



Research

Behaviour change intervention increases physical activity, spinal mobility and quality of life in adults with ankylosing spondylitis: a randomised trial

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KEY WORDS

Ankylosing spondylitis
Physical fitness
Motor activity
Exercise
Quality of life

ABSTRACT

Questions: Does a 3-month behaviour change intervention targeting physical activity (PA) increase habitual physical activity in adults with ankylosing spondylitis (AS)? Does the intervention improve health-related physical fitness, AS-related features, and attitude to exercise? Are any gains maintained over a 3-month follow-up? **Design:** Parallel-group, randomised, controlled trial with concealed allocation, assessor blinding and intention-to-treat analysis. **Participants:** Forty adults with a diagnosis of AS, on stable medication, and without PA-limiting comorbidities. **Intervention:** Over a 3-month period, the experimental group engaged in individually-tailored, semi-structured consultations aiming to motivate and support individuals in participating in PA. The control group continued with usual care. **Outcome measures:** The primary outcome was PA measured by accelerometry over 1 week. Secondary outcomes included clinical questionnaires and measures of health-related physical fitness. Measures were taken at baseline, post-intervention, and after a 3-month follow-up period. **Results:** Baseline characteristics were similar across groups, except age and body composition. There were statistically significant, moderate-to-large time-by-group effects in health-enhancing PA (mixed-design ANOVA for overall effect $F(2, 76) = 14.826, p < 0.001$), spinal mobility ($F(2, 76) = 5.691, p < 0.005$) and quality of life ($\chi^2(2) = 8.400, p < 0.015$) favouring the intervention group; post-intervention improvements were sustained 3 months later. No significant effects were seen in other physical fitness outcomes or on clinical questionnaires. No adverse effects were reported during the study. **Conclusion:** Health-enhancing PA, spinal mobility and quality of life were significantly improved after the intervention, and improvements were maintained at 3-month follow-up. **Trial registration:** NCT02374502. [O'Dwyer T, Monaghan A, Moran J, O'Shea F, Wilson F (2016) Behaviour change intervention increases physical activity, spinal mobility and quality of life in adults with ankylosing spondylitis: a randomised trial. *Journal of Physiotherapy* XX: XX-XX]

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Introduction

Ankylosing spondylitis (AS) is a chronic inflammatory rheumatic disease that primarily affects the axial skeleton. Clinically, it is characterised by inflammatory back pain and stiffness, with decreased spinal mobility, fatigue and limitations in physical function.¹ Accompanying extra-articular features may include uveitis, osteoporosis, inflammatory bowel disease, psoriasis, and cardiac, pulmonary and kidney involvement.² AS is associated with reductions in physical fitness, work productivity and health-related quality of life.³⁻⁵

Physical activity (PA), including therapeutic exercise, is a key component in the management of AS.^{6,7} Exercise-based interventions have been shown to be effective in improving physical function, mobility, disease activity and quality of life outcomes.^{8,9} In addition to these AS-specific benefits, PA has been shown to reduce the risk of cardiovascular disease, obesity, some cancers, type 2 diabetes and osteoporosis in the general population.¹⁰ It also improves musculoskeletal health and reduces symptoms of depression. Despite these benefits,

individuals with AS tend to have poor compliance with exercise programs;^{11,12} the majority of adults with AS do not participate in regular exercise and may engage in less health-related PA than the general population.^{5,12,13} Furthermore, exercise prescriptions have traditionally focused on flexibility and mobility.^{8,9} Without also including aerobic and resistance components, exercise programs may not elicit the potential health benefits of PA.¹⁰

The promotion of PA to individuals with chronic conditions, such as AS, is a key challenge faced by healthcare professionals and policy makers.^{7,14-16} International guidelines recommend that adults obtain at least 150 minutes of moderate-intensity aerobic PA per week, in bouts of activity lasting at least 10 minutes (PA_{BOUTS}).^{6,15} Alternatively, weekly PA recommendations may be met by performing 75 minutes of vigorous-intensity PA, or by combining moderate-intensity and vigorous-intensity PA (MVPA). In addition, strengthening exercises are recommended for all adults, while balance and coordination exercises are recommended for adults aged > 65 years. Awareness of these guidelines among individuals with rheumatic conditions is low, and the

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efficacy of population-based approaches to PA promotion in reaching individuals with AS is questionable.¹⁷

'Brief intervention' is a term used to mean verbal advice, discussion, negotiation or encouragement, involving the provision of formal help and follow-up; this can vary from basic advice to a more extended, individually focused discussion.¹⁶ National guidelines recommend brief interventions as effective methods with which to bring about health behaviour changes, including increasing PA.^{16,18} In sedentary adults, brief interventions have shown positive short-term and long-term benefits on self-reported PA.^{19,20} Although trials have delivered education and exercise-based interventions in AS cohorts,^{8,9} it is believed that no study, to date, has explored strategies to increase habitual PA among individuals with AS. Thus, the Increasing Physical Activity in Ankylosing Spondylitis (INPACT-AS) trial was devised.

Therefore, the research questions for this parallel-group, randomised, controlled trial with concealed allocation, assessor blinding and intention-to-treat analysis were:

1. Does a 3-month behaviour change intervention targeting PA increase habitual PA in adults with AS?
2. Does the intervention improve health-related physical fitness, AS-related features, and attitude to exercise?
3. Are any gains maintained over a 3-month follow-up period?

Method

Design

This study was an assessor-blinded, parallel-group, randomised, controlled trial conducted between March 2015 and October 2015. Adults with a diagnosis of AS were randomly allocated either to individually tailored, semi-structured consultations to encourage PA (experimental group) or to usual care (control group), for a 3 month period. Eligible participants were randomised using a computer-generated list of random numbers that had been prepared using a blocked randomisation model by a researcher with no involvement in the trial. The allocation sequence was concealed in sequentially numbered, opaque, sealed envelopes. Following completion of baseline assessments, the lead researcher opened the appropriate envelope and assigned participants to their group. Outcomes were assessed at the end of the 3-month intervention period and 3 months later.

Participants, therapists and centres

Participants were recruited through the rheumatology outpatient clinics of St. James's Hospital, Dublin, and through patient support groups. Adults between 18 and 64 years of age who had been diagnosed by a rheumatologist with AS were eligible for inclusion in the study if they were on stable pharmacological management and proficient in English. The exclusion criteria were:

a concomitant cardiac, respiratory or neurological condition; a comorbidity that restricts PA; an acute lower limb injury; uncontrolled epilepsy; a cognitive impairment; pregnancy; inability to ambulate without a mobility aid; or a change in medication during the 6 weeks preceding trial commencement. Written, informed consent was obtained from each participant prior to involvement in the study.

Intervention

Participants in the experimental group engaged in a number of individually tailored consultations with a physiotherapist. The aim of these sessions was to motivate and support individuals to participate in PA, taking into account their needs, ambitions, preferences and available resources. This intervention incorporated the 'spirit' of motivational interviewing, and emphasised partnership and cooperation between the physiotherapist and the participant.²¹ Table 1 lists the specific behaviour change techniques used during the trial;²² not all techniques were used for all participants.

Initial consultations (lasting approximately 30 minutes) were semi-structured, although three common areas were addressed with each participant. The first area was education: participants were provided with an AS information booklet (www.ankylosing-spondylitis.ie/pdf/SUAS_info_booklet.pdf) and participants were made aware of PA guidelines. The second area was resources: participants were provided with information about community-based programs, hospital-based classes and online resources. The third area was goal setting: individual PA goals were established, and individualised action plans were devised. Potential barriers to goal attainment were identified and strategies to overcome these were discussed.

Follow-up sessions were arranged to review PA behaviour, monitor progress, review goals and provide support and encouragement. The frequency of follow-up sessions and the mode of follow-up (in person or telephone) were at the discretion of the participant. Weekly reminders of personal PA goals were sent to participants by mobile text message or email. If applicable, participants were granted access to a commercial platform^a to view individually tailored exercise programs.

Participants in the control group were informed of their group allocation by phone, and advised to continue with their habitual PA and medical management. They were only contacted by a member of the research team to schedule appointments for reassessment. No restrictions were imposed on beginning new PA routines, and appointments with healthcare professionals continued as normal.

Outcomes

Assessments were performed at baseline (Month 0), at the conclusion of the intervention period (Month 3), and following a 3-month follow-up period (Month 6). All physical fitness testing took place in the same exercise laboratory; equipment was calibrated prior to each session. Two physiotherapists trained in administering

Table 1
Behaviour change techniques used during the initial consultations and follow-up sessions (BCTTV1 labelling).²²

Domain	Technique
Goals and planning	Goal setting (behaviour and outcome), problem solving, action planning, review of behaviour and outcome goal(s), 'discrepancy between current behaviour and goals
Feedback and monitoring	Self-monitoring of behaviour and outcomes
Social support	Social support (unspecified and practical)
Shaping knowledge	Instruction on how to perform the behaviour, re-attribution
Natural consequences	Information about health and emotional consequences, monitoring of emotional consequences, anticipated regret
Comparison of behaviour	Social comparison
Repetition and substitution	Behaviour substitution, habit formation, habit reversal, generalisation of target behaviour, graded tasks
Comparisons of outcomes	Pros and cons, comparative imagining of future outcomes
Reward and threat	Social reward
Antecedents	Body changes
Identity	Incompatible beliefs
Self-belief	Verbal persuasion about capability, focus on past success

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