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ORIGINAL ARTICLE

A goal management intervention for patients with polyarthritis and elevated levels of depressive symptoms: a quasiexperimental study

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ABSTRACT

Purpose: Goal was to establish whether an intervention that aims to increase goal management competencies is effective in decreasing elevated levels of depressive symptoms and increasing well-being in patients with polyarthritis.

Materials and methods: Eighty-five persons with polyarthritis and elevated levels of depressive symptoms participated in the goal management intervention consisting of six group-based meetings. A quasiexperimental design with baseline measurement, follow-up at 6 months and a reference group of 151 patients from an observational study was applied. Primary outcome was depression; secondary outcomes were anxiety, purpose in life, positive affect, satisfaction with participation, goal management strategies, and arthritis self-efficacy. A linear mixed model procedure was applied to evaluate changes in outcomes.

Results: No improvement was found for depressive symptoms and no changes were found for the secondary outcomes, except for positive affect that improved in the intervention group. This increase was mediated by an increase in goal adjustment. Furthermore, goal maintenance decreased and self-efficacy for other symptoms increased in the intervention group.

Conclusion: This study indicates that interventions designed to aid patients with arthritis with goal management skills are potentially helpful for increasing positive affect, although further studies are needed.

➤ IMPLICATIONS FOR REHABILITATION

- People with polyarthritis have to manage their disease in combination with possibly conflicting roles and personal goals, resulting in an ongoing process of finding equilibrium in a constantly changing situation.
- Based on a person-focused view, the program *Right on Target* focused on coping with threatened activities and life goals due to arthritis.
- The program consisted of six group-based meetings led by a trained nurse and a personal trajectory wherein participants were stimulated to try out various behavioral options related to an own threatened activity in concordance with their personal goals.
- The program seemed effective in increasing flexible goal adjustment and self-efficacy and participants experienced more positive affect directly after the program and at 6-month follow-up.

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Psychological well-being; depression; adaptation; self-management; health promotion; goal management strategies; person-focused intervention

Introduction

Chronic diseases, such as polyarthritis, present a number of challenges to patients in several life domains [1]. People with a chronic disease have to manage their disease in combination with possibly conflicting roles and tasks, and this daily management takes place mostly outside the healthcare system [1,2]. Interventions that help participants acquire skills and techniques are seen as essential to supporting patients to achieve self-management [3]. Adaptation to chronic disease is an ongoing process of finding equilibrium in a situation that can constantly change [4]. The psychological component of this process of adaptation to a chronic disease has been described as healthy rebalancing to new circumstances [5].

In the present study, the effect of a health promotion intervention that focused on coping with threatened activities and life goals due to arthritis was evaluated. Characterized by systemic inflammation, swelling, chronic pain, fatigue, and disability, polyarthritis is a collective term for a variety of chronic conditions associated with autoimmune pathologies. The intervention, called *Right on Target*, aimed at helping people with polyarthritis and elevated levels of depressive symptoms to increase their goal management competencies and thereby increase their adaptation. Depression and anxiety are components of psychological distress that affect 20 to 40% of the patients [6–12]. Symptoms of depression were chosen as a primary outcome since it is the most studied outcome in relationship to goal management in chronic diseases [13–16] and particularly well-researched and documented among patients with arthritis [8,17–19].

The present study investigated whether the intervention was effective in improving depressed mood (primary outcome) and anxiety, purpose in life, positive affect, and satisfaction with social

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participation (secondary outcomes) in people with polyarthritis. The outcomes were chosen in order to formulate a multi-dimensional display of successful adaptation that includes the absence of psychological distress, and the presence of well-being [4,5,20,21]. Several positive concepts can prevent psychopathology and promote a satisfying life with polyarthritis. First, the sense of a purpose in life is largely derived from having valued activities in which to engage [22]. Purpose in life was found to be related to quality of life in arthritis patients [23] and goal management [20]. Second, the experience of positive affect is considered an indicator of adaptation and psychological health [4]. Positive affect can reduce the negative influence of pain on well-being and prevent clinical depression [4,24–26]. In addition, the participation in society of persons with arthritis is often negatively affected by symptoms and limitations caused by the disease [27,28]. The assessment of social roles is largely subjective as they are carried out from a sense of personal value or necessity [29]. The subjective nature of participation was considered of particular interest since the intervention focused on the management of personal goals.

Perceived self-efficacy – the confidence that one can accomplish a particular goal – is considered a key mechanism through which existing self-management programs increase health behavior and health status [30,31]. The goal management intervention contains some of the behavior change techniques that are considered to enhance the self-efficacy process [31,32]. Therefore, self-efficacy for coping with symptoms of arthritis was included as a putative mediator.

The intervention was designed based on theories of goal management [33]. Having personal goals and striving towards them gives individuals structure and meaning to their lives and is essential for well-being, identity, purpose in life, and satisfaction [22,34,35]. However, pursuing personal goals may also produce negative psychological effects when they become unattainable or no progress is made [36,37]. Goal management strategies refer to the various strategies that can be applied to minimize discrepancies between the actual situation and the goals of an individual.

Earlier studies linked the goal management strategies to levels of distress and well-being in patients with polyarthritis [20,21]. The inability to use several strategies – low coping flexibility [38] – was linked to lower levels of adaptation, while a broad repertoire of goal management strategies was related to higher levels of adaptation. Being capable of using different approaches in different situations can be especially beneficial for people with inflammatory arthritis, as they must deal with the disease's unpredictable inflammatory and fluctuating course [39]. To facilitate participants' coping flexibility general applicable goal management competencies that can be used in daily life for various situations are learned during the intervention. *Right on Target* assumes a person-focused perspective in which all aspects of a patient's life are included [33].

The intervention derives from the comprehensive Integrated Model of Goal Management, which combines four strategies from two established models [20]: (1) the maintenance of goals and adjustment of goals [35,40] and (2) the disengagement of goals and reengagement in new goals [41]. The first strategy, goal maintenance, involves attempts to alter unsatisfactory life circumstances and situational constraints in accordance with personal preferences. Goal adjustment covers the adjustment of personal goals, which involves the revision of self-evaluative standards and prsonal goals in accordance with perceived benefits and losses. Thirdly, goal disengagement is theorized to be a facet of the broader strategy of goal adjustment as it conceptualizes the ultimate form of adjusting goals [20]. Goal disengagement occurs when a goal is perceived as no longer attainable, and the individual withdraws any effort and commitment to that goal. Finally, the fourth strategy is goal reengagement, which includes identifying, committing to and starting to pursue new goals. In an earlier study, patients referred to and saw these four strategies as behavioral options [42].

Materials and methods

Trial design

For a full description of this study's design, as initially planned, please refer to Arends et al. [33]. Originally, the study was planned as a randomized controlled trial. After the trial commenced, substantial changes were made to the study design that were not described in the publication. Changes are described briefly in this section and have been fully listed in the trial register. Changes were made to the design, due to the initial small number of applicants. All eligible participants were assigned to the intervention group after enrollment, resulting in a quasiexperimental study design. The reference group consisted of selected polyarthritis patients who participated in a longitudinal observational study that ran from October 2010 to June 2012 [20,21]. Furthermore, the statistical analysis applied was changed from the analysis of variance for repeated measures to the more sophisticated linear mixed model procedure. The latter corrects for correlated observations (i.e., several measurements within one subject over time) and no separate intention to treat analysis is needed as all available data are analyzed [43]. In addition, changes were made to facilitate data comparison. First, the cost-effectiveness measurements were disregarded as no data on costs and use of health services were measured in the observational cohort where the reference group was drawn from. Second, the follow-up of 8 months for the intervention group was brought forward to 6 months to correspond to the data available in the observational cohort. Third, a number of questionnaires did not match between the two surveys and, therefore, were not addressed in the current study. The study protocol was registered at www.trialregister.nl, under number NTR3606, and published [33]. Ethical approval for this study was granted by the Medical Ethics Committee Twente.

Procedure of recruitment and data collection

Intervention group

Participants were recruited by: inviting participants from four arthritis clinics in The Netherlands, contacting participants of previous studies, listing news items in local newspapers, and placing announcements in local patient organization bulletins. Recruitment ran from October 2012 to October 2013. Applicants received information by post along with an application form, an informed consent, and a screening questionnaire. Inclusion criteria were age $\geq$18 years, a diagnosis of polyarthritis, and a score of $\geq$4 on the depression subscale of the Hospital Anxiety and Depression scale (HADS-D). Exclusion criteria were severe psychological distress (indicated by a score of $\geq$22 on the HADS), insufficient Dutch language skills, and/or enrollment in psychotherapeutic treatment at the time of entry into the study.

Reference group

Participants for the longitudinal observational study were randomly selected from the electronic diagnosis registration system of a rheumatology clinic and subsequently received an invitation for the questionnaire study. The same criteria used to select the

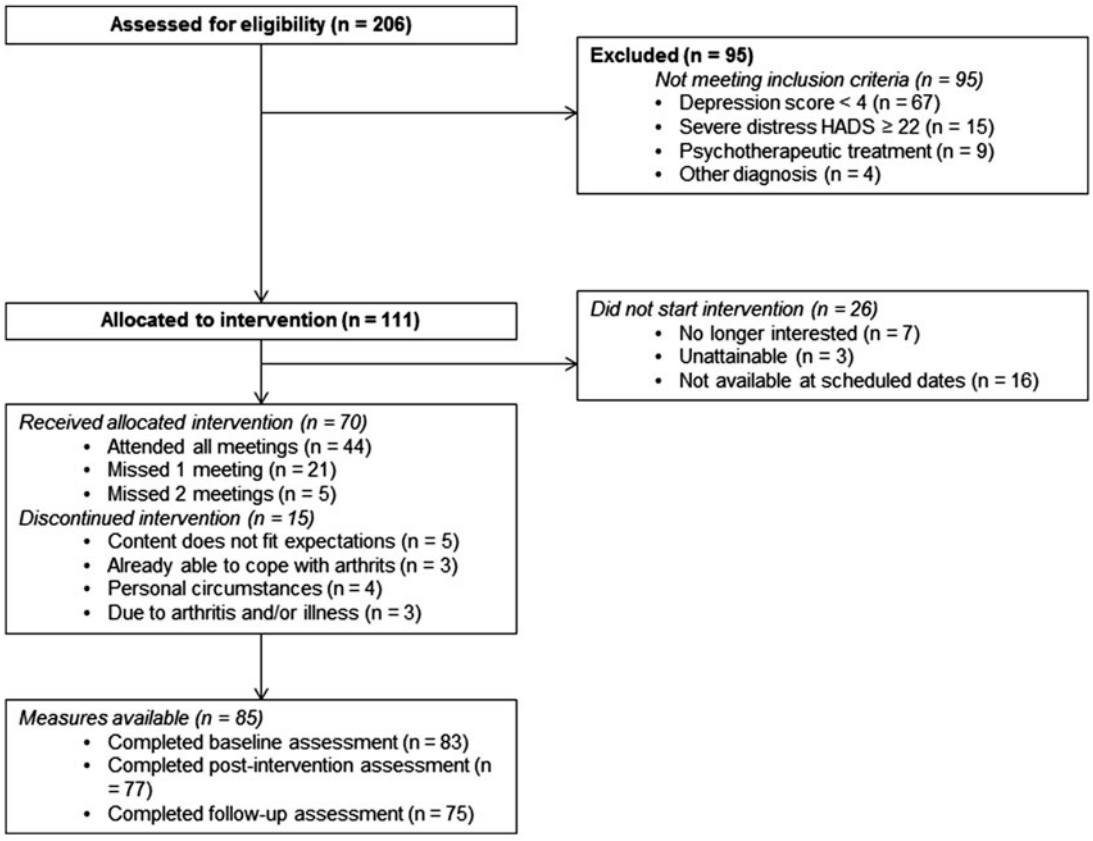

Figure 1. Participant flow within the intervention group.

current intervention group were applied to the 331 participants in the observational study, ultimately leading to a selection of 160 eligible patients for the reference group. Subsequently, data of nine persons were removed due to their participation in the intervention, resulting in 151 persons in the reference group.

Data collection procedure

Data were collected through questionnaires sent home at baseline, at postintervention (2 months, only intervention group), and at follow-up (6 months).

Intervention

Content

The content of the psychoeducational program *Right on Target* [33] was as follows. First, awareness of the impact of arthritis on participants' life was increased, and goals at risk were analyzed. Second, participants' usual ways of dealing with such difficulties (e.g., valued activities threatened by arthritis) were examined, and goal management strategies were discussed and compared. Subsequently, participants selected a threatened activity to focus on in their personal trajectory. In order to experience and practice multiple goal management strategies, participants were stimulated to try out various behavioral options. During the group meetings, the experiences in their personal trajectory were evaluated and discussed, and participants were encouraged to help and stimulate each other's new behavior.

The program consisted of six group-based meetings with six to eght participants, led by a nurse specialized in arthritis care. Trainers followed a 1-day training course and received supervision and monitoring by a psychologist during their execution of the intervention. The first four meetings were weekly, the fifth and sixth meetings were bi-weekly. The duration of every meeting was 2 h. In total, thirteen groups were held at four rheumatology clinics.

Enrolment, treatment adherence and retention

In total, 206 patients expressed an interest in participating in the intervention (Figure 1). After screening, 111 eligible applicants were contacted by a trainer in their region to plan the patient's participation in the intervention. Participants that attended at least one intervention meeting were included in the analysis ($n = 85$). In the intervention group, 83.5% of the participants returned the questionnaires at all measurement times and 62.9% attended all meetings.

Participants that missed one or two group meetings received additional information from their trainer, allowing participants to prepare for their next meeting. Participants that withdrew were asked to state their reasons ($n = 15$). Participants in the intervention group were significantly more likely younger, diagnosed with RA, reported higher levels of fatigue, had shorter disease duration, and were more often woman, compared to participants in the reference group (Table 1).

Measures

The depression subscale of the Hospital Anxiety and Depression Scale (HADS-D) measures presence and severity of *depressive symptoms* [44]. Higher scores indicate more depressive symptoms (range 0–21). Internal consistency at baseline was in the intervention group $\alpha = 0.66$ and in the reference group $\alpha = 0.31$. (Note that internal consistency for depression was $\alpha = 0.80$ in the whole sample of the observational study, which might indicate that the low internal consistency in the subgroup is related to the applied inclusion criterion of HADS-D ≥ 4).

Table 1. Baseline demographics and disease characteristics of participants in the intervention and the reference group.

Demographic characteristics	Intervention $n = 85$	References $n = 151$	Differences on baseline[1]
N (%)			
Sex, *n* (%)			χ^2 (1) = 5.08, $p < 0.05$
Male	24 (28.2)	65 (43)	
Female	61 (71.8)	86 (57)	
Age (years), mean (SD), range	57.34 (11.63), 23–82	64.99 (12.39), 22–91	$t(234) = -4.65$, $p < 0.001$
Marital status, *n* (%)			χ^2 (1) = 0.69, ns
Not living with partner	19 (22.4)	42 (27.8)	
Living with partner	63 (74.1)	107 (70.9)	
Missing	3 (3.5)	2 (1.5)	
Educational level, *n* (%)[2]			χ^2 (2) = 5.37, ns
No / Lower	27 (31.8)	72 (47.7)	
Secondary	40 (47.1)	54 (35.8)	
Higher	15 (16.6)	22 (14.6)	
Missing	3 (3.5)	3 (2.0)	
Work status, *n* (%)			χ^2 (1) = 2.08, ns
No paid job	55 (64.7)	115 (76.2)	
Full-time and part-time employment	26 (30.6)	35 (23.2)	
Missing	4 (4.7)	1 (0.7)	
Antidepressive medication use, yes (%)	19 (21.1)	35 (23.2)	χ^2 (1) = 0.56, ns
Disease characteristics			
Diagnosis, *n* (%)			χ^2 (5) = 12.52, $p < 0.05$
Rheumatoid arthritis	65 (76.5)	84 (55.6)	
Gout and other crystal diseases	2 (2.4)	13 (8.6)	
Polymyalgia and temporal arteriitis	6 (7.1)	21 (13.9)	
Spondylarthropathy	6 (7.1)	11 (7.3)	
SLE and other systemic diseases	1 (1.2)	8 (5.3)	
Other/non-classifiable	5 (5.9)	14 (9.3)	
Disease duration (years), mean (SD), range	7.81 (8.30), 0–41	16.21 (14.03), 0–71	$t(232.53) = -5.6$, $p < 0.001$
Comorbidities,[3] *n* (SD)	1.40 (1.27)	1.64 (1.56)	$t(234) = -1.22$, ns
Fatigue,[4] mean (SD)	60.42 (22.07)	47.97 (24.37)	$t(228) = 3.85$, $p < 0.001$
Pain,[5] mean (SD)	45.22 (22.78)	4.49 (2.36)	

SD: standard deviation.
[1]Independent sample *t*-test and Pearson's Chi-square were used.
[2]Low: no education, primary school or lower vocational education; middle: high school and middle vocational education; high: high vocational education and university.
[3]Checklist with 15 conditions.
[4]Fatigue in the past week was asked using a visual analog scale: 0 (no fatigue) – 100 (completely exhausted).
[5]Pain was measured using a visual analog scale in the intervention group (range 0–100) and with a numerical rating scale in the reference group (0–10). Therefore, no test for differences at baseline could be performed.

Anxiety symptoms were measured with the HADS anxiety subscale, with higher scores indicating more anxiety symptoms (range 0–21, $\alpha = 0.75$). The extent wherein participants experienced a meaningful life (i.e., *purpose in life*) was measured with the Purpose In Life Scale (PIL) [45,46], with one added question [20]: "Doing the things I do every day is a source of deep pleasure and satisfaction." Higher scores indicate more purpose in life (range 6–30, $\alpha = 0.77$). The positive subscale of the Positive and Negative Affect Schedule, which consists of ten positive mood descriptors, was used for the measurement of *positive affect* [47]. Higher scores indicate more positive affect in the past week (range 10–50, $\alpha = 0.89$). Participants' *satisfaction with social participation* was measured with the Impact on Participation and Autonomy (IPA) [48]. Higher scores indicate more satisfaction (range 0–4, $\alpha = 0.89$). The following domains were used: family, autonomy outdoors, and social relations.

The Tenacious Goal Pursuit and Flexible Goal Adjustment scales [49] were used to measure assimilative tenacity (*maintenance of goals*) and accommodative flexibility (*adjustment of goals*), respectively. High scores on these scales indicate high assimilative tenacity and high accommodative flexibility, respectively (range 15–75, goal maintenance $\alpha = 0.73$, goal adjustment $\alpha = 0.78$). *Goal disengagement* and *goal reengagement* were measured with the Goal Adjustment Scale [41]. This scale measures how respondents usually react if they have to stop pursuing an important goal. Higher scores indicate a tendency to disengage from unattainable goals (goal disengagement, range 4–20, $\alpha = 0.56$) and a tendency to reengage with new goals (goal reengagement, range 6–30, $\alpha = 0.86$). Two subscales of the Arthritis Self-efficacy Scale were used (range 1–5) to measure *self-efficacy for pain* ($\alpha = 0.82$) and *self-efficacy for other arthritis symptoms* ($\alpha = 0.79$) [50,51]. Higher scores indicate greater perceived ability to control aspects of arthritis. At baseline, *demographic variables* and diagnosis, disease duration, pain, fatigue, and amount of comorbidities were assessed.

Statistical methods

In order to demonstrate a medium sized effect $d = 0.40$, 100 participants in each condition were required, based on a statistical power of 80% and a significance level of 0.05. All statistical analyses were performed using SPSS version 21 for Windows (IBM Statistics). Independent samples *t*-tests and χ^2 tests were used to examine significant differences at baseline between the conditions.

Differences in scores between the intervention group and the reference group on outcomes and possible mediators were studied using the linear mixed model procedure (LMM). Outcomes at baseline and 6 months follow-up were used as repeated measures, with group (two levels: intervention/reference group), time (two levels) and their first order interactions as fixed factors. The estimation method used was restricted maximum likelihood (REML) and the covariance structure unstructured. Sex, age, diagnosis (dummy coded) and disease duration were sequentially added to the model in order to control for their influence, and then removed when the model did not become more

Table 2. Means and standard deviations on outcome baseline measurements and follow-up measurements, estimated effects and effect sizes of the intervention group compared to the reference group.

	Intervention group, mean (SD)	Reference group, mean (SD)	Group × time (95% CI)	*p*-Value	d_{corr}
Depression			−0.20 (−0.99 to 0.59)	0.624	
Baseline	6.28 (3.10)	6.69 (2.32)			
Follow-up	5.76 (3.60)	6.22 (3.18)			
Anxiety			−0.72 (−1.56 to 0.11)	0.088	
Baseline	6.59 (3.51)	5.96 (2.89)			
Follow-up	5.92 (3.36)	6.00 (3.09)			
Purpose in life			0.47 (−0.42 to 1.35)	0.300	
Baseline	20.40 (3.81)	20.71 (3.49)			
Follow-up	20.73 (3.79)	20.66 (3.18)			
Positive affect			2.01 (0.43 to 3.59)	0.013	0.251
Baseline	31.03 (6.83)	31.77 (6.47)			
Follow-up	33.35 (6.64)	32.46 (6.27)			
Participation			−0.03 (−0.16 to 0.11)	0.674	
Baseline	2.43 (0.49)	2.41 (0.55)			
Follow-up	2.37 (0.61)	2.44 (0.61)			
Goal maintenance			−1.89 (−3.48 to −0.30)	0.020	−0.322
Baseline	46.38 (6.36)	45.00 (5.89)			
Follow-up	44.21 (6.18)	44.77 (5.82)			
Goal adjustment			2.34 (0.93 to 3.74)	0.001	0.311
Baseline	47.77 (8.05)	50.30 (5.40)			
Follow-up	49.53 (5.62)	49.96 (5.23)			
Goal disengagement			0.02 (−0.68 to 0.73)	0.947	
Baseline	11.55 (2.51)	11.61 (2.26)			
Follow-up	11.55 (2.28)	11.49 (2.24)			
Goal reengagement			0.30 (−0.70 to 1.30)	0.556	
Baseline	20.93 (3.44)	20.97 (3.40)			
Follow-up	21.43 (3.39)	21.18 (3.48)			
Self-efficacy pain			0.12 (−0.07 to 0.29)	0.238	
Baseline	2.69 (0.82)	3.06 (0.75)			
Follow-up	2.92 (0.80)	3.19 (0.74)			
Self-efficacy other			0.22 (0.06 to 0.38)	0.008	0.345
Baseline	2.95 (0.71)	3.36 (0.58)			
Follow-up	3.18 (0.66)	3.38 (0.65)			

Number of respondents with complete data per sub questionnaire for intervention group on baseline =78–83, and follow-up =72–75; and for the reference group on baseline =146–151, and follow-up =127–130.

explanatory. For significant differences in changes in outcomes over time 95% confidence intervals were calculated. Taking into account the differing sample sizes and differences on baseline values, the effect size d_{corr} is reported for significant differing outcomes (small $d = 0.2$, medium $d = 0.5$, and large $d = 0.8$), calculated with an online calculator [52].

To examine whether improvement in possible mediators would mediate the effect of the intervention on outcome variables, separate mediational analyses with linear regression and bias-corrected bootstrapping procedures ($n = 5000$ bootstrap resamples) were used [53]. An indirect effect was considered significant when zero was not contained in the 95% confidence interval.

Separate analyses with three time moments were carried out using only intervention group data. The course of primary and secondary outcomes using time as fixed factor (three levels: baseline/postintervention/follow-up) was analyzed using the linear mixed model procedure, with the unstructured covariance structure, and controlling for relevant patient characteristics as described above.

Results

With regard to the primary outcome, no significant improvement was present on the depression subscale of the HADS in the intervention group compared to the reference group (group* time [95% CI] −0.20 [−0.99, 0.59], $p = 0.624$) (Table 2). For the secondary outcomes of anxiety, purpose in life, and satisfaction with participation, no significant improvement was present in the intervention group compared to the reference group. With regard to positive affect, significant improvement was present in favor of the intervention group when compared to the reference group (2.01 [0.43, 3.59], $p = 0.013$, $d_{corr} = 0.25$). Goal maintenance decreased significantly in the intervention group compared to the reference group (−1.89 [−3.48, −0.30], $p = 0.020$, $d_{corr} = -0.32$). Significant improvement was present in goal adjustment in favor of the intervention group compared to the reference group (2.34 [0.93, 3.74], $p = 0.001$, $d_{corr} = 0.31$). For goal disengagement, goal reengagement and self-efficacy for pain, no treatment effect was found. Self-efficacy for other symptoms significantly increased in the intervention group when compared to the reference group (0.22 [0.06, 0.38], $p = 0.008$, $d_{corr} = 0.35$).

Mediation analyses were executed with positive affect on follow-up as an outcome, controlling for baseline positive affect and the mediator variable at baseline. Levels of goal maintenance, goal adjustment and self-efficacy for symptoms other than pain significantly changed in the hypothesized direction between baseline and follow-up and, therefore, were assessed as possible mediators of the treatment effect on positive affect. Change in goal maintenance and self-efficacy for other symptoms did not mediate the relation between group and positive affect (data not shown). The relationship between group and positive affect was significantly mediated by goal adjustment ($b = 0.49$ [0.05, 1.18], $p < 0.05$). Controlled for positive affect and goal adjustment at baseline (Step 1 in Table 3), the intervention group showed a stronger increase in positive affect at follow-up than did the reference group. Step 2 in Table 3 shows that the improvement in goal adjustment significantly predicted positive affect at follow-up (Figure 2). The group effect became non-significant.

The analysis with three measurement moments with the intervention group showed that positive affect significantly increased

Table 3. Mediation analysis of improvement of goal adjustment on positive affect at follow-up.

Positive affect follow-up (T3) $n = 198$	Step 1 (*B*, SE, 95% CI)			Step 2 (*B*, SE, 95% CI)		
Group[1]	1.54*	0.75	0.06, 3.02	1.05	0.72	−0.38, 2.47
Baseline positive affect (T0)	0.64***	0.06	0.53, 0.76	0.61***	0.06	0.50, 0.72
Baseline Goal adjustment (T0)	−0.07	0.06	−0.19, 0.05	0.11	0.07	−0.02, 0.25
Improvement in goal adjustment (T3–T0)				0.39***	0.08	0.22, 0.55
Explained variance (adjusted R^2)	*0.40***			*0.46***		
Indirect effect, bootstrap SE, bootstrap 95% CI				0.49*	0.28	0.05, 1.18

*$p < 0.05$.
***$p < 0.001$.
[1]Intervention group versus reference group.

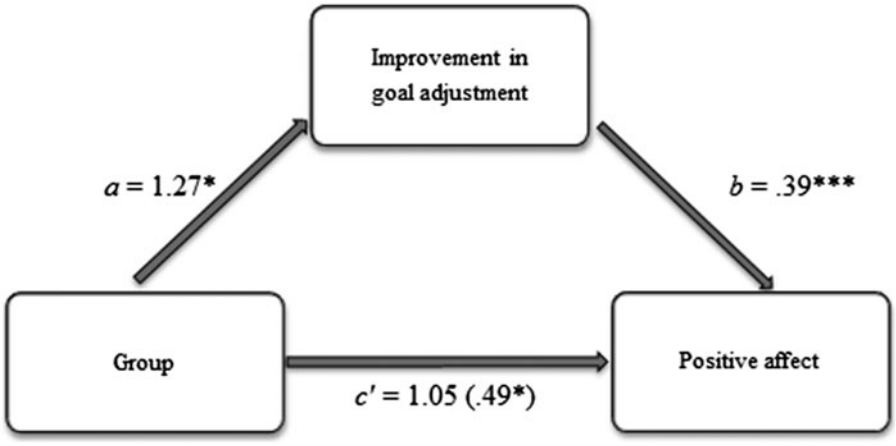

Figure 2. Standardized regression coefficients for the relationship between group and positive affect as mediated by goal adjustment. The indirect effect via goal adjustment is between parentheses. *$p < 0.05$; ***$p < 0.001$.

over time (time [95% CI] 1.26 [0.54, 1.97], $p = 0.001$, means: $t0 = 31.03$, $t1 = 33.64$, $t2 = 33.35$), which supports the previous analysis that included the reference group. No significant changes in the course over time of depression were found in the intervention group (–0.23 [–0.63, 0.17], $p = 0.261$, means: $t0 = 6.28$, $t1 = 5.93$, $t2 = 5.76$). Similarly, no significant changes for anxiety, purpose in life, or participation over time were found (data not shown).

Discussion

Objective of this study was to examine whether an intervention aimed at increasing goal management competencies decreased depressive symptoms and improved levels of adaptation in people with polyarthritis and elevated levels of depressive symptoms. Contrary to our hypothesis, there was no decrease in levels of depressive symptoms in *Right on Target* participants when compared to the reference group. Levels of anxiety symptoms, also, did not decrease for participants that received the intervention, nor did their purpose in life or satisfaction with social participation increase significantly as compared to the reference group at follow-up. Participants did experience an increase in positive affect during and after the intervention, and this increase in positive affect continued at follow-up. An increase in goal adjustment significantly mediated the increase in positive affect in the intervention group. The other three goal management strategies did not relate to the increase in positive affect.

The time needed for visible changes to occur in positive affect is hypothesized to be shorter than for anxiety, depression, purpose in life and satisfaction with participation. Therefore, a longer follow-up might have provided more insight into possible changes in these outcomes. However, the intervention may also have no effect on these outcomes, even when a longer follow-up is applied. The finding that an increase in goal adjustment mediated the stable increase in positive affect is promising, as it indicates that the intervention can be applied to increase the goal management skills of people with polyarthritis and this enhanced ability can possibly, in turn, stimulate positive adaptation. The association between increased adaptive (coping) strategies and increased positive affect is in line with previous research [20,21,54,55].

The strategy of goal adjustment proved to be the most valuable, in accordance with previous research among patients with polyarthritis and populations with other chronic diseases or disabilities [13,14,20,21]. With regard to the other three strategies the findings are mixed. The tendency to maintain goals decreased among participants, but was not found to mediate the increase in positive affect. Through participating in the intervention, participants might have realized that some goals no longer matched with their personal capacities and compensatory activities at disposal. While the experience of an irreversible loss of goals during the program might evoke negative feelings, it can also accelerate the processes of adaptation, which can, in the long run, increase well-being [40]. In this way, the absence of improvement on the adaptation outcomes (except for positive affect) in this study could be related to the fact that accepting the unattainability of goals needs time and that an increase of positive affect is the first sign of the adaption process.

Participants did not increase their tendency to search for and commit to new goals. Possibly a first step in adapting to the disease is to downscale the importance of certain goals. Searching for new goals might actually be a step beyond the timeframe in which this study took place. In addition, the ability to disengage from goals did not increase in the intervention group. Apart from

theoretical explanations, the measurement performance indicators of the related subscale for the strategy disengagement of goals might have contributed to the (lack of) results found for the ability to disengage from goals.

Participants increased their efficacy in coping with the influence that arthritis symptoms have in their daily lives. One explanation for this result is that the behavioral change techniques applied in the program to increase goal management competencies [33] are usually also applied to increase self-efficacy [31,32]. Although self-efficacy did not mediate the relation between the intervention and the increase in positive affect, the increase of self-efficacy is a valuable result given its role in the improvement of health behavior and health status [30].

Parallel to the present study, an in-depth process evaluation of *Right on Target* was executed [56]. Adherence to the protocol was found to be satisfactory, indicating that the intervention was executed as intended. Several behavioral change techniques and components were appointed as effective ingredients by participants, while participants differed in their preference for exercises and other elements of the program. While the use of various components has increased the attractiveness for a broad audience, for some participants it might also have resulted in a low intensity of some of the effective elements. Another question raised was whether the program contained sufficient support for all participants to become more flexible in their goal management and sufficient guidance on when to apply which goal management strategy, as some participants felt that the duration of the program was not sufficient to internalize their newly learned behaviors or address their problems. These insights can further inform improvement of the program and the choice of effective behavioral change techniques and their operationalization in intervention development.

Inherent limitations of the present study, such as lack of randomization, a measure of disease severity, and the absence of a cost-effectiveness analysis, can be attributed to the changes made to the design of the study which were required due to the initial small number of applicants. As a result, only a comparison of the follow-up measurements could occur between the intervention and reference groups. And although the same inclusion and exclusion criteria were applied to both groups, they differed with regard to some demographic and disease characteristics, which might have been less likely if participants were randomly assigned to a condition. Nevertheless, there is an advantage to having participants in the reference group not placed on a waiting list or with expectations of joining an intervention after the measurements; the reference group now reflects a natural course of adaptation. Reasons why people were less interested than expected are unknown, but may have had to do with the characteristics of the intervention. Offering the intervention in local community centers, reimbursement for travel expenses by the health insurance, or providing online modules might reach a larger group of participants.

Strong features were the considerable differences between the participants in the intervention in disease and demographic characteristics and, furthermore, that the program was available in both city and regional hospitals of various sizes. Nevertheless, two remarks are worth mentioning with regard to the generalizability of the findings to other persons with polyarthritis. First, despite wide-ranging recruitment, vast majority of the applicants entered the study through their clinic, and the sample, therefore, might be less representative for the population of patients that are not under treatment at a clinic. Second, the mean duration of disease was almost 8 years in the intervention group as compared to 16 years in the reference group, which might suggest that people who are more recently diagnosed are more willing to participate in an intervention or seek help. Reaching patients with a relatively short duration of disease is suggested to be beneficial [$<$2–8 years; 57–61]. Yet, conclusions of this study might be less applicable for people with longer disease duration.

Other limitations relate to the measures applied. Although established and validated measures previously applied in other studies of polyarthritis were used, low reliability of the goal disengagement subscale and HADS-D in the reference group complicated interpretation of the findings. The few studies that have been done on the responsiveness of the HADS for changes over time, report it to be moderate [62–64], although it is considered a valid screening instrument for depression and anxiety in persons with rheumatic diseases [64–66]. Also, the applied inclusion criterion of at least a score of four on the depression subscale of the HADS and exclusion criterion of $\geq$22 on the HADS (considered indicative of severe psychological distress) can possibly have caused floor and ceiling effects that have reduced the changes to detect an effect on the primary outcome measure. Lastly, measured as "general experienced meaningfulness in life," the measurement of purpose in life has its limitations, as it might be difficult to determine progression or regression with this instrument [22,46].

Conclusion

The goal management program was designed for people with elevated levels of depressive symptoms, with the idea that threats to personal goals caused by arthritis and its symptoms can evoke psychological distress and lower well-being. *Right on Target* was not effective in improving depression and no change was observed in anxiety symptoms, purpose in life, and satisfaction with participation. The goal management program seemed to be effective in increasing flexible goal adjustment and self-efficacy and decreasing tenacious goal pursuit. In addition, the increase in the ability to adjust goals mediated a significant increase in positive affect in the group that participated in the program. In conclusion, the results of this study provided preliminary evidence for the value for psychological health of an intervention based on goal management for people with arthritis. Flexible goal adjustment and goal tenacity are potentially helpful when designing interventions aimed to support people in coping with threatened goals. Undoubtedly, more research is needed to provide a deeper understanding of the complex relations between the management of personal goals and well-being among the chronically ill population [67]. The goal management intervention was developed with a person-focused perspective and is based on personal preferences, needs and values with an emphasis on the personal meaning of an illness. The implementation of a person-focused intervention in secondary care poses a challenge for those involved, yet the present study provides a small but promising direction towards greater well-being.

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Ethical approval

Multicentre research ethics committee approval from the Medical Ethics Review Committee Twente (protocol ID: NL40257.044.12). Local research ethics committee approval was obtained at all four sites where patients were recruited for the trial.

Disclosure statement

No potential conflict of interest was reported by the authors.

All authors contributed substantial to the conception and design of the study, drafting or critically revising the article and have approved the final version of the article.

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