ORIGINAL ARTICLE

Effects of a Coping Intervention on Patients With Rheumatic Diseases: Results of a Randomized Controlled Trial

MANON SAVELKOUL,[1] LUC P. DE WITTE,[2] MATH J. J. M. CANDEL,[3] HILLE VAN DER TEMPEL,[4] AND BART VAN DEN BORNE[1]

Objective. **To test the effects (on coping, social interactions, loneliness, functional health status, and life satisfaction) of an intervention aimed at teaching people with rheumatic diseases to cope actively with their problems.**
Methods. **A total of 168 patients with chronic rheumatic disorders affecting the joints were randomly assigned to a coping intervention group, a mutual support control group, or a waiting list control group. Measurements were by self-report questionnaires.**
Results. **Post-intervention measurements showed that the coping intervention increased action-directed coping and functional health status, but these effects did not persist up to 6-months followup. In patients who attended at least half of the 10 sessions, the coping intervention contributed to decreased loneliness at post-intervention and to improvements in social interactions and life satisfaction at 6-months followup.**
Conclusion. **Teaching patients with rheumatic diseases to cope actively with their problems had positive impacts. Consequently it is recommended that the coping intervention be incorporated into regular care. Maintenance sessions are advisable.**
Arthritis Care Res 45:69–76, 2001.

KEY WORDS. Coping; Intervention; Randomized controlled trial; Functional health status.

INTRODUCTION

Because of the far-reaching impact, variability, and duration of many forms of arthritis, it seems reasonable to teach patients a method to solve the many different problems that they may face, to gain a sense of control and confidence in their abilities to solve their problems, and to get support for themselves. In fact, there are indications that teaching patients with rheumatic diseases to cope actively with their problems may have a positive influence on their well-being. Cross-sectional and prospective studies have shown that active coping may increase social support, which in turn improves the quality of life of the patient, although the exact relationships between these variables remain unclear (1–4).

Coping can be classified according to 2 basic dimensions: managing the stressful situation (active coping) versus avoidance (passive coping), on the one hand, and emotion-focused coping (aimed at restraining emotions caused by the stressful situation) versus problem-focused coping (aimed at changing the cause of the stressful situation) on the other (5,6). Active coping can be both emotion-focused (aimed at changing the significance of the stressor, e.g., positive reappraisal, cognitive restructuring, reassuring thoughts) and problem-focused (aimed at changing the situation that is causing the stress, e.g., action-directed coping, seeking social support). Passive coping is always emotion-focused (aimed at avoidance, e.g., wishful thinking, palliative coping) (5,6).

Based on the results of previous studies (1–4), the effects of a coping intervention aimed at teaching patients active problem-focused coping in the form of action-directed coping and coping by seeking social support were investigated in a randomized controlled trial. Primary outcome

[1]Manon Savelkoul, MPH, and Bart van den Borne, PhD, Department of Health Education and Promotion, Maastricht University, Maastricht, The Netherlands; [2]Luc P. de Witte, PhD, MD, Institute for Rehabilitation Research, Hoensbroek, The Netherlands; [3]Math J. J. M. Candel, PhD, Department of Methodology and Statistics, Maastricht University, Maastricht, The Netherlands; [4]Hille van der Tempel, MD, Department of Rheumatology, Maasland Hospital, Sittard, The Netherlands.

Address correspondence to Manon Savelkoul, MPH, Department of Health Education and Promotion, Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands.

Submitted for publication July 25, 2000; accepted in revised form August 29, 2000.

measures were action-directed coping and coping by seeking social support; secondary outcome measures were positive and negative social interactions, loneliness, functional health status, and life satisfaction. The present trial compared the effects of the coping intervention with the effects in a mutual support control group and a waiting list control group. The mutual support control group was included in order to control for nonspecific treatment effects in the coping intervention.

PATIENTS AND METHODS

Participants and procedure. Over a period of 3 months, patients aged 18 years or older who visited the outpatient rheumatology clinics of 2 regional hospitals in the Netherlands received a questionnaire (n = 2,792). Rheumatologists indicated the patient's diagnosis on the questionnaire. Of the 1,901 patients who filled in the questionnaire (68%), 463 were selected on the basis of the following features: 1) at least 1 chronic rheumatic disorder affecting the joints (rheumatoid arthritis [RA], osteoarthritis [OA], ankylosing spondylitis [AS], psoriatic arthritis, juvenile chronic arthritis, systemic onset Still's disease, spondylosis, seronegative spondylarthropathy, diffuse ideopathic skeletal hyperostosis [DISH]), 2) a disease duration of more than 1 year, 3) age between 35 and 65 years, 4) a higher than median score on impact of the rheumatic disease on functional health status, and 5) a higher than median score on at least 1 of the following characteristics: loneliness, lack of social support, or impact of the rheumatic disease on social behavior. The selection criteria on diagnosis and age were chosen to obtain a homogeneous group of patients with respect to rheumatic disease and age. Because the first year of having a rheumatic disease can be turbulent, we selected only patients with a disease duration of more than 1 year. To reach the target population of our coping intervention, patients were selected with a relatively high impact of the rheumatic disease on their functional health status in general and on their social life in particular.

Of the 463 patients who were selected for the study, 430 were actually invited for participation because 15 patients had already taken part in a pilot test of the coping intervention and 18 patients indicated on the questionnaire that they did not want to participate in the trial. Of the 430 patients who were invited, 428 received an invitation, as 2 patients could not be located. A total of 183 patients agreed to participate, of whom 15 withdrew from the study after randomization but before the first measurement (preintervention). Consequently, the final study sample consisted of 168 patients.

The study was approved by the medical ethics committees of the participating hospitals. Informed consent was obtained after the procedure had been fully explained to the patients. At no time, however, did patients receive any information on the expected outcomes of the study, nor did they receive any advance information on the procedure in the coping intervention and mutual support; the coping intervention and mutual support were presented as having the same goal (learning how to cope with a rheumatic disease) but differing in procedure. The supervisors of the coping intervention and mutual support did not know the expected outcomes either. Furthermore, the supervisors of the coping intervention were not informed about the procedure in the mutual support control group, and vice versa. Patients did not receive incentive payment for participation. During the study, patients' current medical treatment was continued.

Three credibility questions were administered at the start of the coping intervention and mutual support to ensure that the coping intervention was as credible as the mutual support control group condition. The credibility questions addressed the following topics: patients' perceptions of the logic of the program, patients' confidence regarding their likelihood of success in the program, and patients' willingness to recommend the program to others.

Study design. Concealed randomization was performed in which patients were randomly and blindly assigned to a coping intervention group (n = 56), a mutual support control group (n = 56), or a waiting list control group (n = 56). Data were collected by questionnaires that were mailed to the participating patients before the start of the coping intervention and mutual support (pre-intervention), after the end of the coping intervention and mutual support (post-intervention), and again 6 months later (followup).

Study groups. The procedures followed in the coping intervention and in the mutual support control group differed significantly, in that teaching patients active coping was the focus of the coping intervention, whereas no deliberate attention was paid to coping in the mutual support control group. To control for nonspecific treatment effects in the coping intervention group, the coping intervention group and the mutual support control group followed the same structure. Both the coping intervention and the mutual support took place in groups of 10–12 patients who participated in 10 sessions, supported by a manual for the patients and led by 2 supervisors. All sessions lasted 2 hours. The first 8 sessions were weekly sessions, the 9th session was 2 weeks after the 8th session, and the 10th session was 3 weeks after the 9th session. Manuals detailing treatment procedures and methods of administration for the coping intervention and the mutual support were given to and discussed with the supervisors. Also, supervisors were trained in using the manuals and supervised on their adherence to the manuals. At the end of every session (except for the very first session), homework assignments were given, which were discussed and evaluated in the next session. These homework assignments were described in the manual. Group sharing was encouraged during group sessions. Patients in the coping intervention and the mutual support control group met at different times and places, in order to avoid any possibility of intergroup communication.

Coping intervention group. Patients in the coping intervention group participated in an intervention aimed at increasing action-directed coping and coping by seeking social support. The exchange of information, experiences,

feelings, and emotions was also important. Each group was led by a therapist experienced in behavioral therapy, who structured and directed all activities. A nurse who was specialized in rheumatology or a social worker who was experienced in rheumatology participated as a cofacilitator.

The purpose of the first part of the coping intervention was to make patients aware of all the possible sources of social support and the changes that they desired in the social support they received (goals). As the coping intervention was aimed at teaching patients action-directed coping and coping by seeking social support, the second part of the coping intervention was structured in accordance with 4 steps of problem-solving (7), with special attention being paid to seeking social support in the second step: 1) describe the problem; 2) think about all kinds of possible solutions; 3) choose 1 or more solutions; 4) implement the solution or solutions and evaluate the results. Patients were given the opportunity to pass through the 4 steps of problem-solving at their own pace. Homework assignments contained exercises designed to help the patients apply the content of the sessions to their own lives.

Mutual support control group. In the mutual support group the aim was to exchange information, experiences, feelings, and emotions. The sessions were led by 2 patients who were trained in supervising mutual support groups. Sessions were structured in accordance with instructions for designing mutual support groups formulated by the Federation of Patient and Consumer Organizations in the Netherlands (FPCN). Mutual support groups based on this structure are widely applied for chronic illness in the Netherlands. The supervisors' role was to facilitate interaction. The topics of conversation for all sessions were determined by the patients during the first session; in the fourth session, patients were given the opportunity to change the topics for the remaining sessions. Instead of discussing a new topic in the very last session, important experiences and events of the previous period were discussed. For homework assignments the patients were to think about the topic of conversation of the next session. No coping skills were taught.

Waiting list control group. Patients in the waiting list control group were not exposed to either the coping intervention or the mutual support group program during the study. After the last measurement (followup) had taken place, which was about 9 months after the first measurement (pre-intervention), the waiting list control group was invited to participate in mutual support sessions.

Outcome measures. *Action-directed coping and coping by seeking social support.* Action-directed coping and coping by seeking social support were measured with 2 subscales of a short version of the Utrecht Coping Questionnaire (8), whose reliability and validity have been reported to be acceptable (9). The subscale to measure action-directed coping consists of 5 items (Cronbach's $\alpha = 0.82$ in the present study). Seeking social support was measured with a subscale also consisting of 5 items (Cronbach's $\alpha = 0.80$). A total score was computed for these subscales by adding scores on all items within the subscale (10).

Positive social interactions. Positive social interactions were measured with the Social Support List–Interactions (SSL-I) (11). The SSL-I is reliable and valid (12–14) and consists of 34 items measuring the amount experienced of 6 types of positive social interactions or supportive interactions: 1) daily emotional support, 2) problem-oriented emotional support, 3) esteem support, 4) instrumental support, 5) social companionship, and 6) informational support. The scores on all 6 subscales measuring positive social interactions were summed to indicate the total amount of positive social interactions (Cronbach's $\alpha = 0.93$).

Negative social interactions. Also included were 7 additional items of the SSL-I to measure the amount of negative social interactions. Reliability and validity have been found to be sufficient (12–14). The scores on the subscale measuring negative social interactions were added to determine the total amount of negative social interactions (Cronbach's $\alpha = 0.97$).

Loneliness. The Loneliness Scale (15) was used to measure loneliness. The Loneliness Scale consists of 5 positive and 6 negative items. The positive items assess feelings of belonging, whereas the negative items apply to 3 separate aspects of missing relationships. The higher the score on this scale, the greater the loneliness. The Loneliness Scale has been found to be reliable and valid (15) and has also been successfully used in previous research with patients with rheumatic diseases (16,17). In the present study, Cronbach's α was 0.91.

Functional health status. Functional health was measured with the SIP68, a condensed version of the Sickness Impact Profile (18,19). The SIP68 consists of 68 items measuring health-related behavioral problems on the following 6 scales: "somatic autonomy," "mobility control," "emotional stability," "psychological autonomy and communication," "mobility range," and "social behavior." The reliability and validity of the scale have proved to be high (19,20). In the present study, Cronbach's α of the whole scale was 0.85, whereas Cronbach's α of the subscales ranged from 0.63 to 0.77.

Life satisfaction. Life satisfaction was measured with the Life Satisfaction Questionnaire (LSQ) (21,22). The LSQ consists of 9 items measuring satisfaction with life in general and with the following 8 life domains: self-care ability, leisure situation, vocational situation, financial situation, sexual life, partnership relations, family life, and contacts with friends and acquaintances. The LSQ has been used for the general public (21) and for several rehabilitation groups (23–27). Adequate reliability and validity of the LSQ were found in these studies. Cronbach's α in the present study was 0.79.

Statistical analyses. The 3 groups were compared with regard to patient characteristics and outcome measures at pre-intervention, using 1-way analyses of variance (ANOVA), Kruskall-Wallis tests, and chi-square tests.

To find out whether the coping intervention was as credible as the mutual support control group condition,

Table 1. Patient characteristics, at pre-intervention, of the coping intervention group (CIG), the mutual support control group (MSCG), and the waiting list control group (WLCG)

	CIG (n = 56)	MSCG (n = 56)	WLCG (n = 56)
Age, years*	52.5 ± 8.31	51.1 ± 8.91	50.5 ± 8.65
Sex, % male	23.2	41.1	32.1
Marital status, % single	14.5	10.7	12.5
Monthly family income <3,500 Dutch guilders, %	74.0	76.4	78.0
Level of education			
% low	54.2	40.4	51.1
% medium	35.4	46.8	28.9
% high	10.4	12.8	20.0
Diagnosis†			
% RA	60.7	54.5	55.4
% OA	3.6	9.1	10.7
% AS	14.3	16.4	17.9
% less common diagnoses‡	14.3	10.9	5.4
% combination RA/OA, RA/OA/other	7.2	9.1	10.8
Duration of disease, years*	12.6 ± 10.75	14.1 ± 11.25	13.9 ± 10.56

* Mean ± SD.
† RA = rheumatoid arthritis; OA = osteoarthritis; AS = ankylosing spondylitis.
‡ Psoriatic arthritis, juvenile chronic arthritis, adult onset Still's disease, spondylarthrosis, spondylarthropathy (associated with Crohn's disease), and diffuse ideopathic skeletal hyperostosis.

Mann-Whitney U tests were used to test significant differences between the coping intervention group and the mutual support control group on 3 credibility questions.

Multiple regression analyses were performed to assess whether the coping intervention contributed positively to the outcome measures. Pre-intervention characteristics that were significantly related to the outcome measures and that also showed a significant difference between the study groups at pre-intervention were considered potential confounders and were included as predictors in the regression model. These characteristics include the patient characteristics given in Table 1 and variables such as social network size, self-efficacy in problem solving and in seeking social support, health locus of control, social skills, patients' own judgments of functioning and health, reporting other chronic conditions, having recently experienced interfering incidents (e.g., divorce), participation in mutual support groups during the previous period, and social desirability in responding to the questionnaire. As patients were taught in groups, we also tested for intraclass correlation with 1-way ANOVA (28) in order to check whether a term for group assignment needed to be included in the regression model. Finally, the dependent variable at pre-intervention was incorporated in the regression model as a predictor. The results presented below only include those predictors that turned out to be significant. In multiple regression, tests were done to check for high collinearity, outliers were removed from the analyses, and skewed dependent variables were transformed by taking square roots or logarithms of the values. If the coping intervention contributed positively to an outcome measure, the accompanying effect size was calculated.

Intention-to-treat analyses were performed in which dropouts (n = 12 at post-intervention and n = 4 at followup) were given the mean value of the lowest quartile for a particular measure. Intention-to-treat analyses did not include those patients who decided not to enter the study after randomization but before the pre-intervention measurement (n = 15).

Additional analyses were performed for those patients in the coping intervention and the mutual support control group who attended at least half of the 10 sessions (per-protocol analyses). The decision to use 5 sessions as a cutoff point was based on the assumption that 5 sessions is the minimum exposure to the intervention that is necessary to be influenced by it.

RESULTS

Treatment credibility. There were no significant differences between the coping intervention group and the mutual support control group on the credibility questions. This suggests that the results of the study were not significantly influenced by differences in treatment credibility.

Intra-class correlation. Intra-class correlations were not significant for any of the outcome measures. Consequently, no term for group assignment was included in the regression modeling.

Pre-intervention comparisons on patient characteristics and outcome measures. Table 1 shows pre-intervention comparisons on patient characteristics, whereas Table 2 shows pre-intervention comparisons on outcome measures of the coping intervention group, the mutual support control group, and the waiting list control group. The 3 study groups did not differ significantly in either patient characteristics or outcome measures at pre-intervention.

Intention-to-treat analyses. *Attendance.* The number of patients who attended no sessions at all was equal for the

Table 2. Outcome measures, at pre-intervention, of the coping intervention group (CIG), the mutual support control group (MSCG), and the waiting list control group (WLCG)*

	Theoretical range	CIG (n = 56)	MSCG (n = 56)	WLCG (n = 56)
Action-directed coping	5–20	12.7 ± 2.97	13.3 ± 2.42	12.7 ± 2.94
Coping by seeking social support	5–20	9.8 ± 2.82	10.0 ± 2.59	9.9 ± 2.78
Positive social interactions	34–136	73.4 ± 14.92	73.5 ± 13.48	76.7 ± 13.06
Negative social interactions	7–28	10.2 ± 3.22	10.1 ± 3.40	9.5 ± 2.61
Loneliness	0–11	4.3 ± 3.88	3.9 ± 3.46	2.8 ± 3.16
Life satisfaction	1–6	4.3 ± 0.77	4.4 ± 0.70	4.4 ± 0.64
Impact on functional health status	0–68	17.2 ± 7.18	14.4 ± 8.04	15.6 ± 7.19

* Values are mean ± SD.

coping intervention group and the mutual support control group (n = 6), and the number of patients who attended all 10 sessions was almost equal for both groups (n = 14 and n = 15, respectively). In addition, the number of patients who attended fewer than 5 meetings was 19 in the coping intervention group and 18 in the mutual support control group. The average attendance was 6.1 sessions in the coping intervention group and 6.4 sessions in the mutual support control group. There was no significant difference in average attendance between the coping intervention group and the mutual support control group.

Effects of the coping intervention. As can be seen in Table 3, the coping intervention had a significant positive effect on action-directed coping at post-intervention (β = 0.16, $P < 0.05$; effect size [ES] = 0.18), compared with mutual support. The other significant predictor of action-directed coping at post-intervention was action-directed coping at pre- intervention ("pre-measurement" in Table 3; $\beta = 0.71$, $P < 0.001$). Although not statistically significant, the coping intervention also proved to be superior to the waiting list control group in improving action-directed coping at post-intervention. Table 3 also shows that the coping intervention had a significant positive effect on functional health status at post-intervention ($\beta = 0.12$, $P < 0.05$; ES = 0.08), compared with the waiting list control group. Besides the coping intervention, post-intervention functional health status was also explained by functional health status measured at pre-intervention ("pre-measurement"; $\beta = 0.77$, $P < 0.001$). Analysis of coping intervention effects on subscales of functional health status revealed a significant positive effect on "mobility range" at post-intervention ($\beta = 0.19$, $P < 0.01$; ES = 0.23). Pre-intervention mobility range was the only other significant predictor ("pre-measurement"; $\beta = 0.70$, $P < 0.001$). Although not statistically significant, the coping intervention also proved to be superior to mutual support in that it led to a higher functional health status at post-intervention.

At post intervention, no effect of the coping intervention could be found on coping by seeking social support. Also, despite the contact with other patients during the coping intervention, no significant effects were found on social interactions or loneliness.

At followup, the coping intervention was not found to contribute to any of the outcome measures. Obviously, the improvements in action-directed coping and functional health status brought about by the coping intervention did not persist. In addition, there were apparently no long-term effects of the coping intervention on any of the other outcome measures in patients assigned to the coping intervention.

Per-protocol analyses. *Attendance.* The average attendance among patients who attended at least 5 of the 10 sessions was 8.5 sessions in the coping intervention group and 8.8 sessions in the mutual support control group. There was no significant difference in average attendance between the coping intervention group and the mutual support control group.

Effects of the coping intervention. Just like the intention-to-treat analyses, the per-protocol analyses showed that the coping intervention significantly increased action-directed coping ($\beta = 0.19$, $P < 0.05$; ES = 0.39) and functional health status ($\beta = 0.16$, $P < 0.01$; ES = 0.22), more specifically the mobility range ($\beta = 0.22$, $P < 0.01$; ES = 0.24), at post-intervention. These results of per-

Table 3. Intention-to-treat results of multiple regression analyses*

Dependent variables at post-intervention	Independent variables: β			R^2	n
	CIG vs. WLCG	CIG vs. MSCG	Pre-measurement		
Action-directed coping	n.s.	0.16†	0.71‡	0.50	158
Functional health status	0.12†	n.s.	0.77‡	0.71	158
Mobility range	0.19§	n.s.	0.70‡		

* CIG = coping intervention group; WLCG = waiting list control group; MSCG = mutual support control group. n.s. = not significant.
† $P < 0.05$.
‡ $P < 0.001$.
§ $P < 0.01$.

Table 4. Per-protocol results of multiple regression analyses*

Dependent variables at post-intervention	Independent variables: β				
	CIG vs. WLCG	CIG vs. MSCG	Pre-measurement	R^2	n
Action-directed coping	n.s.	0.19†	0.71‡	0.53	125
Functional health status	0.16§	n.s.	0.81‡	0.75	126
Mobility range	0.16§	n.s.	0.73‡	0.59	122

Dependent variables	Independent variables: β					
	CIG vs. WLCG	CIG vs. MSCG	Pre-measurement	Functional health	R^2	n
Loneliness at post-intervention	n.s.	−0.15†	0.73‡	0.13†	0.61	124
Negative social interactions at followup	−0.16†	n.s.	0.66‡	——	0.46	126
Life satisfaction at followup	n.s.	0.15†	0.80‡	——	0.64	126

* CIG = coping intervention group; WLCG = waiting list control group; MSCG = mutual support control group. n.s. = not significant.
† $P < 0.05$.
‡ $P < 0.001$.
§ $P < 0.01$.

protocol multiple regression analyses are shown in Table 4. Table 4 also shows that the per-protocol analyses found additional positive effects of the coping intervention on loneliness at post-intervention ($\beta = -0.15$, $P < 0.05$; ES = 0.04) and on life satisfaction at followup ($\beta = 0.15$, $P < 0.05$; ES = 0.13), compared with mutual support. Besides the coping intervention, loneliness and life satisfaction at pre-intervention were also significant predictors ("pre-measurement" in Table 4; $\beta = 0.73$, $P < 0.001$, and $\beta = 0.80$, $P < 0.001$). In addition, the coping intervention significantly decreased negative social interactions at followup ($\beta = -0.16$, $P < 0.05$; ES = 0.25), compared with no intervention (the waiting list control group). Negative social interactions at followup were also predicted by negative social interactions at pre-intervention ("pre-measurement"; $\beta = 0.66$, $P < 0.001$). Although the coping intervention reached statistical significance in explaining action-directed coping, functional health status, loneliness, life satisfaction, and negative social interactions only when compared with one of the control conditions, the coping intervention in all cases proved to be superior to both the control conditions.

DISCUSSION

This randomized controlled trial aimed to investigate the effects of teaching patients with rheumatic diseases action-directed coping and coping by seeking social support. In the present trial, a coping intervention was compared with a mutual support control group and a waiting list control group. The results show that, at post-intervention, the coping intervention resulted in more action-directed coping than in the mutual support groups and that, compared with standard medical care (the waiting list control group), the coping intervention improved the patients' functional health status. The same results were found when we included only those patients who attended at least 5 of the 10 sessions of the coping intervention. Moreover, in these patients additional positive effects of the coping intervention were found, on loneliness at post-intervention and on life satisfaction at followup, compared with mutual support. In these patients, the coping intervention also resulted in fewer negative social interactions at followup, in comparison with standard medical care.

The question whether the changes achieved are meaningful can be discussed on the basis of the effect sizes. Because all patients in the coping intervention group were being treated with standard medical care, effect sizes represent the additional effects beyond those achieved by regular treatments. Intention-to-treat effect sizes in this study were 0.18 for action-directed coping, 0.08 for functional health status in general, and 0.23 for mobility range, which is low but normal for this kind of trial (29). Moreover, the effect size on mobility range was higher than effect sizes on disability achieved in other patient education trials in rheumatic diseases; meta-analyses of psychobehavioral (30) and psychoeducational (31) interventions found weighted average effect sizes of 0.05 and 0.10, respectively. It is unclear whether these effect sizes are based on intention-to-treat analyses. Moreover, the effect sizes of drug treatments on disability are somewhat higher, 0.34, or even similar, 0.21, to the effect size on mobility range in our study, whereas the drug studies are likely to be subject to publication bias (failure to publish negative findings) (30,31).

What constitutes a "clinically meaningful change" is very hard to define; it depends on the level and the character of the health problem (20). For a patient population with a chronic disease affecting the patients' lives in many aspects, the effects achieved would appear to be valuable. With regard to functional health status in rheumatic diseases, lack of a decrease is important and a modest effect may be clinically significant. Moreover, the positive effects on functional health status and quality of life that were found in the present study are in accordance with the standards for arthritis patient education developed by a task force of the National Arthritis Advisory Board in the United States: "In order for a program to meet the standards . . . it must demonstrate its effectiveness in maintaining or improving health status (i.e. pain, functional

ability, psychological state, social functioning and/or quality of life)" (32,33). Consequently, we recommend that patient education interventions like the coping intervention described in this article be incorporated into regular care. However, as the effects on action-directed coping and functional health status did not persist up to followup, maintenance sessions are recommended.

To reach the patients who were most likely to benefit from the coping intervention, selection criteria with regard to diagnosis, disease duration, age, social support, and functional health status were applied. The results should be interpreted accordingly; based on the results of the present study we can conclude that the effects described can be obtained in a selected group of patients.

The coping intervention increased action-directed coping but, unexpectedly, did not increase coping by seeking social support, although it was specifically aimed at teaching patients both types of coping. Nevertheless, the focus on action-directed coping and coping by seeking social support in the coping intervention obviously had a positive influence on the patients' functional health status. More specifically, our study suggests that teaching patients to cope with their disease by solving problems in a systematic and social support–seeking way not only leads to more action-directed coping but also increases the patients' functional health status.

In studies comparing the effects of 2 or more interventions, differences in treatment credibility can influence the outcome. This did not seem to be the case in the present study, as the coping intervention group and the mutual support control group did not differ in treatment credibility. This finding is supported by the fact that the numbers of patients who attended fewer than 5 meetings of the coping intervention and mutual support groups were almost equal (n = 19 and n = 18, respectively). Also, the results were probably not due to a social desirability response set, as social desirability was measured for incorporation as a possible confounder in multiple regression analyses. Furthermore, the supervisors as well as the participating patients were naive to the expected outcomes and to the procedure in the other study group, both the coping intervention and the mutual support were presented to patients and supervisors as being equal in faithfulness, and the supervisors of the mutual support sessions (placebo intervention) were selected by an external organization. Extensive process evaluation (unpublished observations) revealed that the implementation of both the coping intervention and the mutual support was in accordance with the program and that the patients were equally satisfied with both programs, as were the supervisors.

The intention-to-treat analyses did not include those patients who decided not to enter the study after randomization but before pre-intervention (n = 15). The randomization process assigned 6 of these patients to the waiting list control group, 5 to the coping intervention group, and 4 to the mutual support control group, which may indicate that the decision not to enter the study was not made because these patients did not agree with the study group in which they were placed. The intention-to-treat study sample seems to be representative of the original group of participants, as the 2 groups did not differ significantly in personal or disease characteristics (age, sex, marital status, family income level, level of education, diagnosis, and duration of the rheumatic disease or diseases). The main reasons that patients gave for not entering the study were illness, personal problems, and family problems. There were no differences in the reasons for not entering the study between patients who had been placed in different study groups.

Long-term effects of the coping intervention could only be found in patients who had attended at least 5 sessions; intention-to-treat analyses revealed no effects on any of the outcome measures at followup. The patients who were excluded from the per-protocol analyses (n = 37) because they had attended fewer than 5 sessions of the coping intervention (n = 19) or mutual support (n = 18) had a significantly higher score on loneliness at pre-intervention than the per-protocol study group (n = 131). The 2 groups did not differ significantly on any of the other patient characteristics or outcome measures at pre-intervention. This indicates that the per-protocol study group was comparable to the intention-to-treat study group in most characteristics, except for experiencing significantly less loneliness. It is remarkable that the patients of this per-protocol study group showed improvements in loneliness at post-intervention and in negative social interactions at followup, despite the fact that it was precisely these patients who were less lonely at the start of the intervention.

This study is not without limitations. Data were obtained from as large a sample as was economically and practically feasible. Power calculations for arthritis patient education studies are often based on an effect size of 0.20 (30). To achieve a power of 80%, based on an effect size of 0.20, a total sample of 1,176 patients (n = 392 in each study group) would have been necessary (29), which was not feasible in the present study. Consequently, the power to detect effects in this study is less than 60%, making it difficult to avoid a Type II error. This may explain why the coping intervention did not differ significantly from the mutual support control group as well as from the waiting list control group for the outcome measures investigated, although results from multiple regression analyses with each outcome measure did suggest superior effects of the coping intervention when compared with both control groups.

In summary, the results indicate that a coping intervention aimed at increasing action-directed coping and coping by seeking social support in adult patients who have had one or more rheumatic diseases for more than 1 year, and who have a somewhat limited social environment and functional health status, increases these patients' action-directed coping and functional health status. The study suggests that patients who attend at least half of all sessions of the coping intervention obtain additional benefits in that loneliness and negative social interactions decrease and life satisfaction improves. Because of the positive effects of the coping intervention, this may be a good intervention to incorporate in standard health services. However, maintenance sessions are recommended to make the positive effects endure.

ACKNOWLEDGMENTS

The authors wish to thank the rheumatologists of Atrium Medical Center (Heerlen, The Netherlands) and Maasland Hospital (Sittard, The Netherlands) and the supervisors of the coping intervention and the mutual support groups. We would also like to thank the patients who participated in this study for their valuable contributions.

REFERENCES

1. Dunkel-Schetter C, Folkman S, Lazarus RS. Correlates of social support receipt. J Pers Soc Psychol 1987;53:71–80.
2. Ros WJG. Social support in cancer patients [dissertation]. Utrecht: Utrecht University; 1989.
3. Smith CA, Wallston KA. Adaptation in patients with chronic rheumatoid arthritis: application of a general model. Health Psychol 1992;11:151–62.
4. Savelkoul M, Post M, de Witte L, van den Borne B. Social support, coping and subjective well-being in patients with rheumatic diseases. Patient Educ Couns 2000;39:205–18.
5. Parker JDA, Endler NS. Coping with coping assessment: a critical review. Eur J Pers 1992;6:321–44.
6. De Ridder DTD, Schreurs K. Coping en sociale steun van chronisch zieken. Zoetermeer (The Netherlands): Nationale Commissie Chronisch Zieken; 1994.
7. D'Zurilla TJ, Goldfried MR. Problem solving and behavior modification. J Abnorm Psychol 1971;78:107–26.
8. Schreurs PJG, Tellegen B, van de Willige G. Gezondheid, stress en coping: de ontwikkeling van de Utrechtse Copinglijst. Tijdschr Psychol 1984;12:101–17.
9. Janssen M, Bal RM, Komproe I, Philipsen H, Furda J. Evaluatie van de 15-item versie van de Utrechtse Coping Lijst. Maastricht: Maastricht University; 1997.
10. Schreurs PJG, van de Willige G, Tellegen B, Brosschot JF. De Utrechtse Coping Lijst: UCL-handleiding. Lisse (The Netherlands): Swets & Zeitlinger; 1988.
11. Van Sonderen E. Het meten van sociale steun met de Sociale Steun Lijst–Interacties (SSL-I) en de Sociale Steun Lijst–Discrepanties (SSL-D): een handleiding. Groningen: Noordelijk Centrum voor Gezondheidsvraagstukken; 1993.
12. Van Sonderen E, Sanderman R. Social support. In: Vingerhoets AJJM, editor. Advances in behavioral medicine assessment. In press.
13. Van Sonderen E, Ormel J. Het meten van aspecten van sociale steun en hun relatie met welbevinden: een onderzoek naar de bruikbaarheid van de SSL-I en de SSL-D. Gedrag en Gezondheid 1997;25:190–200.
14. Van Sonderen FLP. Measuring social support [dissertation]. Groningen: University of Groningen; 1991.
15. De Jong-Gierveld J, Kamphuis F. The development of a Rasch-type loneliness scale. Appl Psych Meas 1985;9:289–99.
16. De Witte LP, Tilli DJP, Ticheler AJG, Winants BAC, van der Horst FG, van der Linden S. Leven met een reumatische aandoening: een onderzoek naar de ervaren kwaliteit van het leven bij 372 mensen met een reumatische aandoening. Hoensbroek (The Netherlands): Instituut voor Revalidatie Vraagstukken; 1989.
17. Bal RM. Health deviation and daily functioning in elderly rheumatoid arthritis patients [dissertation]. Maastricht: Maastricht University; 1992.
18. De Bruin AF, Diederiks JPM, de Witte LP, Stevens FCJ, Philipsen H. The development of a short generic version of the Sickness Impact Profile. J Clin Epidemiol 1994;47:407–18.
19. De Bruin AF, de Witte LP, Diederiks JPM. The Sickness Impact Profile: SIP68, a short generic version: first evaluation of the reliability and reproducibility. J Clin Epidemiol 1994;47:863–71.
20. De Bruin AF, Diederiks JPM, de Witte LP, Stevens FC, Philipsen H. Assessing the responsiveness of a functional status measure: the Sickness Impact Profile versus the SIP68. J Clin Epidemiol 1997;50:529–40.
21. Fugl-Meyer AR, Bränholm IB, Fugl-Meyer KS. Happiness and domain-specific life satisfaction in adult northern Swedes. Clin Rehabil 1991;5:25–33.
22. Post MWM, van Dijk AJ, van Asbeck FWA, Schrijvers AJP. Life satisfaction of persons with spinal cord injury compared to a population group. Scand J Rehabil Med 1998;30:23–30.
23. Bränholm IB. On life satisfaction, occupational roles and activity preferences: occupational therapy aspects [dissertation]. Umeå (Sweden): University of Umeå; 1992.
24. Bränholm IB, Erhardsson M. On life satisfaction and activity preferences in subjects with multiple sclerosis: a comparative study. Scand J Occup Ther 1994;1:17–23.
25. Fugl-Meyer AR, Eklund M, Fugl-Meyer KS. Vocational rehabilitation in northern Sweden. III. Aspects of life satisfaction. Scand J Rehabil Med 1991;23:83–7.
26. Viitanen M, Fugl-Meyer KS, Bernspång B, Fugl-Meyer AR. Life satisfaction in long-term survivors after stroke. Scand J Rehabil Med 1988;20:17–24.
27. Post M. Living with spinal cord injury: a study of health status and life satisfaction of independently living people with a spinal cord injury [dissertation]. Utrecht: Utrecht University; 1997.
28. Snijders TAB, Bosker RJ. Multilevel analysis: an introduction to basic and advanced multilevel modeling. London: Sage; 1999.
29. Polit DF, Hungler BP. Nursing research: principles and methods. Philadelphia: JB Lippincott; 1995.
30. Superio-Cabuslay E, Ward MM, Lorig KR. Patient education interventions in osteoarthritis and rheumatoid arthritis: a meta-analytic comparison with nonsteroidal antiinflammatory drug treatment. Arthritis Care Res 1996;9:292–301.
31. Mullen PD, Laville EA, Biddle AK, Lorig K. Efficacy of psychoeducational interventions on pain, depression, and disability in people with arthritis: a meta-analysis. J Rheumatol 1987;14:33–9.
32. Burckhardt CS. Arthritis and musculoskeletal patient education standards. Arthritis Care Res 1994;7:1–4.
33. Lorig K, Visser A. Arthritis patient education standards: a model for the future. Patient Educ Couns 1994;24:3–7.