervention group showed no significant differences in any variable.
Safety results	Not stated.
Main results	The Mann-Whitney test showed statistically significant differences in the quality of life (physical function [P=0.05]), Bath Ankylosing Spondylitis Functional Index (P=0.015), Bath Ankylosing Spondylitis Disease Activity Index (fatigue [P=0.032], neck pain, back and hips [P=0.045], pain or swelling in other joints [P=0.032] and in waking morning stiffness [P=0.019]).
Follow-up	2 months
Conclusions	Physical exercise plus relaxation provides benefits to spondyloarthritis patients and these are advised as a part of their usual treatment.

Giraudet-Le Quintrec et al., 2007	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=208) ≈ 97% female ≈ 55 years ≈ Disease duration 13 years ACR Criteria
Intervention(s)	Educational Program - The programme employed self-efficacy principles to reduce pain and stress at home, and behavioural modification techniques to change behaviours and improve quality of life by modifying psychological and social contacts
Intervention(s) characteristics	The interactive multidisciplinary education program consisted of passive information on the disease, on medical treatment, and on lifestyle advice concerning diet, but also included information on active coping strategies, relaxation, and physical exercise, with the teaching of an exercise program to be followed at home. Sessions were conducted on Thursdays for 6 hours for 8 consecutive weeks. After 6 months, patients attended a 4-hour "booster" session.
Professional that promoted the interventions	Rheumatologist, rehabilitation specialist, dietician, social assistant, 2 nurses, 2 physiotherapists and 2 occupational therapists
Intervention(s) setting	Hospital
Control	Usual medical care.
Outcomes of interest (types and measuring instruments)	Functional Assessment of Chronic Illness Therapy – Fatigue scale (FACIT-F) Fatigue was a secondary outcome
Effectiveness results	After 1 year, no statistically significant difference was observed between the 2 groups in change in FACIT-F score: -0.02±7.05 (education group) vs 0.09±6.85 (control group) (p=0.91).
Safety results	Authors consider the program safe.
Main results	The program is not effective in reducing fatigue. Still, statistically significant differences were found in 3 domains: patient coping (-1.22±5.55 vs -0.22±3.81; p=0.03), knowledge (3.42±4.73 vs 0.73±3.78; p<0.0001), and satisfaction (10.07±11.70 vs 5.72±13.77; p=0.02), all of which were better for the group attending the education sessions.
Follow-up	12-month
Conclusions	Despite improvements in patient coping, knowledge, and satisfaction, the education program was not found to be effective at 1 year. There may have been methodological problems relating to the sensitivity of questionnaires and patient selection, and tailored educational interventions should be considered.

Greco et al., 2003	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=92) ≈ Female: BF/CBT: 94%, SMS: 97%, control group: 93% ≈ Age, years: BF/CBT: 48.2, SMS: 46.7, control group: 47 ≈ Disease duration, years: BF/CBT: 12, SMS: 11.2, control group: 9.6 ACR 1982 revised criteria
Intervention(s)	Biofeedback-assisted cognitive-behavioural stress management (BF/CBT); Symptom-monitoring support (SMS)
Intervention(s) characteristics	BF/CBT: Participants received a standardized 6-session protocol that included auditory electromyographic biofeedback from the trapezius area, progressive muscle relaxation, and cognitive-behavioural pain and stress management training. Cognitive-behavioural training included problem-solving strategies for coping with pain, other lupus symptoms, and interpersonal is- sues; the training also included recognition and alteration of automatic maladaptive thinking patterns that can con-tribute to stress and pain. This protocol was administered by a licensed psychologist who had been conducting re- search based on this protocol for 6 years. The intervention included homework assignments to practice and record use of the relaxation techniques and to complete work- sheets regarding stressor identification and problem-solving skills. SMS: This condition was designed to control for non-specific effects, such as potential benefits of receiving attention from the therapist. During the 6 sessions, participants were asked to describe their lupus symptoms over the previous week. They were invited to report on their lupus history, family history of autoimmune disease, and any current or past stressors. The therapist's role was to elicit information and listen empathically but avoid giving suggestions for change or teaching any pain or stress- management skills. This protocol was administered by the same provider as the BF/CBT intervention. Homework included monitoring of SLE symptoms daily.
Professional that promoted the interventions	A licensed psychologist
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Scale (FSS) Fatigue was a <u>secondary outcome</u>
Effectiveness results	For BF/CBT, effect sizes of pre-post (0.36) and pre-9 months (0.15); for SMS, effect sizes of pre-post (0.28) and pre-9 months (0.31), for control group, effect sizes of pre-post (0.09) and pre-9 months (0.13). The BF/CBT group had no significantly improvement compared with the UC group in fatigue (p: 0.139).
Safety results	Not stated
Main results	BF/CBT participants had significantly greater reductions in pain and psychological dysfunction compared with the SMS group (pain, P=0.044; psychological functioning, P<0.001) and the UC group (pain, P=0.028; psychological functioning, P<0.001). BF/CBT had significantly greater improvement in perceived physical function compared with UC (P=0.035), and improvement relative to SMS was marginally significant (P=0.097). At a 9-month follow-up evaluation, BF/CBT continued to exhibit relative benefit compared with UC in psychological functioning (P=0.023).
Follow-up	9 months
Conclusions	In this first test of BF/CBT for SLE patients with pain, the BF/CBT program was predicted to be superior to a symptom monitoring/support condition and usual medical care alone for improving pain, physical function, and psychological function. The results suggest that the program may be a promising adjunct to medical treatment, particularly with regards to short-term effects on pain, psychological function, and physical function and sustained improvements in psychological functioning.

Greco et al., 2008	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=24) ≈ 96% Female ≈ Age, years: AC: 43.1, MN: 51, control group: 50.6 ≈ Disease duration: not stated ACR 1997 revised criteria
Intervention(s)	Acupuncture (AC) or a minimal needling (MN)
Intervention(s) characteristics	AC and MN completed 10 treatment sessions over approximately 5 weeks, in addition to usual care. **Acupuncture protocol:** based on the acu-points used by Feng, et al (1985). Protocol: (i) limited treatment to 10 sessions over 5 weeks and (ii) includes electrical stimulation to paraspinal points using a PENS 4c electro stimulator. Sterile disposable needles (32-gauge) 30–40 mm in length were inserted to a depth sufficient to produce a needling sensation (De Qi). Two sets of AC points were used on alternating treatment sessions. In each session, seven or eight paraspinal points were stimulated via PENS at a frequency of 2 Hz and moderate intensity as tolerated by the participant. Additionally, the arm and leg AC points were stimulated manually each 10 min as per Feng, et al. All needles were left in place for 30 min. **Minimal needling protocol**— Minimal needling, which involves shallow insertion of needles on body areas that are not known to correspond to AC points, was the control intervention. Each MN participant received the intervention twice weekly for 5 weeks (10 sessions). Acupuncture needles were inserted below the skin's surface to an insufficient depth to elicit a needling sensation or De-Qi. Eight needles were inserted in areas that are not known to correspond to classical AC points or specific neuro-vascular structures. The MN areas included bilateral points on the scapulae (medial aspect, just inferior to scapular spine), gluteus maximus (posterior-lateral aspect, approximately 2 cm below the iliac crest on a line from the L5 spinal process and the anterior superior iliac spine), forearm (posterior medial forearm approximately 4 cm distal to the medial epicondyle) and leg (posterior leg over the midpoint of lateral head of gastrocnemius). The needles in scapular and gluteal locations were connected to the PENS electro-acupuncture unit. No electrical stimulation was provided, but the indicator light on the stimulator was lit as if stimulation was being delivered. The needles remained in place for 30 min.
Professional that promoted the interventions	Physician-acupuncturist
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Scale (FSS), the 4-item Vitality scale of the SF-36 v 2 Health Survey (SF-36 VT) Fatigue was a secondary outcome
Effectiveness results	Change score for fatigue was in the direction of improvement in both the AC and MN groups. Effect size estimates for AC compared with UC were in the small to medium range for fatigue (for FSS: AC vs UC: 0.29, AC vs MN: 0.28, MN vs UC: 0.04; for SF-36 vitality: AC vs UC: 0.31, AC vs MN: 0.28, MN vs UC: 0.56).
Safety results	No serious side effects or adverse events were found. However, minor transient side effects of AC were reported by 6/8 (75%) of the AC group and 4/6 (67%) of the MN completing participants. These consisted of pain during needle insertion (six participants), dizziness or lightheadedness (three participants), local bruising (three participants). One reported transient bleeding. There was one report of muscle soreness following the AC, and one report of low-grade fever lasting <1 h. Based upon interview following each session with each participant, a total count of 33 side effects was reported across 144 sessions, for a side effect rate of 23%. For one AC participant with low body mass, the acupuncturist elected to use finer gauge needles.
Main results	Although transient side effects, such as brief needling pain and lightheadedness, were reported, no serious adverse events were associated with either the acupuncture or minimal needling procedures. Twenty-two participants completed the study, and the majority (85%) of acupuncture and minimal needling participants were able to complete their sessions within the specified time-period of 5–6 weeks. 40% of patients who received acupuncture or minimal needling had ≥30% improvement on standard measures of pain, but no usual care patients showed improvement in pain.
Follow-up	6-7 weeks
Conclusions	A brief course of AC appears feasible and safe for patients with lupus. Common side effects, such as needling pain and light-headedness, did not deter participants from continuing the interventions. The estimates of effect sizes and number of clinical responders suggest that AC may be a useful non-pharmacological method for managing pain for patients with lupus in addition to usual medical care.

Hakkinen et al., 2003	
Participants characteristics (number, age, disease criteria, details)	Early RA patients (n=62) ≈ 61% Female ≈ Age, years: experimental group: 49, control group: 49 ≈ Disease duration, years: experimental group: 10, control group: 8 ACR 1987 criteria
Intervention(s)	Dynamic strength training program
Intervention(s) characteristics	Patients in the dynamic strength training group were personally instructed to perform a strength training program for 24 months at home. Loading of the strength training program was individually designed according to the present capacity of each patient. A physiotherapist with lengthy experience guided the patients during their 5-day inpatient period. Strength training included exercises for all main muscle groups of the body, using elastic bands and dumbbells as resistance. Subjects were programmed to exercise twice weekly with moderate loads of 50–70% of the repetition maximum, 2 sets per exercise, 8–12 repetitions per set. The intensity of the strength training was re-evaluated (according to the strength measurements) every six months, during visits to the clinic. In addition, patients were encouraged to engage in recreational physical activities, such as walking, cycling, skiing, and swimming, an average of 2–3 times per week.
Professional that promoted the interventions	Patients themselves (but a physiotherapist with lengthy experience guided the patients during their 5-day inpatient period)
Intervention(s) setting	Home
Control	Patients in the control group were instructed to perform ROM and stretching exercises twice weekly, with- out any additional resistance, to maintain their joint mobility. They were free to continue their recreational physical activities, except for strength training of any kind.
Outcomes of interest (types and measuring instruments)	Fatigue experienced during the transfers were measured using a 100-mm visual analog scale (VAS) Fatigue was a <u>secondary outcome</u>
Effectiveness results	Fatigue during Transfer I: Experimental group Mean=2 (95% CI=-11 to 1) versus Control group Mean=-12 (95% CI=10 to 14) Fatigue during Transfer II: Experimental group Mean=-1 (95% CI=-11 to 9) versus Control group Mean=-11 (95% CI=-3 to 25)
Safety results	Not stated.
Main results	In the experimental group, strength training led to significant increases (19–59%) in maximal strength of the trained muscles. Such increases in the control group varied from 1% to 31%. There was a clear training effect on muscular strength in favor of the experimental group, but significant improvements in the HAQ indices as well as in the Valpar 9 test were seen also in control patients. Results of the Valpar 9 and the HAQ were statistically significantly better in patients who remained gainfully employed compared with patients who retired preterm during follow-up. However, compared with patients who remained in the work force, patients who retired were older, and their work was physically more demanding.
Follow-up	2 years
Conclusions	Strength training led to increased muscle strength, but this increase did not correlate with improved physical function as assessed by the Valpar 9 work sample test. The increased muscle performance did not prevent a substantial proportion of patients from retiring preterm. The 2 items from the Valpar 9 test that were applied were not sensitive enough to differentiate the patients according to their working status.

Hammond et al., 2008	
Participants characteristics (number, age, disease criteria, details)	Participants with RA or early IA or PsA (n=167) ≈ 64.7% female ≈ 55.4 years ≈ Disease duration 7.3 years
Intervention(s)	Group modular cognitive–behavioural approach programme (the LMAP)
Intervention(s) characteristics	This included 2 modules, each with four 2.5h, and one 2-h review meeting. Module manuals were developed, and Arthritis Research Campaign and Arthritis Care booklets were provided. Each meeting included self-monitoring, skills training to follow individually determined home activity and exercise programmes. Meeting 1 discussed RA and PsA, health beliefs, personal impact of arthritis, understanding multiple factors affecting symptoms, attitudes, personal experiences of what helps, self-management methods and motivating for change. Meetings 2–4 focused on applying ergonomic approaches to reduce pain, hand exercises, fatigue management and benefits of splints. In Module 2, discussions focused on participants' exercise beliefs, barriers and problem-solving these. Each module was delivered to facilitate continuing discussion of themes, negotiating home programmes and weekly review of progress with goals.
Professional that promoted the interventions	Rheumatologist, nurse, social worker, physiotherapist, and occupational therapist.
Intervention(s) setting	Not stated
Control	Group information-focused (or standard) programme
Outcomes of interest (types and measuring instruments)	Fatigue - Visual Analogue Scale (VAS) Fatigue was a secondary outcome
Effectiveness results	Fatigue at 6 months was better: *F*=6.97, *P*=0.01 Fatigue at 12 months: *F*=2.70, *P*=0.1
Safety results	Not stated
Main results	At 6 months, the behavioural group had better pain (P=0.01), fatigue (P=0.01), functional ability (P=0.05) and self-efficacy (P=0.01) scores and greater use of health behaviours.
Follow-up	12 months
Conclusions	Attending a modular behavioural education programme is effective for at least 1 year in enabling people with RA and PsA to reduce pain, improve psychological status and self-manage their condition.

Harkcom et al., 1984	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=17) 100% female ≈ Age, years: Group A: 51.5, Group B: 47.3, Group C: 44, control group: 45.1 ≈ Disease duration, years: Group A: 12.2, Group B: 10.6, Group C: 5.6, control group: 8.8
Intervention(s)	Low intensity aerobic exercise protocols
Intervention(s) characteristics	The subjects then began their program of bicycle ergometer exercise 3 times/week for 12 weeks, a period previously determined to improve aerobic capacity. Each session was supervised by physical education graduate students. The protocols differed in the initial length of total exercise time, the rate of progression, and the final total duration of activity achieved after 6 weeks (15, 25, 35 minutes) and patient groups labelled groups A, B, and C were assigned to the 3 protocols, respectively. The exercise intensity was measured by heart rate and was maintained for all groups at 70% of the maximal heart rate measured during the baseline exercise tolerance test. The load on the bicycle ergometers was applied at a resistance which achieved and maintained 70% of the maximum heart rate at 50 rpm. Each total daily exercise session was divided into 5 bouts of exercise separated by 1-minute rest periods. Each session was preceded by a warmup and ended with a cool-down period and involved gentle, active, rhythmic range of motion exercises. Control subjects continued their routine daily activities without knowledge of any intervention.
Professional that promoted the interventions	Physical education graduate students
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue – Global assessment of change-fatigue (worse, same, better, much better) Fatigue was a secondary outcome
Effectiveness results	In the global assessment of changes in fatigue, group A reported the most improvement, less improvement was shown for group B, and little or no change occurred in group C. This coincided with subjective assessments made by each subject as part of the final assessment. Fatigue was improved and the ability to participate in household and social activities was better for group A and for group B, but with little change for group C.
Safety results	Not stated
Main results	All exercise groups improved their aerobic capacity, exercise time, and joint counts. Subjects described improvement in activities of daily living and reduced joint pain and fatigue.
Follow-up	12 weeks
Conclusions	Female subjects with non-acute RA in functional class I1 benefited from regular, supervised aerobic exercise, and this was accomplished without exacerbating joint symptoms. Also of importance is the observation that as little as 15 minutes per session produced improvement in aerobic capacity, exercise tolerance, and sense of well-being. Low intensity aerobic exercise, even at short durations, performed 3 times per week, is beneficial and may be an important adjunct in the long-term treatment of RA.

Harper et al., 2021	
Participants characteristics (number, age, disease criteria, details)	ANCA-associated vasculitis (AAV) patients (n=43) ≈ 42% female ≈ Age 62 years ≈ Disease duration: not stated
Intervention(s)	Behavioural-based physical activity
Intervention(s) characteristics	Participants randomized to the intervention group were provided with a PA and behavioural change support programme, plus standard care. The intervention support was provided over 12 weeks; weeks 1–8 comprised consecutive weekly face-to-face PA sessions in groups and individual telephone calls to support behaviour change and motivation, weeks 9–12 consisted of weekly individual telephone calls only. Participants were provided with wrist-worn activity trackers (Fitbit Model FB405BKL). The intervention manual is available from the corresponding author on request.
Professional that promoted the interventions	Trained facilitator
Intervention(s) setting	Not stated
Control	Standard care
Outcomes of interest (types and measuring instruments)	Fatigue – Multidimensional Fatigue Inventory (MFI-2), Bristol Rheumatoid Arthritis Fatigue questionnaire Fatigue was a primary outcome
Effectiveness results	At 24 weeks, the adjusted mean difference between groups was -0.7 (95% CI=2.7 to 1.4) for the MFI-20 general fatigue domain and was 5.3 (95% CI=6.4 to 16.9) for the BRAF-MDQ total score.
Safety results	One cardiovascular event was reported in the standard care group. Nine participants reported experiencing a musculoskeletal injury during the trial (6 in the intervention group and 3 in the standard care group), of which 1 required hospitalization (intervention group not related to intervention). Four participants reported serious adverse events, none of which were considered related to the intervention (intervention group n=3; neutropenia, pulmonary embolism, admission following a car accident, standard care n=1; admission to hospital on two occasions with diarrhoea). No participant's disease relapsed during the study period.
Main results	A total of 248 patients were screened and 134 were eligible to participate (54%). Stop/go criteria were amber for recruitment; 43/134 (32%, 95% CI= 24 to 40) eligible participants randomized, amber for adherence; 73% of participants attended all eight physical activity sessions, but only 11/22 (50%, 95% CI= 29 to 71) completed the intervention as per the intended schedule, and green for study withdrawal; 2/43 participants withdrew before 24 weeks (5%, 95% CI= 0 to 11). Qualitative results suggested the intervention was acceptable.
Follow-up	52 weeks
Conclusions	This study suggests a behavioural-based physical activity intervention targeting fatigue self-management was acceptable to patients with AAV, although recruitment and protocol adherence will need modification prior to a definitive trial.

Hewlett et al., 2011	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=126) ≈ 73.2% female ≈ 59.2 years ≈ Disease duration 14 years ACR Criteria
Intervention(s)	Group cognitive behavioural therapy (CBT) for fatigue self-management
Intervention(s) characteristics	6 *2 hours sessions (weeks 1–6), with a 1 hour consolidation session (week 14). Topics likely to improve fatigue self-management were included. Thoughts, feelings, and behaviours related to fatigue were addressed using Socratic (reflective) questioning and guided discovery to enable patients to work out links themselves. Problem-solving, goal setting, self-monitoring of activity/rest and energy management, aimed to help patients turn cognitive and behavioural changes into improved well-being. Goal setting occupied the second hour of sessions, each clinician taking half the group to help patients set and review personal cognitive or behavioural goals. Programme homogeneity across groups was maintained through standardised topics, tools, metaphors, and handouts, delivered by the same clinicians.
Professional that promoted the interventions	Clinical psychologist and a specialist occupational therapist
Intervention(s) setting	Hospital
Control	Receiving fatigue self-management information in a 1 h didactic group session.
Outcomes of interest (types and measuring instruments)	Multi-dimensional Assessment of Fatigue (MAF) Fatigue VAS Fatigue was a primary outcome
Effectiveness results	The standardised effect size for MAF was 0.59 (95% CI=0.15 to 1.03) and 0.77 for fatigue impact VAS (95% CI=0.33 to 1.21) in favour of the CBT intervention.
Safety results	Not stated
Main results	At 18 weeks CBT participants reported better scores than control participants for fatigue impact: MAF 28.99 versus 23.99 (adjusted difference=−5.48, 95% CI=−9.50 to −1.46, p=0.008); VAS 5.99 versus 4.26 (adjusted difference=−1.95, 95% CI=−2.99 to −0.90, p<0.001).
Follow-up	4.5 months
Conclusions	Group CBT for fatigue self-management in RA improves fatigue impact, coping and perceived severity, and well-being.

Hewlett et al., 2019	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=308) ≈ 73.2% female ≈ 59.2 years ≈ Disease duration 14 years ACR Criteria
Intervention(s)	Cognitive behavioural approaches by rheumatology teams (RAFT)
Intervention(s) characteristics	RAFT is the group course for RA fatigue using CBT approaches previously facilitated by a clinical psychologist.11 RAFT comprises seven sessions (weeks 1–6 for 2 hours, consolidation week 14 for 1 hour), addressing behaviours likely to be related to fatigue and their underpinning thoughts and feelings (see online supplementary data), as previously published. Tutors use exploratory questioning, goal-setting and peer-support to enhance self-efficacy (belief that you can succeed with an activity), prompting changes in self-management. RAFT was manualised for codelivery by pairs of rheumatology nurses/ occupational therapists, who trained together over 4 days and delivered an observed course locally before the RCT.
Professional that promoted the interventions	Rheumatology nurses/ occupational therapists
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Reducing Arthritis Fatigue: clinical Teams using CB approaches (RAFT) Bristol RA Fatigue effect numerical Rating scale (BRAF-NRS 0–10) Coping (BRAF-NRSs) and overall impact (BRAF Multidimensional Questionnaire, BRAF-MDQ) Fatigue was a primary outcome
Effectiveness results	At 26 weeks, the adjusted difference between arms for fatigue impact change favoured RAFT (BRAF-NRS Effect −0.59, 95%CI=–1.11 to -0.06), BRAF Multidimensional Questionnaire (MDQ) Total −3.42 (95% CI=–6.44 to -0.39), Living with Fatigue −1.19 (95% CI=–2.17 to -0.21), Emotional Fatigue −0.91 (95% CI=–1.58 to -0.23). Effects persisted at 2 years: BRAF-NRS Effect −0.49 (95% CI=−0.83 to -0.14), BRAF MDQ Total −2.98 (95% CI=−5.39 to -0.57), Living with Fatigue −0.93 (95% CI=−1.75 to -0.10), Emotional Fatigue −0.90 (95% CI=−1.44 to -0.37); BRAF-NRS Coping 0.42 (95% CI=0.08 to 0.77) (relevance of fatigue impact improvement uncertain). RAFT satisfaction: 89% scored > 8/10 vs 54% controls rating usual care booklet (p<0.0001).
Safety results	Not stated
Main results	RAFT, a seven-session group CBA course for RA fatigue self-management delivered by rheumatology nurses and occupational therapists, reduced fatigue impact beyond usual care both at 6 months and 2 years. RAFT had high patient attendance and satisfaction. Improvements were also seen in emotional fatigue, living with fatigue, coping with fatigue and self-efficacy.
Follow-up	2 years
Conclusions	Multiple RA fatigue impacts can be improved for 2 years by rheumatology teams delivering a group programme using cognitive behavioural approaches.

Karlson et al., 2004	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=122) ≈ 73.2% female ≈ 59.2 years ≈ Disease duration 14 years ACR Criteria
Intervention(s)	Psychoeducational intervention
Intervention(s) characteristics	The intervention was carried out during a 30–45-minute discussion between educator, patient, and partner, after a regular visit for medical care. Based on the literature, we decided that the most effective (and acceptable) intervention would be one "owned" by the patient. Hence, patients chose their own partners, the pair identified the problems they wished to work on, and they came up with their own plans, as summarized below. Before the session, the patient and partner independently completed efficacy questionnaires, the patient for himself or herself, and the partner for the patient, covering important lupus self-management behaviours, such as management of pain, fatigue, depression, appointment-keeping, and adherence to medications. The counsellor then met with the subjects and shared their responses. The first aim was to identify areas in which patient self-efficacy for lupus management was low, with the goal of helping the patient and partner each identify ways in which to improve the patient's self-management abilities. The couple was introduced to a problem-solving approach, including problem identification, generation, and evaluation of alternative solutions, choosing a solution, and making concrete plans. Couples were encouraged to generate their own solutions, based on past successful behaviours, and the counsellor served as a facilitator. The second aim was to identify discordant patient and partner beliefs about patient self-management abilities, to help them come to a common understanding of the patient's actual abilities and improve their communication about lupus management. Solutions included techniques such as monitoring (e.g., having the partner regularly observe the patient for signs of fatigue) and checking (e.g., having the partner ask the patient whether he/she is fatigued). The focus was lupus management and not generic improvement of the pair's communication. The intervention was followed by 5 telephone calls. The first telephone call included the patient and partner, if possible. Subsequent calls were made to the patient each month for 4 more months, and included the partner, if both the patient and partner agreed. Collectively, the calls served to monitor and encourage progress in problem solving and communication and to help the patient and partner to renegotiate these goals as their experience in self-management and communication grew.
Professional that promoted the interventions	A masters-level nurse
Intervention(s) setting	Hospital
Control	Patients in the control group and their partners received an attention placebo, including a 45-minute video presentation about lupus, and monthly telephone calls.
Outcomes of interest (types and measuring instruments)	A 4-item lupus fatigue scale Fatigue was a primary outcome
Effectiveness results	At 12 months, positive social support and patient self-efficacy scores were significantly higher and the fatigue score was significantly lower in the experimental versus the control group.
Safety results	Not stated
Main results	At 6 months, significantly higher scores for couples communication (P=0.01) and problem-focused coping (P=0.03) were seen in the experimental group compared with the control group. At 12 months (6 months after the intervention ended), social support was higher (4.4 versus 4.1; P=0.03), self-efficacy was higher (7.2 versus 6.2; P=0.02), couples communication was higher (3.5 versus 3.1; P=0.03), and fatigue was lower (5.1 versus 6.3; P=0.02) in the experimental group compared with the control group. Global mental health status at 12 months, as measured by the Short Form 36 survey, was 69 points in the experimental group compared with 58 points in the control group (P=0.04). In multivariate models, adjusting for baseline covariates, scores for couple communication (P=0.01) were significantly higher at 6 months, and scores for self-efficacy (P=0.004) and global mental health status (P=0.03) were significantly higher at 12 months in the experimental group compared with the control group, and the mean score for global physical function was higher by 7 points, which was a clinically meaningful change (P=0.2). The mean score for fatigue was also significantly lower in the experimental group than in the control group (P=0.05). SLE disease activity was unchanged by this intervention.
Follow-up	12 months
Conclusions	Theory-based educational intervention in SLE demonstrated significantly higher scores for couple communication, self-efficacy, and mental health status, and lower fatigue scores in the experimental group compared with the control group. Because couple communication and self-efficacy appear to be modifiable risk factors, they may also be potential targets in more disadvantaged populations.

Katz et al., 2018	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=96) ≈ 87.5% female ≈ 54.8 years ≈ Disease duration: not stated Physician-diagnosed RA
Intervention(s)	Pedometer only (PED) or Pedometer + step targets (PED+)
Intervention(s) characteristics	**Pedometer only (PED).** The PED group received the educational booklet and discussion, plus a pedometer and a diary to record daily step counts from the pedometer. Participants were shown how to wear the pedometer and were instructed to wear it from the time they got out of bed in the morning until they went to bed at night, except while showering, bathing, or swimming. The step diary was prepopulated with dates and provided spaces to record each day's steps and notes about other activities, problems with the activity monitor, injuries, or other relevant issues. **Pedometer + step targets (PED+).** The PED + group received the educational booklet and discussion, the pedometer and step diary, and individualized daily step targets. Step targets were based on the week of activity monitoring between the baseline and randomization visits and were calculated to increase participants' average daily step counts by 10% for every 2 weeks of the intervention period.
Professional that promoted the interventions	Patients themselves
Intervention(s) setting	Home
Control	**Education only (EDUC).** The EDUC group received an educational brochure (Be Active Your Way: A Guide for Adults [http://health.gov/paguidelines/pdf/ paguide.pdf]) and a guided discussion of simple ways to increase physical activity in daily life based on the booklet. The brochure was available in English and Spanish.
Outcomes of interest (types and measuring instruments)	PROMIS (Patient-Reported Outcome Measurement Information System) Fatigue Short Form 7a questionnaire Fatigue was a primary outcome
Effectiveness results	Mean changes in PROMIS fatigue scores from baseline to week 21 were -1.6, -3.2, and -4.8 for EDUC, PED, and PED + groups, respectively. Within-group changes for PED and PED + groups were statistically significant (P=0.02 and P=0.0002, respectively). The repeated- measures analysis omnibus group-by-time interaction effect was not statistically significant (P=0.21). However, simple tests of interaction indicated a statistical trend for the PED + group to reduce fatigue scores by 3.2 points more than the EDUC group by 21 weeks (P=0.09). Sensitivity analyses were conducted to adjust for differences in age and disease duration among the 3 groups; no substantive differences in results were found. Assuming a 4-point MIC, 43%, 56%, and 53% of individuals in the EDUC, PED, and PED + groups, respectively, achieved an important decline in fatigue (P=0.57). The mean change within the PED + group met the MIC criterion at 21 weeks.
Safety results	Interviewers asked about "problems" at each contact (every 2 weeks for PED and PED + groups; at 10 and 21 weeks for the EDUC group). One participant (PED group) reported a calf muscle strain at day 5 and decreased activity for a short period of time but continued to monitor steps and completed the study. No other adverse effects were reported that were attributed to the intervention.
Main results	Both intervention groups significantly increased steps (1,441 [P=0.004] for PED and 1,656 [P=0.001] for PED +), and the EDUC group decreased steps (-747 [P=0.14]) (group-by-time interaction P=0.0025). Between-group changes in fatigue were not significantly different (interaction P=0.21). Mean changes in fatigue scores from baseline to week 21 were -1.6 (with-group P=0.26), -3.2 (P=0.02), and -4.8 (P=0.0002) for EDUC, PED, and PED + groups, respectively. Function and self-reported disease activity also improved in the PED and PED + groups.
Follow-up	21 weeks
Conclusions	Provision of pedometers, with and with- out providing guidance in the form of step targets, was successful in increasing activity levels in these individuals with RA. While decreases in fatigue were not statistically different across groups, fatigue did significantly decrease in both pedometer groups, with over 50% reporting clinically important decreases in fatigue. Significant improvements in other outcomes were also noted for the 2 pedometer groups. These results provide evidence that pedometers are effective at increasing physical activity among people with RA and provide support for the hypothesis that increasing physical activity by walking has important effects on fatigue and other RA symptoms.

Keramiotou et al., 2020	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=62) ≈ 94% female ≈ Age, years: intervention group: 43.3, control group: 48.7 ≈ Disease duration, years (median): intervention group: 6, control group: 11 2012 SLICC classification criteria for SLE
Intervention(s)	Upper limb exercise
Intervention(s) characteristics	Participants were provided with a booklet including pictures and instructions for the exercise programme and a kit of equipment including a stick, two resistance bands and a plastic container of 4oz, with therapeutic putty of medium soft or medium resistance depending on their strength. To enhance adherence, participants were provided with an exercise diary to record completion of the daily exercise programme. Participants had an initial assessment to tailor the exercise programme to their strength, pain level and flexibility. The initial intensity of exercise was set at a moderate level and the programme was reassessed, using a modified Borg Scale, to maintain the same intensity, in every face-to-face session with the hand therapist at 0, 3, 6 and 9 weeks. Patients in the exercise group received by the hand therapist a 30- min daily programme at home of strengthening and stretching upper limb exercises for 12 weeks, in addition to routine care. The programme included 9 strengthening and stretching exercises for the upper extremities with a stick, 10 strength - ening and stretching exercises for the fingers and 11 strengthening exercises against resistance with therapeutic putty.
Professional that promoted the interventions	Hand therapist
Intervention(s) setting	Home
Control	Control group had four sessions of training in alternative methods of performing daily activities, use of aids, joint protection and energy conservation, additionally to assessment at baseline, 6, 12 and 24 weeks, in order to keep them also committed and motivated.
Outcomes of interest (types and measuring instruments)	PROMIS (Patient-Reported Outcome Measurement Information System) Fatigue Short Form 7a questionnaire Fatigue was a secondary outcome
Effectiveness results	All percent changes of LupusQoL - fatigue domains were significantly higher in the exercise group compared with control group at all- time point.
Safety results	Nos stated
Main results	There was a significant difference between the two groups in percentage changes of DASH, HAQ, grip strength, pinch strength, LupusQoL - physical health and fatigue, and V as scores from baseline to 6, 12 and 24 weeks, and from baseline to 12 weeks for dexterity test ($p<0.001$). No interaction was observed between exercise and disease activity, or medication use at baseline and during the observation period.
Follow-up	24 weeks
Conclusions	The introduction of a 30- min session of therapeutic exercise for the upper limbs, as an adjunct to routine care, can improve hand function, dexterity, performance of activities of daily life and quality of life in patients with SLE.

Knittle et al., 2013	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=78) ≈ 67% female ≈ 63 years ≈ Disease duration not stated ACR Criteria
Intervention(s)	Education session plus a motivational interview from a physical therapist and two self-regulation coaching sessions from a rheumatology nurse.
Intervention(s) characteristics	In week 1, both control and treatment participants attended a group educational session (3-7 people). In week 2, treated patients received a one-to-one education session of 45 min. Patients weighed the pros and cons of (re-)engaging in PA, and links were made for physically active lifestyle and settling of long-term goals. In weeks 4 and 5, one to one coaching sessions (40-60min) to patients in the treatment group were made to enhance fidelity of intervention delivery, followed the structure of a workbook developed for this study. In weeks 6, 12 and 18, patients in the treatment group received a follow-up phone call to discuss the patient's efforts in self-regulating physical activity.
Professional that promoted the interventions	Rheumatology nurse Physical therapist
Intervention(s) setting	Hospital
Control	Control group—which received a group-based patient education session led by a physical therapist
Outcomes of interest (types and measuring instruments)	Fatigue - 20-item Checklist of Individual Strengths (CIS-20) Fatigue was a secondary outcome
Effectiveness results	No significant effects were found for fatigue. Post treatment: -2.8 (-8.0 to 2.4), *P*=0.14 6 months: -2.7 (-8.9 to 3.5), *P*=0.12
Safety results	Not stated
Main results	There were significant main effects on leisure time PA (F=4.01; p=0.02), days per week with 30 min of PA (F=4.39; p=0.02), total self-efficacy (F=5.18; p=0.001) and autonomous motivation (F=7.16; p=0.01); but not on fatigue (F=0.43; p=0.65).
Follow-up	6 months
Conclusions	Combining motivation and action-focused intervention approaches improved PA-related cognitions and led to improved uptake and maintenance of leisure-time PA.

Koksvik et al., 2012	
Participants characteristics (number, age, disease criteria, details)	RA (n=36), AS (n=10), PsA (n=6), JIA (n=5) or undifferentiated polyarthritis (n=11) patients (Total n=68) ≈ 68% female ≈ 50 years ≈ Disease duration 8 years
Intervention(s)	Nursing consultations
Intervention(s) characteristics	The nursing consultations were provided by two CNSs. Each of them had more than 10 years of clinical experience in rheumatology. Additionally, they had undertaken advanced education; one of them had completed a Masters' degree including a clinical rheumatology study and the other had completed a rheumatology specialist postgraduate University course (60 ECTS). The patients met the same nurse at each visit. The nurses' disease assessments were described in a thematic check list and included disease activity (joint examination, laboratory tests and patient' s global assessment (PGA)), comorbidity, medication use, functional and psychosocial status. Moreover, the nurses provided education and counselling addressing self- management strategies that were tailored to the individual patient's needs. The CNSs had open access to a rheumatologist for medical advice, assistance with articular injections and prescription of medications.
Professional that promoted the interventions	Clinical nurse specialists (CNS) or by medical doctors (MD)
Intervention(s) setting	Hospital (rheumatology outpatient clinic)
Control	Medical doctor (MD) consultation: Six different MDs undertook the control group consultations, four of them were rheumatologists and two were in their last year of specialist training. Each patient could meet different MDs during the study period. The MD arm of this RCT reflects treatment as usual in Norwegian outpatient clinics.
Outcomes of interest (types and measuring instruments)	Fatigue – VAS (0-100 mm) Fatigue was a <u>secondary outcome</u>
Effectiveness results	Effects of intervention between MD and CNS groups at 9 and 21 months were 4.0 (−15.8 to 7.8; p=0.50); and 0.3 (−11.8 to 12.3; p=0.97).
Safety results	Not stated
Main results	Statistically significant improvements in favour of the CNS group were found in all LSQ subscales (all p values <0.001) and in overall satisfaction at 9 months (adjusted mean between- group difference 0.74, 95% CI=− 0.96 to − 0.52) and at 21 months (− 0.69, 96% CI=− 0.87 to − 0.50). Disease activity Score 28 joint count (DAS-28) was improved from baseline to 9 months in both groups and improvement was maintained at 21 months, but without any group difference. No statistically significant between-group differences were found in any of the other secondary outcomes.
Follow-up	21 months
Conclusions	Patients with IA are likely to bene fi t from nurse consultations in terms of increased satisfaction with care compared with MD consultations and without loss of efficacy in terms of clinical outcomes.

Kucharski et al., 2019	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=74) ≈ Gender, female: intervention group: 75%, control group: 76.3% ≈ Age, years: intervention group: 69.1, control group: 70.1 ≈ Disease duration not stated RA according to the ACR 1987/ EULAR 2010 criteria
Intervention(s)	Moderate-to-high intensity exercise with person-centered guidance
Intervention(s) characteristics	The exercise group followed a gym-based exercise program with person-centered guidance from a physiotherapist three times a week together with light home-based exercise for 20 weeks. The exercise consisted of moderate-to- high intensity aerobic and resistance exercise with a total of 27 min of aerobic exercise and 5 resistance exercises for large muscle groups.
Professional that promoted the interventions	Physiotherapist
Intervention(s) setting	Hospital
Control	The active control group performed light home-based exercise for mobility, lower body strength and balance, but no gym-based exercise for 20 weeks. The exercise of both groups is described in detail elsewhere.
Outcomes of interest (types and measuring instruments)	Fatigue – Multidimensional Fatigue Inventory (Swedish version) (MFI-20), Visual Analog Scale (0–100 mm)-Fatigue (VAS-F) Fatigue was a secondary outcome
Effectiveness results	The subscales of MFI-20 physical fatigue (p=0.002) and mental fatigue (p=0.048) was significantly reduced at 20 weeks in the exercise group when compared to the control group. The remaining subscales of MFI-20, general fatigue, reduced activity, and motivation remained unaffected by exercise. Global fatigue reported using VAS-F did not significantly differ between exercise and control groups. The subgroup analysis based on dichotomization of DAS28 found no significant differences between the exercise and control group. Within the exercise group there was a significant difference in MFI-20 subscale physical fatigue both in the group with a low (n=26, median Δ=− 2, ICR:−3.25; −1, p=0.001) and a moderate disease activity (n=27, median Δ=0, ICR:−1; 3, p=0.041). In the subgroup analysis the MFI-20 subscale physical fatigue (median Δ=−2, ICR:−3.5; 0.5, p=0.019) and reduced activity (median Δ=− 1.5, ICR:− 4; 0, p=0.013) were significantly improved within the exercise group with a low disease activity (n = 25) but not in the other groups.
Safety results	Not stated
Main results	Outcomes were differences in Multidimensional Fatigue Inventory (MFI-20), Visual Analog Scale Fatigue (VAS fatigue), and Hospital Anxiety and Depression Scale (HADS). Analysis of metabolomics was also performed. The subscales “physical fatigue” and “mental fatigue” in MFI-20 and symptoms of depression using HADS depression scale improved significantly at week 20 in the exercise group compared with the control group. Exercise did not influence global fatigue rated by VAS or subscales “reduced motivation”, “reduced activity” and “general fatigue” in MFI-20. No significant change was found on the anxiety index of HADS. The improvements in physical fatigue were associated with changes in the metabolism of lipids, bile acids, the urea cycle and several sugars.
Follow-up	52 weeks
Conclusions	Person-centered moderate-to-high intensity exercise decreased fatigue and lessened symptoms of depression in older adults with RA, improvements that were accompanied by metabolic changes. Our study strongly suggests that moderate-to-high intensity exercise should be implemented in standard care in older adults with RA. Further, to maintain the beneficial effects, the exercise needs also to be maintained

Laforest et al., 2008	
Participants characteristics (number, age, disease criteria, details)	Patients (n=113) osteoarthritis (62%) or rheumatoid arthritis (38%) ≈ Gender, female: 91% ≈ Age, years: 77.7 ≈ Disease duration not stated RA according to the ACR 1987/ EULAR 2010 criteria
Intervention(s)	Self-Management Intervention
Intervention(s) characteristics	The intervention consists of weekly 1-hr individual home visits by a healthcare professional over 6 weeks. Participants explore the following core themes: (a) their life with arthritis, (b) physical and relaxation exercises, (c) managing pain and stiffness, (d) maintaining a positive attitude, (e) energy management, and (f) partnerships with health professionals and creative problem solving. Each session consists of a review of previously discussed topics, the exploration of a new theme, the formulation of a personal contract (i.e., defining an objective that is meaningful to the person and an action plan to meet it), and time for discussion and reflection. The first session is planned to be 1.5 hrs long, with subsequent sessions lasting 1 hour.
Professional that promoted the interventions	Ten health care professionals
Intervention(s) setting	Home
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue was evaluated with 100-mm Visual Analogue Scales. Fatigue was a <u>secondary outcome</u>
Effectiveness results	No significant postintervention changes were observed in fatigue levels for participants in either group (decrease of 2% in control group and 1% in experimental group). The absence of any change was confirmed by multilevel analyses, which showed no statistically significant differences (p=0.73).
Safety results	Not stated
Main results	Multilevel analysis reveals that experimental group participants reported significantly fewer functional limitations and less helplessness than control participants postintervention. A trend for improved coping effectiveness was observed (p=0.06). Greater improvements in outcome expectations and physical behaviors were associated with greater decreases in helplessness. Larger improvements in outcome expectations were associated with greater decreases in functional limitations.
Follow-up	6 weeks
Conclusions	A structured self-management intervention can have a positive impact on the health status of housebound adults with arthritis.

Lange et al., 2020	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=47) ≈ 77% female ≈ Age, years: intervention group: 73.5, control group: 74 ≈ Disease duration, years: intervention group: 18.7, control group: 21.9 RA according to the ACR 1987/EULAR 2010 criteria
Intervention(s)	Moderate to high intensity exercise with person-centred guidance by a physiotherapist for 20 week
Intervention(s) characteristics	The intervention was performed 2 – 3 times each week, with aerobic exercise of approximately 70–89% of max heart rate for 9*3 min, and five resistance exercises of approximately 70–80% of 1 repetition max. t two occasions during 7 months after the intervention the exercise group were offered light support over telephone. The contact was then ended, and the natural course was done until the current study.
Professional that promoted the interventions	Physiotherapist
Intervention(s) setting	Hospital
Control	Control intervention consisting of low- intensity home-exercise
Outcomes of interest (types and measuring instruments)	Fatigue Visual Analog Scale (0–100 mm) (VAS-F) Fatigue was a secondary outcome
Effectiveness results	VAS fatigue (p=0.023) was significantly increased with-in the control group but not in the exercise group after 4 years. Higher level of fatigue (VAS fatigue) at baseline was negatively associated with increased physical activity after 4 years. 4-year change of fatigue was 5.7 in exercise group (p-value within group: 0.124), 11.7 in control group (p-value within group: 0.023). For every 1 mm higher rating of VAS fatigue at baseline, the participants were 4% less likely to increase their physical activity (OR=0.96, p=0.018).
Safety results	Not stated
Main results	The result show that there was no significant difference in weekly hours of physical activity when groups where compared. However, participants in the exercise group rated significantly increased weekly hours of physical activity after four years (p=0.004) when compared to baseline. Higher levels of fatigue, BMI and physical activity, at baseline were negatively associated with increased physical activity after four years. There was no significant difference in change of physical fitness between the groups. Within group analysis showed that the control group reported increased pain (p=0.035), fatigue (p=0.023) increased number of tender joints (p=0.028) higher disease activity (p=0.007) and worsening of global health (p=0.004) when compared to baseline while the exercise group remained at the same level as at baseline.
Follow-up	3 years and 10 months (range: 3 years, 5 months to 4 years, 3 months)
Conclusions	These results indicate that introducing moderate- to high intensity exercise with person-centred guidance might favor increased physical activity after four years in older adults with RA. Previous partaking in moderate- to high intensity exercise might also be protective against increased disease activity, pain, and fatigue over time.

Lau et al., 2019	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=21) 100% female ≈ Age 57.5 years ≈ Disease duration 14.5 years RA according to the ACR 1987 revised criteria
Intervention(s)	Neural mobilization exercise
Intervention(s) characteristics	RA patients in the NM group were taught a set of active neural mobilization exercises consisting of five actions targeting at the median nerve, musculocutaneous nerve, femoral nerve, saphenous nerve, and the entire nervous system (the spinal cord and peripheral nerves of the upper and lower extremities) with tensioning technique employed.
Professional that promoted the interventions	Researchers
Intervention(s) setting	Not stated
Control	The control RA group was taught a set of gentle joint mobilization exercises which consisted of five actions for mobilizing the fingers, wrist, elbow, shoulder, spine, and lower limbs with- out touching the end range of joints and stressing the nervous system.
Outcomes of interest (types and measuring instruments)	A part of RAID (Rheumatoid Arthritis Impact of Disease) questionnaire (RAID-F) Fatigue was a secondary outcome
Effectiveness results	In NM group, baseline, and follow-up fatigue scores 3.55 (2.30) and 3.36 (1.80), respectively (p= 0.72). In control group, baseline, and follow-up fatigue scores 3.20 (2.53) and 3.10 (2.33), respectively (p=0.57).
Safety results	No adverse events were observed.
Main results	There were no significant differences between the groups at baseline. No adverse events were observed and compliance was over 90%. Post-treatment, favorable changes were observed in the NM group RAID score: –5.1 vs –0.8; weighted RAID score: –0.79 vs –0.15. ESR was reduced in the NM group, albeit non-significantly. Regarding the RAID score domains, the NM group demonstrated significant improvements in pain and coping.
Follow-up	8 weeks
Conclusions	The current data indicate a beneficial effect of NM exercises on pain and self-efficacy in our RA patients. Larger clinical studies are warranted to determine the clinical effectiveness of NM as a treatment for pain for RA patients and simultaneously address immune and neuropeptide modulation through NM.

Li et al., 2020	
Participants characteristics (number, age, disease criteria, details)	RA (n=86) or SLE patients (n=32) ≈ 89% female ≈ Age, years: immediate group: 53.5, delay group: 53.1 ≈ Disease duration: not stated Physician-confirmed diagnosis
Intervention(s)	Immediate group
Intervention(s) characteristics	The 8-week intervention included 3 components: 1) an in-person session with 20 minutes of group education and 30 minutes of individual counselling with a physical therapist, 2) use of a Fitbit Flex 2 with account access in the company web - site, and 3) 4 biweekly phone calls (20–30 minutes) from a physical therapist. The session focused on the benefits of being physically active, how to be active without aggravating symptoms, and pain management. Counselling followed the brief action planning approach, whereby physical therapists guided participants to set goals, develop an action plan, and identify barriers and solutions. Once a goal was set, participants rated their confidence in executing the plan on a 1–10 scale (10 = very confident). The process was repeated until the confidence rating reached 7 or higher, which is associated with a high likelihood of the person following through with the plan. During the biweekly phone calls, the physical therapists reviewed participants' progress remotely on FitViz and counselled them to modify activity goals.
Professional that promoted the interventions	Physical therapist
Intervention(s) setting	Not stated
Control	Delay group
Outcomes of interest (types and measuring instruments)	Fatigue – Fatigue Severity Scale Fatigue was a secondary outcome
Effectiveness results	In RA patients, FSS was found 4.7±1.4 at baseline and 4.4±1.3 at 9 weeks in immediate group, and 4.8±1.4 at baseline and 4.9±1.3 in delay group. Additionally, in SLE patients, FSS was found 5.1±1.2 at baseline and 4.7±1.3 at 9 weeks in immediate group, and 5.0±1.2 at baseline and 5.0±1.2 in delay group.
Safety results	Not stated
Main results	The adjusted mean difference in moderate/vigorous physical activity (MVPA) was 9.4 minutes/day (95% CI=-0.5 to 19.3, P=0.06). A significant effect was found in pain (–2.45; 95% CI=-4.78 to -0.13, P=0.04) and perceived walking habit (0.54; 95% CI=0.08 to 0.99, P=0.02). The remaining secondary outcomes improved but were not statistically significant. Post hoc analysis revealed a significant effect in MVPA (14.3 minutes/ day; 95% CI=2.3 to 26.3) and pain (–4.05; 95% CI=-6.73 to -1.36) in participants with RA but not in those with SLE.
Follow-up	27 weeks
Conclusions	Counselling by a physical therapist has the potential to improve physical activity in people with inflammatory arthritis, but further study is needed to understand the intervention effect on different diseases. We found a significant improvement in pain, suggesting that the intervention might have a positive effect on symptom management.

Lopes-Souza et al., 2021	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=21) 100% female ≈ Age, years: WBVE group: 48.5, isometry group: 47 ≈ Disease duration, years: WBVE group: 13.5, isometry group: 14.8
Intervention(s)	Whole-body vibration exercise (WBVE)
Intervention(s) characteristics	**WBVE group:** The WBVE group performed training program twice a week with at least one day between each session for 12 weeks. The vertical vibrating platform used in the study is of the triaxial type, where the base moves vertically and horizontally directions (with predominantly vertical displacement), model Power Plate Pro5 ® (Power Plate International, Performance Health Systems, USA). The peak was measured using a triaxial accelerometer (Vibration Data logger DT- 178A, Ruby Electronics, Saratoga, USA). Participants performed a warm-up using the cycle ergometer (Carci ®, Brazil); they were sat on a fixed chair with their feet on the cycle ergometer pedal and were instructed to perform the exercise continuously and with no defined load for 2min. After, women were requested to maintain stance on the vibrating platform with 130 knee flexion, without the support of the hands on the platform bars. The deck panel remained covered. During all sessions, the participants wore the same comfortable shoes. Each training session was composed of ten repetitions vibration exposure interspersed with 30 s of passive rest. In the first 4 weeks, WBVE session consisted of 10 bouts with 30 s performed within a frequency of 30Hz, D 1.23 mm and a peak of 2.22g. From 5 to 8 week, WBVE session consisted of 10 bouts with 60 s performed within a frequency of 40Hz, D 0.95mm and a peak of 3.06g. From 9 to 12 week a WBVE session consisted of 10 bouts with 60 s performed within a frequency of 50Hz, D 0.88 mm and a peak of 4.40g. The “low” amplitude was maintained in all sessions. Participants were monitored and asked verbally to report any negative side effects during all interventions. **Isometry group:** Participants in the isometry group performed training program twice a week with at least one day between each session for 12 weeks. The warm-up was performed in the same way as in the WBVE group. After that, women were requested to maintain stance with 130 knee flexion on the same vibrating platform (off). The deck panel remained covered. The cycles, working and rest times corresponded to the weeks were the same as the WBVE group, but without vibration.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Hospital
Control	Isometry group
Outcomes of interest (types and measuring instruments)	Fatigue – Fatigue Assessment of Chronic Illness Therapy scale - Fatigue (FACIT-F) Fatigue was a secondary outcome
Effectiveness results	Significant time effect was found on fatigue in the WBVE group. There was a significant reduction on fatigue with 6 weeks (p=0.04), as well as 12 weeks of intervention (p=0.03). In the isometry group no change was observed.
Safety results	No adverse effects were observed during the WBVE. One patient reported low back pain during the protocol time period, but not related directly with the intervention, and discontinued the study.
Main results	Seventeen women completed the 12 weeks of intervention and were included in the analysis. From a sample of seventy-seven individuals, seventeen participants completed the study, 8 in WBVE group and 9 in isometry group. Fatigue reduced in the WBVE group at 6 and 12 weeks of intervention (p=0.04) and (p=0.03) respectively. There was a significant improvement in the functional ability evaluated by the Health Assessment Questionnaire in the WBVE group compared to the isometry group (p=0.03).
Follow-up	12 weeks
Conclusions	WBVE would be a useful intervention for control of fatigue and improvement of the functional ability of women with SLE in glucocorticoids use.

Lorig et al., 2005	
Participants characteristics (number, age, disease criteria, details)	Inflammatory arthritis (IA) patients (n=355) 85% female ≈ Age 65.2 years ≈ Disease duration: not stated A diagnosis of any rheumatic condition supplied by physician
Intervention(s)	Arthritis Self-Management Program (ASMP)
Intervention(s) characteristics	The ASMP is a 6-week (2 hours per week) program offered to all persons with rheumatic conditions. Programs held in community locations led by a pair of trained peer leaders; one/both have a rheumatic condition. Each program is attended by 10-15 individuals with arthritis as well as some participants' significant others.
Professional that promoted the interventions	Pair of trained peer leaders
Intervention(s) setting	Churches and senior centers
Control	Generic Chronic Disease Self-Management Program (CDSM)
Outcomes of interest (types and measuring instruments)	VNS for fatigue Fatigue was a secondary outcome
Effectiveness results	ASMP vs CDSMP at 4 months: 4.80 vs 5.28 (p=0.033) Four-month ASMP fatigue change -0.441±2.23 (p=0.004) ASMP vs CDSMP at one year: 4.76 vs 5.43 (p=0.005) One-year ASMP fatigue change -0.426±2.14 (p=0.004)
Safety results	Not stated
Main results	Both programs showed positive results. The disease specific ASMP appeared to have advantages over the more generic CDSMP for patients with arthritis at 4 months. These advantages had lessened slightly by 1 year.
Follow-up	1 year
Conclusions	The disease specific ASMP should be considered first where there are sufficient resources and participants. However, both programs had positive effects, and the CDSMP should be considered a viable alternative.

Lorig et al., 2008	
Participants characteristics (number, age, disease criteria, details)	Patients with RA, osteoarthritis, or fibromyalgia (n=855) 85% female ≈ Age 65.2 years ≈ Disease duration: not stated
Intervention(s)	Internet-based Arthritis Self-Management Program (ASMP)
Intervention(s) characteristics	The Internet ASMP consists of password- protected, interactive, Web-based instruction (The Learning Center); Web-based bulletin board discussion (The Discussion Center); tools that the participants can use individually, such as exercise logs, medication diaries, and tailored exercise programs (My Tools); and the Arthritis Helpbook, which contains all the program content. In addition, it contains discussions of the major types of arthritis and medications and has drawings of suggested exercises. The book is not a textbook but rather a reference book to which the participants are referred at various times during the program. The program is focused on reduction of pain and improvement of function. The Learning Center content includes design of individualized exercise programs; use of cognitive symptom management such as relaxation, visualization, distraction, and self-talk; methods for managing negative emotions such as anger, fear, and depression; an overview of medications; aspects of physician–patient communication; healthy eating; fatigue management; action planning; feedback; and methods for solving arthritis- related problems. For each of 6 weeks, participants (approximately 25 per workshop) were asked to log on at least 3 times for a total of 1–2 hours and to participate in the weekly activities.
Professional that promoted the interventions	Moderators (A pair of peer moderators leads each workshop)
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Visual numeric scales (VAS) - fatigue Fatigue was a secondary outcome
Effectiveness results	In usual care, fatigue was 6.47±2.30 at baseline, 6.38±2.19 at 6 months, 6.33±2.20 at 1 year; in online intervention, fatigue was 6.47±2.36 at baseline, 6.07±2.51 at 6 months, 5.95±2.63 at 1 year. In RA patients, 1-year fatigue change was -0.361±2.00 in treatment group and 0.056±1.94 in control group (p=0.925).
Safety results	Not stated
Main results	238 (27.8%) reported having RA. At 1 year, the intervention group significantly improved in 4 of 6 health status measures and self-efficacy. No significant differences in health behaviors or health care utilization were found.
Follow-up	1 year
Conclusions	The Internet-based ASMP, like its predecessor small-group program, appears to be effective in slowing or reducing the negative effects of arthritis over a 1-year period. Both programs should be considered for assisting patients with arthritis. Future studies should focus on the facilitators and barriers to widespread translation as well as to the specific population for whom the programs are effective.

Macedo et al., 2009	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=32) 93% female ≈ Age 50.6 years ≈ Disease duration 10 years ACR criteria
Intervention(s)	Occupational therapy
Intervention(s) characteristics	Comprehensive occupational therapy consisted of an individualized assessment of the patient's medical history, a work assessment, a functional assessment, and a psychosocial assessment. An individualized treatment plan of 6-8 sessions was then formulated. Occupational therapy interventions were conducted within the rheumatology or occupational therapy department, the home, or the workplace. Each session lasted from 30 minutes to 2 hours; work visits required the greatest amount of time. Typical interventions included provision of education on RA, medications, compliance and management within the RA Center clinics, self-advocacy, workplace rights and responsibilities, ergonomic reviews, discussions with employers regarding reasonable accommodations, posture advice, pacing, activities of daily living, stress management, assertiveness, sleep posture and hygiene, exercises, footwear, splinting, and assertive communication. Patients were referred to multidisciplinary team members and community services as required.
Professional that promoted the interventions	Occupational therapist
Intervention(s) setting	Rheumatology or occupational therapy department, the home, or the workplace.
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue measured on an ordinal scale (where 0 none, 1 mild, 2 moderate, and 3 severe) over the past week Fatigue was a secondary outcome
Effectiveness results	Fatigue did not reach significance. Change in scores over 6 months, -0.19±0.66 in usual care group, and -0.25±0.86 in occupational therapy group (p=0.82).
Safety results	Not stated
Main results	At 6 months the improvement in the occupational therapy group was significantly greater than that in the usual care group for all functional outcomes (Canadian Occupational Performance Measure (COPM) performance P<0.001, COPM satisfaction P<0.001, HAQ DI P=0.02) and most work outcomes (RA WIS [P=0.04], VAS work satisfaction [P<0.001], VAS work performance [P=0.01]). Additionally, Arthritis Helplessness Index (P=0.02), Arthritis Impact Measurement Scales II pain subscale (P=0.03), VAS pain (P=0.007), EuroQol Index (P=0.02), EuroQol global (P=0.02), and DAS28 (P=0.03) scores significantly improved.
Follow-up	6 months
Conclusions	Targeted, comprehensive occupational therapy intervention improves functional and work-related outcomes in employed RA patients at risk of work disability.

Manning et al., 2014	
Participants characteristics (number, age, disease criteria, details)	Early RA patients (n=108) ≈ 76% female ≈ 55 years ≈ Disease duration 1.2 years ACR Criteria
Intervention(s)	A brief, supervised education, self-management, and global upper extremity exercise training (EXTRA) program, supplementing a functional home exercise regimen, aimed at improving global upper extremity disability in people with RA
Intervention(s) characteristics	EXTRA program was refined to comprise 4 supervised group (4–6 participants per group) education, self-management, and global upper extremity exercise training sessions (delivered twice weekly for the first 2 weeks of the intervention) supplementing a functional daily home exercise regimen. The supervised sessions commenced with a 15-minute interactive discussion/seminar designed to increase participants' knowledge of RA and exercise, self-efficacy, and disease self-management, and facilitate uptake and longer-term exercise participation. Behaviour change strategies were integrated into the seminars and reviewed, where necessary, in subsequent sessions.
Professional that promoted the interventions	Clinical physiotherapist
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - VAS Fatigue was a secondary outcome
Effectiveness results	Fatigue change after 12 weeks: 0.33 (-0.11 to 0.77), *P*=0.14 Fatigue change after 36 weeks: 0.14 (-0.30 to 0.58), *P*=0.53
Safety results	Authors concluded that the EXTRA program is safe and does not adversely affect disease activity, even in participants with high disease activity.
Main results	At 12 weeks, there was a significant between-group difference, all favouring the EXTRA programme, in the mean change in disability, function, non-dominant handgrip strength, self-efficacy, pain and disease activity but not for fatigue.
Follow-up	9 months
Conclusions	The EXTRA program improves upper extremity disability, function, handgrip strength, and self-efficacy in people with RA, with no adverse effects on disease activity.

Masiero et al., 2011	
Participants characteristics (number, age, disease criteria, details)	AS patients (n=62) ≈ 21% female ≈ 47.5 years ≈ Disease duration, years: RG: 18, EG: 14.5, CG: 20.5 Modified New York criteria
Intervention(s)	Educational-behavioral training associated with an exercise program (Rehabilitation Group, RG), or an educational-behavioral program only (Educational Group, EG)
Intervention(s) characteristics	The protocol rehabilitation treatment started with 2 educational-behavioral meetings followed by 10 exercise training meetings prepared by the interdisciplinary team comprising a physiatrist, a rheumatologist, a physiotherapist, and a psychologist. The educational-behavioral program addressed to the RG and EG was based on approximately 3-hour sessions, every 2 weeks, for groups of 8–12 patients at a time (the patients were encouraged to bring a partner or other family member). The educational methods used were group discussion, problem solving, guided practice, and lectures designed to facilitate program comprehension. An illustrated brochure on the program meeting with a home guide was distributed at the end of the intervention. The exercises consisted of 12 twice-weekly sessions lasting 60 minutes each, with groups of 4–6 subjects, supervised by an experienced physiotherapist. The protocol included analytic flexibility and muscle stretching exercises for the spine and limbs, proprioceptive training, and exercises to expand the chest and control abdominal and diaphragmatic breathing. Patients were taught how to perform the programmed exercises and encouraged to perform them at home at least 3 to 4 times per week in order to comply with the study. At the end of each meeting patients received an illustrated brochure on the program meeting with a home guide.
Professional that promoted the interventions	Physiotherapist
Intervention(s) setting	Hospital
Control	No rehabilitation (Control Group, CG)
Outcomes of interest (types and measuring instruments)	Fatigue - BASDAI item Fatigue was a secondary outcome
Effectiveness results	After two-month follow-up evaluation, fatigue level was significant only between RG and CG (median of RG: 3 (1.6-4) and CG: 3.5 (2-6), p=0.017). The other comparisons of fatigue were not significant. Additionally, after 6 month-follow-up evaluation, fatigue level was significant between RG and CG (median of RG: 2.2 (1-3) and CG: 4 (2-5), p<0.001), and RG and EG (median of RG: 2.2 (1-3) and EG: 3 (2-5.1), p=0.035).
Safety results	Not stated
Main results	On intragroup comparison at T1 (2-month), the rehabilitation group showed significant improvement in the BASMI and BASDAI, in chest expansion, and in most spinal active range of motion measurements. BASFI and cervical and lumbar VAS scores improved in both the rehabilitation and educational-behavioural groups. The positive results achieved in the rehabilitation group were maintained at the 6-month follow-up.
Follow-up	6 months
Conclusions	Combining intensive group exercise with an educational-behavioural program can pro- vide promising results in the management of patients with clinically stabilized AS on TNF inhibitor treatment.

Mayoux-Benhamou et al., 2008	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=208) ≈ Gender, female: active group: 90%, control group: 89% ≈ 54.7 years ≈ Disease duration 12.7 years 1987 revised ACR criteria
Intervention(s)	Educational program
Intervention(s) characteristics	The educational program was delivered within the month following the randomization and included 8 weekly, 5-hour sessions for outpatients. Participants were organized into classes of 8 to 10 for the sessions. Four sessions consisted of comprehensive information about RA and its medical management. Four sessions were devoted to physical program and were conducted by health professionals. Each session was initiated by a physician's lecture focused specifically on guidelines for practicing adequate PA and a discussion that aimed to enhance positive attitudes and beliefs related to exercise (1 hour). Tailored advice and individual approaches were provided to offset physical and psychological barriers to exercise, instructing patients on how to incorporate moderate PA into their usual day, find enjoyable and attain- able activities, and modify the program according to their current health because of the variable course of RA. Then participants were split into sub-groups to participate in workshops. The occupational therapist's intervention (1 hour) included education on joint protection positioning, proper footwear, and use of splints and adaptive aids that participants could test. The physical therapist's intervention (1 hour) included the practice of the home-based exercise and aerobic activities such as cycling. After a break, the participants attended classes devoted to aquatic (1 hour) or relaxation training (1 hour).
Professional that promoted the interventions	Health professionals
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Functional Assessment of Chronic Illness Therapy–Fatigue (FACIT-F) Fatigue was a secondary outcome
Effectiveness results	It was found an association between compliance with fatigue on the FACIT vitality scale (mean: 2.94±8.04 vs –0.1±7.25 for noncompliant patients, p=0.04, a negative score indicating reduction of fatigue).
Safety results	Not stated
Main results	At 6-month follow-up, home-based exercise, and leisure physical activity (PA) compliance were significantly higher [13.5% vs 1%, respectively (p=0.001); and 28.2% vs 13.8% (p=0.02)] but were not at 12 months. Predictors of leisure PA compliance at 6 months included participating in the active group (OR 2.74, 95% CI=1.17 to 6.38) and previous low leisure PA (OR 6.01, 95% CI=2.47 to 14.61), with decreased fatigue (FACIT-F mean –2.94 ± 8.04 vs –0.1 ± 7.25 for noncompliant subjects; p=0.04) and improved psychological status (Arthritis Impact Measurement Scale mean –1.25±3.12 vs 0.11±3.39; p=0.03).
Follow-up	6 months
Conclusions	Education of patients with RA may increase compliance especially with leisure PA, particularly when it is poor at baseline, but these effects are limited and short-term.

McBain et al., 2016	
Participants characteristics (number, age, disease criteria, details)	RA (n=71) or PsA (n=29) patients (total n=100) ≈ Gender, female: intervention group: 46%, control group: 65% ≈ Age, years: intervention group: 54.8, control group: 58.7 ≈ Disease duration, years: intervention group: 8, control group: 6
Intervention(s)	A patient-initiated disease-modifying anti-rheumatic drugs (DMARD) self-monitoring service
Intervention(s) characteristics	All participants randomised to the intervention group took part in a group-based training session to provide them with the knowledge, skills and resources required to self-monitor and initiate care. This one-off 2 h training session was delivered by a rheumatologist and a Health Psychologist, with a group of between 2 and 6 patients. Participants were trained how to identify normal or 'safe' ranges of blood levels, side effects and symptoms, decide if any action was necessary and how to initiate care from their CNS. Participants were guided through example blood test scenarios and given practice materials to be completed during the session. The results of these tasks were then reviewed during group discussions led by the rheumatologist. Participants continued to receive routine care from their rheumatologist, de fi ned as outpatient appointments every 6 months; had access to the emergency nurse helpline if necessary and continued with routine blood monitoring every 4 – 6 weeks depending on their dose of methotrexate. Following each blood test, participants were sent a copy of their results either via email or post, depending on the patient's preference. Included were the patient's previous blood test results, to enable calculation of change scores by the participant. Participants also recorded, using a 17-item checklist developed by the authors, the side effects and symptoms they had experienced since their last blood test, indicating if they were any new or continuing symptoms.
Professional that promoted the interventions	A rheumatologist and a Health Psychologist
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue was measured using two separate visual numeric scales that were displayed as histograms. The histograms become larger in size and darker in colour as the severity of the pain or fatigue increases (from left to right). Scores ranged from 0 to 10, with the higher scores indicating greater pain or fatigue experienced in the past two weeks. Fatigue was a <u>secondary outcome</u>
Effectiveness results	There were no statistically significant interaction effects on levels of fatigue.
Safety results	Two participants in the intervention were removed from the trial for safety reasons as they were deemed unable to self-monitor their laboratory results safely. Patients' ability to safely initiate care improved significantly over the trial period ($F_{1,278}=9.24$, $p=0.003$), from 65.4% of all decisions at blood test 1 to 89.1% at blood test 6.
Main results	The patient-initiated DMARD self-monitoring service was associated with 54.55% fewer visits to the CNS ($p<0.0001$), 6.80% fewer visits to the rheumatologist ($p=0.23$) and 38.80% fewer visits to the general practitioner ($p=0.07$), compared with control participants. There was no association between trial arm and any of the clinical or psychosocial outcomes.
Follow-up	Not stated
Conclusions	The results suggest that a patient- initiated service that incorporates patients' self- monitoring DMARD therapy can lead to significant reductions in healthcare use, while maintaining clinical and psychosocial well-being.

Metin et al., 2016	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=51) ≈ Age 54.4 years ≈ 88.2% female ≈ Disease duration 10.7 years
Intervention(s)	Aromatherapy massage or reflexology
Intervention(s) characteristics	**Aromatherapy Massage.** The aromatherapy massage essential oil was a 5% mixture consisting of Lavandula augustifolia, Juniperus communis, Cananga odorata, and Rosmarinus officinalis in the ratio 3:3:2:2 in 100 mL of coconut carrier oil. Before beginning the aromatherapy massage, subjects were placed in a supine position. The aromatherapy oils were applied topically to both knees. The PI remained seated on the same side as the intervention knee. The first part of the massage was initiated with superficial effleurage from the foot superiorly, including the ankle and knee joint area, for 3 minutes before applying essential oils. In the second part of the massage, the knee area was divided into four equal quadrants (with an imaginary plus sign passing midpatella). Five drops of the essential oil blend were applied to each quadrant (total 20 drops) with both hands and with circular movements on the knee for a total of 6 minutes. The third part of the massage technique was an additional 6 minutes of massage with five drops of essential oil blend for each quadrant (total 20 drops) of the right knee. After completing the 15-minute aromatherapy massage session for the right knee, the massage was repeated on the left knee. The total duration of aromatherapy massage was 30 minutes. Aromatherapy massage was provided three times each week for a 6-week period. **Reflexology.** Before the intervention, subjects were placed in a supine position. During reflexology, the PI sat on a chair facing the subjects' feet, with the feet at the PI's chest level. Relaxation techniques were administered first to the right foot for 5 minutes. After relaxation, all reflex points and the region associated with the pituitary gland on the right foot were stimulated with thumb pressing, finger pressing, rubbing, stroking, and squeezing for 3 minutes. Subsequently, 12 minutes were spent stimulating the specific areas of the foot associated with the head, neck, shoulders, pineal, pituitary gland, solar plexus, spinal column, knees, and spleen using the same reflexology techniques. After completion of the right foot, the same steps were repeated for the left foot. Reflexology was applied for 20 minutes on each foot, for a total of 40 minutes. Treatment was continued once weekly for a 6-week period.
Professional that promoted the interventions	One individual (certified aromatherapy massage, reflexology practitioner, and registered nurse)
Intervention(s) setting	Home
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue Severity Scale (FSS). Fatigue was a secondary outcome
Effectiveness results	At the end of the monitoring period, the analysis showed a statistically significant decrease in VAS and FSS scores among the intervention groups compared with the control group ($p<0.05$). Likewise, aromatherapy massage significantly reduced fatigue scores beginning the fourth week of the study. Reflexology reduced fatigue scores beginning the first week of the study. The effects of the reflexology intervention were earlier than for aromatherapy massage. In addition, the pain scores were significantly lower each week (except for week 4) for subjects who received the reflexology intervention compared with subjects who received aromatherapy massage. Similar findings were seen with fatigue scores. The fatigue scores were significantly lower each week for subjects who received the reflexology intervention compared with subjects who received aromatherapy massage. At the 6 weeks, mean of FSS was 2.94±1.13 in aromatherapy group, 1.88±1.18 in reflexology group, and 4.41±1.79 in control group ($F=13.873$, $p=0.001$).
Safety results	Not stated
Main results	Pain and fatigue scores significantly decreased in the aromatherapy massage and reflexology groups compared with the control group ($p<0.05$). The reflexology intervention started to decrease mean pain and fatigue scores earlier than aromatherapy massage (week 1 vs week 2 for pain, week 1 vs week 4 for fatigue) ($p<0.05$).
Follow-up	6 weeks
Conclusions	In this study, aromatherapy massage and reflexology significantly decreased pain and fatigue symptoms in subjects with RA in the short term. Thus, the study confirms that aromatherapy massage and reflexology can be applied as non-pharmacologic methods for managing pain and fatigue in subjects with RA. Based on the study results, aromatherapy massage and reflexology may be beneficial for RA subjects. Moreover, these complementary treatments are useful for nurses who can apply aromatherapy massage and reflexology as a component of care for symptom management in RA subjects. However, practitioner training and experience with aromatherapy massage and reflexology are critical to achieving successful results.

Miyamoto et al., 2019	
Participants characteristics (number, age, disease criteria, details)	Primer Sjögren Syndrome (pSS) patients (n=45) ≈ Age, years: intervention group: 53.4, control group: 51.3 100% female ≈ Disease duration, months: intervention group: 24, control group: 42 American European Consensus Criteria for pSS
Intervention(s)	Supervised walking program (supervised aerobic exercise program)
Intervention(s) characteristics	The patients of the TG performed a walking exercise, supervised by two trained professionals who alternated weekly, in an outdoor track field (400 m) 3 times a week for 16 weeks. The HR of the patients was registered with a pulse watch (Polar® A1, Kempele, Finland) and ratings of the general perceived exertion (RPE) rated on the Borg RPE 0–10 scale at the beginning, middle, and end of the effective walking time. Each training session was preceded by a warm-up period, when patients were instructed to walk freely and slowly for 5 min, followed by 20–50 min of effective walking when they were instructed to maintain their paces to achieve the target HR, and ending with a cooling down period for 5 min (similar to warm-up period). Increasing duration of exercise was made as follows: 20 min in the first 2 weeks, adding 5 min per week until eighth week, completing 50 min, which remains until the end of the program. All patients performed a maximal exercise test on the tread - mill (Super ATL, Inbramed, Porto Alegre, Brazil), directed by the software Ergo PC (Micromed, Brasília, Brazil) and supervised by a cardiologist, who performed a screening process for cardiac risk. The protocol begins with a warm- up period of 3 min at 3 km/h and increases 1 km/h each minute until 7 km/h, from this moment, 2.5% inclination is added until 15% in the 13 min.
Professional that promoted the interventions	Two trained professionals, alternated weekly
Intervention(s) setting	An outdoor track field (400 m)
Control	The patients of the control group were instructed not to perform any kind of regular physical exercise for 16 weeks.
Outcomes of interest (types and measuring instruments)	Functional Assessment of Chronic Illness Therapy Fatigue Subscale (FACIT-fatigue) Fatigue was a primary outcome
Effectiveness results	There was correlation between the improvement of VO_2max and improvement of the FACIT-fatigue (r=0.418, p=0.047). Patients in the TG with 15% VO_2max gain showed significant improvements in FACIT-fatigue (p=0.047) and ESSPRI fatigue (p=0.044). Fatigue measured by FACIT-fatigue improved only in TG (p=0.017). There was a difference between groups in mean changes after 16 weeks only in FACIT-fatigue (p=0.030). The improvement of fatigue (FACIT-fatigue) in the TG was correlated with the improvement of the VO_2max (ml/ kg/min) (r=0.418, p=0.047), ESSPRI fatigue (r=-0.677, p<0.001), ESSPRI pain (r=-0.429, p=0.041), ESSPRI total (r=-0.630, p=0.001), BDI (r=-0.474, p=0.022), SF-36 domains physical functioning (r=0.682, p=0.001), role-physical (r=0.552, p=0.006), general health (r=0.423, p=0.044), social functioning (r=0.425, p=0.043) and mental health (r=0.586, p=0.003), SF-36 PCS (r=0.522, p=0.011), and SF-36 MCS (r=0.456, p=0.029). While, in the CG, there was association between the improvement of fatigue (FACIT-fatigue) only with ESSPRI fatigue (r=-0.694, p<0.001), ESSPRI total (r=0.496, p=0.019), and BDI (r=-0.477, p=0.025).
Safety results	This supervised walking program was demonstrated to be safe (no further information).
Main results	After 16 weeks, the mean change of VO_2max (ml/kg/min), distance, and FACIT-fatigue were higher in the TG than in the CG (p=0.016, p=0.043 and p=0.030, respectively). Improved cardiorespiratory fitness was associated with improvements in fatigue scores and physical components of quality of life (SF-36). Furthermore, improved fatigue scores were associated with reduced depression and improvements in the physical and mental components of SF-36. Overall, 95.4% of patients in the TG rated themselves as clinically improved versus 62% of the patients in the CG (p=0.049). There was no flare in disease activity and no serious adverse events with exercise.
Follow-up	16 weeks
Conclusions	This supervised walking program was demonstrated to be feasible and safe with improvements in cardiorespiratory fitness, exercise tolerance, fatigue, and patient perception of improvement in pSS patients.

Ndosi et al., 2013	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=181) ≈ Age, years: intervention group: 57.3, control group: 60.2 ≈ 74% female ≈ Disease duration, years: intervention group: 10.2, control group: 9.6 1987 ACR criteria
Intervention(s)	Nurse-led care (NLC)
Intervention(s) characteristics	Nine CNS and 10 rheumatologists delivered the interventions. When patients arrived at the clinic, the independent assessor performed 'joint counts' for DAS28 and then oversaw the completion of self-reported pain visual analogue scale (pain-VAS), fatigue-VAS and duration of morning stiffness. The patients were then given questionnaires in 'freepost' return envelopes before consultation with their allocated practitioner. The training of independent assessors was conducted during the study set-up meetings. The rheumatologists and CNS delivering the interventions did not have any special training as they were expected to undertake their 'normal' practice, having agreed to follow the study protocol. Patients were seen by their respective practitioners at baseline and at weeks 13, 26, 39 and 52. The NLC interventions usually include allocated 30-min time slots in which the CNS takes history, performs physical examination, pain control, prescribing or recommending medication and dosage changes, intra-articular or intramuscular steroid injections, provision of patient education, psychosocial support and ordering blood tests or X-rays. Referrals for ward admission, to the rheumatologist or other health professionals, were carried out as appropriate.
Professional that promoted the interventions	Clinical nurse specialists (CNSs) and rheumatologists
Intervention(s) setting	Centre onsite
Control	**Rheumatologist-led care (RLC) (control group):** The usual RLC is similar to the above except that it usually involves an allocated 15-min time slot. All interventions, referrals and the duration of the consultation were recorded in a standard 'consultation checklist' designed for this study. Both practitioners saw patients according to the protocol and any extra visits or admissions were recorded.
Outcomes of interest (types and measuring instruments)	Fatigue-VAS Fatigue was a <u>secondary outcome</u>
Effectiveness results	Significance for non- inferiority was also reached in fatigue (at corresponding standardised effect size margins of 0.4). In fatigue, there was a slight worsening in the NLC compared to slight improvements in the RCL group. At 52 weeks mean of ΔFatigue in overall was 2.32 (25.5) in RLC group, -1.22 (21.3) in NLC group, and difference was 3.38 (-2.01-8.76; p=0.017)
Safety results	Not stated
Main results	Demographics and baseline characteristics of patients under NLC (n=91) were comparable to those under RLC (n=90). Overall baseline-adjusted difference in DAS28 mean change (95% CI) for RLC minus NLC was −0.31 (−0.63 to 0.02) for PP and -0.15 (−0.45 to 0.14) for ITT analyses. Mean difference in healthcare cost (RLC minus NLC) was £710 (−£352, £1773) and − £128 (−£1263, £1006) for PP and ITT analyses, respectively. NLC was more cost-effective with respect to cost and DAS28, but not in relation to QALY utility scores. In all secondary outcomes, significance was met for non-inferiority of NLC. NLC had higher 'general satisfaction' scores than RLC in week 26.
Follow-up	52 weeks
Conclusions	This study provides robust evidence to support the noninferiority of NLC in managing RA. Indeed, our findings have shown that there may be some clinical benefit of NLC, particularly in respect of disease-specific outcome and general satisfaction with care. In terms of health policy, we are not able to draw firm conclusions on cost-effectiveness given the variation in results between disease-specific and generic outcomes.

Neuberger et al., 2007	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=220) ≈ Age (median) 55.5 (40-70) years ≈ 82.7% female ≈ Disease duration (median) 8 (0.5-50) years
Intervention(s)	Low-impact aerobic exercise program
Intervention(s) characteristics	The intervention was 12 weeks of low-impact aerobic exercises for 1 hour 3 times a week. In low-impact aerobic exercise one foot is always on the ground and there are no running or jumping movements. C-Tx participants at- tended classes at a fitness center; H-Tx participants exercised at home using a videotape of the same exercise program. The exercises consisted of 4 phases: warm-up, low-impact aerobics, strengthening, and cool-down exercises. Distribution of minutes for each phase of exercise (warm-up, aerobics, strengthening, and cool-down, respectively) was as follows: 20, 10, 20, and 10 for week 1; 15, 20, 15, and 10 for weeks 2-3; 10, 25, 20, and 5 for weeks 4-6; and 10, 30, 15, and 5 for weeks 7-12.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Fitness center or home
Control	Usual care (was asked to keep exercise levels at baseline amount)
Outcomes of interest (types and measuring instruments)	14-item Global Fatigue Index of the Multidimensional Assessment of Fatigue questionnaire Fatigue was a secondary outcome
Effectiveness results	This analysis identified an interaction of the Global Fatigue Index and the Exercise Benefits/Barriers Scale scores. Participants with a global fatigue score 31 exercised an average of 62 minutes per week, whereas those with a global fatigue score 31 exercised an average of 85 minutes each week. Among participants with low fatigue, those with a score 117 on the Exercise Benefits/Barriers Scale exercised an average 62 minutes weekly, whereas those with a score 117 exercised an average of 95 minutes weekly.
Safety results	Not stated
Main results	Using structural equation modeling, overall symptoms (latent variable for pain, fatigue, and depression) decreased significantly at T3 ($P < 0.04$) for the class exercise group compared with the control group. There were significant interaction effects of time and group for the functional measures of walk time and grip strength: the treatment groups improved more than the control group ($P < 0.005$). There were no significant increases in measures of disease activity. Fatigue and perceptions of benefits and barriers to exercise affected participants' amount of exercise, supporting previous research.
Follow-up	12 weeks
Conclusions	This study supported the positive effects of exercise on walk time and grip strength and demonstrated that fatigue and perceived benefits/barriers to exercise influenced exercise participation. Furthermore, overall symptoms of fatigue, pain, and depression were positively influenced in this selective group of patients with RA ages 40-70 years.

Niedermann et al., 2013	
Participants characteristics (number, age, disease criteria, details)	AS patients (n=106) ≈ Age 49 years ≈ 40% female ≈ Disease duration, years, (range): intervention group: 9 (0.5-45), control group: 8 (0.5-39) Modified New York criteria
Intervention(s)	Cardiovascular training
Intervention(s) characteristics	The training group performed a 12-week supervised NW training for 30 minutes twice a week using individually monitored, moderate-intensity heart rate (HR) levels. Moderate-intensity HR ranges of 55–75% and 65– 85% of the maximum HR (HR max) were used for participants who reached less than 100W and those who reached at least 100W, respectively, in the baseline bicycle test. The intensity range was adjusted if an individual exceeded the upper HR limit repeatedly or constantly during at least 20 minutes of activity. Participants with a low fitness status, i.e., having reached less than 100W in the test and not being able to perform the training in their individual lower fitness range for a sufficient duration of at least 20 minutes, were first asked to keep walking for at least 20 minutes, and if this was achieved, to perform NW within the intensity range. All participants in the training group were provided with the NW equipment and an HR monitor (Polar watch; Polar Electro Europe). The NW training was performed in small groups of 2– 6 participants and was led by instructing physiotherapists. Furthermore, participants in the training group were asked to perform at least one additional unsupervised, but HR-monitored cardiovascular training, NW, or other endurance activity, e.g., outdoor or ergometer biking, to achieve at least 3 training units per week. All physiotherapists who instructed the cardiovascular training previously underwent a standardized 4-hour education session
Professional that promoted the interventions	Physiotherapist
Intervention(s) setting	A training location
Control	The control group was offered an attention control intervention consisting of monthly 2.5-hour discussion groups on coping strategies and techniques of mindfulness-based stress reduction led by a psychologist
Outcomes of interest (types and measuring instruments)	BASDAI-fatigue Fatigue was a secondary outcome
Effectiveness results	Subscores for fatigue were not different between the groups.
Safety results	Safe (no detailed information)
Main results	At the 3-month follow-up, the fitness level in the training group was significantly higher than in the control group (mean SE 90.32W 4.52W versus 109.84W 4.72W; P=0.001), independent of other covariates. The mean BASDAI total score was 0.31 points lower (P=0.31) in the training group, reaching significance for the peripheral pain subscore (1.19; P=0.01) but not for back pain or fatigue.
Follow-up	12 weeks
Conclusions	Cardiovascular training, in addition to flexibility exercise, increased fitness in AS patients and reduced their peripheral pain. The improved cardiovascular fitness and the significant improvement in BASDAI peripheral pain support the inclusion of cardiovascular training as an additional exercise strategy for people with AS.

Noreau et al., 1995	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=29) ≈ Age 49.3 years ≈ 69% female ≈ Disease duration, years: intervention group: 8.1, control group: 11
Intervention(s)	Modified dance-based exercise
Intervention(s) characteristics	The exercise program (12 weeks, 2 times/week) was conducted by a physical therapist. A complete session consisted of a warm-up in a stead and standing position (10 min), followed by a 15-30 min period of aerobic exercise on a format of aerobic dancing without jumps.
Professional that promoted the interventions	Physical therapist
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Profile of Mood States (POMS)-fatigue Fatigue was a secondary outcome
Effectiveness results	Most subjects perceived a decrease in the symptoms of fatigue. Post-test (12-week) fatigue was 5.68±4.77 and 9.50±7.74 in the exercise and control group, respectively.
Safety results	Safe (no detailed information)
Main results	Exercise training induced a mean improvement of 13% in aerobic power, with the highest values reaching 40%. Positive changes in depression, anxiety, fatigue, and tension were observed after the 12-week exercise program.
Follow-up	12 weeks
Conclusions	These findings provide some evidence in favor of aerobic exercise in individuals in RA. A weight bearing-activity with limited ground impacts do not provoke short-term adverse effects on joint status.

Pinto et al., 2020	
Participants characteristics (number, age, disease criteria, details)	Primary Sjogren Syndrome (pSS) patients (n=36) ≈ Age, years: intervention group: 55.8, control group: 53.1 100% female ≈ Disease duration, years: intervention group: 7.5, control group: 6.4 American-European Criteria
Intervention(s)	Transcranial direct-current stimulation (tDCS)
Intervention(s) characteristics	Each patient was seated comfortably in an armchair. Hair was parted and tied with elastic hair bands to allow good contact between the electrodes and the scalp. The tDCS was delivered with two rubber 5 x 7 cm electrodes, which were covered by saline-soaked sponges and fixed with an elastic band. The anode was placed over the right dorsolateral prefrontal cortex and the cathode over the left dorsolateral prefrontal cortex. The sites receiving stimulation corresponded to F4 and F3, respectively, of the International 10/20 Electroencephalogram (EEG) System. Guided by results of previous research [19], participants underwent five consecutive tDCS sessions from Monday to Friday, with a constant current intensity of 2 mA, for 20 minutes/day. A gradual current ramp-up and ramp-down with 30s duration were used for participants' comfort. All tDCS sessions were conducted at the same time each day. For the sham tDCS, electrodes were placed identically to the intervention group and stimulation was applied for 20 minutes. As it is known that cutaneous perception associated with tDCS is restricted to the few seconds of ramp during stimulation, current was ramped up at the beginning and ramped down at the end of the 20 min period to mimic the somatosensory sensation of active tDCS. No current was applied in between the ramp-up and ramp-down. Therefore, sham stimulation looks and feels identical to active stimulation and is reliable for blinding purposes.
Professional that promoted the interventions	Two trained interventionists
Intervention(s) setting	Hospital
Control	Sham tDCS (sham stimulation 19 looks and feels identical to active stimulation and is reliable for blinding purposes)
Outcomes of interest (types and measuring instruments)	Fatigue Severity Scale (FSS), Short-form Profile of Fatigue and Discomfort - Sicca Symptoms Inventory (PROFAD-SSI), EULAR Sjögren's Syndrome Patient Reported Index (ESSPRI; ESSPRI assesses fatigue, pain, and drynessusing a numerical rating scale) Fatigue was a primary outcome
Effectiveness results	For our primary outcome, fatigue severity measured by the FSS, the active group showed significantly greater improvements than the sham group at T2 (mean group difference -0.85; effect size 0.80) and T4 (mean group difference -0.93; effect size 0.73). These improvements were larger than the clinically important difference of 0.6 found for the FSS in patients with systemic lupus erythematosus. At T3, there was no significant difference between groups. For the secondary outcomes, the mean differences in the PROFAD favoured the active group for mental (effect sizes 0.41, 0.27 and 0.52 for T2, T3, and T4, respectively) and somatic fatigue (effect sizes 0.21, 0.18 and 0.43 at T2, T3, and T4 respectively), but the differences between groups were not significant. The improvements in mental fatigue at T2, T3, and T4, and in somatic fatigue at T3 and T4 in the active group were also larger than the clinically important difference of 0.6 reported in the VAS fatigue in patients with pSS. The active group showed significantly greater reductions in fatigue as assessed by the ESSPRI at T2 (effect size 1.04) and T4 (effect size 0.89), but not at T3. One month after the tDCS protocol was completed (T4), the active group showed significantly greater reductions in pain as measured by the ESSPRI (effect size 0.72).
Safety results	Skin redness (hyperaemia) at the level of tDCS electrode placement was the only adverse event that differed significantly between groups: there were 32 occurrences in the active group and 12 in the sham group (p=0.001). All hyperaemia events resolved before the patients. No serious adverse events were reported.
Main results	After five tDCS sessions, fatigue severity assessed by the FSS (primary outcome) demonstrated a mean group difference of -0.85 [95% CI=-1.57 to -0.13; effect size 0.80] favouring the active group. The active group presented significantly greater reductions in fatigue as measured by the EULAR Sjögren's Syndrome Patient Reported Index after five tDCS sessions [mean group difference: 1.40; 95%CI=-2.33 to -0.48; effect size 1.04]. Although there were no between-group differences in the secondary outcomes of sleep, mood and anxiety, within-group comparisons evidenced a small but significant difference in the active group for depression and sleep. There were no significant cortisol changes. All reported adverse events were mild and transitory.
Follow-up	30 days
Conclusions	tDCS seems to be safe and reduce fatigue in pSS. A differential effect on pain and sleep may underlie its effects. Further studies are needed to optimise tDCS treatment strategies in pSS.

Pot-Vaucel et al., 2016	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=54) ≈ Age 60.2 years Gender: not stated ≈ Disease duration 11.1 years ACR 2009 criteria
Intervention(s)	Patient therapeutic education (PTE)
Intervention(s) characteristics	Patients were randomised into 2 groups, the first placed on a waiting list (WL) with routine treatments including the usual medical information about treating their RA, and a second group enrolled in a course of PTE for 6 months. The course was split into 3 stages: Stage 1: private interview with a therapeutic education nurse, used to make an educational diagnosis and, with the patient, choose 3 subjects which cause problems, out of the 10 suggested; Stage 2: allocation to an educational route leading in 6 months to communal workshops (maximum of 3) and/or private interviews for the 3 subjects chosen; Stage 3: final interview with a therapeutic education nurse specialising in training evaluation, leading to production of a report. The average time for educational diagnosis was 1 h and the 3 communal sessions of about 1 and half to 2 h each, with a 1 h final evaluation.
Professional that promoted the interventions	A nurse (trained and qualified in PTE)
Intervention(s) setting	Not stated
Control	Waiting list (WL)
Outcomes of interest (types and measuring instruments)	Fatigue – Visual Analogue Scale (VAS) Fatigue was a secondary outcome
Effectiveness results	Fatigue was unchanged in the 2 groups (in PTE group 4.44±2.49 and in WL group 4.45±2.49; p>0.05)
Safety results	Not clear
Main results	Fifty-four were evaluated after 6 months. The main criterion was defined for all three of the chosen themes at 76.9% in the PTE group and 42.4% in the WL group. Among the other positively evaluated criteria were: less corticotherapy, more occupational therapy, more demand for social aid, more physical activity, knowledge of the recognition of an RA attack and how to cope with it. On the other hand, knowledge of the treatments did not differ between the 2 groups nor did the RAPID scores, fatigue, stiffness, depression, compliance, number of consultations and hospitalisations. Patient satisfaction was excellent (between 85.3 and 93.9%).
Follow-up	6 months
Conclusions	This study is a good illustration of the position occupied and value of PTE in solving the problems specific to each RA case, the resulting high level of patient satisfaction and its independently complementary aspects relative to the purely medical treatment of RA. Customized PTE could better respond to specific patients' problems in RA.

Primdahl et al., 2012	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=287) ≈ Age 61.1 years ≈ 70% female ≈ Disease duration 7 (4-13) years ACR criteria
Intervention(s)	Allocated to shared care setting or to planned nursing consultations
Intervention(s) characteristics	The participants were randomly allocated to one of three outpatient settings: 1: 'Follow up as usual' in an outpatient setting with 20–30 min consultations performed by a senior or junior rheumatologist. The frequency of the consultations ranged from every three months to once a year based on the doctor's judgment. 2: A shared care setting with no planned consultations apart from an annual hospital review. The General Practitioner (GP) monitored the medication according to a written algorithm defined by the rheumatologic departments. The patients and the GPs could address problems through a nurse-led telephone helpline. 3: Planned 30 min nursing consultations every three months with an experienced rheumatology outpatient nurse who was trained in joint assessments. The nurse could refer the patient for a consultation with a rheumatologist, the GP, an occupational therapist, a physiotherapist, or a podiatrist if needed. Besides monitoring the medical treatment, disease activity and physical disability, the nurses also used Pendleton's framework. This framework includes defining the reason for the patient's attendance, consideration of other problems, appropriate action and the achievement of a shared understanding of the problem with the patient. A procedure defining the role of the nurse in the consultations was developed by the nurses involved. The participants in the ''follow-up as usual'' group continued to have the option to call the hospital for an extra appointment in case a flare-up occurred between planned consultations. The participants in the nurse-led group had access to the same telephone helpline as had the participants in the shared care group. To ensure that inflammatory activity and side effects were not ignored, all participants completed three-monthly self-report questionnaires about their disease activity, physical disability, and experiences of adverse effects. The nurses contacted the participants in the shared care group by telephone if their three-monthly scores rose by more than 20% or if they experienced adverse effects. The telephone helpline was managed by the same nurses who carried out the nursing consultations.
Professional that promoted the interventions	A senior or junior rheumatologist or nurse or GP
Intervention(s) setting	Hospital or clinic
Control	Control group (continued planned medical consultations every 3-12 months)
Outcomes of interest (types and measuring instruments)	Fatigue – VAS (0-100 scale) Fatigue was a secondary outcome
Effectiveness results	In fatigue-VAS, between medical group and shared care, difference was 0.184 and between shared care and nursing, difference was 0.235 at 12 months.
Safety results	Not stated
Main results	Following an educational programme, the nursing group increased or stabilized their SE during the first year compared to the medical and the shared care group. SE in the shared care group did not differ significantly from the medical group. No difference between the groups was seen in disease activity at any time
Follow-up	1 year
Conclusions	Nursing consultations provide opportunities for maintenance of the patients' SE after patient education.

Primdahl et al., 2014	
Participants characteristics (number, age, disease criteria, details)	RA patients with low disease activity (n=287) ≈ Age 63 (54-69) years ≈ 70% female ≈ Disease duration 7 (4-13) years ACR criteria
Intervention(s)	Shared care without planned consultations or planned nursing consultations.
Intervention(s) characteristics	**The shared care group**: Participants in this group were offered no planned consultations, apart from the annual hospital reviews. These participants could address problems to their GP or to the clinically experienced rheumatology outpatient nurses at the hospital via a nurse-led telephone helpline. The GPs took over the responsibility for monitoring the blood tests according to written guidelines defined by the rheumatology departments. GPs were free to contact the rheumatology department and use the nurse-led telephone line for advice or specialist review. **The nursing group**: Participants in this group were allocated to planned 30-min consultations every 3 months with a clinically experienced rheumatology outpatient nurse. The nurses were trained to perform joint assessments and evaluate the blood tests and the Health Assessment Questionnaire (HAQ). These participants could also address problems through the nurse-led telephone helpline. If the DAS28-CRP exceeded 3.2 points, the patient should be seen by a rheumatologist within 5 working days. The nurses consulted a rheumatologist if blood tests exceeded agreed limitations, or if they had questions. The nurses could make referrals to the GP, an occupational therapist, a physiotherapist or a podiatrist in primary care. A procedure for the consultations was developed by the four nurses involved in the study from both hospitals. Apart from monitoring the patients' medication and clinical assessment the procedure included self-management issues and that patients were to take responsibility for their disease.
Professional that promoted the interventions	Nurse or GP
Intervention(s) setting	Hospital or clinic
Control	**The rheumatologist group (control group)**: Participants in this group continued with follow-up as usual with planned 20–30 min consultations every 3–12 months with a senior rheumatologist or a junior physician supervised by senior rheumatologists. The frequency of the consultations was based on the rheumatologist's judgment. The aim of the treatment was to maintain Disease Activity Score DAS28-CRP<3.2,17 18 using disease modifying anti-rheumatic drugs.19 In the case of a flare-up, the participants could get an additional appointment between planned consultations. The monitoring of side effects was undertaken by the rheumatologists.
Outcomes of interest (types and measuring instruments)	Visual analogue scale (VAS) - fatigue Fatigue was a secondary outcome
Effectiveness results	In VAS-fatigue, 2 years of shared care was -0.67 (-7.15 to 5.81), and 2 years of nursing was -3.84 (-8.88 to 1.21).
Safety results	A significantly lower number of patients in the shared care group had their blood tests taken at the planned intervals than in the rheumatologist group (χ^2=0.19, p=0.039). The OR for having their blood tests taken at the right time for 90% of the time was significantly lower in the shared care group compared with the rheumatologist group (OR=0.49, p=0.049), but there were no significant differences in OR for having out-of-range blood tests (OR=0.70, p=0.272) or in the number of alerts between the shared care and the rheumatologist' groups. The nursing group did not differ significantly from the medical group in any of these measures. No significant differences were seen between the groups in any of the other safety measures.
Main results	At 2-year follow-up, the group allocated to nursing consultations had lower disease activity than the group that underwent rheumatologist consultations (DAS28-CRP=−0.3, p=0.049). The nursing group increased their self-efficacy (Arthritis Self-Efficacy Scale=18.8, p=0.001), confidence (10.7, p=0.001) and satisfaction (10.8, p<0.001) compared with the rheumatologist group. The shared care group reported a transient lower satisfaction compared with the rheumatologist group after 1 year (−8.8, p=0.004). No statistically significant differences were seen in other outcome variables.
Follow-up	2 years
Conclusions	It is safe to implement shared care and nursing consultations as alternatives to rheumatologist consultations for RA outpatients with low disease activity without deterioration in disease control. Nursing consultations can enhance patients' self-efficacy, confidence, and satisfaction.

Prioreschi et al., 2016	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=31) ≈ Age, years: intervention group: 51, control group: 52 100% female ≈ Disease duration, years: intervention group: 10, control group: 12 ACR 1987 criteria
Intervention(s)	Whole body vibration (WBV) therapy
Intervention(s) characteristics	Whole body vibration therapy consisted of two 15-minute session per week (total of 24 sessions over 12 weeks) of supervised therapy, which comprised of ten repetitions standing on the vibration plate for 60 seconds, followed by a 30 second rest period. All WBV training was performed on the same vertical synchronous vibration plate (DKN XG 5.0, DKN Technology, California, USA). Different vibration platforms exist; vertical synchronous platforms move both legs up and down in unison, while oscillating plates move each leg up and down in a side-alternating manner. Vibration was set at 3mm amplitude and a frequency of 30Hz in all instances, as lower amplitude. Patients were taught the correct posture (barefoot, holding on to the handlebars with knees slightly bent) while on the vibration plate in order to maximise the vibration effect while minimising any harmful effects, and to standardise procedure. All sessions were monitored by the primary investigator for compliance and accuracy. The CON group was instructed to continue with their normal daily activities for the three-month period.
Professional that promoted the interventions	Primary investigator
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - using a Likert scale anchored at 0 (not tired at all) and 5 (the most tired I have ever felt) Fatigue was a <u>secondary outcome</u>
Effectiveness results	The time effect (p = 0.04), as well as a group by time interaction (p = 0.01) for fatigue levels, where fatigue was decreased (p<0.01, CI -4.82 to -1.67) in the WBV group at assessment 2 as compared to baseline, however this effect was not sustained at assessment 3. No changes were observed in the CON group for fatigue levels over the study period shows the percentage change in fatigue scores for each individual at the post intervention assessment as compared to baseline. Percentage change showed a trend towards being significantly greater in the WBV group compared to the CON group (p = 0.06). From baseline to post intervention (three-month assessment) for each participant in the whole-body vibration group (WBV) and the control group (CON) where a negative change indicates less fatigue.
Safety results	Not stated
Main results	After the intervention period, functional ability was significantly improved in the WBV group (1.22(0.19) to 0.92(0.19), p=0.02). Hip BMD was significantly reduced in the CON group (0.97(0.05) to 0.84(0.05) g.cm -2, p=0.01), while no decreases were seen in the WBV group (1.01(0.05) to 0.94(0.05) g.cm -2, p=0.50). Despite no change in RA disease activity in either group at either follow up, fatigue levels were improved in the WBV group (4.4(0.63) to 1.1(0.65) yet remained unchanged in the CON group at both follow ups (p=0.01). Ten-minute bouts of light to moderate physical activity were significantly reduced in the CON group after the intervention (2.8(0.61) to 1.8(0.64) bouts per day, p=0.01), and were preserved in the WBV group (3.1(0.59) to 3.0(0.61) bouts per day, p=0.70).
Follow-up	6 months
Conclusions	Intermittent WBV shows promise for sustained improvements in functional ability, for attenuating loss of bone mass at the hip, as well as for decreasing fatigue in patients with established RA.

Puksic et al., 2021	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=57) ≈ Age 55.3 years ≈ 95% female ≈ Disease duration 8 years ACR 2010 criteria
Intervention(s)	Yoga program
Intervention(s) characteristics	The yoga program was conducted two times weekly with 90 min per session for 12 weeks at the Department's gym. The number of participants per group ranged from 6–8. The program was performed according to the Yoga in Daily Life system (Level 1 - Sarva hita asanas). The session started with a guided relaxation (5–10 min) in a supine position (anandasana) which was followed by the practice of physical postures (asanas) and breathing exercises (50–60 min), short relaxation (5 min), a special alternate nostril breathing technique (nadi shodhana pranayama) (10 min), self-inquiry meditation (5–10 min) and closing OM chant. Postures were gradually introduced and evolved in intensity and complexity as practitioners advanced. They were modified according to individual functional limitations. Correct postural alignment was advocated; excess kneeling was avoided. Breathing exercises included practice of abdominal breathing and consecutively complete yogic breath (utilising abdominal, thoracic and clavicular part of the breath). Awareness of breath in coordination with movement was advocated during the whole session. Pranayama and meditation were performed sitting on exercise balls instead of traditional lotus pose to avoid excess burden on knees and ankles of patients. Home practice was advised but not formally monitored.
Professional that promoted the interventions	A rheumatologist and qualified yoga instructor
Intervention(s) setting	Hospital
Control	The control group had 1xweekly/60-minute educational lectures on arthritis-related topics. This form of an active control group was chosen to control for effects of investigator attention and social interaction within a group. At the end of the study period the control group participants were offered to attend a one-month yoga course.
Outcomes of interest (types and measuring instruments)	Fatigue - Functional Assessment of Chronic Illness Therapy-fatigue scale (FACIT-fatigue) Fatigue was a <u>secondary outcome</u>
Effectiveness results	At 12 weeks the yoga group showed a significant improvement in FACIT-fatigue relative to control, with the adjusted mean difference of 5.08 (CI=1.29 to 8.86; p=0.009, ES=0.53). At 24 weeks the improvement in FACIT-fatigue in favour of yoga remained significant 5.43 (CI=1.33 to 9.54; p=0.01, ES=0.56). There was a significant between-group difference in favour of yoga for anxiety -1.79 (CI=-3.34 to -0.23; p=0.025, ES=0.54).
Safety results	Adverse events recorded in the yoga group included one participant with persistent positional vertigo (supine position) which limited her participation in the session, and one participant with acute diverticulitis in the follow-up period that was not intervention related. One participant in the control group presented with acute thyroiditis and anaemia before receiving allocated intervention, 1 had disease relapse and 1 participant experienced forearm fracture. These events were not considered study related. Adverse events recorded in the yoga group included one participant with persistent positional vertigo (supine position) which limited her participation in the session, and one participant with acute diverticulitis in the follow-up period that was not intervention related. One participant in the control group presented with acute thyroiditis and anaemia before receiving allocated intervention, 1 had disease relapse and 1 participant experienced forearm fracture. These events were not considered study related.
Main results	No significant between-group differences were found for SF-36 (all p>0.05). At 12 weeks the adjusted mean difference between groups favoured yoga for Functional Assessment of Chronic Illness Therapy-fatigue (5.08 CI 1.29 to 8.86; p=0.009) and Hospital Anxiety and Depression Scale (HADS)-depression (-1.37 CI -2.38 to -0.36); p=0.008) and at 24 weeks for HADS-anxiety (-1.79 CI -3.34 to -0.23; p=0.025), while the impact on fatigue was sustained (5.43 CI 1.33 to 9.54, p=0.01). The program had no impact on RA disease activity. Feasibility outcomes included recruitment rate 16 %, retention 80.7 %, and adherence to yoga 87.5 vs 82.7 % for control. No serious adverse events were recorded.
Follow-up	12 weeks
Conclusions	Yoga in Daily Life program was not associated with change in health-related quality of life of RA patients. Significant improvements in fatigue and mood were observed at postintervention and follow-up. This yoga program was found feasible and safe for patients and may complement standard RA treat-to-target strategy.

Ramsey-Goldman et al., 2000	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=10) ≈ Age, years: Aerobic group: 33.9, range of motion/muscle strengthening (ROM/MS) group: 43.2 100% female ≈ Disease duration, years: Aerobic group: 2.6, range of motion/muscle strengthening (ROM/MS) group: 14.4 ACR revised criteria
Intervention(s)	Aerobic exercise group or a range of motion/muscle strengthening (ROM/MS) exercise
Intervention(s) characteristics	The aerobic exercise group was designated group 1 and the ROM/MS exercise group was designated group 2. Each exercise program was divided into 2 phases, phase I and phase II. **Group 1: aerobic exercise.** In phase I of the aerobic exercise, patients received an individual exercise prescription based on their initial level of fitness, which specified types of activities allowed, intensity and duration of each activity, and total duration of the exercise session. Each exercise session began with a 5–10- minute warm-up, was followed by 20–30 minutes of aerobic activity and concluded with a 5–10-minute cool-down period. The exercise group met for 50 minutes 3 times per week. Phase I lasted 2 months. In phase II of the aerobic exercise, patients continued to exercise in the supervised setting for the first month and then in an unsupervised home exercise program for the next 6 months. The patients' home exercise prescriptions were similar to those used during the supervised exercise sessions. Patients were monitored by telephone and exercise logs to encourage compliance. **Group 2: range of motion/muscle strengthening.** In phase I of the ROM/MS exercise group, health professionals led an exercise program limited to isolated upper and lower extremity joint range of motion as well as to limb movement patterns. Care was taken to include several rest periods so as not to influence cardiovascular fitness. The group met 3 times a week for 50-minute sessions. Duration of the program was 2 months. In phase II, muscle strengthening was added to the range of motion exercise. The program began with stretching exercises, proceeded to the isometric and progressive resistive exercises, and ended with gentle stretching. A typical strengthening program included 2 to 3 sets of 10 repetitive isotonic contractions per muscle group using increasing weights from 1 to 2 pounds depending on subject tolerance. Patients were instructed in a formal, 1-month, 3 times a week, 40-minute session. Patients were then instructed and encouraged to continue these exercises at home for an additional 6 months. Patients were monitored by telephone and exercise logs to encourage compliance.
Professional that promoted the interventions	Trained health professionals
Intervention(s) setting	Phase 1: not stated, phase 2: home
Control	Aerobic exercise group or a range of motion/muscle strengthening (ROM/MS) exercise
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Scale (FSS) Fatigue was a primary outcome
Effectiveness results	Outcome variables were reassessed at the end of phase I. The effect of aerobic versus ROM/MS exercise as the average change (differences from phase I minus baseline values; -0.78 and -0.47, respectively) and phase II minus baseline (-0.71 and -0.68, respectively) for the two groups, fatigue did not change. The confidence intervals overlapped; therefore, there were no clinically significant differences between the two groups.
Safety results	A validated disease activity index was used, and both aerobic and range of motion/muscle strengthening types of exercise were reported as safely (no detailed data)
Main results	Both aerobic and ROM/MS types of exercise were safe and did not worsen SLE disease activity. Patients in both exercise groups showed some improvement in fatigue, functional status, cardiovascular fitness, and muscle strength. Both groups showed increased bone turnover, but BMD was unchanged. Eighty percent of the patients met the compliance standard for the study
Follow-up	8 months
Conclusions	This pilot study shows the feasibility of exercise for SLE patients. The potential value of this approach shows promise in the routine management of these patients.

Robb-Nicholson et al., 1989	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=23) ≈ Age 39.5 years 100% female ≈ Disease duration 8 years
Intervention(s)	Aerobic exercise
Intervention(s) characteristics	The treatment group (TG) was instructed to exercise at home for 30 min three times per week for 8 weeks to attain 60-80% of their maximum heart rate achieved during the exercise tolerance test (the target range). Patients were instructed to warm up for 5 min, exercise in a target range heart rate for 20 min, and cool down for 5 min. They were instructed in taking their own pulses and kept logs of their exercise duration, maximum heart rate achieved, and symptoms experienced during exercise. TG subjects were allowed to walk, bicycle or jog.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	The control group was instructed in non-aerobic stretching exercises to be performed for 30 min three times each week for 8 weeks
Outcomes of interest (types and measuring instruments)	Profile of Mood States (POMS) - fatigue Fatigue was a primary outcome
Effectiveness results	After 8 weeks of conditioning, there were no statistically significant differences between the TG and the CG in POMS fatigue (subscale). There were significant differences in the responses to all of the questions in the fatigue scale, demonstrating significant improvement in the TG (question 1: CG: -1.3 ±2.2, TG: +1.9 ± 1.7, and $p < 0.005$; question 2: CG: -1.0 ±2.3, TG: +1.1 ± 1.9, and p: 0.01; question 3: CG: -0.9 ± 1.3, TG: +1.7 ±2.2, and $p < 0.0005$; question 4: CG: -0.2 ± 1.9, TG: +1.7 ± 2.5 and $p < 0.005$). Analysis of the original TG (10 subjects) and CG (10 subjects) showed a significant correlation between the change in fatigue (by POMS), and change in Vbj max ($r = 0.5543$, $p < 0.003$).
Safety results	Not stated
Main results	At baseline, SLE patients had significantly lower maximum oxygen consumption (Vbj max) than normals ($p<0.005$). Adjusted for age and sex, SLE patients perform at 54% of their expected maximum Vt>2, which is similar to published data from patients with rheumatoid arthritis. Depression by NIMH was not correlated with Vt>2 max or length of time on ETT. Fatigue measured by Profile of Mood States (POMS) was correlated with ETT time ($r = 0.476$, $p < 0.025$) and with Vfoj max ($r=-0.402$, $p<0.07$). After an 8-week aerobic conditioning programme the experimental group increased their aerobic capacity by 19% in contrast to 8% in controls. This change correlated with decreased fatigue as measured by visual analogue scales
Follow-up	8 weeks
Conclusions	Exercise did not exacerbate disease, and only two of 16 experimental subjects experienced transient joint symptoms during exercise.

Santos et al., 2016	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=44) ≈ Age 58.4 years ≈ 86.4% female ≈ Disease duration 16.3 years ACR criteria
Intervention(s)	Balneotherapy
Intervention(s) characteristics	For a period of 21 days the thermal group received daily sulphur bath treatments. There were two types of treatment given on alternate days, namely: Sulphur bath of 30 minutes at 34ºC in a water pool, complemented with underwater exercises supervised by an experienced physiotherapist. The medical hydrologist's prescription was specific for each clinical condition, namely the type of exercises for different body parts (paying attention to patients' limitations but emphasizing function and respiratory control) followed by 10 minutes of relaxation, including electronically controlled water jets directed at the most painful body areas while maintaining the jet at a safe distance. Sulphur bath for 20 minutes at 37ºC in individual tubs, plus underwater jets for 10 minutes at 38ºC directed at the most painful joints, and finally global steam for 5 minutes at 38ºC. The latter two treatments were also adjusted by two experienced aquatic technicians, trained to be aware of symptoms and signs for alarm. The medical hydrologist's prescription (jet force, temperature, body site) was targeted toward each patient's characteristics and disease course. Body massage was not given because of the subjectivity of each therapist.
Professional that promoted the interventions	Medical hydrologist and experienced physiotherapist
Intervention(s) setting	Spa center
Control	Usual care
Outcomes of interest (types and measuring instruments)	VAS - fatigue Fatigue was a <u>secondary outcome</u>
Effectiveness results	There were no significant differences between groups regarding fatigue. Difference between groups, end of treatment at 21 days and 3 months, were +2.89 (-13.48 to 19.26; p=0.723) and +11.81 (-1.69 to 25.31; p=0.085), respectively.
Safety results	Not stated
Main results	HAQ-DI at the end of treatment (21 days) and at the 3-month follow-up was improved in the spa group (OR=0.37, CI=0.09–0.64, P=0.01 at 21 days, and 0.44, 0.15–0.72, P=0.004 at 3 months).
Follow-up	3 months
Conclusions	In individuals in whom pain (physical and psychological) predominates, any complementary gain in function is beneficial. The main goal is to enhance quality of life.

Scott et al., 2020	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=335) ≈ Age, years: Intensive management group: 56.4, standard care group: 56.8 ≈ Female, %: Intensive management group: 83, standard care group: 78 ≈ Disease duration, years: Intensive management group: 6.6, standard care group: 5.2 ACR 2010 criteria
Intervention(s)	Intensive management
Intervention(s) characteristics	Intensive Management spanned four strands: (i) providing information about RA with a handbook outlining treatments, side effects and ways to cope with RA; (ii) optimising drug treatment with csDMARDs and biologics using a treatment algorithm; (iii) giving intra-muscular glucocorticoids if arthritis not fully controlled; and (iv) providing "treatment support" focussing on pain and fatigue management; physical activity; medication adherence, sleep and mood. Treatment support used techniques taken from motivational interviewing (MI).
Professional that promoted the interventions	Specially trained healthcare professionals (nurses and allied healthcare professionals)
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	VAS – fatigue (0-100 mm) Fatigue was a secondary outcome
Effectiveness results	Mean pain and fatigue scores were significantly lower with intensive management in unadjusted and adjusted linear regression analyses. Clinically meaningful improvements in fatigue (10 units or more) were achieved by 58% (95% CI=51% to 66%) of patients receiving intensive management and 35% (95% CI=28% to 42%) of patients receiving standard care; logistic regression showed this difference was significant [adjusted OR 2.81 (1.76 to 4.48) P<0.001].
Safety results	There were 26 serious adverse events involving 24 patients: 15 with intensive management and 11 with standard care; there was no significant difference in the proportion of serious adverse events between treatment groups (Chi-squared=0.64; DF=1; P=0.42). Three patients died: two on intensive management and one on standard care; no death was considered treatment related. Other serious adverse events spanned several systems; there was no indication any were treatment related. Overall, 132 patients (60 intensive management; 72 standard care) had 265 adverse events (114 intensive management; 151 standard care). There was no evidence intensive management increased adverse event risks; in fact, a smaller proportion of patients with adverse events and a lower frequency of adverse events were reported in the intensive management arm.
Main results	459 patients were screened and 335 were randomised (168 intensive management; 167 standard care); 303 (90%) patients provided 12-month outcomes. Intensive management increased DAS28-ESR 12-month remissions compared to standard care (32% vs 18%, p=0.004). Intensive management also significantly increased remissions using a range of alternative remission criteria and increased patients with DAS28-ESR low disease activity scores. (48% vs 32%, p=0.005). In addition, it substantially reduced fatigue (mean difference -18; 95% CI: -24 to -11, p<0.001). There was no evidence that serious adverse events (intensive management =15 vs standard care =11) or other adverse events (114 vs 151) significantly increase with intensive management.
Follow-up	12 months
Conclusions	The trial shows that intensive management incorporating psychosocial support delivered by specially trained healthcare professions is effective in moderately active established RA. More patients achieve remissions, there were greater improvements in fatigue, and there were no more harms.

Strombeck et al., 2007	
Participants characteristics (number, age, disease criteria, details)	Primary Sjogren's syndrome (primary SS) (n=19) ≈ Age, years (median): Intensive management group: 60 (41-65), standard care group: 56.5 (42-63) 100% Female ≈ Disease duration, years (median): Intensive management group: 5 (2-14), standard care group: 8 (3-23) Diagnosed according to the American European Consensus Criteria (AECC)
Intervention(s)	A moderate to high intensive exercise program
Intervention(s) characteristics	The exercise method was Nordic walking, which is walking with specially constructed ski poles. The TG met once a week for 12 consecutive weeks for a 45-min walk and were instructed to walk for 45 min twice more every week at home. All participants were provided with walking poles and a telemetric heart rate monitor. The weekly group sessions were conducted by a trained walker. During the first 8 weeks the patients were told to exercise at a heart rate corresponding to 60-70% of age-predicted maximum heart rate and for the remaining 4 weeks they were told to exercise at 70-80% of age-predicted maximum heart rate. Age-predicted maximum heart rate was estimated to be 220 minus the age of the individual. Logs of exercise duration, average heart rate and perceived exertion were kept by the patient.
Professional that promoted the interventions	Patients themselves
Intervention(s) setting	Home
Control	The 10 patients in the CG were given written instructions for range of motion exercises to be performed at home three times a week over 12 weeks. Otherwise, the patients were told to maintain their current level of activity during the 12-week programme. The patients kept exercise logs.
Outcomes of interest (types and measuring instruments)	Fatigue - validated Swedish version of the disease-specific Profile of Fatigue questionnaire (ProF), VAS-fatigue (0-100 mm) Fatigue was a primary outcome
Effectiveness results	Fatigue was significantly reduced in the TG, as measured with VAS (p=0.03). No reduction of fatigue was seen according to the ProF. There was no correlation between changes in VAS fatigue and in aerobic capacity.
Safety results	Not stated
Main results	Nine women in the TG and 10 women in the CG completed the study. Analysis showed significant differences between the groups regarding aerobic capacity (p=0.03), fatigue (p=0.03), RPE (p= 0.03), and depression (p=0.02) with the better values for the TG. There were no differences in anxiety or HRQoL.
Follow-up	12 weeks
Conclusions	These findings support the use of appropriate aerobic exercise in the treatment of primary SS.

Sveaas et al., 2018	
Participants characteristics (number, age, disease criteria, details)	axSpA (n=24) ≈ Age 48.5 years 50% Female ≈ Disease duration 24.9 years Diagnosed according to the Assessment of SpondyloArthritis international Society (ASAS) classification criteria
Intervention(s)	High-intensity exercise
Intervention(s) characteristics	The intervention lasted for 3 months and followed the American College of Sports Medicine (ACSM) exercise recommendations. Two days a week, the exercise sessions were supervised, and the participants performed high-intensity interval exercise on a treadmill (4 min of walking/running at 90–95% of maximal heart rate followed by 3 min of active resting at 70% of maximal heart rate, repeated four times). Thereafter, the participants performed 20 min of strength exercises for major muscle groups (maximum of eight to 10 repetitions, two to three sets). Once a week, the participants performed a cardiorespiratory exercise session individually for 40 min.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	Usual care (Participants in the control group were asked to not change their physical activity habits)
Outcomes of interest (types and measuring instruments)	Fatigue - BASDAI (numeric rating scale, 0 – 10, 10 = worst) Fatigue was a secondary outcome
Effectiveness results	Significant treatment effects were also seen for fatigue [−2.4, (−4.3 to −0.4), p=0.02, ES=1.3], with an improvement of 46% in the EG and 8% in the CG, and for ability to do a full day's activities [−2.2 (−3.9 to −0.4), p=0.02, ES=0.8], with an improvement of 52% in the EG compared to a 12% improvement in the CG.
Safety results	Not stated
Main results	Twenty-four patients were included in the analyses. All patients in the EG followed the exercise protocol. The EG had a statistically significant beneficial effect [mean group differences (95% confidence interval)] on emotional distress [−5.8, (−9.7 to −1.9), p<0.01], fatigue [−2.4, (−4.3 to −0.4), p=0.02], and ability to do a full day's work [−2.2, (−3.9 to −0.4), p=0.02] compared to the CG.
Follow-up	12 weeks
Conclusions	This pilot study showed promising effects of cardiorespiratory and strength exercises on emotional distress, fatigue, and ability to do a full day's activities in patients with axSpA. The findings need to be confirmed in a larger trial.

Sveaas et al., 2020a	
Participants characteristics (number, age, disease criteria, details)	axSpA (n=100) ≈ Age 46.2 years ≈ 53% Female ≈ Disease duration: not stated Diagnosed according to the Assessment of SpondyloArthritis international Society (ASAS) classification criteria
Intervention(s)	High-intensity exercises
Intervention(s) characteristics	Patients in the exercise group were encouraged to exercise 3 times a week for 3 months. Physical therapists specialized in rheumatology and trained in the exercise protocol supervised the exercises sessions twice a week at each study center These supervised sessions consisted of 40 minutes of cardiorespiratory exercise and 20 minutes of strength exercises. The cardiorespiratory exercise was performed on a treadmill or a cycle ergometer at high intensity (10 minutes of warm-up, thereafter 4 minutes of forceful walking/running or bicycling at 90-95% of maximal heart rate [HR] followed by 3 minutes of active resting at 70% of maximal HR repeated 4 times). The strength exercises were individually adapted to each participant according to the available equipment at each study center. The strength exercises focused on major muscle groups (squats, leg press, deadlifts, rows to chest, bench press, shoulder press, pulldowns, and sit-ups) and included 8 to 10 repetitions maximum in 2 to 3 sets. In addition to the supervised sessions, patients in the exercise group were encouraged to perform a cardiorespiratory exercise session once a week on their own for at least 40 minutes on intensity level above 70% of maximal HR (controlled by pulse-watch).
Professional that promoted the interventions	Physical therapist
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Scale (FSS) Fatigue was a secondary outcome
Effectiveness results	A significant beneficial effect of the intervention was seen on fatigue, vitality, and perceived general health and mood at the 3-month follow-up. Furthermore, compared with the control group, the exercise group reduced the rate of having severe fatigue (OR = 0.41 [95% CI=0.18 to 0.91], P=0.03). The effect sizes were medium for fatigue. As expected, differences between the groups in fatigue, were not sustained at 12-month follow-up. Furthermore, the number of patients reporting to have “severe fatigue” (OR = 0.32 [95% CI=0.39 to 1.48], P=0.67) was similar in the groups at the 12-month follow-up.
Safety results	No acute adverse events were reported during the exercise session, but 2 patients reported persistent pain during exercise.
Main results	A total of 38 participants (76%) in the exercise group followed ≥ 80% of the exercise protocol. At 3 months, there was a significant beneficial effect on fatigue (mean group differences=-0.4, 95% CI=-0.7 to -0.1), vitality (5.0, 95% CI=1.1 to 10.5), mood (-2, 95% CI=-3.7 to -0.04), and general health (9.0, 95% CI=3.3 to 14.7) but no effect on sleep (-1.1, 95% CI=-2.1 to 0.2). Compared with the control group, the exercise group had a reduced rate of severe fatigue and poor sleep. No differences were seen between the groups at 12 months.
Follow-up	12 months
Conclusions	A 3-month exercise program had a beneficial effect on fatigue, sleep, mood, and general health in patients with axSpA at the end of the intervention; however, no long-term effects were seen. High-intensity cardiorespiratory and strength exercises should be considered as important in exercise programs for patients with axSpA.

Sveaas et al., 2020b	
Participants characteristics (number, age, disease criteria, details)	axSpA (n=97) ≈ Age 46.2 years ≈ 53% Female ≈ Disease duration: not stated Diagnosed according to the Assessment of SpondyloArthritis international Society (ASAS) classification criteria
Intervention(s)	High intensity exercises
Intervention(s) characteristics	The exercise programme followed the American College of Sports Medicine recommendations for cardiorespiratory and muscular strength exercises15 and lasted for 12weeks. Two times per week the sessions were supervised by a physiotherapist and consisted of high intensity cardiorespiratory and strength exercises. In addition, the exercise group performed an individual cardiorespiratory exercise session once a week. In total, the intervention group had three training sessions per week. As a rule, some pain (≤5on a scale from 0 to 10) was tolerated during the exercises. However, if the pain got worse the day after, the exercises were adapted.
Professional that promoted the interventions	Physiotherapists
Intervention(s) setting	Hospital or fitness centre
Control	Usual care
Outcomes of interest (types and measuring instruments)	BASDAI - fatigue (from 0 to 10 (10=worst) Fatigue was a primary outcome
Effectiveness results	For BASDAI, there was a significant treatment effect, corresponding to a 24% difference in change between the groups (33% vs 9%). Standardised mean difference (SMD, effect sizes) with 95% CI of BASDAI-fatigue was 0.8 (0 to 0.8). Estimated mean group difference of BASDAI-fatigue was -1.4 (-2.2 to 0.6; p<0.001).
Safety results	One patient in the exercise group experienced chest pain and nausea during the exercises and completed the intervention at moderate intensity after advice from a cardiologist. Two patients reported persistent pain during exercise, but the safety of the exercise programme was proven by the beneficial group-effect on disease activity.
Main results	97 of the 100 (97%) randomised patients completed the measurements after the intervention. There was a significant treatment effect of the intervention on the primary outcome (ASDAS: -0.6 [-0.8 to -0.3], p<0.001 and BASDAI: -1.2 [-1.8 to -0.7], p<0.001). Significant treatment effects were also seen for inflammation, physical function, and CV- health.
Follow-up	3 months
Conclusions	High intensity exercises reduced disease symptoms (pain, fatigue, stiffness) and inflammation in patients with axSpA. It improves patients' function and CV health. This debunks concerns that high intensity exercise might exacerbate disease activity in patients with axSpA.

Tench et al., 2003	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=93) ≈ Age 39 years 100% Female ≈ Disease duration, median: 30 (IQR 10-84) months Diagnosed according to ACR revised criteria
Intervention(s)	Relaxation programme
Intervention(s) characteristics	Exercise group. The patients were asked to exercise at home at least three times a week for between 30 and 50 min for a period of 12 weeks at a heart rate corresponding to 60% of peak oxygen consumption. The main exercise was walking but patients were encouraged to take other forms of exercise, such as cycling and swimming, and were seen every 2 weeks for a supervised exercise session. Relaxation group. The patients were asked to listen to a 30-min relaxation audiotape a minimum of three times a week in a darkened, warm, and quiet room and were seen every 2 weeks for a supervised relaxation session.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Home and supervised exercise session (no detail)
Control	No intervention, using a minimization protocol: The patients were asked to continue with their normal daily activity pattern and specifically asked to avoid doing any extra physical activities. They were reviewed at follow-up but not seen at other times
Outcomes of interest (types and measuring instruments)	Fatigue - Fatigue Severity Score (FSS), Chalder Fatigue Scale (CFS) and a visual analogue scale (VAS)-fatigue Fatigue was a primary outcome
Effectiveness results	After 12 weeks of treatment there was significant improvement in fatigue measured using the Chalder Fatigue Scale (p=0.04), but no significant differences between the groups for any of the other symptomatic measures (p-value of FSS=0.20).
Safety results	Not stated
Main results	Analysis by intention to treat showed that 16 of the 33 (49%) patients in the exercise group rated themselves as 'much' or 'very much' better compared with eight out of 29 (28%) in the relaxation group and five out of 32 (16%) in the control group (x^2=8.3, df=2, P=0.02). Fatigue improved significantly on one out of three measures after exercise therapy and there was a trend for fatigue to improve on all measures after exercise.
Follow-up	12 weeks
Conclusions	These findings support the use of appropriately prescribed graded aerobic exercise in the management of patients with fatigue and systemic lupus erythematosus.

Thomsen et al., 2017	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=150) ≈ Age, years: intervention group: 59.7, control group: 59.5 ≈ Female: intervention group: 81%, control group: 80% ≈ Disease duration, years: intervention group: 12, control group: 11
Intervention(s)	Individually tailored, theory-based behavioural intervention
Intervention(s) characteristics	The intervention consisted of 1) three individual motivational counselling sessions and 2) individual text message reminders targeting reduction of SB. The intervention was based on behavioural choice theory [30] which addresses how people replace the choice of an unhealthy reinforcing behaviour with less reinforcing and more healthy alternatives. Furthermore, motivational interviewing techniques were included in the intervention. The first motivational counselling session commenced by identifying the participant's physical activity and SB patterns during a typical weekday and the interviewer reporting the health benefits of reducing SB. The session also incorporated individual behavioural goal setting and action-planning for change in SB with the participants identifying daily behavioural choices and describing possible behaviour alternatives. In session two and three, behavioural goals were reviewed, including discussion of pros and cons of the outcomes of the behaviour, identity associated with the changed behaviour, and feed-back on the behaviour from the interviewer. The intervention focused on four key messages regarding reduction of SB; 1) reduce TV-viewing, 2) substitute sitting with standing when possible – at work and/or at home, 3) break up prolonged sitting by standing up frequently and 4) maximum 30 min of sitting per episode. During the intervention the participants were provided with four booklets containing each of the key messages with specific suggestions and ideas for reduction of daily sitting time. After each motivational counselling session, based on the participants' individual behavioural goal(s) and their gender, age, partner status, housing, work status and hobbies, an external communications consultant drafted individually tailored text messages to each one reminding them of their behavioural goal(s).
Professional that promoted the interventions	Health professionals
Intervention(s) setting	Hospital
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Multidimensional Fatigue Inventory and visual analogue scale (VAS)-fatigue Fatigue was a secondary outcome
Effectiveness results	Statistically significant differences in favour of the intervention group were found in self-reported daily sitting time at work and during leisure time, for fatigue; also, significantly greater proportions achieved clinically meaningful improvements in fatigue (Percentage of achieved 10mm improvement on VAS for fatigue was 62% in intervention group and 14% in control group). Difference in change (mean, 95%CI) between groups for VAS-fatigue was -26.80 (-34.32 to -19.30; p<0.0001), for MFI-general was -3.43 (-4.59 to -2.26; p<0.0001).
Safety results	Not stated
Main results	75 patients were allocated to each group. Mean reduction in daily sitting time was −1.61 hours/ day in the intervention versus 0.59 hours/day increase in the control group between-group difference -2.20 (95% CI=-2.72 to -1.69; p<0.0001) hours/day in favour of the intervention group. Most of the secondary outcomes were also in favour of the intervention.
Follow-up	16 weeks
Conclusions	An individually tailored, behavioural intervention reduced daily sitting time in patients with RA and improved patient-reported outcomes and cholesterol levels.

Thomsen et al., 2019	
Participants characteristics (number, age, disease criteria, details)	PsA patients (n=67) ≈ Age, years: intervention group: 50.7, control group: 45.6 ≈ 64% Female ≈ Disease duration, years (median): intervention group: 5.5, control group: 3 Classification of Psoriatic Arthritis (CASPAR) Study Group criteria
Intervention(s)	High-intensity interval training (HIIT)
Intervention(s) characteristics	At baseline, the patients performed a max test measuring their HRmax and maximum oxygen uptake (Vo2 max) on a stationary bicycle. All tests were carried out at the Cardiac Exercise Research Group (CERG) facilities at NTNU. The exercise intervention was performed as a supervised HIIT workout starting with a 10-minute warm-up period followed by 4 × 4 minutes of exercise at 85–95% of HRmax interrupted by 3 minutes of exercise at 70% of the HRmax (11). The supervised HIIT was performed on a stationary bicycle at CERG twice weekly, with an intermitting day of rest. One supervisor guided a maximum of 6 patients at a time. Additionally, the patients did one self-guided HIIT a week. All exercises were supported by using a heart rate monitor. During the follow-up period from 3 to 9 months, patients in the HIIT group were encouraged to continue exercising but without guidance. To reinforce adherence to the training program, diaries were obtained from the HIIT group every week during the intervention period from baseline to 3 months and included information on the type of exercise, time, location, and with whom it was performed. Moreover, the intensity was rated by the registered pulse and by the 15-point Borg scale (from 6 to 20), the latter being a method of rating perceived exertion.
Professional that promoted the interventions	Physiotherapy and physiology students (who were experienced in guiding an HIIT)
Intervention(s) setting	Hospital
Control	Instructed not to change their pre-study physical exercise habits. However, during the follow-up period from 3 to 9 months, they were allowed to start exercising.
Outcomes of interest (types and measuring instruments)	Fatigue - Visual analogue scale (VAS) Fatigue was a secondary outcome
Effectiveness results	Patients in the HIIT group reported lower fatigue than that reported by patients in the control group (−12.83 mm [95% CI=-25.88 to 0.23]). Moreover, within group analyses showed that both groups experienced reductions in fatigue from baseline to 3 months (Changes within groups were -15.86 in intervention group and -3.03 in control group). At 9 months of follow-up, there were no clinically important differences between the 2 groups for fatigue (Mean between-group difference at 9 months was 5.20 (95% CI=-8.00 to 18.41; p=0.44).
Safety results	One patient left the HIIT group due to sequelae after a stroke before the study and found that participation in the intervention was too difficult. No other adverse events were reported during the intervention.
Main results	At 3 months, there was no clear difference in the PGA score (-0.49 [95% CI=-10.91 to 9.94]), DAS44 (-0.08 [95% CI=-0.36 to 0.20]), or pain intensity (5.45 [95% CI=-4.36 to 15.26]) between the groups. However, patients in the intervention group reported less fatigue (-12.83 [95% CI=-25.88 to 0.23]) than those in the control group. There was no evidence of long-term effects of HIIT on outcomes measured at 9 months.
Follow-up	9 months
Conclusions	HIIT showed no clear effects on disease activity markers in patients with PsA, but the intervention (exercise) group reported meaningfully less fatigue after the intervention period. The results of this study suggest that patients with PsA tolerate HIIT without deterioration of disease activity and with improvement in fatigue.

Thomsen et al., 2020	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=150) ≈ Age, years: intervention group: 59.7, control group: 59.5 ≈ Female: intervention group: 81%, control group: 80% ≈ Disease duration, years (median): intervention group: 12, control group: 11
Intervention(s)	Individually tailored behavioral intervention (Motivational counselling and text message reminders)
Intervention(s) characteristics	4-month intervention consisted of 3 individual motivational counselling sessions and 0–5 individual text messages per week. The intervention aimed to increase light-intensity physical activity through reduction of sedentary behavior. In the first counselling session (at week 1) the participants set individual behavioral goals and made action plans for reduction of daily sitting time. At the 2 later counselling sessions (at weeks 3 and 10) attainment of the behavioral goals was reviewed and the goals were modified, and/or new ones were set. The participants were provided with oral and written information about the health benefits of reducing daily sitting time. Immediately after each counselling session, a communications specialist drafted text messages to the participants reminding them of their individually set behavioral goals. The participants made individual decisions on the frequency and time of the text messages.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	Usual care
Outcomes of interest (types and measuring instruments)	Fatigue - Visual analogue scale (VAS) and Multidimensional Fatigue Inventory (MFI) Fatigue was a secondary outcome
Effectiveness results	For the intervention group compared to the control group, participants significantly decreased self-reported daily sitting time at work and during leisure time. Moreover, the intervention favored the intervention group in terms of self-reported fatigue. Between-group difference of VAS-fatigue was -12.3 (95% CI=-20.71 to -3.89; p=0.0043)
Safety results	Not stated
Main results	At 22-month follow-up from baseline, 12 participants were lost to follow-up. Compared to baseline, sitting time in the intervention group decreased 1.10 hours/day, whereas it increased by 1.32 hours/day in the control group, a between-group difference of -2.43 hours/day (95% CI=-2.99 to -1.86; P<0.0001) favoring the intervention group. For most secondary outcomes, between-group differences favored the intervention: VAS-pain -15.51 mm (95% CI=-23.42 to -7.60), VAS-fatigue -12.30 mm (95% CI=-20.71 to -3.88), physical function -0.39 Health Assessment Questionnaire units (95% CI=-0.53 to -0.26), total cholesterol -0.86 mmoles/liter (95% CI=-1.03 to -0.68), triglycerides -0.26 mmoles/liter (95% CI=-0.43 to -0.09), and average glucose -1.15 mmoles/liter (95% CI=-1.39 to -0.91).
Follow-up	22 months
Conclusions	The 4-month postintervention results showed that patients in the intervention reduced their daily sitting time and improved patient-reported outcomes and total cholesterol levels compared to the control group. Eighteen months after intervention, patients in the intervention group were still significantly less sedentary than controls. Findings suggest that a behavioral approach is beneficial for promoting long-term physical activity and health in patients with RA.

Tiffreau et al., 2016	
Participants characteristics (number, age, disease criteria, details)	Polymyositis (n=21) ≈ Age, years: intervention group: 51.9, control group: 57.6 ≈ Female: intervention group: 60%, control group: 73% ≈ Disease duration, months: intervention group: 45.7, control group: 60.5 According to International Myositis Assessment and Clinical Studies Group criteria
Intervention(s)	Standardized rehabilitation programme
Intervention(s) characteristics	In the intervention group, a personalized rehabilitation programme was focused on muscle strength training, chest expansion, increased joint range of motion, better gait and transfers, and improved aerobic capacity. Strength training was performed (at 60% of the estimated one repetition maximum) for muscles with a Medical Research Council (MRC) scale score of at least 3 out of 5, with two series of 10 repetitions per day. For respiratory rehabilitation, the patient performed 20 min of inspiratory and expiratory muscle strength training. Joint range of motion was trained by passive movements and stretching exercises. Walking ability was trained in a 30-minute walk. Patients performed 30-minute sessions of aerobic exercise on a cycle ergometer three times a week (at 60% of the estimated maximum heart rate) and also received three 30-minute massage and relaxation sessions a week. Patients with pharyngeal muscle weakness performed swallowing exercises. In the subsequent, home-based, self-managed rehabilitation programme, each participant 130 performed a daily 30-minute session derived from the hospital-based programme.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Hospital
Control	The control group received physiotherapy on an outpatient basis (30-min sessions with a private-practice physiotherapist three times a week).
Outcomes of interest (types and measuring instruments)	Fatigue - Visual analogue scale (VAS) Fatigue was a <u>secondary outcome</u>
Effectiveness results	The level of fatigue was similar in the two groups at all evaluations.
Safety results	Not stated
Main results	At 12 months, the mean ± standard deviation HAQ-DI was significantly lower in the intervention group than in the control group (0.64±0.53 vs 1.36±1.02, respectively; p=0.026). The intervention group also had better scores than the control group for some quality-of-life dimensions (SF36 General Health: 53.44±8.73 vs 36.57±22.10, respectively; p=0.038; SF36 Role Physical: 63.89±43.50 vs 17.86±37.40, respectively; p=0.023) and pain levels (5.0±10.61 vs 33.38±35.68, respectively; p=0.04) at 12 months. Lastly, the programme was well tolerated by all the participants.
Follow-up	12 months
Conclusions	In patients suffering from (IM), the combination of a four-week standardized rehabilitation programme and a personalized, home-based, self-managed rehabilitation programme was well tolerated and had a positive medium-term functional impact.

Wadell et al., 2021	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=47) ≈ Age, median (IQR): 63 (54-71) years ≈ 77% Female ≈ Disease duration, years, median (IQR): intervention group: 19.2 (10.6-28.2), control group: 19.1 (9.7-28.5)
Intervention(s)	Anti-inflammatory diet
Intervention(s) characteristics	The anti-inflammatory diet was a portfolio diet including foods with suggested anti-inflammatory properties. breakfast contained whole grain, low fat dairy, fruits or berries, nuts (mainly walnuts) and a juice shot containing probiotics (Lactobacillus plantarum v299). The main meals were composed of fatty fish or legumes, potatoes or grains (predominantly whole grain), vegetables and low-fat dairy. As snacks, participants received two fruits per day. In total, i.e. including meals not provided by the study, participants were instructed to limit meat consumption to ≤3 times/wk, consume ≥ 5 portions/d of fruit, berries and vegetables, to choose low fat dairy and whole grain, as well as to use oil or margarine as cooking fat.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Home
Control	Usual Swedish intake for ten weeks followed by a wash out period before switching to the other diet: Participants received breakfast composed of orange juice and a mix of yoghurt and quark served with cornflakes or white bread with butter and cheese. The main meals were composed of meat or chicken, potatoes or white rice and high fat dairy. Quark, protein pudding and protein bars were given as snacks. In total, participants were instructed to consume meat ≥5 times/wk, limit seafood intake to ≤1 time/wk and fruit and vegetables to ≤5 portions/day, to choose high fat dairy, use butter as cooking fat and to abstain from probiotics.
Outcomes of interest (types and measuring instruments)	Fatigue - Visual analogue scale (VAS) Fatigue was a <u>secondary outcome</u>
Effectiveness results	The main analysis of fatigue did not result in any significant difference but, although no evidence of difference, when participants with changes in the pharmacological treatment were excluded, the difference in fatigue after intervention diet period compared to control diet period was much larger (mean=-9.068, 95% CI=-19.7 to 1.57, p=0.09, n=25).
Safety results	Based on the telephone interview, 91% of the diet periods were completed with good compliance. s. In addition, there were no significant weight changes within either diet period, although a trend towards a negligible weight loss during intervention diet period was observed (median [IQR] -0.4 kg [-1.4, 0.6], p = 0.082). Upset stomach was reported as an adverse effect during both diet periods; gas, diarrhea, stomachache, nausea and heartburn during intervention diet period (13 participants) and constipation, bloating and acid reflux during control diet period (4 participants).
Main results	Forty-seven participants completed more than 1 diet period and were included in the main analyses. No significant difference between intervention and control diet at end of diet periods was observed for any outcome. However, significant improvements were obtained for SF-36 Physical Functioning (mean=5.79, SE=2.12, 95% CI=1.58 to 10.01) during the intervention diet period. When excluding participants with anti-rheumatic medication changes, the differences between diet periods increased for most outcomes, favoring the intervention diet period, and the difference for SF-36 Physical Functioning became significant (n = 25, mean=7.90, 95% CI=0.56 to 15.24, p=0.036).
Follow-up	10 weeks
Conclusions	In main analyses, the proposed anti-inflammatory diet did not significantly improve HrQoL for patients with RA compared to control diet. In sub-analyses, significant improvements in physical functioning were detected. Larger studies with consistent medication use and in populations more affected by the disease may be needed to obtain conclusive evidence.

Wallace et al., 2019	
Participants characteristics (number, age, disease criteria, details)	Inclusion body myositis (IBM) patients (n=17) ≈ Age 61.5 years ≈ 24% Female ≈ Disease duration: not stated
Intervention(s)	Community-based aerobic exercise; Group A underwent a 12-week training period (T1), an 8-week reversal period to detrain, then a 12-week control period (C2).
Intervention(s) characteristics	Participants exercised on a bicycle ergometer 3 times per week for 12 weeks (36 sessions) working towards a duration of 30 minutes. All had heart rate monitors to set training targets. Initially the target heart rate corresponded to 60% of VO2 peak. The intensity was progressively increased to 70% after 4 weeks and 80% after 8 weeks. Target heart rates were calculated using the standard formula: 220 minus the participant's age. Each exercise session began with a 5-minute warm-up on the bicycle ergometer and ended with a 5- to 10-minute cool-down period. Participants were encouraged to exercise on alternative days to allow time for recovery and reduce general orthopedic stress. For the control and detraining period, participants were asked to continue their normal, pre-study activity levels. They continued to complete the exercise diary and were encouraged to complete any additional exercise or activity they had done. All participants were telephoned by the research physiotherapist 3 months after the cessation of the study to see if they were continuing to exercise.
Professional that promoted the interventions	Research physiotherapist
Intervention(s) setting	local gyms
Control	Group B went through the control period first (C1) and the training period second (T2).
Outcomes of interest (types and measuring instruments)	Fatigue Severity Scale (FSS) Fatigue was a secondary outcome
Effectiveness results	There were no major differences with training observed in FSS for the IBM participants.
Safety results	There were no increases in serum creatine kinase (CK) at Table 2 group or individual level with exercise training in both conditions. There were also no changes in energy, mood, or fatigue as recorded via the visual analogue scales in the training diaries.
Main results	Data from 17 people with IBM were included in the analysis and had high levels of participation and demonstrated improvements in VO2 peak, and a strong effect size in the IBM group (Cohen d=1.72). No major changes were observed in the secondary outcome measures. Qualitative interviews revealed that participants valued the support of gym instructors and the research physiotherapists in overcoming challenges to participation.
Follow-up	32 weeks
Conclusions	Twelve weeks of aerobic training in community gyms was feasible, safe, and improved aerobic capacity in people with IBM.

Wang et al., 2008	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=20) ≈ Age, years: intervention group: 48, control group: 51 ≈ Female: intervention group: 80%, control group: 70% ≈ Disease duration, years: intervention group: 14, control group: 15 ACR criteria
Intervention(s)	Tai Chi program
Intervention(s) characteristics	The Tai Chi program was based on classical Yang style. Patients participated in two 60-min Tai Chi sessions conducted each week for 12 weeks. Each session included: (1) 10 min of warm-up and a review of Tai Chi principles; (2) 30 min of Tai Chi exercises; (3) 10 min of breathing technique, and (4) 10 min of relaxation. Subjects were instructed to practice Tai Chi at least 20 min once a day at home. All subjects were encouraged to maintain their usual physical activities, but not to participate in additional strength training other than their Tai Chi exercises.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Hospital
Control	The control group also attended two 60-min sessions per week for 12 weeks. Each session started with 40 min of information about (1) RA as a disease; (2) diet and nutrition; (3) therapies to treat RA, and (4) physical and mental health education (recognizing and dealing with stress and depression, etc.). The final 20 min consisted of stretching exercises involving the upper body, trunk and lower body, each stretch being held for 10–15 s. Subjects were also instructed to practice at least 20 min strength exercises once a day at home. All subjects were encouraged to maintain their usual physical activities, but not to participate in additional strength training other than their class stretching exercises. Throughout the 12-week period, we tracked the number of and reasons for missing sessions in both groups.
Outcomes of interest (types and measuring instruments)	VAS - fatigue (0-10 cm) Fatigue was a secondary outcome
Effectiveness results	Change from baseline to week 12 of VAS-fatigue was -1.5±2.8 in Tai Chi group and -0.5±2.6 in control group (p-value between groups: 0.31). During the 3-month follow-up (telephone interview), 9 patients in the Tai Chi group continued to practice Tai Chi (3 of them joined a Tai Chi class, 6 practiced Tai Chi at home), and all 9 patients reported improvement in fatigue compared to the baseline measurement.
Safety results	No adverse events were observed, and no patients withdrew from the study
Main results	At 12 weeks, 5/10 patients (50%) randomized to Tai Chi achieved an ACR 20% response compared with 0/10 (0%) in the control (p=0.03). Tai Chi had greater improvement in the disability index (p=0.01), vitality subscale of the Medical Outcome Study Short Form 36 (p=0.01) and the depression index (p=0.003). Similar trends to improvement were also observed for disease activity, functional capacity, and health-related quality of life. No adverse events were observed, and no patients withdrew from the study.
Follow-up	12 weeks (and 3-month telephone follow-up)
Conclusions	Tai Chi appears safe and may be beneficial for functional class I or II RA. These promising results warrant further investigation into the potential complementary role of Tai Chi for treatment of RA.

Wu et al., 2019	
Participants characteristics (number, age, disease criteria, details)	SLE patients (n=76) ≈ Age, years: intervention group: 43.8, control group: 43.5 100% Female ≈ Disease duration, years: intervention group: 12, control group: 12.3 ACR 1997 criteria
Intervention(s)	Physical activity counselling
Intervention(s) characteristics	Patients in the intervention group participated in an exercise counselling programme and wore the pedometer on the waist for 1 week as the baseline and for 12 weeks following the baseline. Each of the intervention group participants was taught how to set up the pedometer by the physical activity counsellor. The face-to-face counselling was conducted at weeks 1, 4, and 8 at the participants' home or at the clinical office and lasted approximately 30 minutes. Follow-up phone calls were made on weeks 2, 6, and 10 to assess the participants' achievement of their daily goals, and possible barriers were discussed. All interviews were recorded in each participant's profile as a reference for the next interview.
Professional that promoted the interventions	Counsellor (who has expertise in physical activity counselling for patients with SLE and had been trained in the 5A's counselling techniques)
Intervention(s) setting	Home or clinical office
Control	Usual care (Patients in the usual care group wore the pedometer for 1 week as the baseline and for 12 weeks following the baseline. They were recommended to maintain a normal lifestyle and clinical visits as usual during the study period. Contact phone calls were arranged at weeks 2, 6, and 10 to give medication or laboratory test information. The pedometer was only used as a step counter)
Outcomes of interest (types and measuring instruments)	Fatigue Severity Scale (FSS) Fatigue was a primary outcome
Effectiveness results	The mean score for fatigue in the intervention group compared with the control group at the eighth week and 12th week remained unchanged from baseline (B=−0.18, P=0.47 and B=−0.14, P=0.64, respectively).
Safety results	Not stated
Main results	The study showed that daily steps, quality of sleep, and vitality in the intervention group were significantly improved compared with those in the control group at weeks 8 and 12. Mental health was significantly improved only at week 8 in the counselling group. A positive correlation between physical activity changes and changes in vitality and mental health was observed.
Follow-up	12 weeks
Conclusions	Physical activity counselling can improve physical activity. As physical activity increases, systemic lupus erythematosus women feel more energetic and happier.

Xie et al., 2019	
Participants characteristics (number, age, disease criteria, details)	AS patients (n=60) ≈ Age: not stated ≈ Female: intervention group: 23%, control group: 22% ≈ Disease duration: not stated Modified New York criteria
Intervention(s)	Baduanjin Qigong exercise
Intervention(s) characteristics	Patients in the exercise group (Baduanjin qigong) underwent a 12- week, 2-phase Baduanjin qigong training program. The entire set of Baduanjin qigong exercises in this study consisted of 10 postures. In the first phase, patients were required to attend classes twice per week for 4 weeks. All patients in this group were encouraged to practice what they learned at home, with DVD tutorials of Baduanjin qigong that were provided as part of their enrollment in the study. Patients who could not complete the entire Baduanjin qigong program were excluded from the final analysis. In the second phase, patients were required to practice Baduanjin qigong at home at least 3 times per week for 8 weeks. Watching video tutorials was encouraged. Two researchers randomly contacted patients by telephone to encourage and supervise regular performance. During the 12-week treatment, these patients were required to maintain their current lifestyles except for the introduction of Baduanjin qigong exercise.
Professional that promoted the interventions	A rheumatologist
Intervention(s) setting	Classes and home
Control	Usual care: No treatment, and the patients maintained their current lifestyle during the study period. No changes to current AS medications were permitted; however, medication use for other disease(s) was allowed. Similar to the exercise group, participation in other exercise programs, such as yoga, Tai Ji and gymnastics, was not permitted. However, general activities, such as walking, jumping, stretching, or swimming occasionally, were not prohibited. All adverse events were required to be recorded and reported to the researchers
Outcomes of interest (types and measuring instruments)	Fatigue Severity Scale (FSS) Fatigue was a primary outcome
Effectiveness results	After 12-week intervention, lower scores with respect to fatigue were observed in the Baduanjin qigong group, compared to the no treatment group (2.28 (SD=1.09), 2.55 (SD=1.19), respectively, p= 0.03).
Safety results	No severe adverse effects were reported by the patients during the observation period. Seven patients in the Baduanjin qigong group reported mild muscle ache in the thigh and crus during the first two weeks of treatment.
Main results	A total of 46 patients completed the study. At the end of treatment period, although total BASDAI scores were not statistically different, reduced scores were observed in the exercise group, compared to no-treatment group, with respect to fatigue (P=0.03), intensity (P=0.04) and duration (P=0.01) of morning stiffness; exercise group also exhibited higher patient global assessment scores(P=0.04).
Follow-up	12 weeks
Conclusions	This study preliminarily demonstrated that a 12-week Baduanjin qigong exercise regimen was effective in improving the symptoms of fatigue, intensity and duration of morning stiffness, and patient global assessment; moreover, it appears to be safe for patients with AS when practiced correctly.

Yakut et al., 2021	
Participants characteristics (number, age, disease criteria, details)	Systemic sclerosis (SSc) patients (n=37) ≈ Age, years: Supervised exercise group: 51.2, Home exercise group: 49.6 ≈ Female: Supervised exercise group: 84%, Home exercise group: 83% ≈ Disease duration, years: Supervised exercise group: 9.7, Home exercise group: 8.6 American College of Rheumatology/ European League Against Rheumatism criteria
Intervention(s)	Supervised exercise or home exercise
Intervention(s) characteristics	**The supervised exercise group (SEG)** received the combined exercise training consisting of breathing, resistance, and aerobic exercises under the supervision of a physiotherapist twice per week for 12 weeks (in total 24 sessions). Each session lasted about 1 hour, with a warm-up session for the first 5 minutes and cool-down session for the last 5 minutes. Three to four repetitions, lasting 30 seconds of static active stretching and flexibility exercises for the large muscle groups of trunk and upper-lower extremities were performed as warm-up and cool-down exercises. The patients in the **home exercise group (HEG)** were instructed, in a session of about 1 hour, how to perform the exercise program at home by a physiotherapist. Then, they practiced the exercise program twice per week for 12 weeks at home. The HEG received the combined exercise training consisting of breathing and posture exercise and walking. The warm-up, cool-down and breathing exercises and their contents were the same with the SEG. Posture exercises consisting of bilateral shoulder flexion-abduction-circumduction, trunk rotation, knee extension and 4-way straight leg exercises were performed in 1 set of 8-12 repetitions. Then, they walked at a moderate/submaximal intensity (3-6 intensity according to RPE), at a constant speed for 20 minutes. RPE was explained to the patients for exercise intensity and added to exercise diaries.
Professional that promoted the interventions	Physiotherapist
Intervention(s) setting	Not stated for SEG
Control	Supervised exercise or home exercise
Outcomes of interest (types and measuring instruments)	Fatigue Impact Scale (FIS) Fatigue was a <u>secondary outcome</u>
Effectiveness results	In terms of parameter of fatigue level measured before and after 6MWT, there was a significant decrease in the severity of fatigue level after the test in the SEG ($P<0.05$), while no change was observed in any parameter in the HEG ($p>0.05$). Fatigue total score, physical, cognitive, and psychosocial dimensions of fatigue scores were decreased in the SEG and HEG ($P<0.05$). Fatigue level changes were significantly greater in the SEG compared to HEG ($p<0.001$).
Safety results	Not stated
Main results	Significant improvements were observed in the functional capacity, measured by 6-minute walking test in the supervised exercise group (before=376.21±65.50, after=518.78±75.84 m) and home exercise group (before=384.44±68.14, after=432.7±70.8 m; $P<0.05$). Respiratory-peripheral muscle strength (except for inspiratory muscle strength and upper limb strength in the home exercise group) and HRQoL were significantly increased, and fatigue level was significantly decreased in the supervised exercise and home exercise groups ($P<0.05$). However, pulmonary functions and dyspnea severity were significantly improved only in the supervised exercise group ($P<0.05$). The supervised exercise program was found superior to the home exercise program for change in all parameters ($P< 0.05$).
Follow-up	12 weeks
Conclusions	This study suggests that exercise interventions should be applied in addition to the medical treatments of patients with SSc as supervised and home exercise programs play an important role in the functionality and health status of these patients.

Yentür et al., 2021	
Participants characteristics (number, age, disease criteria, details)	RA patients (n=30) ≈ Age, years: Pilates group: 48.2, aerobic exercises group: 50.7, combined training group: 51.9 Gender: not stated ≈ Disease duration, years: Pilates group: 12.4, aerobic exercises group: 13.7, combined training group: 11 ACR criteria
Intervention(s)	Pilates exercises or aerobic exercises or combined training including pilates with aerobic exercises
Intervention(s) characteristics	**Pilates exercise:** Pilates exercises were applied for 3 times in a week and took about 45 min per session. The basic principles of pilates were taught, and benefits and scope of exercises were explained to the patients in the first session. Centering and segmental extremity movements as warm-up were applied at the beginning of the sessions. Exercise balls and resistance elastic bands were used in the latter weeks of the treatment according to the patients' condition. Breathing control, postural exercises, sitting exercises, and proprioceptive exercises were taught and applied to the patients. Stretching, relaxation, and postural exercises were used for cool-down. **Aerobic group:** Walking on treadmill as an aerobic exercise was applied for three times in a week/8 weeks. Maximum heart rate (MHR =220 − age) was calculated and followed with a monitor (Polar FT 100, China) during the training. The aim was to reach 60–80% of MHR as training workload. The training began with under the workload for 5 min for warm-up, then continued with training workload for 20 min, and finished with cool-down for 5 min diminishing the velocity. **Combined group:** Both pilates and aerobic exercises were applied to the patients in the combined group for 8 weeks. Aerobic exercises were applied to the patients, and then pilates exercises were applied after 15 min of resting period for 3 times in a week.
Professional that promoted the interventions	Not stated
Intervention(s) setting	Not stated
Control	Pilates exercises or aerobic exercises or combined training including pilates with aerobic exercises
Outcomes of interest (types and measuring instruments)	Fatigue Severity Scale (FSS) Fatigue was a primary outcome
Effectiveness results	Fatigue showed a significant group-by-time difference ($p<0.05$). A significant difference was determined in fatigue ($p<0.05$). No statistically significant difference was observed among the groups' change value of treatment in fatigue (5.80±1.10 in pilates group, 4.90±0.73 in aerobic group, and 7.10±1.29 in combined group; $p=0.076$).
Safety results	In this study, it was mentioned that pilates exercises can be safely practiced and can be an alternative to aerobic exercises in RA patients according to these results, but no detailed information were given.
Main results	The results of the present study showed significant improvements for the first group on fatigue, depression, aerobic capacity, and quality of life ($p<0.05$). Improvements in all parameters except for pain were obtained for the second and third groups ($p<0.05$). In addition, there was no statistically significant difference among the treatment groups in assessments ($p>0.05$).
Follow-up	8 weeks
Conclusions	Pilates exercises may have similar effects to aerobic exercises in patients with RA. Addition of clinical pilates exercises to the routine treatment of RA may enhance the success of rehabilitation.

Zangi et al., 2012	
Participants characteristics (number, age, disease criteria, details)	Inflammatory arthritis (IA) patients (n=71) ≈ Age 53.9 years ≈ 79% Female ≈ Disease duration 16.2 years Fulfilling the ACR 1987 criteria for RA and the New York classification criteria for AS
Intervention(s)	Vitality Training Programme (VTP)
Intervention(s) characteristics	The VTP comprised 10 group sessions over a period of 15 weeks plus a booster session approximately 6 months after the end of the course. Each session lasted 4.5 h. The number of participants in each VTP group ranged from 8 to 12. Through mindfulness-based exercises, participants were encouraged to become aware of, and intentionally attend to, their emotions, thoughts and bodily experiences. In addition, various creative exercises, such as guided imagery, music, drawing, poetry and metaphors, were used to encourage experiential learning processes. Between sessions the participants performed awareness and relaxation training by listening to a CD with mindfulness-based exercises and wrote reflective diaries.
Professional that promoted the interventions	Physiotherapists, occupational therapists, nurses, and social workers
Intervention(s) setting	Not stated
Control	Participants in the control group were informed that they would be invited to participate in the VTP after all data collection was completed.
Outcomes of interest (types and measuring instruments)	Fatigue - Numerical Rating Scales (NRS) scored from 0 to 10 Fatigue was a secondary outcome
Effectiveness results	Significant treatment effects in favour of the VTP group were found post-treatment and at 12 months for fatigue. The improvement in fatigue was increased at 12 months in the VTP group whereas the control group was unchanged from baseline. The mean treatment effect at 12 months was −1.1 (95% CI=−0.4 to −1.8), effect size 0.50.
Safety results	No adverse events were reported.
Main results	Of 73 participants randomised, 68 completed assessments post-intervention and 67 at 12 months. Significant treatment effects in favour of the VTP group were found post-treatment and maintained at 12 months in psychological distress (adjusted mean between-group difference −3.7, 95% CI=−6.3 to −1.1), self-efficacy pain (9.1, 95% CI=3.4 to 14.8) and symptoms (13.1, 95% CI=6.7 to 19.3), emotional processing (0.3, 95% CI=0.02 to 0.5), fatigue (−1.1, 95% CI=−1.8 to −0.4), self-care ability (1.0, 95% CI 0.5 to 1.6) and overall well-being (0.6, 95% CI 0.1 to 1.2). No significant group differences were found in emotional expression, pain or disease activity.
Follow-up	12 months
Conclusions	The VTP improved most primary and secondary outcomes compared with individual use of CD exercises. Improvements were maintained at 12 months, suggesting that the VTP is a beneficial complement to existing treatments for patients with inflammatory rheumatic joint diseases.