An outsourced health-enhancing physical activity programme for people with rheumatoid arthritis: exploration of adherence and response

The Harvard community has made this article openly available. Please share how this access benefits you. Your story matters

Citation

Published Version
doi:10.1093/rheumatology/keu444

Citable link
http://nrs.harvard.edu/urn-3:HUL.InstRepos:17295728

Terms of Use
This article was downloaded from Harvard University’s DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA
An outsourced health-enhancing physical activity programme for people with rheumatoid arthritis: exploration of adherence and response

Birgitta Nordgren¹, Cecilia Fridén¹, Ingrid Demmelmaier¹, Gunnar Bergström², Ingrid E. Lundberg³, Alyssa B. Dufour¹,⁴,⁵, Christina H. Opava¹,⁶ and the PARA Study Group*

Abstract

Objectives. The aims of this study were to document adherence to and changes in health-enhancing physical activity (HEPA) levels and self-reported and assessed functioning and to explore aspects of adherence and response during the first year of an outsourced 2-year HEPA programme in people with RA.

Methods. Two-hundred and twenty patients participated in this observational cohort study, which included daily physical activity, twice-weekly circuit training and biweekly support group meetings. Self-reported data included current (past week) and maintained (past 6 months) HEPA levels, sociodemographics and disease-related and psychosocial factors. Tests of aerobic capacity and muscle function were performed and anthropometric data were collected.

Results. Eighty-eight per cent of the participants completed 1 year assessments. Self-reported current and maintained HEPA increased. General health perception and a number of other self-reported disease-related and psychosocial factors improved, while exercise self-efficacy declined. Aerobic capacity, timed standing and grip strength improved and waist circumference decreased. The mean number of circuit training sessions performed was 48, the mean number of days with HEPA was 189 and the mean number of support group meetings attended was 9. Better adherence to circuit training improved general health, and better adherence to group meetings improved timed standing. Exercise self-efficacy improved among those adhering more to circuit training or support group meetings.

Conclusion. The outsourced HEPA programme had high retention and reasonable adherence. A number of health outcomes improved. Relationships between adherence to the programme components and response were not clear-cut and need further attention.


Key words: clinical trial, health behaviour, exercise, muscular strength, physical fitness, self-efficacy social cognitive theory, trans-theoretical model.
High retention and reasonable adherence indicated good feasibility of the outsourced HEPA programme in patients with RA. Physical activity and several health outcomes improved substantially in patients with RA during the 1 year HEPA programme. The relationship between adherence to the HEPA programme components and response in patients with RA was not clear-cut and needs further attention.
variables or HEPA compared with the 220 patients who started the programme.

**Intervention**

Three main components constituted the intervention programme: (i) at least moderate-intensity physical activity for at least 30 min on most days of the week; (ii) at least two weekly 45-min circuit training sessions, including both muscle strength training (50–80% of one repetition maximum, 3 × 10 repetitions) and aerobic exercises (60–85% of maximal heart rate) and (iii) biweekly support group meetings. The recommended number of circuit training sessions during the year was 104; the possible total HEPA, which included both daily physical activities and circuit training sessions, was 365. A maximum of 20–22 support group meetings were offered by the different participating sites. Participants who signed up and paid for a 1 year membership at a public training centre were initially instructed by the physical therapists (coaches) on how to perform the circuit training. They could then access the training centres whenever they preferred during opening hours and exercise together with regular members. The study coaches were available once a week at fixed times at each centre for optional consultations and advice on circuit training. Pedometers and access to a web page for step registration were provided to each participant in order to encourage daily physical activity. The support group meetings were informed by an active behavioural learning approach in line with social cognitive theory [18] and were guided by coaches who were trained to deliver the programme by facilitating the participants' learning of specific behavioural skills to enable incorporation of HEPA into daily routines [19]. More details of the intervention programme, which also included expert lectures, physical activity in different environments, challenge competitions and self-assessed aerobic capacity tests [20], have been published elsewhere [16].

**Measurements**

Participants were assessed at baseline and after 1 year using data retrieved from the Swedish Rheumatology Quality Register, patient files, mailed questionnaires, performance tests, anthropometrics and weekly text messages [16, 21].

**Self-reports**

Data on sociodemographics included age (years), gender, education (university versus below), income (above/below average Swedish income in 2008) and children under the age of 18 years at home (yes/no).

Disease-related variables included disease duration, comorbidities (including respiratory, cardiovascular, neurological and psychiatric disease, diabetes mellitus or other) and general health perception (primary response variable) [22], pain [23] and fatigue [24, 25] rated on a visual analogue scale. Quality of life was assessed with the EuroQol five-dimensions questionnaire (EQ-5D) [26] and activity limitation with the HAQ-DI [27].

Psychosocial variables were assessed with the Exercise Self-efficacy Scale (secondary response variable) [28, 29], the modified Fear-Avoidance Beliefs Questionnaire (secondary response variable) [30], the scales to measure social support for exercise behaviours [31] and two study-specific items concerning outcome expectations for physical activity on long-term health and present RA symptoms.

Data on self-reported current (in the past week) HEPA were collected with the short form of the International Physical Activity Questionnaire (IPAQ), assessing overall physical activity during the past week without separating aerobic physical activity from muscle strength training [32]. Maintained (> 6 months) HEPA was assessed with the Exercise Stage Assessment Instrument (ESAI) [33]. The original one-item ESAI was modified for the present study to include two items: one item on aerobic physical activity, defined as moderate-intensity activity for at least 30 min on at least 5 days/week, and one item on muscle strength training at least twice weekly, both followed by the question ‘Are you physically active according to this description?’.

**Performance tests and anthropometrics**

Performance tests of maximal aerobic capacity estimated from a submaximal bicycle ergometer test [34], lower limb function with the timed-stands test [35] and maximum and average grip strength with the Grippit device [36] were performed (secondary response variables). Anthropometric data on BMI, waist circumference and blood pressure (systolic and diastolic) were collected. Trained physical therapists independent of the intervention supervised tests and collected the data.

**Adherence**

Two text messages were sent once each week to collect data on the number of days during the past week that participants performed circuit training sessions and on how many additional days of the past week they performed at least moderate-intensity physical activity for at least 30 min [21]. Support group meeting attendance was registered by the coaches.

**Statistical analyses**

Descriptive statistics were calculated for baseline measurements using mean (s.d.) for continuous variables and proportions for categorical variables. Since the majority of participants reported a 10 for both items concerning outcome expectations, they were dichotomized into 10 vs <10 for analysis. Differences at baseline between the intervention sample and the 24 dropouts who did not start the programme and for those completing 1 year assessments vs those not completing them were examined using Student's t-test for continuous variables and χ² tests for categorical variables.

Changes from baseline to the end of the intervention year were examined for disease-related and psychosocial variables, HEPA levels, performance tests and anthropometric measures using generalized linear models. Using the two observations, at baseline and at the end of the
intervention year, β-coefficients and standard errors were calculated using a mixed model approach with a subject effect.

Adherence and response were explored in two subsequent analyses incorporating the three programme components—circuit training, total HEPA (including circuit training) and support group meetings—and the primary and secondary response variables.

Adherence

Participants were categorized into adherers and non-adherers based on 50%, 70% and 90% participation in circuit training sessions, total HEPA and support group meetings, respectively. The change in the primary and secondary response variables was calculated between baseline and the end of the intervention year and Student’s t-test was used to compare the mean changes in the response variables in adherers vs non-adherers.

Response

Participants were categorized into responders and non-responders based on 10%, 20% and 30% 1-year improvement in the primary and each of the secondary response variables. Student’s t-test was used to examine the differences in mean adherence to each of the three programme components in the responders and non-responders.

In addition to the above individual response variables, a total response variable was created based on improvement in general health perception and at least two out of three performance tests. Using the total response variable at the 10% level of improvement at the end of the intervention year, baseline characteristics of participants were compared in responders vs non-responders using Student’s t-test.

SAS/STAT version 9.3 (SAS Institute, Cary, NC, USA) was used for all analyses. Alpha levels were set to 0.05 for presentation of descriptive data for the 1 year change and baseline differences by responder status, while alpha levels were set to 0.01 to account for multiple testing in the exploration of different levels of adherence and response.

Results

Eighty-one per cent of the 220 participants were female, with a mean age of 59 years (s.d. 8.8) and a mean disease duration of 12 years (s.d. 9.6). Fifty-one per cent had a university education, 69% had income above the Swedish national average and 16% had children at home. Seventeen per cent had one and 40% had two or more co-morbidities. The most common co-morbidities were cardiovascular disease (n = 61; 51 of which had high blood pressure), lung disease (n = 21) and additional musculoskeletal conditions (n = 22). Current and maintained HEPA were reported by 60% and 0%, respectively, at baseline. Results of baseline assessments are displayed in Table 1.

Twenty-six participants did not complete the 1 year assessment. They did not differ (P > 0.05) from the remaining sample for any of the variables assessed at baseline. Reasons given for dropping out were mainly related to logistics, such as distance to the training centre (n = 2), training costs (n = 2) and work or family responsibilities (n = 3), but also negative feelings about the training concept or the training centre, the group meetings, the coaches and/or peers (n = 6). Other reasons were co-morbidities and injuries (n = 6). Seven participants gave no reason for dropping out.

One hundred and ninety-four (88%) of the 220 participants who started the programme were assessed after the intervention year with questionnaires (n = 191) and/or performance tests (n = 186). Their mean number of reported circuit training sessions was 48 (s.d. 36.2), the mean number of days with total HEPA was 189 (s.d. 92.3) and their mean registered support group meeting attendance was 9 (s.d. 6.4).

For those (n = 186) who answered the IPAQ at both baseline and the 1 year assessment, the proportion meeting current HEPA (during the previous week) increased from 55% to 82% (P = 0.0004). For those (n = 178) completing the ESAI at both assessments, the proportion reaching maintained HEPA (during the previous 6 months) increased from none to 37% (P = 0.0495). The participants improved their general health perception, quality of life and social support from friends and reduced their pain, activity limitation and fear avoidance beliefs during the 1 year intervention (Table 1). In contrast, exercise self-efficacy declined. The outcome of the performance tests indicated improved aerobic capacity, timed standing and grip strength. Waist circumference decreased (Table 1).

Greater adherence (at 50%, 70% and 90% levels) to group meetings or circuit training was related to greater improvement in exercise self-efficacy, and greater adherence to group meetings was also associated with greater improvements in timed standing compared with those who attended less (Table 2). Adherence to total HEPA was not associated with any of the response variables, nor was circuit training or support group meetings associated with general health perception, fear avoidance beliefs, maximal oxygen uptake (VO2max) or grip strength (complete data not shown).

Responses at the 10% and 20% levels in general health perception were more likely to occur among participants who adhered more to circuit training compared with those adhering less (Table 3). Other response variables were not statistically significantly related to adherence to the three programme components (complete data not shown).

The proportions of responders at the 10% improvement level having a university education, income above average and fewer co-morbidities were statistically significantly higher compared with non-responders, while the proportion of responders meeting current HEPA at baseline was lower than the proportion among non-responders (Table 4). Mean timed standing, mean grip strength and mean systolic blood pressure at baseline were lower among responders than among non-responders.
TABLE 1 Baseline data and 1 year changes for disease-related and psychosocial variables, performance tests and anthropometric measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline mean (s.d.)</th>
<th>Year 1 baseline (s.e.)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health, a VAS (0-100)</td>
<td>214</td>
<td>31 (20.8)</td>
<td>183</td>
</tr>
<tr>
<td>Pain, VAS (0-100)</td>
<td>218</td>
<td>29 (22.2)</td>
<td>178</td>
</tr>
<tr>
<td>Fatigue, VAS (0-100)</td>
<td>217</td>
<td>37 (25.7)</td>
<td>182</td>
</tr>
<tr>
<td>Quality of life, EQ-5D (0-100)</td>
<td>217</td>
<td>69 (18.4)</td>
<td>188</td>
</tr>
<tr>
<td>Activity limitation, HAQ-DI (0-3)</td>
<td>218</td>
<td>0.53 (0.50)</td>
<td>187</td>
</tr>
<tr>
<td>Exercise self-efficacy (6-60)</td>
<td>205</td>
<td>36 (11.8)</td>
<td>183</td>
</tr>
<tr>
<td>Fear avoidance beliefs (0-24)</td>
<td>218</td>
<td>6 (4.4)</td>
<td>188</td>
</tr>
<tr>
<td>Social support, family (0-65)</td>
<td>198</td>
<td>22 (14.1)</td>
<td>186</td>
</tr>
<tr>
<td>Social support, friends (0-65)</td>
<td>189</td>
<td>27 (14.6)</td>
<td>173</td>
</tr>
<tr>
<td>OE long-term health = 10, n (%)</td>
<td>217</td>
<td>172 (79)</td>
<td>186</td>
</tr>
<tr>
<td>OE RA symptoms = 10, n (%)</td>
<td>217</td>
<td>77 (35)</td>
<td>186</td>
</tr>
<tr>
<td>Estimated VO2max, l/min</td>
<td>173</td>
<td>2.10 (0.55)</td>
<td>137</td>
</tr>
<tr>
<td>Estimated VO2max, ml/kg/min</td>
<td>173</td>
<td>28.65 (8.57)</td>
<td>136</td>
</tr>
<tr>
<td>Timed standing, sec</td>
<td>214</td>
<td>22.6 (8.7)</td>
<td>181</td>
</tr>
<tr>
<td>Grip strength maximum (right), n</td>
<td>220</td>
<td>219.35 (113.07)</td>
<td>184</td>
</tr>
<tr>
<td>Grip strength average (right), n</td>
<td>220</td>
<td>186.30 (104.81)</td>
<td>184</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>211</td>
<td>26.7 (4.9)</td>
<td>178</td>
</tr>
<tr>
<td>Waist circumference, cm</td>
<td>218</td>
<td>91.8 (13.5)</td>
<td>182</td>
</tr>
<tr>
<td>Systolic blood pressure, mmHg</td>
<td>219</td>
<td>134.1 (16.4)</td>
<td>182</td>
</tr>
<tr>
<td>Diastolic blood pressure, mmHg</td>
<td>219</td>
<td>81.7 (9.7)</td>
<td>182</td>
</tr>
</tbody>
</table>

Alpha level set at 0.05 (shown in bold text). aGeneral health perception. EQ-5D: EuroQol five-dimensions questionnaire; HAQ-DI: Stanford Health Assessment Questionnaire Disability Index; OE: outcome expectations; VO2max: maximal oxygen uptake.

Discussion

In this study we evaluated an outsourced comprehensive HEPA programme in people with RA. The results indicate high retention but moderate adherence of about 50% to each of the three programme components. Nevertheless, self-reported HEPA levels, self-reported health outcomes and physical capacity increased significantly during the year. Our explorative analyses, although not clear-cut, revealed a number of interesting relations between adherence and response. A number of characteristics to help target potential responders for outsourced HEPA programmes were also identified.

The study programme was based on public health recommendations on HEPA, evidence-based exercise recommendations for people with RA and theory- and evidence-based behaviour modification techniques. It was delivered by physical therapy coaches specifically trained to deliver the programme in training facilities with convenient access for the participants. Although retention in the study was good, adherence to the three programme components seems modest. It may be that our expectations of reaching the recommended levels of HEPA were set too high in the design of the study; however, the reported mean days of total HEPA during the year still represented a major increase compared with previous levels, which was also indicated by IPAQ and ESAI changes at the 1 year assessments.

The modest, but significant, changes in physical performance are in line with those of our previous 1 year randomized controlled trial of a HEPA programme and better than those of a previous HEPA programme mainly delivered over the Internet [12, 14]. While results from HEPA studies have previously been mixed [12, 14] regarding changes in HEPA behaviour, the results of the present intervention support an improvement. In comparison with clinically supervised long-term exercise studies [37, 38], however, the improvements of physical capacity and activity limitation in HEPA studies seem modest, which indicates that the delivery of outsourced HEPA programmes with limited supervision from health professionals is challenging and may need further improvement.

Greater improvement in timed standing for those attending at least 50% of the support group meetings compared with the rest of the sample may be explained by better quality in total HEPA performance, as they were constantly reminded by group peers and their physical therapist coaches about the necessity of keeping the intensity up. Better adherence to circuit training sessions resulting in improved health perception is in line with recent findings of positive associations between physical activity and perceived health [10, 39] and may be attributed to potentially improved physical capacity following circuit training rather than moderate-intensity physical activity.

The decrease in exercise self-efficacy found at the 1 year assessments of the present study may be an effect of response shift, that is, self-efficacy may decline once a person realizes what it takes to obtain HEPA and feels that
it is impossible. Such feelings could possibly have been better addressed in the programme and physical activity better adjusted to each person’s preference and level of functioning. Not surprisingly, those with better adherence to circuit training sessions thus improved their self-efficacy for exercise.

Responders to the present HEPA programme had a tendency to have more co-morbidities, less current HEPA and poorer capacity in performance tests at baseline. This might indicate that those with low functioning benefit more from a HEPA programme, a result in agreement with previous studies involving people with arthritis and healthy individuals [40].

<table>
<thead>
<tr>
<th>Intervention component</th>
<th>Health</th>
<th>Exercise self-efficacy</th>
<th>Timed standing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Health</td>
<td>VAS (0–100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exercise self-efficacy (6–60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Timed standing, s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit training, 50%</td>
<td>91</td>
<td>–2 (24.8)</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>91</td>
<td>–4 (19.1)</td>
<td>88</td>
</tr>
<tr>
<td>Circuit training, 70%</td>
<td>134</td>
<td>–2 (23.7)</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>–6 (16.9)</td>
<td>47</td>
</tr>
<tr>
<td>Circuit training, 90%</td>
<td>160</td>
<td>–2 (23.3)</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>–8 (8.2)</td>
<td>22</td>
</tr>
<tr>
<td>Total HEPA, 50%</td>
<td>76</td>
<td>–4 (24.2)</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>106</td>
<td>–2 (20.7)</td>
<td>104</td>
</tr>
<tr>
<td>Total HEPA, 70%</td>
<td>128</td>
<td>–2 (23.7)</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>–5 (18.1)</td>
<td>54</td>
</tr>
<tr>
<td>Total HEPA, 90%</td>
<td>167</td>
<td>–2 (22.3)</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>–13 (18.1)</td>
<td>14</td>
</tr>
<tr>
<td>Group meetings, 50%</td>
<td>83</td>
<td>–5 (20.2)</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>99</td>
<td>–2 (23.6)</td>
<td>92</td>
</tr>
<tr>
<td>Group meetings, 70%</td>
<td>124</td>
<td>–5 (21.1)</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>1 (23.7)</td>
<td>55</td>
</tr>
<tr>
<td>Group meetings, 90%</td>
<td>170</td>
<td>–3 (22.5)</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>3 (15.9)</td>
<td>11</td>
</tr>
</tbody>
</table>

Alpha level set at 0.01 (shown in bold text). aGeneral health perception. HEPA: health-enhancing physical activity; VAS: visual analogue scale.

<table>
<thead>
<tr>
<th>Response variable</th>
<th>Circuit training</th>
<th>Total HEPA</th>
<th>Support group meetings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean (s.o.)</td>
<td>$P$-value</td>
</tr>
<tr>
<td>$\Delta$Health, 10%</td>
<td>0</td>
<td>83</td>
<td>46 (32.9)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>99</td>
<td>60 (36.5)</td>
</tr>
<tr>
<td>$\Delta$Health, 20%</td>
<td>0</td>
<td>91</td>
<td>46 (32.4)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>91</td>
<td>61 (37.0)</td>
</tr>
</tbody>
</table>

0: non-responders; 1: responders. aCircuit training sessions recommended: $\geq 104$. bPossible total HEPA sessions, including both circuit training and daily physical activity = 365. cSupport group meetings = 20–22. dHealth: general health perception. $P < 0.05$ in bold. HEPA: health-enhancing physical activity.

As this study is clearly not a randomized controlled trial, the changes described over the intervention year cannot be attributed exclusively to the HEPA programme. An initial intention to use invited patients who abstained from participation to demonstrate the natural course of functioning and health had to be abandoned since the two samples differed at baseline on a number of sociodemographic, disease-related and psychosocial variables [17]. However, the present study was never designed to evaluate effects of the HEPA programme per se, but rather to explore adherence and response aspects.

Participant recruitment via a national patient register is indeed a strength of this study, as is the inclusion of a
large, well-defined sample. Despite each participant meeting the inclusion criteria for not obtaining HEPA at baseline, it still seems that they constituted a fairly physically fit and active study sample. This certainly limits the external validity of the study, but also left little room for improvement, resulting in less variation in changes over the year and limited possibilities of identifying relationships between adherence and response. Only 11% of the targeted sample started the programme, clearly showing the difficulties in recruiting participants for long-term interventions [17]. A resulting limitation of our study is that we did not recruit a large enough sample to perform fully powered analyses for women and men separately.

Despite introducing and encouraging the participants to obtain sufficient HEPA, the coaches had limited opportunities to follow-up on individual performance and thus, while HEPA frequency was controlled, its quality was largely unknown. Another coaching challenge was the tailoring of HEPA support to individual needs among groups of participants with substantial variations in both previous HEPA experience and health conditions. On the other hand, peer support was encouraged and many participants met at the training centre or at walking trails to challenge each other to perform at their best.

The influence of social desirability cannot be excluded in a study such as the present one, nor can response shift, as discussed previously for self-efficacy, but it may also be true for HEPA reporting. Physical capacity tests may be biased, although we trained physical therapists at the eight participating sites to perform the tests. Differences in equipment and other local facilities, as well as variations in rigour and accuracy, may have caused bias, but since the same participants were tested at the same units on both occasions, this might be of minor importance.

Outsourcing of HEPA programmes is necessary in order to support people with RA that cannot be constantly supervised in health care environments. The present study used physical therapists trained to coach HEPA

| TABLE 4 Baseline characteristics of responders (at the 10% level) and non-responders |
|--------------------------------------|--------------------------------------|--------------------------------------|
| Age, mean (s.d.), years | 58 (9.9) | 60 (8.4) | 0.2173 |
| Females, n (%) | 66 (83) | 82 (79) | 0.5357 |
| University education, n (%) | 36 (45) | 62 (60) | 0.0489 |
| Income above average, n (%) | 50 (63) | 79 (7) | 0.0485 |
| Children at home, n (%) | 16 (20) | 15 (14) | 0.3164 |
| Disease duration, mean (s.d.), years | 12.25 (8.62) | 11.68 (9.36) | 0.6804 |
| Co-morbidities, n (%) | | | |
| 0 | 40 (50) | 41 (39) | 0.0335 |
| 1 | 6 (8) | 22 (21) | 0.5357 |
| ≥2 | 34 (44) | 41 (39) | 0.0335 |
| Health, mean (s.d.), VAS 0–100 | 31 (21.0) | 26 (19.9) | 0.1198 |
| Pain, mean (s.d.), VAS 0–100 | 28 (21.3) | 25 (22.0) | 0.4611 |
| Fatigue, mean (s.d.), VAS 0–100 | 38 (25.8) | 33 (25.7) | 0.2269 |
| Quality of life, mean (s.d.), EQ-5D 0–100 | 70 (17.3) | 72 (16.8) | 0.4686 |
| Activity limitation, mean (s.d.), HAQ-DI 0–3 | 0.56 (0.5) | 0.44 (0.5) | 0.1023 |
| Fear avoidance beliefs, mean (s.d.), 0–24 | 6 (3.3) | 6 (3.0) | 0.5221 |
| Exercise self-efficacy, mean (s.d.), 0–60 | 35 (12.2) | 35 (12.1) | 0.9809 |
| Social support, family, mean (s.d.), 0–65 | 25 (15.0) | 28 (14.8) | 0.2428 |
| Social support, friends, mean (s.d.), 0–65 | 20.62 (13.46) | 24 (14.4) | 0.1813 |
| OE long-term health = 10, n (%) | 67 (84.8) | 80 (78.4) | 0.2759 |
| OE RA symptoms = 10, n (%) | 24 (30.4) | 38 (37.4) | 0.3337 |
| Current HEPA, n (%) | 39 (49) | 69 (67) | 0.0164 |
| Estimated VO2max, mean (s.d.), l/min | 2.05 (0.57) | 2.17 (0.54) | 0.1751 |
| Estimated VO2max, mean (s.d.), ml/kg/min | 27.31 (7.18) | 29.91 (9.35) | 0.0591 |
| Timed standing, mean (s.d.), s | 23.3 (7.5) | 20.8 (7.6) | 0.0267 |
| Grip strength maximum, mean (s.d.), cm | 203.88 (112.24) | 234.62 (117.33) | 0.0743 |
| Grip strength mean, mean (s.d.), cm | 169.96 (102.51) | 202.74 (108.64) | 0.0390 |
| BMI, mean (s.d.), kg/m² | 27.1 (5.2) | 26.6 (4.9) | 0.5685 |
| Waist circumference, mean (s.d.), cm | 92.5 (14.1) | 91.8 (13.8) | 0.7046 |
| Systolic blood pressure, mean (s.d.), mmHg | 129.3 (15.3) | 134.6 (15.9) | 0.0259 |
| Diastolic blood pressure, mean (s.d.), mmHg | 81.0 (9.1) | 81.02 (9.9) | 0.9611 |

Alpha levels set at 0.05 (shown in bold text). aGeneral health perception. EQ-5D: EuroQol five-dimensions questionnaire; HAQ-DI: Stanford Health Assessment Questionnaire Disability Index; HEPA: health-enhancing physical activity; OE: outcome expectations; VO2max: maximal oxygen uptake.
behaviour changes, and although initially uncomfortable
with abandoning their role as experts for that of coach,
they gradually adjusted and even started to use their new
skills in everyday clinical practice [19]. We firmly believe
that physical therapists need to be involved in hands-on
HEPA instruction, but do not exclude the possibility that
trained laypeople could lead the support groups, as has
been done successfully in arthritis self-management pro-
grammes [41].

The current HEPA programme seemed to suit the needs
of certain participants better than others and their experi-
ences indicate a great variation, highlighting the need to
individualize HEPA programmes regarding settings, exer-
cise formats and behavioural support [42]. How to target
the right people and how to tailor the programmes to their
individual needs in order for them to adopt and maintain
HEPA is a major challenge for future research.

Acknowledgements

We gratefully acknowledge the participants for their time
and effort and the support from professor Staffan
Lindblad and the Swedish Rheumatology Quality
Register for providing access to data. Members of the
PARA Study Group: physical therapists Christina
Eriksson, Annelie Nordström, Eva Prinzell and Malin
Wisell, Linköping University Hospital, Linköping; Birgitta
Folin, Helena Heldt, Carina Sjöman and Maria Währman,
Norrköping Hospital, Norrköping; Eva Frykstad, Anna
Moberg, Hanna Olsson and Johanna Pettersson,
Mälarsjukhuset, Eskilstuna; Anna Hallén and Sofia
Sandström, Karolinska University Hospital, Solna; Anna
Dahlgren and Åsa Lindkvist, Karolinska University
Hospital, Huddinge; Erica Christensen, Elin Löfberg and
Sara Stråt, Danderyd University Hospital, Stockholm;
Katrin Bylander, Ingrid Larsson and Maria Skogmyr,
Östersund Hospital, Östersund; Sofia Blomqvist and
Susan Sandberg, Sunderby Hospital, Luleå; Anna
Nordin, Winternet, Boden; Emma Svärdf, Karolinska
Institutet, Stockholm; Anne Marie Norén, Stockholm
County Council, Stockholm, Sweden.

Funding: This study was supported by the Swedish
Research Council, Combine Sweden, the Swedish
Rheumatism Foundation, the Strategic Research
Program in Health Care Sciences and the National
Postgraduate School of Health Care Sciences.

Disclosure statement: The authors have declared no
conflicts of interest.

References

1 World Health Organization. Physical Activity and Adults.
http://www.who.int/dietphysicalactivity/factsheet_adults/
2 National Health Service. Physical activity guidelines for
adults. http://www.nhs.uk/Livewell/Fitness/Pages/phys-
cical-activity-guidelines-for-adults.aspx (21 March 2014,
date last accessed).
3 Centers for Disease Control and Prevention. 2008 Physical
physicalactivity/everyone/guidelines/adults.html (21
March 2014, date last accessed).
4 Haskell WL, Lee IM, Pate RR et al. Physical activity and
public health: updated recommendation for adults from
the American College of Sports Medicine and the
39:1423–34.
5 Krishnan E, Lingala B, Bruce B, Fries JF. Disability in
rheumatoid arthritis in the era of biological treatments. Ann
6 Symmons DP, Gabriel SE. Epidemiology of CVD in
rheumatic disease, with a focus on RA and SLE. Nat Rev
Rheumatol 2011;7:399–408.
7 Taylor P, Manger B, Alvaro-Gracia J et al. Patient
perceptions concerning pain management in the
treatment of rheumatoid arthritis. J Int Med Res 2010;38:
1213–24.
8 Tierney M, Fraser A, Kennedy N. Physical activity in
rheumatoid arthritis: a systematic review. J Phys Act
9 Demmelmaier I, Bergman P, Nordgren B, Jensen I,
Opava CH. Current and maintained health-enhancing
physical activity in rheumatoid arthritis—the PARA 2010
10 Larkin L, Kennedy N. Correlates of physical activity in
adults with rheumatoid arthritis: a systematic review.
11 Demmelmaier I, Åsenlöf P, Opava CH. Supporting step-
wise change. Improving health behaviors in rheumatoid
arthritis with physical activity as the example. Int J Clin
Rheumatol 2013:8:89–94.
12 Brodin N, Eurenius E, Jensen I, Nisell R, Opava CH.
Coaching patients with early rheumatoid arthritis to
healthy physical activity: a multicenter, randomized, con-
13 Sjöquist ES, Brodin N, Lampa J, Jensen I, Opava CH.
Physical activity coaching of patients with rheumatoid
arthritis in everyday practice: a long-term follow-up.
Musculoskeletal Care 2011;9:75–85.
14 van den Berg MH, Ronday HK, Peeters AJ et al. Using
internet technology to deliver a home-based physical ac-
tivity intervention for patients with rheumatoid arthritis: a
randomized controlled trial. Arthritis Rheum 2006;55:
935–45.
15 Arnett FC, Edworthy SM, Bloch DA et al. The American
Rheumatism Association 1987 revised criteria for the
31:315–24.
16 Nordgren B, Friden C, Demmelmaier I, Bergstrom G,
Opava CH. Long-term health-enhancing physical activity
in rheumatoid arthritis—the PARA 2010 study. BMC Public
Health 2012;12:397.
17 Nordgren B, Friden C, Demmelmaier I, Opava CH. Who
makes it to the base? Selection procedure for a physical
activity trial targeting people with RA—the PARA 2010
18 Bandura A. Social cognitive theory: an agentic perspec-
An outsourced physical activity programme in RA

19 Nessen T, Opava CH, Martin C, Demmelmaier I. From clinical expert to guide: experiences from coaching people with rheumatoid arthritis to increased physical activity. Phys Ther 2014;94:644–53.


33 Burbank PM, Riebe D. Promoting Exercise and Behavior Change in Older Adults: Interventions with the Transtheoretical Model. New York, NY, USA: Springer, 2002.


42 Demmelmaier I, Lindkvist Å, Nordgren B, Opava CH. “A gift from heaven” or “This was not for me”. A mixed methods approach to describe experiences of participation in an outsourced physical activity programme for persons with rheumatoid arthritis. Clin Rheumatol 2014 Jun 20 [Epub ahead of print].