

RESEARCH ARTICLE

WILEY

Promoting engagement in physical activity in early rheumatoid arthritis: A proof-of-concept intervention study

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Funding information

Physiotherapy Research Foundation, Grant/Award Number: PRF-15-A05

Abstract

Objective(s): The aim of this study is to test the feasibility and acceptability of promoting engagement in physical activity in early rheumatoid arthritis (PEPA-RA) to inform a future trial.

Design: A 'proof of concept' study was carried out.

Setting: This study was conducted in community hospitals delivered by musculoskeletal primary care physiotherapists.

Participants: Participants were 12 adults with rheumatoid arthritis (RA) diagnosed 6–24 months previously (nine females, three males; mean age 58 years, range 23–79).

Intervention: The intervention consisted of five sessions, that is, four group sessions and one individual session facilitated by a physiotherapist over 12 weeks including patient education and support for behaviour change as well as supervised practical exercise.

Main outcomes: The main outcomes were attendance, completion of outcome measures, adverse events, and participant and physiotherapist feedback views relating to the intervention.

Results: Overall attendance was 85%, with sessions missed due to illness or RA flare. Outcome measure completion ranged from 83% to 100%. There were no clinically meaningful changes in pain or function at 12 weeks, but mean 6-min walk distance improved from 394 to 440 m. No serious adverse events were reported, and participants were generally positive about the intervention. Suggested minor modifications for the group sessions included venue accessibility and ensuring that physical activity time was protected. Several participants indicated that they would have liked to receive the intervention earlier following diagnosis.

Conclusions: PEPA-RA and the outcomes appear feasible and acceptable. Overall, small beneficial effects were noted at 12 weeks for most outcomes. Challenges to recruitment resulted in a smaller than anticipated sample size, and the majority of participants were active at baseline indicating that future recruitment needs to target less active individuals.

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KEYWORDS

musculoskeletal, physical activity, physical therapy, primary care, rheumatoid arthritis, self-management

1 | INTRODUCTION

Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune systemic disease, characterised by pain, fatigue, swollen and stiff joints and potential joint destruction, leading to loss of function and decreased mobility. People with RA do less physical activity (PA) than the general population, and this is associated with work disability and reduced physical function (Sokka et al., 2008). High-intensity training (Lemmey, Williams, Marcora, Jones, & Maddison, 2012) and supervised exercise (Baillet et al., 2010) can improve physical function in RA, while PA decreases chronic inflammation and reduces pain, without adversely affecting disease activity. Despite positive benefits, people with RA do not maintain PA beyond a supervised intervention (Lemmey et al., 2012).

People with RA report a range of barriers to PA and are often reluctant to participate for fear of exacerbating symptoms (Neuberger et al., 2007). It is therefore essential to provide appropriate support to overcome barriers soon after diagnosis, in order to optimise PA, minimise inappropriate health beliefs and prevent unnecessary reductions in function. People with RA report needing support to engage with PA following diagnosis (Withall, Haase, Walsh, Young, & Cramp, 2016) and often want more information relating to exercise (Allen, Carville, & McKenna, 2018).

Physiotherapists are well placed to provide support for PA as their approach is person-centred, taking into account the individual's health and well-being needs, and supporting self-management through patient education and the facilitation of behaviour change (Chartered Society of Physiotherapy, 2015). Whilst guidelines (National Institute for Health and Care Excellence (NICE), 2018) indicate that people with RA should have access to specialist physiotherapy to encourage regular PA, this rarely occurs in practice (National Rheumatoid Arthritis Society, 2013). Conversations regarding health promotion, including PA, need to occur early in the patient pathway and are best delivered within primary care (Chartered Society of Physiotherapy, 2015).

Based upon focus group findings with people with RA (Withall et al., 2016), in combination with evidence from a successful PA intervention for osteoarthritis (Hurley, Walsh, Mitchell, Nicholas, & Patel, 2012) and input from patient research partners, we designed an intervention for delivery in a primary care setting for people with recently diagnosed RA—promoting engagement in physical activity in early RA (PEPA-RA). The intervention, informed by a theoretical framework for health behaviour change, aims to support long-term PA engagement to optimise maintenance of physical function. The aim of this study was to test the feasibility of PEPA-RA and inform a future trial of the refined intervention.

2 | METHODS

The intention was to recruit up to 36 people with a recent diagnosis of RA (see Table 1 for inclusion/exclusion criteria) and deliver four PA intervention groups with six to nine participants per group. Recruitment was initiated in two large teaching hospital rheumatology outpatient clinics. Rheumatology staff received a familiarisation session and were encouraged to discuss the study with all patients recently diagnosed with RA. If patients expressed an interest, an information sheet was provided. Those declining the trial were offered a copy of the 'Keep Moving' booklet published by Arthritis Research UK. Where possible, reasons for declining were gathered. Due to poor initial recruitment, potential participants were also identified via general practice (GP) records by staff employed in the practice. GP letters of invitation were sent to those identified as potentially eligible, along with an information sheet and reply slip. Those expressing an interest were telephoned, providing an opportunity to ask questions about the study and, if appropriate, complete a screening interview. If they confirmed verbally that they would like to participate, they were referred to the physiotherapists delivering the intervention. Written consent was obtained at the initial session.

2.1 | Physiotherapist training

Band 6 musculoskeletal physiotherapists from primary care received training to deliver PEPA-RA via two half-day workshops. Training was led by a musculoskeletal physiotherapist with experience of delivering similar interventions (RT) and supported by a Rheumatology Clinical Specialist Physiotherapist (MD), a patient research partner (CS) and experts in the delivery of similar PA health behaviour change interventions (NW and AH). Following training, it was intended that four primary care physiotherapists would each deliver the intervention to a group of six to nine people.

TABLE 1 Participant inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> Adults with RA (Arnett et al., 1988) diagnosed in the previous 6–24 months Able to undertake a PA programme Understand and speak English Understand the purpose of the research and provide informed consent 	<ul style="list-style-type: none"> Diagnosis of RA less than 6 months or more than 2 years previously Unable to participate for medical reasons

Abbreviations: PA, physical activity; RA, rheumatoid arthritis.

The intervention consisted of four group sessions and a one-to-one session delivered over 12 weeks in a primary care setting. Each session included patient education and support for behaviour change as well as a supervised practical exercise component. The intervention was based upon a combination of self-determination theory (Ryan & Deci, 2000) and COM-B framework (capability, opportunity, motivation

and behaviour) (Michie, van Stralen, & West, 2011) and employed motivational interviewing techniques to promote behaviour change (Miller & Rollnick, 2013). The combination of group and a one-to-one sessions was intended to facilitate peer support (providing relatedness) and ensure individual support to meet specific needs (enhancing autonomy and competence). See Table 2 for further details of PEPA-RA.

TABLE 2 Description of PEPA-RA

	Summary	Content
Session 1 (Week 0) 2 h	Set and review goals, facilitate engagement and motivation, create an autonomy supportive environment and facilitate relatedness (connection with others 'like me'). Commenced with one hour of group discussion followed by a 15-min break and up to 45 min for a subsequent practical session.	Discussion topics related to current feelings and experiences of PA with RA. Participants discussed benefits of PA, relating to RA and generally, with support from the physiotherapist. They explored pacing and goal setting and were encouraged to consider implementation of these strategies. SMART (Specific, Measurable, Achievable, Realistic, and Time-framed) action plans (Locke, 1996) were negotiated, and individually tailored. Action plans were patient-centred and individuals supported to undertake PA of their choice to promote intrinsic motivation. The use of role models, peer support, individual goals, self-monitoring, modification of cognitive thoughts and beliefs about exercise were incorporated to enhance self-efficacy in doing PA and promote behaviour change (Knapp, 1988). Skills were taught to overcome temporary lapses in PA (Chao, Foy, & Farmer, 2000) as well as specific strategies to address PA barriers (Gyurcsik et al., 2009). Participants were encouraged to take ownership of individual action plans and select PA that they were likely to enjoy. They were encouraged to self-monitor PA goals through a daily diary and pedometers were available to take home.
Session 2 (Week 2) 2 h		
Session 3 (Week 4) 45 min	Individualised session at a location agreed between the patient and physiotherapist. Guided by the individual's SMART goals as well as practicalities faced by the physiotherapist including insurance issues and travel time. Example locations for the individual session included patient's home, community gym or swimming pool.	Participants were supported to identify community facilities for PA (opportunity (Ryan & Deci, 2000)). The session facilitated discussion of individual barriers to PA and identification of strategies to overcome them that may have been unique to the individual and their setting. Participants could invite a supportive 'other' to attend this session.
Session 4 (Week 8) 90 min	Group consolidation sessions. Commenced with 45 min of group discussion followed by a 15-min break and up to 30 min for a subsequent practical session.	Included discussion on problem solving in relation to barriers and setbacks, as well as relapse prevention. Due to the flare and remission pattern of RA there were periods when continued PA at the usual level was not practicable; recovery strategies and re-engagement methods were thus incorporated into the intervention.
Session 5 (Week 12) 90 min		

Abbreviation: PEPA-RA, promoting engagement in physical activity in early rheumatoid arthritis.

2.2 | Outcome measures

Participants completed outcomes at baseline and 12 weeks; overseen by the research fellow (RT) not involved in the intervention delivery, to minimise risk of bias. Acceptability of the outcomes was explored through the subsequent patient interviews (described below), as well as through percentage of analysable data. See Table 3 for details of outcome measures.

The following data were also collected where possible:

- Reasons for declining to participate
- Attendance
- Adverse events—data collected by the treating physiotherapist based upon events occurring during the sessions and participant report of events between sessions

- Queries received by the research team from the treating physiotherapists

Following the intervention, semistructured interviews were undertaken with the physiotherapists that delivered the intervention to explore views regarding the following: training and support provided; method of intervention delivery including number of sessions and time between sessions; intervention content, and any other issues relating to the training, the intervention or potential future study that they deemed important (see Appendix A for physiotherapist interview topic guide). Physiotherapists were encouraged to keep a reflective diary that they were able to refer to during the interview. A researcher (SM) not previously involved in the study carried out interviews.

Participants were also invited to undergo semistructured interviews to explore their experiences of the intervention, the support

TABLE 3 Means and standard deviations of mediators and outcomes

	Percent data completion	Baseline (mean)	12 weeks (mean)
Outcomes			
Pain-VAS scale ^a	88%	4.7	4.4
Function-VAS scale	88%	3.6	3.8
7-day PA: International Physical Activity Questionnaire—Short Form (Craig et al., 2003) (low, moderate, high)	83%	High (<i>n</i> = 6/12)	High (<i>n</i> = 6/12)
6-minute walk test (m) (Staalesen Strumse et al., 2009) ^b	88%	394	440
Function: modified Health Assessment Questionnaire (Pincus, Summey, Soraci, Wallston, & Hummon, 1983) (mild, moderate, severe) ^a	83%	Mild (<i>n</i> = 5/12)	Mild (<i>n</i> = 6/12)
Fatigue: Bristol Rheumatoid Arthritis Fatigue—Numerical Rating Scales (Nicklin et al., 2010): ^a			
• Level of fatigue	96%	5.18	5.09
• Effect of fatigue	96%	5.18	5.18
• Cope with fatigue	96%	3.45	4.63
Psychosocial mediators			
Self-efficacy for exercise (Gecht, Connell, Sinacore, & Prohaska, 1996)	92%	72.4	76.9
Motivation to exercise: Behavioural Regulation In Exercise Questionnaire version 2 (Markland & Tobin, 2004)	88%	40.1	44.4
EuroQol visual analogue scale (Hurst, Kind, Ruta, Hunter, & Stubbings, 1997)	88%	63.3	67.2
SF12-Physical component	88%	39.6	42.32
SF12-Mental component	88%	44.09	44.61
Perceived Autonomy Support for PA (adapted from Williams, McGregor, Zeldman, Freedman, & Deci, 2004) (Week 12 only)	92%	Not applicable	34.7 (range 24–42)
Psychological Need Satisfaction in Exercise (Wilson, Rogers, Rodgers, & Wild, 2006) (Week 12 only)	83%	Not applicable	40.6 (range 33–51)

Abbreviation: VAS, visual analogue scale.

^aLower score indicates improvement.

^bParticipants walked as far as possible on a hard, flat surface in 6 min.

material and outcome measures (see Appendix A for participant interview topic guide). They were also asked about additional outcomes that they experienced and any contact with the rheumatology team during the study period. A choice of face to face or telephone interview was offered. The researcher (SM) employed to carry out the interviews with physiotherapists also conducted patient interviews.

2.3 | Data analysis

Quantitative outcome data were reported using descriptive statistics including percentage of patients with analysable data and means and standard deviations calculated for the PA and psychosocial measures. Interview data were analysed using inductive thematic analysis (Braun & Clarke, 2006). FC and AH read the deidentified final transcripts several times and wrote down initial impressions independently before generating initial codes. They subsequently met to review and discuss themes and subthemes before finally labelling them.

2.4 | Ethical approval

Ethical approval was granted by the East Midlands—Leicester Central Research Ethics Committee (ref: 17/EM/0029), as well as from the Faculty Research Ethics Committee, UWE Bristol (ref: HAS.17.04.144).

3 | RESULTS

Nine females and three males were eligible and provided consent. Average age was 58 years (range 23–79 years). Four participants were in paid employment, four were retired, one was a student, one a homemaker, and two were in receipt of benefits. No one identified as being unemployed.

Challenges to recruitment in secondary care included rheumatology staff forgetting to inform patients about the study, insufficient time and nursing staff and administrators too busy to screen records. Further to this, one secondary care site commenced a PA programme for inflammatory arthritis patients during the recruitment period reducing potential participants (Skeates, Pearson, Derham, & Palmer, 2020). Although the study was registered via the Clinical Research Network portfolio, the secondary care settings were only participant identification sites meaning that research nurses could not support recruitment. Recruitment via GPs was more successful but limited by time as revision to ethical approval and recruitment of sites was required.

Twelve individuals provided reasons for not participating in the study and were not screened:

- Travel time/distance ($n = 3$);
- Existing commitments, including work ($n = 5$);
- Already physically active ($n = 2$); and

- No formal RA diagnosis ($n = 2$).

Twenty-one were considered for screening, of which 12 provided consent and participated: eight from secondary care and four from primary care. Of the remaining nine, three were not eligible, three were unable to make the dates offered due to work or holiday commitments, one declined due to personal circumstances, one declined due to travel distance to the intervention and the fatigue this would cause and one initially agreed to participate but failed to respond to further contact.

Only three Band 6 primary care musculoskeletal physiotherapists could be released for the training and delivery of PEPA-RA due to staff shortages. The intervention was delivered on three occasions with each physiotherapist delivering one full intervention (two groups of $n = 5$ and one group of $n = 2$). Overall attendance was 85% (51/60), with sessions missed due to illness or flare. The median number of sessions attended was four, with two minimum ($n = 1$ participant) and all five maximum ($n = 5$ participants). Therapists reported that some participants did not fully participate in the exercise component, predominantly due to fatigue.

No serious adverse events were reported. One participant was unable to participate in the full exercise session due to dizziness. This was an ongoing, pre-existing issue caused by low blood pressure, and following a few minutes rest, they were able to continue without dizziness. The same participant missed the one-to-one session due to a cold and the final two group sessions due to an ongoing back complaint unrelated to the intervention. One participant experienced a flare of their RA during the study period resulting in them missing the final session.

3.1.1 | Outcome measures

Completion of individual measures ranged from 83% to 100% (see Table 3). Only two participants changed their level of activity between baseline and 12 weeks with one demonstrating improvement and the other a deterioration (due to RA flare). For the 6-min walk test, missing data were all at Week 12 with one participant moving away and two declining the test (one due to back pain and one due to RA flare). Seven of the nine participants that completed pretest and posttest demonstrated improvement, one remained the same and one deteriorated. Only three participants demonstrated a meaningful change in function from baseline to 12 weeks, although the mean change was not clinically meaningful. For level of fatigue, six participants were worse, three better and two unchanged from baseline to 12 weeks. For fatigue effect, six were worse, four better and one unchanged. For coping, six were worse, two better and three unchanged.

Eight of the 10 participants with data at both time points demonstrated small improvements in self-efficacy for exercise. For motivation to exercise, four of the nine participants with useable data at both time points demonstrated improvement, four deterioration and one unchanged. There was no clinically important change on average

for quality of life, but four participants showed clinically important improvements in pain and one showed clinically important improvement in 'how well they were doing'.

3.2 | Qualitative findings: RA participants

All 12 participants were interviewed (see Table 4 for participant characteristics). Duration of individual interviews ranged from 24 to 79 min. There was an overall positive opinion towards PEPA-RA.

I really felt encouraged and enthusiastic towards being more physically active, improving my lifestyle, improving my life in general. P3

Three themes were identified from the data: *Confidence in Physical Activity*; *Interactions* and *Programme Dynamics*, each with four subthemes (see Table 5).

Confidence in Physical Activity included four subthemes:

i. Barriers

Co-morbidities as well as direct and indirect effects of RA limited PA. For example, the psychosocial consequences of RA led to lack of motivation to be active and fear avoidance prevented engagement. Other barriers included paying for gym membership when the unpredictable nature of RA flares interrupted attendance and finding suitable modes of exercise that could be maintained independently.

The challenge for me was identifying an exercise that I would benefit from and I was happy to do alone. P3

ii. Reassurance

Supervised exercise provided an opportunity to try things out in

TABLE 4 Participant characteristics

Participant ID	Sex	Age (years)	Time since RA diagnosis (months)
1	Female	59	11
3	Female	63	11
5	Female	65	23
6	Female	43	18
7	Male	79	13
8	Female	57	12
10	Female	54	20
12	Male	23	16
14	Female	67	11
15	Male	68	8
16	Female	66	22
17	Female	48	24

Abbreviation: RA, rheumatoid arthritis.

TABLE 5 Themes and subthemes from interviews with participants

Theme	Subtheme
Confidence in Physical Activity	Barriers
	Reassurance
	Knowledge
	Benefits experienced from the programme
Interactions	Benefits of the RA group
	Communication
	Group Challenges
	Physiotherapists Disposition
Programme Dynamics	Location
	Timing
	Support tools
	Exercise supervision from a trusted Health Professional

a safe environment with professional support providing reassurance about doing the right type of PA at the right level. Attending the programme gave individuals 'permission' to be physically active despite having RA.

I felt safe to be able to try those things out because someone with knowledge was alongside of me. P3

iii. Knowledge

Education on symptom management and joint protection as well as information on pacing, planning and prioritising PA gave participants confidence and motivation to be active. Whilst written information was welcomed, particularly for future reference, verbal summaries were also important. Identifying local opportunities for PA (i.e., group walks) would have been useful. No aspects of the education were deemed irrelevant, but specific information relating to diet and RA should be included.

The people running it ought to find out first what group activities are available in the areas that people come from so that they could advise them. P7

iv. Benefits experienced from the programme

Physical benefits reported included feeling stronger, more flexible and energetic, improved weight management, and reduced aches and pains. Psychological benefits included more confidence to exercise, feeling healthier and better emotionally, and importantly gaining enjoyment from PA. Some had found easier ways to do things including adapting exercises to accommodate specific joint problems.

... the pain doesn't go but I think it's a bit better since I've been exercising P17

The theme Interactions also had four subthemes:

i. Benefits of the RA group

The group provided a safe environment in which participants did not feel judged. It was also a distraction from symptoms.

If you are walking on your own you soon get pretty bored ..., but if you are walking with a group and nattering to them as the same time you can walk further without suffering any fatigue. P7

Despite group delivery, participants noted that individual challenges were recognised. The group provided opportunities for vicarious learning including how others were managing PA alongside their RA. Seeing others with the condition provided perspective and motivation to stay active. Group cohesion reduced feelings of social isolation and provided an opportunity to make new friends.

... whilst their problem may be the same as yours, their way of dealing with it is different. P8

ii. Communication

Having an opportunity to speak in confidence with the physiotherapist as provided in the one-to-one session was important.

... sometimes when you are in a group you cannot tell your personal things P16

Codelivery of the intervention by role models with established RA could enhance communication. Several participants expected direction in terms of specific exercise modes and parameters, though not a criticism, but highlighting a need for clearer information.

iii. Group challenges

Individuals dominating group discussions was a challenge.

... there's always the ones who will monopolise P8

Whilst there was suggestion to limit the time each person could talk, some preferred a less structured approach. Group size was key with small groups limiting opportunities for interaction, whereas larger groups meant some did not contribute much and exercise space was crowded. Gender balance was also a challenge with few males participating.

iv. Physiotherapists disposition

The physiotherapist was considered central to success of PEPA-RA: providing a safe environment, recognising and addressing fears

and instilling trust. Physiotherapists were identified as good communicators who were knowledgeable about RA. They were altruistic and willing to seek additional information if necessary.

... the advice from the physiotherapist was perfectly adequate P7

The final theme identified was Programme Dynamics with four subthemes:

i. Location

Access via public transport and accessible car parking were important. One individual limited participation in the exercise session to conserve energy for the bus journey home. A central location might be best, with level access. Space for the exercise session was important including enough equipment to avoid long waits.

... just taking turns so you stand there and wait, that in itself is an awkward thing to do. P8

The opportunity to exercise in a gym setting was welcome by some, whereas others preferred to exercise outdoors or at a familiar location. Finally, staff (e.g., receptionists) at the venue needed to be knowledgeable about the intervention.

ii. Timing

Some suggested that the exercise time needed protecting. Exercising at the start or in the middle and better group management could avoid the education session overrunning. Sitting throughout the education session caused some people discomfort and stiffness. In relation to time of day for delivery, daytime may not suit everyone, especially those in employment. Some questioned the spacing of sessions, particularly the longer gap between later sessions; suggesting the rationale was not clear to participants. Finally, some would have liked PEPA-RA earlier in the care pathway.

I wish it had been available at the beginning because some of the problems, some of the reason why I'm detached from the rest of the world is because in the early days I just sat and let it all fade away P3

iii. Support tools

Some found the pedometers difficult to use, whereas others found them too basic and had purchased accelerometers or used existing devices. Keeping a PA log was useful.

... by doing the daily logs it allowed me to actually pace myself P17

One participant indicated that they would have preferred PA support delivered remotely with exercise classes streamed over the internet.

iv. Exercise supervision from a trusted health professional

Overall participants welcomed the support received.

We had the physiotherapist there to help us decide how we could determine whether we were challenging ourselves enough or too much. P3

Some had expected directed exercise rather than a choice, although this was welcome. Some may have carried out more PA had they been given direct instruction. The individualised nature of the support was received positively, helping to overcome specific joint problems.

... you need to have trust in someone with knowledge of the condition and knowledge about physical exercise to be confident enough to say 'well this is hurting a bit but it's OK for me to do it'. P3

Information on specific exercises for affected joints would have been welcome to some. Finally, supervision of exercise was important with some wanting more feedback from the physiotherapist and others noting that the feedback relating to technique and effort had been very useful.

Towards the end of each interview, participants were asked for their opinions regarding the outcome measures. The majority indicated no concerns and only a few minor issues identified relating to the variable nature of RA as well as the need to recall 'average' values. Two participants suggested some repetition in the questions but did not view this as a problem.

3.3 | Qualitative findings: Physiotherapist data

All three physiotherapists were interviewed with individual interviews lasting between 35 and 65 min. The primary care musculoskeletal physiotherapists were positive regarding the training to deliver PEPA-RA and in relation to their experiences of delivering the intervention. Three themes were identified from the data: *Preparedness*, *Delivering PEPA-RA*, and *The Future of PEPA-RA* (Table 6).

Preparedness included the following subthemes:

i. Training content

This was perceived as comprehensive, although more time to focus upon individual session plans including a demonstration would have been welcome.

... a little bit more time about what was in each session plan, so a little bit more prepared in that sense Ph1

TABLE 6 Themes and subthemes from interviews with physiotherapists delivering PEPA-RA

Theme	Subtheme
Preparedness	Training content
	Receiving training
	Drawing upon experience
	Investing personal time
Delivering PEPA-RA	Positive experience
	Group benefits
	Group challenges
The Future of PEPA-RA	Timing
	Feasibility
	Exercise component
	Physiotherapist

They suggested that it would be useful to know what information patients received at diagnosis.

... we were told about the pathway and medical management but yeah, it's just sort of finding out if there is any other support provided. Ph2

ii. Receiving training

The physiotherapists were generally positive regarding the training, although a long gap before the delivery of the intervention should be avoided. Providing the instructor training where local secondary care RA is delivered might facilitate communication.

It would have been more helpful if it was held over at the [name] hospital, it would kind of helped with connections there a little bit more. Ph1

iii. Drawing upon experience

Prior training and experience of motivational interviewing and managing groups enhanced confidence.

I have had experience running motivational interviews and groups in the past so it's something I heard before and was able, due to my previous experience, I was able to implement into the sessions Ph3

The physiotherapists felt competent to manage patient concerns and redirect to rheumatology as appropriate, with no need to contact the rheumatology team or the team that provided training.

... one of the participants had a flare up of her condition, rheumatoid arthritis, so she had to contact the helpline and I felt like I was able to, based on the training, I was able to highlight that to her and facilitate so

basically encourage her to get in touch with the helpline Ph3

... people went off on massive tangents which is why it took a little longer, that's probably something I need to reflect and work on in the future. Ph2

iv. Investing personal time

All physiotherapists spent time outside of work preparing for delivery of PEPA-RA including making personal notes and re-reading training materials and patient handouts.

Some participants were still coming to terms with their RA diagnosis and requiring individual psychological support.

... I would go over it on the Sunday at home before I did it on the Monday Ph1

... a thing I wasn't prepared for was the fact that people were still very much coming to terms with their diagnosis, so needing lots of psychological support Ph2

The theme Delivering PEPA-RA included three subthemes:

Some participants had very low exercise tolerance.

i. Positive experiences

Physiotherapists thought that the patient handouts were very good, particularly the step plan and activity logs. The education sessions reportedly flowed well with good participant engagement. The one-to-one session was deemed beneficial, providing space for problem solving and an opportunity for the participant to discuss confidential information.

... a couple of the women in particular had very, very low baseline fitness ... so even just walking down the corridor to the group sessions was enough activity for them Ph2

The theme of the Future of PEPA-RA included four subthemes:

... people don't tell things in the group necessarily that they would say individually Ph3

i. Timing

It was felt that PEPA-RA should be offered sooner after diagnosis and patients made aware of it as soon as they are diagnosed.

A further positive experience related to the nature of the participants in that they were already motivated prior to commencing the programme.

I wonder if it could be done sooner, especially the education aspects Ph1

The patients were already quite motivated to make the change, so it was quite easy to kind of implement that. Ph1

ii. Feasibility

Despite clear interest, staffing pressures presented a challenge to freeing up appropriate physiotherapists. Group sizes would need to be sufficient to ensure financial viability, whilst still being manageable. The time needed by the physiotherapist to travel to the one-to-one sessions would also need consideration in relation to viability.

ii. Group benefits

Physiotherapists noted that more active participants provided inspiration and acted as role models. Group members also provided information and insights based upon personal experience.

... it's just the feasibility in departments to how much we can offer exercise classes and these education sessions because we are quite stretched on the whole Ph1

... everyone else found it quite inspiring having him in the group and probably that had a bit more of an impact than some of the things I was facilitating Ph2

iii. Exercise component

iii. Group challenges

The education session sometimes took longer than scheduled and training for skills to manage group discussions was an area for development.

Exercise sessions need tailoring to individual patient goals and therefore require flexibility. Portable equipment would allow delivery in a wide range of settings. A further suggestion was to deliver PEPA-RA in community gyms.

... setting up with portable equipment such as a gym ball or Theraband or step could be feasible. Ph3

iv. Physiotherapist

Prior experience of rheumatology, delivering group interventions and using motivational interviewing was important. In the absence of these skills, additional training would be needed. It was felt that there were suitable physiotherapists likely to be interested in delivering the intervention in future

... people would be engaged and interested to do it
Ph1

4 | DISCUSSION

The aim was to explore the feasibility of PEPA-RA and inform a future trial. Findings suggest that the format and content of the intervention were largely acceptable to patients and primary care musculoskeletal physiotherapists, with acceptability supported by the high attendance (85% of sessions). The intervention appears safe with no serious adverse events reported. The physiotherapists delivering PEPA-RA were confident that they could support participants adequately with no need to seek input from the rheumatology team or the team that provided the training.

The format of four group and one-to-one session was well received. The social opportunity was highly valued by participants with the group format appearing to be a key factor in enhancing motivation for PA, self-management and coping skills, and providing peer support and encouragement. Previous research has demonstrated greater health benefits with group exercise compared to exercising alone (Kanamori et al., 2016). In addition, the one-to-one exercise session provided opportunity to try a variety of activities in a safe environment with a focus upon personal goals. Having personally meaningful goals is key to autonomous motivation, a known predictor of PA maintenance in people with RA (Hurkmans et al., 2010).

The location of delivering PEPA-RA needs consideration as good public transport provision and adequate parking is vital. Physical space is also important to limit crowding during the exercise sessions. Delivering PEPA-RA using portable equipment or in a public gym setting were suggested as options. Providing the intervention in a publicly accessible setting may enhance sustainability.

Feedback regarding support materials was generally positive, notably the PA diaries helped participants self-manage PA by facilitating pacing and prioritisation. Participants and physiotherapists identified key behaviour change techniques, including action-planning, goal setting, problem-solving and self-monitoring, as helpful; reinforcing similar findings (Bird et al., 2013; Michie, Abraham, Whittington, McAteer, & Gupta, 2009). Several participants also indicated that the exercise handouts would continue to be useful prompts in the future. The physiotherapists were overwhelmingly positive regarding the

participant handouts and used them to supplement their training and existing knowledge.

The physiotherapists reported that the training received prior to delivering PEPA-RA had been comprehensive but needs to be undertaken close to the time of delivery. Locating the training in the local rheumatology unit may also help facilitate communication between health care providers. The physiotherapists were supportive of the intervention structure suggesting that it flowed well, although they did invest personal time in preparing for delivery. Participants suggested that the intervention structure was acceptable, in part, due to the support and encouragement from the individual physiotherapist, which may be key to effectiveness. The structure of discussion and exercise was acceptable to participants, although concerns were raised about the education session not being kept to schedule, affecting the time available for supervised PA. Time and group management should have more focus in future physiotherapist training.

For future evaluation and clinical implementation, methods to enhance intervention fidelity and therapist competence need consideration (Nezu & Nezu, 2005). Prior experience of treating people with RA, managing groups and motivational interviewing skills may be necessary for successful delivery of PEPA-RA. Therapist competence affects treatment effectiveness, and it may be possible to enhance competence with a detailed manual, training and regular supervision (Keefe, Main, & George, 2018). The benefit of supplementing skills with additional training is not however clear.

Participants explicitly noted that motivation was influenced by the intervention, with implicit reference to other motivational determinants such as beliefs about capability and increased confidence. The availability of choice within exercise sessions enabled participants to feel more in control, which is important for autonomous motivation (SDT; Ryan & Deci, 2000) and long-term maintenance (Knittle, De Gucht, Hurkmans, Vlieland, & Maes, 2016).

The outcome measures appeared to be acceptable based upon completion rates. Interview findings suggested minor concerns regarding recall, repetition, and the need to average symptom scores over time. Future evaluation of PEPA-RA should include objective PA assessment, as the International Physical Activity Questionnaire – Short Form can overestimate PA levels (Lee, Macfarlane, Lam, & Stewart, 2011). There was little mean change in any of the outcomes between baseline and 12 weeks, potentially due to the high PA levels of most participants at baseline. This is unsurprising as participants volunteered to take part in the study with the knowledge that it was a PA intervention, a common problem in PA trials (Neuberger et al., 2007; Nordgren, Friden, Demmelmaier, & Opava, 2014). This is not however reflective of the general RA population, and future research should target recruitment of those with lower levels of PA engagement.

Recruitment was challenging particularly via rheumatology clinics. Time pressures of a busy clinic might mean that recruitment was low priority and a dedicated research nurse therefore required. Most participants were recruited via mailshot with eligible patients easily identified by a GP administrator searching electronic medical records. Expanding the inclusion criteria to those with a new RA diagnosis may

aid recruitment and fits with the view from participants and physiotherapists that PEPA-RA should be offered earlier following diagnosis.

Acceptability must account for reasons for declining participation, which mainly related to work or other prior commitments. Participants in paid employment at the time of completing PEPA-RA reported limiting activity in the supervised exercise session to conserve energy, left early to return to work and lost pay to attend. This echoes previous findings that RA patients of working age often prioritise work over other activities, including physical exercise (Feldthusen, Bjork, Forsblad-d'Elia, & Mannerkorpi, 2013). In the future, flexible delivery options including weekends or evenings warrant consideration as well as sessions delivered remotely.

Limitations to this study include the fact that only 12 individuals completed the intervention with one group consisting of only two participants and the cost of delivering the intervention was not considered. To support clinical implementation of PEPA-RA, both clinical and cost effectiveness need demonstrating, including a clear indication of group size to guide financial viability.

5 | CONCLUSION

Participants were positive about PEPA-RA with several indicating that they would recommend it to others. It appears to be feasible, acceptable and safe for people with a recent RA diagnosis and consideration should be given to offering the intervention immediately following diagnosis. With appropriate training, PEPA-RA can feasibly be delivered by primary care musculoskeletal physiotherapists without rheumatology specialist expertise, in a primary care setting. Findings will be used to refine PEPA-RA in collaboration with patient research partners and a funding application developed to evaluate the intervention.

ACKNOWLEDGEMENTS

We would like to thank the physiotherapists that took part in the study and delivered the intervention as well as the individuals with rheumatoid arthritis that participated. We would also like to thank the funder of the project: Physiotherapy Research Foundation (Ref: PRF-15-A05). The authors declare no conflicts of interest.

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How to cite this article: Cramp F, Thomas R, Haase AM, et al. Promoting engagement in physical activity in early rheumatoid arthritis: A proof-of-concept intervention study. *Musculoskeletal Care*. 2020;18:487–500. <https://doi.org/10.1002/msc.1493>

APPENDIX A.

A.1 | Topic guide for interviews with primary care musculoskeletal physiotherapists

Overall purpose

- To explore with the physiotherapists
 1. The acceptability of the training package they received
 2. Their experiences relating to programme delivery
 3. The acceptability of the intervention
 4. The feasibility of the intervention (format, delivery method and location, content and support)

Main body:

1. The acceptability of the training package they received Thinking back to the training you received:
 - A. Was the location of the training suitable?
 - B. Was the training the right length? Would you have liked more or less information?
 - C. Did the training prepare you for the delivery of the intervention? If no, what was needed or required that was not captured?
 - D. What else would you like us to think about regarding this training that you feel you would have like to have known about?
2. Your experiences relating to programme delivery

The session plans were structured with each session having

- a. patient education
- b. support for behaviour change—were you previously experienced in using motivational interviewing techniques? How did you find these in practice?
- c. supervised practical exercise component (about the talk heard.. the self-reward)

How did this structure work out in delivery do you think?

Barriers/enablers/

- d. 3. The acceptability of the intervention

Is this intervention one that you feel can be sustainable? How many participants would you consider appropriate?

Do you feel the programme would be acceptable to other physios?

What banding of physiotherapist do you think should deliver the intervention?

Did you encounter any problems/concerns about such distress?

Do you have concerns over potential flare ups—any problems arising?

- e. 4. The feasibility of the intervention (format, delivery method and location, content and support)

Format and delivery method

- a. As you know, patients attended the physical activity intervention relating to the *timing of their RA diagnosis*. What is your view of the timing of the programme in relation to this aspect? Was it about right? Was it too early, too late? What would you recommend?
- b. Thinking now about the *group discussion sessions* you held? Which aspects of the discussion did you find worked best/worst? Were there any aspects of the discussion that you think we can cut out? Was there anything missing from the group

discussion? Do you have any other comments to make about the discussion sessions?

- c. Turning to the *group physical activity sessions* you held? Which aspects worked best/worst most/least helpful? How was the duration and level of difficulty of the activities for your group? Were there sufficient breaks for example? Do you have any other comments to make about the group physical activity session?
- d. Part of the intervention was an *individual session* with the participants from your group How did this session work? Do you have any recommendations to improve that session?
- e. Thinking about the handouts that you gave out during the physical activity intervention? Were there any handouts that you felt worked especially well? Were there any parts of the handouts that you felt should not be used?
- f. Were you able to answer questions/queries from your group satisfactorily?

Location

Where did you hold the intervention? Did this work well? Were there drawbacks to this location?

Support

Did you need any support from the trainers over the time you delivered the intervention? Or from anyone else, for example did you phone the rheumatology helpline or suggest to any of the participants that they should call the helpline? Can you tell me a bit more about this?

- Finally: Do you have any other comments that you would like to make about your experience of participating in the study?

General prompts

Can you give me an example?

Can you explain that a bit more?

Why do you say that?

A.2 | Participant interview topic guide

Overall purpose:

- To explore views and experiences relating to the physical activity intervention
- To discuss motivating factors that would help them to engage in PA in the future
- To explore views relating to the outcomes and/or benefits of PA as well as their experiences of the study questionnaires
- This will help us to refine the PA intervention for future patients

Main body:

Views and experiences of the physical activity intervention

- What is your overall view of the physical activity intervention?
- What is your view of the timing of the programme in relation to your RA diagnosis?

- What was your opinion of the group discussion sessions? What aspects of the discussion did you find most/least helpful? Were there any aspects of the discussion that you think should be omitted in future? Was there anything that you felt was missing from the group discussion? Do you have any other comments to make about the discussion sessions?
- What was your opinion of the group physical activity sessions? Which aspects did you find most/least helpful? What was your opinion of the duration and level of difficulty of the activities? Do you have any other comments to make about the group physical activity session?
- What was your opinion of the individual session with the physiotherapist? In your opinion could it have been improved in any way?
- What did you think about the handouts that you received during the physical activity intervention? Were there any particular aspects that you found helpful? Were there any parts of the handouts that you feel should not be used in future?
- What was your opinion of the way that the course was delivered? Do you have any comments to make about the physiotherapist that was leading the intervention? Were they able to answer any questions/queries satisfactorily? How well did they motivate you to be physically active?
- What did you think about the questionnaires that you were asked to complete at the beginning and end of the intervention? Were there any aspects that you found irrelevant? Were there any other questions that you feel should have been included?
- Overall, how useful did you find the intervention? Were there any disadvantages to taking part? Did you find that there were any unexpected benefits to taking part? Can you think of anyway that the intervention could be improved in future? In particular is there anything additional that you think should be included to motivate people with RA to participate in physical activity?
- Do you have any other comments that you would like to make about your experience of participating in the study?

General prompts

- Can you give me an example?
- Can you explain that a bit more?
- Why do you say that?