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THE EFFECT OF COGNITIVE BEHAVIOR THERAPY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Summary—In order to examine the effectiveness of cognitive behavioral therapy for patients with rheumatoid arthritis (RA) three patients groups were studied: a cognitive behavioral therapy group (CBT), an occupational therapy group (OT), and a waiting-list control group. The CBT received a comprehensive, 10-session treatment package that taught progressive relaxation, rational thinking and the differential use of pain coping strategies. CBT resulted in minor changes in pain coping behavior at posttreatment, while CBT and OT showed an increase of knowledge of RA. No therapeutic effects with regard to health status were demonstrated at posttreatment and at 6 months follow-up. Clinical and laboratory measures of disease activity revealed progressive deterioration of the patients during the course of the study. It is suggested that the ineffectiveness of CBT might be due to the progressive course of RA in the patients studied, as well as to the rather small changes in coping behavior.

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, unpredictable disease occurring in about 1% of the adult population. The main feature of RA is inflammation of the joints, resulting in damage to joints and physical disability.The disease strikes all ages, but the first signs are predominantly observed between the ages of 20 and 50 yr. The male–female ratio is 1:3, respectively (Anderson, Bradley, Young & McDaniel, 1985). RA is a disease of the immune system, but its specific cause remains unknown. Therefore, prevailing medical treatment has so far been aimed at suppression of symptoms and prevention damage to joints. The pain and physical debility of this disease produce changes in nearly every area of life, from employment to interpersonal relationships (Skevington, 1987). Characteristic symptoms are physical disability, pain, stiffness, depression and social isolation. Remissions and exacerbations are frequently experienced, and sufferers report large changes in severity over a period of days, weeks or months (Anderson et al., 1985).

Medical treatment is aimed at the reduction of symptoms by attacking the inflammation and at maximum prevention of joint damage. Medical management of RA involves the use of analgesics, nonsteroid anti-inflammatory agents, corticosteroids and injectable gold. Medication regimens to control inflammation and reduce RA pain often have adverse side effects. Therefore, nonpharmacological pain management techniques have emerged as therapeutic adjuncts in the treatment of RA. Important adjuncts to medical treatment are paramedic interventions aimed at coping with pain, fatigue and physical disability. In the late seventies, patient education programs were developed to increase the effectiveness of medical and paramedical interventions (Lorig, Laurin & Gines, 1984). These programs focused on therapy compliance by increasing patients' knowledge about RA and stimulating their active role in therapy. Of recent date is the application of cognitive-behavioral therapy (CBT), teaching RA patients to alter maladaptive cognitive and behavioral responses to pain. Strategies used in CBT have been primarily based on the gate control theory of Melzack and Wall (1983) and the data-base of studies on the role of stress and coping in RA (Manne & Zautra, 1992). The conceptualization of pain as having both cognitive and emotional components paved the way to the assumption that changing the patient's thoughts and attitudes may alter his or her subjective experience of pain. Reviews of studies on the role of coping with RA show a tendency for positive relations between the endorsement of active coping strategies that require self-regulated participation by the patient and indices of psychological and physical

functioning. In contrast, a trend for inverse relations is revealed between the use of passive coping strategies (depending on others, restricting social activities) and adjustment (Jensen, Turner, Romano & Karoly, 1991).

Noteworthy for their controlled investigations of cognitive behavioral therapy (CBT) are the following studies: Appelbaum, Blanchard, Hickling & Alfonso, 1988; Bradley, Young, Anderson, Turner, Agudelo, McDaniel, Pisko, Semble & Morgan, 1987; O'Leary, Shoor, Lorig & Holman, 1988; Parker, Frank, Beck, Smarr, Buescher, Phillips, Smith, Anderson & Walker, 1988; Radojevic, Nicassio & Weisman, 1992; Taal, Reimsman, Brus, Seydel, Rasker & Wiegman, 1993. The CBT packages that were applied consisted of the following procedures: relaxation training, cognitive pain coping strategies, such as distraction, dissociation and relabeling, and self-management strategies. Overall, these studies provide some evidence for the potential effectiveness of brief CBT in comparison to an attention placebo, patient education, symptom monitoring and/or no treatment control conditions. However, it is hard to draw clear conclusions given the heterogeneity of samples across studies, differences in length of treatment and the amalgam of dependent variables. The general picture that emerges from the current data is that CBT in comparison with control conditions results at posttreatment in minor but significant effects with regard to pain (Appelbaum *et al.*, 1988; Bradley *et al.*, 1987; O'Leary *et al.*, 1988; Radojevic *et al.*, 1992), pain coping behavior (Appelbaum *et al.*, 1988; Bradley *et al.*, 1987; O'Leary *et al*, 1988; Taal *et al.*, 1993) and/or physical ability (Appelbaum *et al.*, 1988; Taal *et al.*, 1993). However, the effects established at posttreatment diminish at follow-up assessments of 6 months and longer (Appelbaum *et al.*, 1988; Bradley *et al.*, 1987; Parker *et al.*, 1988; Taal *et al.*, 1993). It may be argued that this is due to the progressive nature of RA and/or the rather small treatment effects of CBT in these patients. Positive effects of CBT at posttreatment or 2 month follow-up are especially found when RA patients are studied whose duration of disease is relatively short and whose course of disease is nonprogressive as assessed by clinical measures of disease activity (e.g. O'Leary *et al.*, 1988; Radojevic *et al.*, 1992). It has to be noted that study results may be obscured by the reliance on multiple outcome measures and, moreover the use of various sets of measures. The use of many outcome measures makes it likely that any therapy will be statistically significantly efficacious on some measure. In addition, differences in the way outcome measures are defined by researchers limit the ability to generalize conclusions. Recently, the Committee on Outcome Measures in Rheumatoid Arthritis Clinical Trials (OMERACT) of the American College of Rheumatology (ACR) addressed these problems by developing a core set of outcome measures in rheumatic arthritis (Felson *et al.*, 1993).

There is evidence that suggests that poor long-term adaptation is associated with passive coping behaviors, such as taking to bed or restricting one's social acitivities (Brown, Nicassio & Wallston, 1989; Smith & Wallston, 1992). Consequently, the rationale of current CBT programs is that an active coping style is more beneficial. However, it has to be noted that active coping may be limited by real physical limitations, the denial of which could prove injurious. In addition, there is some evidence that active coping behaviors beneficial in reducing pain may have detrimental effects on physical functioning. In the cross-sectional study by Kraaimaat and Huiskes (1989) it was found that frequent use of the pain coping strategy 'reducing demands' (continued activities at a slower pace or less precise) was associated with less pain, but also with less mobility and ability to provide selfcare. This finding led to the development of the present CBT program, in which the differential effects of coping strategies are emphasized.

In The Netherlands, occupational therapy is a rather common treatment in the care of RA patients. In order to assess the adjunctive utility of CBT in traditional RA patient care, its effects have to be compared with that of general treatment practices (e.g. occupational therapy). With the exception of the study by Taal *et al.* (1993), all the aforementioned outcome studies were conducted outside The Netherlands. It is well known that health care systems of different countries vary. Therefore, it was of interest to investigate the effect of CBT as an adjunct to the current medical care in The Netherlands.

The present study attempts to clarify the effect of CBT in comparison to standard occupational treatment (OT) and a no-treatment control group. It is hypothesized that CBT will be more effective in changing functional ability, psychological and social functioning than occupational therapy or a waiting-list control condition at posttreatment and follow-up.

Table 1. ARA classification, medication, clinical and laboratory measures of the 77 RA patients

ARA Functional Class[a]	
I	11
II	59
III	7
Present medication[b]	
No rheumatological medication	4
NSAID or Analgesic	29
DMARD (HCQ/Gold/PEN/SASP/Csp)	19
DMARD (Methotrexate/Azathioprine)	3
Prednisone, no DMARD	3
Laboratory and clinical measures[c]	
ESR (range 2–140 mm 1 hr)	20 (8–37)
C-reactive protein (mg/l)	0.7 (0.0–1.6)
Thompson score (range 0–534)	62 (7–139)
Walking time (sec)	24 (22–28)
Grip strength	28 (17–46)

[a]I: Histological changes with no destructive changes; II: There are some changes in bone texture without actual joint deformity, soft tissue lesions and limitations of joint mobility may be present; III: There is evidence of cartilage and bone destruction with muscle atrophy and joint deformity noted.
[b]NSAID = nonsteroidal anti-inflammatory drug; HCQ = Hydroxy-chloroquinine; Gold = Aurothioglucose or Auranofine; PEN = d-Penicillamine; SASP = Sulfasalazine; CSP = Ciclosporine. No corticosteroid but prednisone was used. Patients using DMARD's or Prednisone could also be using NSAID's. Five patients with DMARD also had Prednisone (2.5–15 mg/day).
[c]Median and interquatile ranges within parentheses.

METHOD

Patients

Selection criteria were: a minimum age of 20 yr, a duration of illness of at least 1 yr and a diagnosis of RA assessed by a rheumatologist according to the revised criteria of Arnett, Edworthy and Bloch, (1988). Subjects who had difficulty ambulating due to aging or medical problems, and Class IV RA patients with the most advanced disease, were excluded from the study.

Rheumatologists of 4 hospitals in the center of the Netherlands selected 512 patients who met these criteria.* These patients were invited by letter to participate in the study. Positive reactions were received from 143 patients, of whom 77 took part in the present study.

The mean age of the participating patients was 57 yr. (SD 12.7), 83% were married or living together, and 68% were women. The mean duration of illness was 15.6 yr (SD 12.4) and the mean age at which the illness manifested was 42 yr (SD 15.3). ARA classification, medication and laboratory findings of the sample are listed in Table 1. Of the 58 patients who entered treatment, 6 patients dropped out. Dropouts were defined as those who missed more than one session.

Conditions

Patients were randomly assigned to the three conditions. In addition, the conditions were counterbalanced across seasons to avoid the possibility of seasonal fluctuations as a confounding variable. During the study, the current medical treatment was continued.

The two treatment conditions consisted of 10 weekly sessions of 2 hr. The feasibility and credibility of the CBT and OT were tested in a previous pilot study and found to be satisfactory. Manuals detailing treatment procedures and methods of administration for each of the conditions were provided. The two treatments were given in groups of 6–10 patients and supported by a separate booklet.† In the first four sessions of both treatment conditions, information about medical management of RA was given for 1 hr by a rheumatologist. The information and procedure

of providing biomedical information was similar in both conditions. The CBT and OT groups met at different times in order to avoid any possibility of significant intergroup communication.

The CBT was aimed at coping with pain and disease related stress (e.g. physical impairment). Therapists were clinical psychologists trained in the program and supervised by a behavior therapist. Sessions were tape recorded and reviewed for accuracy in implementation of the treatment by the supervising behavior therapist. The treatment package consisted of biomedical information (4 hr), assessment of the patients' coping repertoire and self-management of active coping behavior. Special attention was given to the differential effects of behavioral coping with regard to pain, mobility and self-care. The following coping strategies were trained: progressive relaxation, rational thinking, active coping behaviors (distraction by pleasant activities, continuation of activities by reducing demands) and goal setting with an emphasis on the adjustment of demands to the current physical condition. At the end of every session, homework assignments were given, which were discussed and evaluated in the next session.

Occupational Therapy (OT) was aimed at coping with physical handicaps to improve the patients' physical condition. OT was given by an occupational therapist. The treatment consisted of biomedical information (4 hr), energy conservation, joint protection and the use of various devices in performing daily life activities. Energy conservation, joint protection and the use of devices were trained by means of simulated real-life activities. Patients were also trained in exercises aimed at reduction of stiffness and increase or maintenance of joint mobility. The aforementioned techniques are generally accepted to be important for RA patients and applied as a standard practice in occupational therapy (e.g. Furst, Gerher, Smith, Fisher & Shulman, 1987). At the end of every session, homework assignments were given, which were discussed and evaluated in the next session.

Condition 3 consisted of a waiting-list control group (WLC).

Measurements

Assessments were made before treatment at posttreatment after 10 weeks, and 6 months thereafter. The set of outcome measures was selected according to the ACR core set proposed by Felson *et al.*, (1993).

Disease activity. Blood samples were taken for measurements of the erythrocyte sedimentation rate (ESR, Westergren method, mm/1st h) and C-reative protein (CRP; nephelometric). ESR is a widely used blood measure that generally, but imperfectly, parallels the levels of arthritis activity, particularly inflammation. CRP is an acute phase protein molecule that is active in immune system function; CRP levels are associated with disease activity. In addition, the patients were clinically assessed by a rheumatology research nurse* who was blind to the treatment condition. The clinical measurement of disease activity included a 30-m walking time and a joint score according to the method described by Thompson (simultaneous presence of joint tenderness and swelling; the score is weighted for joint size; range 0–534) (Thompson, 1987; VandenBrink, VanderHeide, Jacobs, VanderVeen & Bijlsma, 1993).

Functional, psychological and social status. In a separate room, patients were asked to complete the following self-report measures:

—A Dutch health status questionnaire, the IRGL (Invloed Reuma op Gezondheid en Leefwijze = Impact of Rheumatic Diseases on Health and Lifestyle). The IRGL is multidimensional in nature and oriented at the measurement of physical, psychological and social aspects of health status in patients with rheumatic diseases. The IRGL is partly derived from the Arthritis Impact Measurement Scales (AIMS1; Meenan, Gertman & Mason, 1980) and consists of 21 items for the physical dimension (resulting in 3 scales: mobility, self-care and pain), 22 items for the psychological dimension (resulting in the scales anxiety, depression and cheerful mood), 13 items for the social health dimension (resulting in 2 indices for social network, and 3 scales for perceived emotional support: potential emotional support, actual emotional support and mutual visits). In the present investigation, all the IRGL scales were used with the exception of the scales for cheerful mood and social network. In previous research, the reliability and validity of the IRGL scales were shown to be satisfactory (Huiskes, Kraaimaat & Bijlsma, 1990a, b). The following Cronhach's αs were assessed for scales containing 3 or more items: mobility (0.92), self-care (0.90), pain (0.86),

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anxiety (0.87), depression (0.92), potential support (0.88), actual support (0.66). Test–retest reliability (6-month interval) coefficients range from 0.46 (depression) to 0.83 (mobility). The concurrent validity has been demonstrated by significant correlations ($r > 0.36$, $P < 0.01$) between physical subscales and independent assessments of functional status (Huiskes et al., 1990a). The psychosocial subscales correlated more weekly with the functional status (Huiskes et al., 1990a).

—RA Knowledge Test (RKT) assessed knowledge about RA and its treatment and management. The RKT was developed for the purpose of the present investigation and consists of 24 multiple choice items (range 0–24).

—Pain coping strategies were assessed by the PCI (Pain Coping Inventory; Kraaimaat & Huiskes, 1989; Kraaimaat and Schevikhoven, 1988; Bakker & Kraaimaat, 1994). The PCI consists of 39 items, relating to the way patients deal with pain. Subjects rated how frequently they engaged in various behaviors and thoughts in the phase of pain on a 5-point scale ranging from 1—never, to 5—very frequently. In previous research with RA patients, patients with chronic headache and patients attending pain clinics, 6 rather independent pain coping strategies were identified by simultaneous component analysis (Bakker & Kraaimaat, 1994). Active pain coping is represented by the scales: pain transformation (4 items; $\alpha = 0.75$), distraction by pleasant activities (5 items, $\alpha = 0.69$), and reducing demands (3 items; $\alpha = 0.73$). Passive pain coping strategies are measured by the scales: retreating (7 items; $\alpha = 0.69$), catastrophizing (9 items; $\alpha = 0.79$) and resting (5 items; $\alpha = 0.72$). Test-retest reliability (6-month interval) coefficients range from 0.42 (reducing demands) to 0.82 (catastrophizing).

RESULTS

Dropouts

Between pretreatment and follow-up assessment, 3 patients in the CBT and 3 patients in the OT dropped out. In 5 of these patients hospitalization or inability to attend the treatment due to a deterioration of their condition was the main reason for dropping out. The pretreatment measures of the 6 dropouts were compared with those of the participating patients. In comparison with the participating patients, dropouts were older ($t = 2.03$, $P < 0.05$) and they reported less mobility ($t = -3.25$ $P < 0.01$), more pain ($t = 2.00$, $P < 0.05$), more depression ($t = 2.59$, $P < 0.01$), and more anxiety ($t = 2.05$, $P < 0.05$). The 6 patients who dropped out were left out in the further analyses of the data.

Pretreatment condition comparisons

In order to test for possible differences between conditions at pretreatment three separate one-way multivariate analyses of variance (MANOVA) were performed on the following dimensions: physical functioning (mobility, self-care, pain), psychological functioning (anxiety, depression) and social functioning (potential support, actual support, mutual visits). No significant condition differences were found on any dependent dimension. Variables examined with analysis of variance (ANOVA) and χ^2 were: age, gender, marital status, RA classification, illness duration, age at which the illness manifested itself, type of medication, knowledge of RA (RKT), pain coping (transformation, distraction, reducing demands, retreating, catastrophizing, resting) and disease activity (ESR/ CRPI Thompson score, walking time and grip strength). There were no significant pretreatment differences on any dependent variable.

Intervening variables: pain coping and knowledge

The pain coping strategies measured by the PCI were demonstrated to be rather independent (Bakker & Kraaimaat, 1994). Therefore in order to examine the treatment effects and to compare patterns of gain and loss of subgroups, a univariate two-factor analysis of variance (ANOVA) with repeated measures on one factor (pretest–posttest) were performed on the scores of the pain coping inventory. A significant interaction effect was observed only for 'distraction by pleasant activities' ($F = 6.05$, $P = 0.004$). Separate t-tests demonstrated a significant increase in this type of pain coping behavior only in the CBT condition ($t = -3.65$, $P < 0.01$; effect size $= 0.50$). Of the 2 treatment conditions, only CBT resulted in improvement in pain coping behavior. However, it has

Table 2. Means and SDs on the subscales of the Dutch health inventory at pre-, post- and follow-up assessment

		Preassessment		Postassessment		Follow-up assessment	
		Mean	SD	Mean	SD	Mean	SD
Physical functioning							
Mobility	CBT	20.7	5.3	22.2	5.1	19.9	5.6
	OT	18.3	6.7	17.9	5.7	17.9	6.6
	WLC	19.4	6.8	19.5	6.6	18.8	7.7
Self-care	CBT	24.9	3.9	25.7	4.7	25.0	5.6
	OT	25.4	6.2	24.5	6.3	23.9	6.5
	WLC	25.9	5.5	26.2	5.9	24.3	7.5
Pain	CBT	16.0	3.8	14.8	4.3	14.7	4.7
	OT	16.6	4.8	15.4	4.6	16.6	4.6
	WLC	16.6	4.3	14.6	4.4	15.9	5.4
Psychological functioning							
Anxiety	CBT	18.4	5.3	19.3	5.7	19.9	5.8
	OT	17.9	5.0	17.7	6.3	18.4	6.7
	WLC	18.4	6.0	17.5	5.0	18.9	6.9
Depression	CBT	2.0	2.2	3.1	3.5	3.3	3.4
	OT	3.4	4.7	2.2	2.9	4.0	4.2
	WLC	3.2	3.2	2.5	2.5	4.1	3.8
Social functioning							
Potential	CBT	14.5	5.0	14.3	4.6	13.4	4.7
support	OT	14.9	4.7	15.0	5.0	15.0	5.0
	WLC	15.3	4.3	15.4	4.4	14.8	4.4
Actual	CBT	6.7	1.5	6.9	1.6	6.3	1.3
support	OT	7.3	2.4	7.4	2.1	6.8	1.9
	WLC	6.7	2.0	7.0	2.1	6.3	1.8
Mutual	CBT	5.9	1.7	6.2	1.3	6.0	1.0
visits	OT	6.2	1.3	6.0	1.5	5.8	1.4
	WLC	6.2	1.6	6.3	1.6	5.4	1.2

CBT = cognitive behavioral therapy (n = 24), OT = occupational therapy (n = 28); WLC = waiting list control condition (n = 19).

to be noted that this involved a moderate amount of change (Cohen, 1969) in only one type of coping behavior.

In addition, a significant increase in the scores on the knowledge test (RKT) was demonstrated in the CBT ($t = -3.07$, $P < 0.01$) and the OT condition ($t = -5.01$, $P < 0.01$), but not in the waiting-list control group ($t = -0.95$, NS).

Disease activity

In order to assess the effects of therapy on laboratory and clinical measures, it was decided to use a within-patient relative ranking method (Friedman ANOVA by Ranks). Reasons for doing this were that distributions of variables do not comply with requirements for analysis with parametric statistics. The ranks of the overall groups showed a significant deterioration for 3 measures of disease activity, viz. ESR ($\chi^2 = 13.7$, $P < 0.01$), Thompson score ($\chi^2 = 11.5$, $P < 0.01$) and Walking time ($\chi^2 = 29.1$, $P < 0.01$). Moreover, whenever the difference between the ranks of a distinct group was significant, a progressive deterioration was reflected. The CBT group showed a significant increase in ESR ($\chi^2 = 9.3$, $P < 0.01$) and Thompson score ($\chi^2 = 7.11$, $P < 0.05$), the OT group a significant increase in Thompson score ($\chi^2 = 6.4$, $P < 0.05$) and Walking time ($\chi^2 = 18.5$, $P < 0.01$), and the waiting-list control group a significant increase in Walking time ($\chi^2 = 13.1$, $P < 0.01$).

In conclusion, there was a progressive course of the disease in the RA patients in this study, as reflected in the laboratory and clinical measures.

Physical, psychological and social functioning

Table 2 shows means and SDs on measures of physical, psychological and social functioning at pretest/posttest and follow-up for the 3 conditions. As can be seen in the table, only minor variations occurred between pre-, post- and follow-up measures.

In order to examine the significance of treatment effects 3 separate MANOVAs were conducted between conditions and across pretreatment, posttreatment and follow-up on the 3 health status dimensions.

The MANOVA on physical functioning measures for mobility, self-care and pain revealed a

significant time effect, Wilks' $\lambda = 0.90$, $F(6,256)$, $P < 0.05$. Exploratory ANOVAs demonstrated a significant time main effect for pain, $F(2,132) = 3.52$, $P < 0.05$. Contrast analysis demonstrated an increase in pain between posttest and follow-up test.

The second MANOVA, which was conducted on the psychological functioning variables of anxiety and depression, yielded a significant time effect, Wilk's $\lambda = 0.92$, $F(4,250)$, $P < 0.05$. Exploratory ANOVAs demonstrated a significant time main effect for depression, $F(2,126) = 5.08$, $P < 0.01$. Contrast analysis revealed an increase in depression between posttest and follow-up.

The third MANOVA, which was conducted on the social functioning measures of potential social support, actual support and mutual visits, yielded a significant time effect, Wilk's $\lambda = 0.87$, $F(6,244)$, $P < 0.01$. Exploratory ANOVAs showed a significant time effect for actual support, $F(2,132) = 7.08$, $P < 0.001$. Contrast analysis demonstrated a decrease in actual support between posttests and follow-up. These findings suggest a general deterioration on pain, depression and actual support over time for the entire sample. There were no significant interaction effects. That is to say that different time–courses for the physical, psychological or social health status were not found in the 3 conditions.

Duration of RA, treatment condition and individual fluctuations in health status between pretest and follow-up tests

In order to gain some insight in factors that influence individual fluctuations in health status between pre- and follow-up tests residual gain scores were calculated for each self-report health status measure. By means of multiple regression analysis (stepwise) the relative contribution of RA duration, condition (3 levels) and duration × condition was explored to individual changes in health status. Duration of RA explained 12% of the variance in self-care ($P < 0.001$), 6% of the variance in pain ($P < 0.05$), 9% of the variance in anxiety ($P < 0.01$) and 12% of the variance in depression ($P < 0.001$). Condition and duration × condition were not significant contributing factors in the analyses. Patients with a relatively larger illness duration demonstrated negative changes in self-care, pain, anxiety and depression, while positive changes were revealed in patients with a relative short illness duration. These changes were not related to treatment condition.

DISCUSSION

This study evaluated the use of CBT in patients with RA. The effect of CBT was compared with that of OT a standard therapy for RA patients in The Netherlands, and a waiting list control group (WLC). CBT and OT were both successful in increasing the patients' knowledge of RA, while only CBT resulted in moderate changes in pain coping behavior. The latter finding gives some support to the validity of CBT in changing the patient's pain coping behavior. However, it must be noted that only moderate changes in just one type of pain coping behavior were demonstrated.

CBT and OT both were ineffective in changing the patients' physical, psychological or social health status. Previous studies of CBT in patients with RA did demonstrate minor but beneficial changes in health status at posttreatment. The data from these studies contrast with our finding that CBT is also ineffective in changing the patients health status at posttreatment. These divergent results may be due to differences in outcome measures, CBT packages, patient selection procedures and/or health care systems. Our choice of outcome measures represents an advance over previous choices in evaluation studies in that outcome measures were selected according to the ACR core set (Felson *et al.*, 1993). A new element in the present CBT package was the differential use of pain coping behavior, in which patients were trained to use pain coping strategies not to the detriment of their overall mobility and self-care. It is possible that this approach is less effective in reducing pain in patients with a long-standing disease. Furthermore, the patients in our study demonstrated an increase in disease activity during the course of the study, reflecting the progressive nature of the disease. In literature, positive effects of CBT are especially found in patients with a relatively short duration of disease and with a nonprogressive course of disease as assessed by clinical and laboratory measures of disease activity (e.g. O'Leary *et al.*, 1988). It may be hypothesized that the potential beneficial changes of CBT on health status have been counteracted in our study by the progressive nature of RA.

Patient selection procedures might have contributed to the fact that there was a rather progressive course of the disease in the patients in our study. It is possible that patients of the rheumatology centers who agreed to participate in the present study were a subgroup of patients with a rather progressed disease state. In order to test this possibility *post hoc* comparisons were performed on the scores on the Dutch health status questionnaire of the 73 *S*s in the present study and those of a sample of 362 RA patients from an earlier study acquired from the same referring rheumatologists (Kraaimaat & Huiskes, 1989). No significant differences were found between both samples, indicating that the patients in the present study were representive of those generally treated by rheumatologists in outpatient clinics. A patient factor of more interest may be illness duration. The patients participating in this study had a long history of rheumatic illness. Only 5 patients suffered from RA for a period shorter than 5 yr. Pincus and Callahan (1989) demonstrated that RA patients identified in rheumatologists' offices have a severely progressive disease, while the RA of patients identified in the population is more often charac- terized by a self-limited course. In the present study a relatively longer illness duration was found to be related to negative changes between pretest and follow-up in self-care, pain, depression and anxiety, while positive changes were revealed in patients with a relatively short illness duration. There is consistent evidence that much of the structural damage to the joints occurs early in the disease course (Brook & Corbett, 1977; Fuchs, Kaye, Callahan, Nance & Pincus, 1989). If the disease state and duration are responsible for the lack of effect of CBT in the present study, a greater effectiveness of CBT might be expected in patients with a less severe RA and a recent onset.

A central issue in the development of CBT for patients with RA is that aims related to mobility, self-care and impact are congruent with aims related to reduction of disease activity. In general, stress is thought to worsen autoimmune diseases. Activity of the sympathic nervous system (SNS) in particular may promote inflammation (Moran, 1991). If that is the case, coping strategies effectively dealing with stress may reduce disease activity through reduction of SNS activity. Coping strategies directed at improving physical ability do not necessarily affect disease activity positively through biological mechanisms. For instance, if an effort is needed to increase mobility, this may negatively affect disease activity. In contrast, complete bedrest which threatens mobility, may attenuate inflammation. Ideally, CBT programs are geared to knowledge about biological mechanisms affecting inflammation, as well as to knowledge about coping behavior effective in dealing with pain, physical ability and psychological distress. Interdisciplinary research is needed to advance our understanding of the biobehavioral mechanism in RA.

With regard to OT, our findings contrast with the clinician's belief in The Netherlands that OT is beneficial in these patients. However, it has to be noted that the OT in this study was applied in a 10 session group format, while in standard treatment it is individually applied in clinical practice without restraints on length of the treatment. In addition, previous to this treatment program most patients had at some time already received standard OT. Further research is needed to substantiate the effectiveness of OT in patients with RA.

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