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**Improving the quality of life and psychological well-being of recently diagnosed multiple sclerosis patients: preliminary evaluation of a group-based cognitive behavioral intervention**

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(Article begins on next page)

**Improving quality of life and psychological well-being  
of recently diagnosed multiple sclerosis patients:  
preliminary evaluation of a group-based cognitive behavioral intervention**

**Abstract**

**Purpose:** The study evaluates a group-based cognitive behavioral intervention aimed at promoting the quality of life and the psychological well-being of recently diagnosed multiple sclerosis (MS) patients (up to three years since the diagnosis).

**Method:** The study involved 85 patients (59% women; mean age 37,  $SD = 12.3$ ; 94% with relapsing-remitting MS; Expanded Disability Status Scale (EDSS) between 1 and 4). A quasi-experimental study design was applied: 54 patients (intervention group) participated to five group-sessions, a 6-months post-intervention, and a 1-year follow-up, while 31 patients (comparison group) participated to activities routinely provided to recently diagnosed MS patients. Measures of Quality of Life (SF-12), Depression (CESD-10), Affective well-being (PANAS), and Optimism (LOT-R) were assessed.

**Results:** At 6-months post-intervention, mental health increased in the intervention group and decreased in the comparison group, while negative affect decreased in the intervention group and increased in the comparison group. At 1-year follow-up mental health and optimism increased in the intervention group and decreased in the comparison group.

**Conclusions:** Preliminary evidence suggests that the proposed intervention fosters the quality of life and the psychological well-being of recently diagnosed MS patients, by reducing negative affect and promoting mental health and optimism, especially in the long-term.

## **Introduction**

Multiple sclerosis (MS) is a chronic neurological disease, characterized by autoimmune inflammation, axonal degeneration and progressive demyelination of the central nervous system. Symptoms have high variability due to the widespread nature of the neurological injuries and include fatigue and pain, disturbances in sensation and vision, spasticity, motor difficulties, bowel and bladder problems, and cognitive impairment. Multiple sclerosis is usually diagnosed between the ages of 20 and 40 and it affects more women than men (the proportion is about 3:1) [1]. The course of the illness is highly unpredictable, in most cases characterized by relapses and periods of symptoms remission. The MS etiology still remains unknown and at present no resolutive cure is available. All these aspects have psychological consequences for patients: in particular, compared to the general population, MS patients report higher depression and lower quality of life [2,3,4]. For this reason, psychological interventions are needed to support patients to face psychological challenges due to MS and to promote their well-being and global adjustment to the illness.

Evidence of effectiveness comes from Cognitive Behavior Therapy (CBT) as a treatment useful to promote symptom self-management, reduce anxiety and depression, increase adaptive coping strategies, and globally improve the patients' quality of life and well-being [5]. Many clinical trials were based on individual treatment, but evidence of effectiveness also came from group-based intervention: useful elements seem to be the reciprocal support and information among patients, the sharing of emotions and experiences, and the opportunity of learning functional coping strategies from others [6,7,8].

In a previous work, we presented a randomized controlled evaluation of a cognitive behavioral group-based intervention aimed at reducing the depression and promoting the quality of life and the psychological well-being of MS patients (having a mean disease

duration of eight years and mild to moderate disability)[9]: results pointed out that the intervention was effective in promoting the patients' quality of life and had an effect on their self-efficacy and psychological well-being [9].

On the basis of these encouraging results, we implemented this type of intervention in a group of patients in an early phase of the illness, which is the first three years following the diagnosis. Research on the adjustment to MS among newly diagnosed patients is scarce and, to our knowledge, no studies have been yet carried out to evaluate the effectiveness of a psychological intervention specifically targeting this population. Literature pointed out that the immediate reaction to the MS diagnosis is often characterized by anger and negation; then, in the first period of the illness, patients are likely to experience uncertainty, anxiety and psychological distress [10,11,12], although physical difficulties are generally limited. Moreover, newly diagnosed patients report lower quality of life [13] and higher depression [14] compared to healthy controls. These results suggest that the first years following the diagnosis of MS are characterized by psychological difficulties. In particular, within the first three years since diagnosis psychological distress has proved to be the main determinant of low quality of life [15,16]. Therefore, during this critical period after the diagnosis, it is particularly relevant to offer MS patients a psychological intervention aimed at giving support and promoting psychological resources useful in the immediate, as well as in the long term. Preliminary evidence of effectiveness of this type of intervention would add a significant knowledge in this field and would be useful for rehabilitation professionals working with MS patients in an early phase of the illness.

Starting from this theoretical framework and our previous research, the aim of the present study was to evaluate a group-based cognitive behavioral intervention aimed at promoting the quality of life and the psychological well-being of recently diagnosed MS

patients (up to three years since the diagnosis), through the promotion of the identity redefinition after the diagnosis, the sense of coherence, and the self-efficacy in dealing with MS. For the purposes of the study, we considered as indicators of psychological well-being diverse measures, namely depression, affective well-being (positive and negative affect) and optimism. Recent research stressed the need of focusing not only on the patients' negative adjustment to chronic illnesses, as measured by depression and the negative affect, but also on the positive adjustment, as evaluated through the positive affect [17,18] and the optimism [19,20]. On one hand, the positive affect was found to be related to both decreasing depression [21] and increasing adherence to therapies [22]. On the other hand, the optimism has proved to be a key variable for patients' resiliency because optimistic individuals are more likely to engage in valued goals, to employ adaptive coping strategies to face difficulties, and to get opportunities from the illness experience [23]. In particular, among MS patients, optimism was found to be negatively related to depression and positively to benefit-finding [21]. To our knowledge, optimism have rarely been considered as outcome measures of psychological interventions targeting MS patients, thus our study adds to the existing knowledge in this field.

## **Method**

### ***Participants***

Patients were recruited from a Multiple Sclerosis Clinic Centre (Regional Referral Multiple Sclerosis Centre – CRESM, Torino, Italy). The study was based on a pretest-posttest quasi-experimental design (intervention vs comparison group) with three data collection points in a span of one year (pre-intervention, 6-months post-intervention and 1-year follow up). All the subjects had a confirmed diagnosis of multiple sclerosis, and the eligibility

criteria for the study were as follows: (a) diagnosed with multiple sclerosis in the last three years; (b) aged 18 or above; (c) an Expanded Disability Status Scale (EDSS) score [24], which is the most widely used measure of disability in MS, evaluated by the neurologist, between 1 (no disability) and 4 (autonomous, able to walk without aid or rest some 500 meters, moderate neurological deficits in diverse functional systems) (EDSS total range 1-10). The majority of MS patients in the first years after the diagnosis report an EDSS score lower than 4, which represents a mild or moderate disability [25]; (d) absence of clinically significant cognitive deficits; and (e) absence of severe psychiatric deficits. The requirements were verified with a neurologist in the patients' case sheets.

Two-hundred-ninety-nine patients were screened and 17 patients were excluded because they did not meet the inclusion criteria. Patients suitable to be recruited ( $N = 282$ ) were invited by telephone and by letter to participate to the intervention. One-hundred and seventy-three patients did not answer or were not interested, while 109 patients agreed to participate and were recruited: 54 patients were assigned to the intervention group, while 55 patients were unable to participate in the scheduled dates and were included in the comparison group, with the opportunity of taking part in the intervention in a subsequent round of group sessions. Patients of the comparison group participated to the activities routinely provided by the MS Centre to recently diagnosed patients (interviews with neurologist, psychologist, and nurse). People in the comparison group had the same characteristics of the intervention group with respect to gender, age, disease duration and type of MS. Since 24 of them did not complete the first assessment, the final number of patients in the comparison group was 31 (figure 1). The study was approved by the Hospital Ethics Committee and participants gave written informed consent for participation in the study.

### ***The intervention***

The intervention group was purposefully divided into nine sub-groups based on age (20-35, 36-50 and 51-65 years old): considering that the illness has a specific impact on individuals in relation to developmental tasks [26], grouping together people of similar ages would facilitate the sharing of similar experiences. For each age category (20-35, 36-50 and 51-65 years old), three sub-groups were formed and the number of participants in each sub-groups ranged from 4 to 10.

Intervention sessions were held away from the MS Clinic Centre in a non-medical place (a castle with a large park). Groups were conducted by one psychologist having experience of group-based cognitive behavioral interventions. Five sessions were held over two months, followed by a 6-months session and a 1-year follow-up. Each session lasted for about 2 hours with a 15-minute break. Relaxations exercises were performed at the beginning and at the end of each session. The topics of the five sessions were the following: 1) the experience of the diagnosis of MS (how participants felt when receiving the diagnosis and how they feel at present), identity change and redefinition following the diagnosis (in the family, work and free-time domains; 2) life goals that give participants a sense of coherence (before and after the diagnosis); the definition of new, realistic and meaningful goals in life; 3) strategies to reach goals and behavior evaluation; self-efficacy over symptoms (especially fatigue); 4) the management of negative emotions related to the illness; positive, negative, illusory thinking related to the illness; 5) effective communication (in personal relationships and with health professionals) and the ability of asking for help. Homework was given to participants, based on session topics, and they were asked to do relaxation exercises every day. The 6-months session was based on recall of all topics with participants and on discussion about their feelings after the group experience (useful aspects, perceived changes,

and difficulties in realizing the given indications), while the 1-year follow-up was focused on a global evaluation of the experience.

### ***Measures***

Patients were requested to fill in a questionnaire including socio-demographic variables and measures of quality of life, depression, affective well-being, and optimism.

*Quality of life* was assessed through the Italian version of the SF-12 Health Survey [27]: it is the short version of the SF-36 and represents a validated and widely used self-report instrument assessing the health status. It is composed of 12 items, which provide measures of Physical Health (PCS) and Mental Health (MCS) with standardized scores ranging from 0 to 100 (mean score = 50;  $SD = 10$ ) (Cronbach's alpha for PCS = 0.82, for MCS = 0.86).

*Depression* was assessed through the Italian validation of the 10-item Center for Epidemiologic Studies Depression Scale (CES-D-10) [28]: it evaluates the frequency of depressive symptoms during the past week; each item is scored on a 4-point scale ranging from 0 (rarely or none of the time) to 3 (most or all of the time) (Cronbach's alpha = 0.86; range, 0–30; a cutoff score of 10 or higher indicates the presence of significant depressive symptoms).

*Affective Well-being* was evaluated through the Italian validation of the Positive Affect Negative Affect Schedule (PANAS) [29]: it comprises two mood scales, one measuring the Positive Affect (PA) (10 items), and the other measuring the Negative Affect (NA) (10 items); each item is rated on a 5-point scale, ranging from 1 (never) to 5 (always), to indicate the number of times the respondent feels this way in their daily living (e.g., positive: interested; e.g., negative: scared) (Cronbach's alpha for PA = 0.84, for NA = 0.87).

*Optimism* was evaluated through the Italian validation of the Life Orientation Test-Revised (LOT-R) [30]. It comprises 10 items (3 positive, 3 negative, and 4 fillers) with a 5-



points Likert response format ranging from 0 (strongly disagree) to 4 (strongly agree) (Cronbach's alpha = 0.83; range 0-24).

The questionnaire was anonymous and participants were requested to write a self-generated code to combine questionnaires of different waves. People in the intervention group completed questionnaires on site immediately before the first session (pre-treatment), after the sixth session (6-months post-treatment), and one year after the intervention conclusion (follow-up session). At post-treatment patients in the intervention group also completed a second questionnaire aimed at evaluating the group experience [see 9, for details]. People in the comparison group completed an electronic version of the same questionnaire at home at three time points (corresponding to pre-treatment, 6-months post-treatment, and 1-year follow-up of the intervention group).

### ***Statistical analyses***

Statistical analyses were performed by means of SPSS version 22. Repeated measures analysis of variance was used to investigate significant group X time interactions on each outcome measure: time was entered as factor within subjects and group (intervention vs comparison) as factor between subjects. Years since diagnosis were entered as covariates. A first series of repeated measures ANOVA was carried considering two time points (pre-treatment and 6-months post-treatment), and a second series considering three time points (pre-treatment, 6-months post-treatment and 1-year follow-up). Significant group X time interaction effects were examined through repeated contrasts (each category compared with the previous one).

### **Results**

The characteristics of the study participants are reported in table 1.

*Insert table 1 about here*

Patients in the intervention group and patients in the comparison group did not differentiate at the baseline on socio-demographic characteristics (gender, age, marital status, education, and employment), clinical variables (MS type and disease duration) nor in the variables considered in the study (quality of life, depression, affective well-being, and optimism).

The majority of patients in the intervention group ( $N = 43$ , 80%) completed treatment, and 36 (67%) were present at 1-year follow-up (attrition 20% at 6 months and 33% at 1 year). Differences between completer and drop-out patients were not significant with respect to gender, age, disease duration, and the study variables. With regard to the comparison group, 18 (58%) were present at 6-months post-treatment and 13 (42%) at 1-year follow-up (attrition 42% and 58% respectively) (figure 1).

*Insert figure 1 about here*

### ***Outcome evaluation***

Changes in the outcome measures between pre-treatment and 6-months post-treatment for the intervention and the comparison groups are reported in table 2. Concerning quality of life, the mental health increased in the intervention group and decreased in the comparison group, as indicated by the significant group x time interaction ( $F(1, 50) = 4.66, p = 0.036$ ), while change in physical health scores was not statistically significant ( $F(1, 50) = 0.008, p = 0.927$ ). Depression scores tended to lower for the intervention group at post-treatment, although the group x time interaction was not statistically significant ( $F(1, 49) = 1.31, p = 0.258$ ). With regard to affective well-being, a significant group x time effect was observed for negative affect ( $F(1, 49) = 4.10, p = 0.048$ ), showing decreasing scores in the intervention group and increasing scores in the comparison group at post-treatment. Changes in positive affect scores were not statistically significant ( $F(1, 51) = 1.40, p = 0.242$ ). Finally, optimism

increased in both groups, and especially in the comparison group, at post-treatment: the effects of group x time ( $F(1, 51) = 5.59, p = 0.022$ ) was statistically significant.

*Insert table 2 about here*

Patterns of change in the outcome measures across three time points (pre-treatment, 6-months post-treatment, and 1-year follow-up) for the intervention and the comparison groups are reported in table 3. As observed before, mental health increased in the intervention group and decreased in the comparison group at post-treatment, and the observed trend was maintained at 1-year follow-up ( $F(2, 70) = 3.14, p = 0.049$ ). The change in physical health scores across time was not significant (group x time  $F(2, 70) = 0.009, p = 0.915$ ). Depression tended to slightly increase in the intervention group at 1-year follow-up, even though the effect did not reach statistical significance and scores were lower than for the comparison group ( $F(2, 68) = 1.09, p = 0.336$ ). As for negative affect, decreasing scores in the intervention group were observed across time, although the group x time interaction was not statistically significant ( $F(2, 64) = 0.483, p = 0.619$ ). Positive affect scores were constant across time ( $F(2, 64) = 0.399, p = 0.673$ ). Finally, optimism increased in the intervention group and sharply decreased in the comparison group at 1-year follow-up, suggesting a long-term effect of the intervention ( $F(2, 66) = 5.39, p = 0.007$ ).

*Insert table 3 about here*

### ***Process evaluation***

For process evaluation, attendance rate and participants' responses to the evaluation questionnaires administered at post-treatment were considered. Patients demonstrated good compliance with the treatment (attrition 20%, 7 people dropped out after the first or second session, while 4 patients were absent at 6-months post-treatment due to personal or family reasons). The attrition rate at 1-year follow up was 33% due to common difficulties in

obtaining patients' participation in delayed sessions. Results about evaluation questionnaires are reported in table 4: as a whole participants were satisfied, considered the experience useful for a personal change and would recommend it to other MS patients.

*Insert table 4 about here*

## **Discussion**

Recently diagnosed MS patients who attended the group-based cognitive behavioral intervention reported increased mental health and reduced negative affect at 6-months post-treatment with respect to the comparison group. At 1-year follow-up, patients in the intervention group reported increased mental health and increased optimism with respect to the comparison group, suggesting a long term effect of the intervention. The physical health and the positive affect tended to be stable along time in both groups. Depression showed a trend to lower in the intervention group at post-treatment and to slightly increase at 1-year follow-up, though the differences were not statistically significant. The intervention had a high attendance rate at 6-months post-treatment, participants positively evaluated the group experience and reported overall satisfaction.

Results about quality of life are consistent with previous research which proved the effectiveness of cognitive behavioral therapy in promoting MS patients' adjustment to the illness [5,9]. In particular, the intervention had an effect on the mental health, that is the psychological component of the quality of life, including aspects affected by MS, like the presence of negative emotions and the limitations in social roles due to emotional problems. Concerning the affective well-being, the intervention proved to reduce the negative affect in the short term, while the positive affect was stable across time. Overall the result is in line with recent research indicating the effectiveness of cognitive behavior therapy in improving

MS patients' affective states [31], even though repeated follow up would be useful to detect any significant effects of the intervention on the positive affect in the long term.

With regard to optimism, our results indicate that the intervention increased the patients' levels of optimism, especially in the long-term. Literature stressed that more optimistic patients are likely to better adjust to the illness [19, 23]. In particular, our intervention promoted the awareness of different ways of thinking about MS (positive, negative, and illusory thinking) and stressed the relevance of a realistic optimism for the adjustment, in accordance with research stressing that medium levels of optimism (as opposed to unrealistic optimism) promote adaptive coping strategies among MS patients [32].

With regard to depression, even though a global statistical significant effect was not detected, results suggest a role of the intervention in reducing depressive symptoms among patients. Moreover, the fact that the depression scores tended to increase in the intervention group at 1-year follow up suggests the need of booster sessions to maintain the effects of the intervention across time. Further studies with larger sample size and repeated follow up would allow to deepen these results.

The low attrition rate at post-treatment and the positive evaluation from patients indicated that they perceived the group intervention as an important occasion of sharing experiences with similar people, learning adjustment strategies and receiving support, under the guidance of a psychologist acting as a group moderator. As highlighted by previous studies, group rehabilitation for MS patients is effective when participants perceive a peer support [33] and when specific contents are transmitted by health professionals in a flexible and comprehensive manner [34].

Compared to results from our previous study, also for newly diagnosed patients the intervention was beneficial with respect to their quality of life. Moreover, an effect emerged on the psychological well-being, in particular on the negative affect and on the optimism.

The study has some limitations. First of all, the evaluation was carried out through a quasi-experimental group design and the patients' recruitment was based on their interest in participating in the study, thus caution should be used in generalizing results about the effects of the intervention on the target population. However, quasi-experimental designs controlling for confounding variables are the best alternative when randomized controlled trials are not feasible [35] and especially when the study explores topics poorly investigated in literature. Nonetheless, a randomized controlled trial on a larger sample would allow to evaluate if the differential patterns of change in the intervention and in the comparison group observed in this preliminary study are confirmed.

Secondly, the study was characterized by a large reduction of the group of participants, especially due to non-response and to declination to participate for work and family commitments. Although the percentage of people who declined to participate was quite high, other studies on the effectiveness of psychological interventions for MS patients reported a comparable number of refusals [6] and highlighted the problem of low rates of attendance [36]. As pointed out in literature, the self-selection of participants is an intrinsic and almost unavoidable element in psychological interventions targeting MS patients [37]. In particular, most newly diagnosed MS patients are between 20 and 40 years of age, are fully engaged in work and family commitments and generally experience limited physical difficulties, although they report various degrees of psychological distress [10,11,12]. In our study, many patients, when offered the opportunity of a psychological intervention, declined to participate, at least in the immediate, because they gave priority to work commitments, especially at a

time of economic crisis, like the present. This self-selection might represent a research bias, even though the analyses demonstrated that the intervention and the comparison group did not differentiate at baseline with respect to the study variables. Nonetheless, future research should focus on strategies to increase patients' participation and retention in psychological intervention sessions. Finally, a third limitation of the study is due to the fact that patients were recruited from only one clinic. Results from further research, including patients coming from diverse clinic centers, would be more representative of the population under study.

Despite these limitations, this study provides preliminary evidence that a group-based cognitive behavioral intervention focused on identity redefinition, sense of coherence and self-efficacy may promote the quality of life and the psychological well-being of recently diagnosed MS patients. To our knowledge, this is the first study evaluating a psychological intervention specifically targeting this population. As previously said, newly diagnosed patients are generally between 20 and 40 years (in our study the average age of participants was 37 years), with mild disability, thus fully engaged in study and/or job career and in the family. The MS diagnosis represents for them a challenge with respect to the identity redefinition, the construction of a sense of coherence in life, and the search for new action strategies in daily living. As a consequence, for these patients psychological difficulties may arise in the first years following the diagnosis. Moreover, these difficulties are often neglected by patients, essentially because physical symptoms are generally limited. Our study indicates that an intervention specifically tailored to recently diagnosed MS patients aimed at giving them psychological support and promoting their psychological resources to cope with the illness is effective in improving their quality of life and psychological well-being. In particular, working on identity redefinition after the diagnosis, on the attribution of a sense of coherence to one's life with MS, and on planning realistic goals in diverse life domains

demonstrated to be crucial to promote patients' adjustment to the illness. Literature has pointed out that a better adjustment to MS might in turn promote greater adherence to pharmacological therapies [22,38]. The suggestion for clinical practice is to consider the first years following the MS diagnosis as a good time for a psychological intervention, which should be routinely provided to patients along with pharmacological therapies. Considering that the population of newly diagnosed patients nowadays is gradually increasing, thanks to more timely diagnosis, it is relevant to implement precocious and effective psychological intervention to improve their global adjustment to the illness.



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### **Implications for rehabilitation**

- Preliminary evidence suggests that a group-based cognitive behavioral intervention focused on identity redefinition, sense of coherence, and self-efficacy promotes the quality of life (increased mental health) and the psychological well-being (decreased negative affect and increased optimism) of recently diagnosed MS patients (up to three years since the diagnosis).
- The first years following the MS diagnosis should be considered as a good time for a psychological intervention aimed at promoting the patient's adjustment to the illness.
- Strategies should be found to increase the participation of recently diagnosed MS patients in psychological interventions.



TABLE 1 Characteristics of study participants

	Intervention ( <i>N</i> = 54)		Comparison ( <i>N</i> = 31)	
Gender (female)	33	61%	17	55%
Age (mean, <i>SD</i> )	38	12.5	34.8	11.9
Years since diagnosis (mean, <i>SD</i> )	1.5	0.7	1.8	0.8
Multiple sclerosis type				
Relapsing remitting	50	93%	30	97%
Primary progressive	1	2%	-	-
Secondary progressive	3	5%	1	3%
Marital status				
Married/living with a partner	30	55%	15	48%
Separated/divorced/widow	7	13%	2	7%
Single	17	32%	14	45%
Education				
8 years	11	20%	4	13%
13 years	31	58%	20	64%
More than 13 years	12	22%	7	23%
Employment				
Employed	42	78%	22	71%
Unemployed/student/retired	12	22%	9	29%

Data are reported as *N* (%) unless otherwise indicated

TABLE 2

Scores on outcome measures for intervention and comparison groups  
 (pre-treatment and 6-months post-treatment)

Outcome variables/Groups	Pre-treatment		6-months post-treatment	
	Mean ( <i>SD</i> )	CI (95%)	Mean ( <i>SD</i> )	CI (95%)
Physical health (SF-12)				
Intervention	46.0 (9.4)	42.64 – 49.40	46.7 (9.1)	43.43 – 49.90
Comparison	45.9 (11.6)	40.78 – 50.94	46.7 (10.9)	41.81 – 51.51
Mental health (SF-12)				
Intervention	46.2 (9.0)	42.74 – 48.72	48.7 (6.9)	45.73 – 51.58
Comparison	45.8 (13.2)	40.60 – 51.07	42.8 (12.0)	38.45 – 47.23
Depression (CES-D)				
Intervention	9.3 (5.6)	7.36 – 11.19	7.7 (4.9)	5.96 – 9.45
Comparison	11.6 (6.2)	8.46 – 14.68	11.4 (6.1)	8.59 – 14.26
Positive affect (PA)				
Intervention	34.9 (6.2)	32.86 – 36.87	34.9 (5.9)	32.81 – 37.03
Comparison	34.2 (5.8)	31.14 – 37.24	36 (7.5)	32.79 – 39.21
Negative affect (NA)				
Intervention	25.7 (6.7)	23.40 – 28.06	23.5 (7.2)	20.81 – 26.11
Comparison	25 (7.9)	21.21 – 28.79	26.1 (9.9)	21.77 – 30.72
Optimism (LOT)				
Intervention	21.1 (5.5)	19.16 – 22.99	21.3 (5.1)	19.36 – 23.26
Comparison	18.6 (7.2)	15.38 – 21.77	21.4 (8.2)	18.18 – 24.68

*SD* = standard deviations; *CI* = confidence intervals  
*N* = 61 (43 intervention group, 18 comparison group)

TABLE 3  
 Scores on outcome measures for intervention and comparison groups (pre-treatment, 6-months post-treatment and 1-year follow-up)

Outcome variables/Groups	Pre-treatment		6-months post-treatment		1-year follow-up	
	Mean ( <i>SD</i> )	CI (95%)	Mean ( <i>SD</i> )	CI (95%)	Mean ( <i>SD</i> )	CI (95%)
Physical health (SF-12)						
Intervention	45.5 (9.5)	41.74 - 49.30	46.3 (9.5)	42.53 - 50.11	46.7 (9.8)	42.92 - 50.51
Comparison	42 (11.7)	34.76 - 49.15	42.5 (11.8)	35.27 - 49.70	43.9 (9.8)	36.70 - 51.15
Mental health (SF-12)						
Intervention	46.0 (8.5)	42.54 - 49.54	49.8 (6.5)*	46.49 - 53.06	49.6 (8.6)	46.44 - 52.68
Comparison	45.7 (11.8)	39.02 - 52.35	40.7 (14.4)*	34.48 - 46.98	41.4 (6.6)	35.49 - 47.35
Depression (CES-D)						
Intervention	9.2 (4.9)	7.19 - 11.15	7.7 (4.6)	5.87 - 9.58	8.2 (5.4)	6.16 - 10.32
Comparison	11.9 (6.7)	7.83 - 15.89	12.1 (6.3)	8.37 - 15.91	9.9 (6.1)	5.62 - 14.09
Positive affect (PA)						
Intervention	34.3 (6.5)	32.00 - 36.70	35.4 (6.1)	33.00 - 37.75	35.4 (6.9)	33.00 - 37.90
Comparison	37.2 (3.5)	31.54 - 42.86	37.2 (7.3)	31.48 - 42.92	36.4 (2.7)	30.49 - 42.31
Negative affect (NA)						
Intervention	25.6 (5.9)	23.12 - 28.06	22.5 (6.1)	20.08 - 24.89	23.2 (6.4)	20.48 - 25.87
Comparison	26.8 (9.7)	20.85 - 32.75	26 (7.7)	20.21 - 31.79	26.2 (11.1)	19.71 - 32.69
Optimism (LOT)						
Intervention	20.7 (5.8)	18.55 - 22.78	21.3 (5.2)	19.15 - 23.45	21.6 (5.6)*	19.49 - 23.64
Comparison	14.2 (5.1)	9.02 - 19.39	18.6 (9.1)	13.33 - 23.87	13.4 (5.6)*	8.32 - 18.48

*SD* = standard deviations; *CI* = confidence intervals

*N* = 49 (36 intervention group, 13 comparison group)

\* *p* < .05 repeated contrasts; for mental health significant 6-months post-treatment vs pre-treatment (*p* = .013); for optimism significant 1-year follow-up vs 6-months post-treatment (*p* = .004)

TABLE 4

Summary statistics on process evaluation

<i>Questions</i>	<i>Answers</i>	<i>N</i>	<i>%</i>
Satisfaction	quite satisfied	12	28%
	very satisfied	31	72%
Evaluation	negative	0	0%
	quite positive	3	7%
	positive	15	35%
	very positive	25	58%
Usefulness	useless	0	0%
	nor useful nor useless	1	2%
	quite useful	10	24%
	useful	16	38%
	very useful	15	36%
Would repeat the experience	yes	42	98%
	don't know	1	2%
Would recommend to other patients	yes	42	98%
	don't know	1	2%
Perceived change	yes	28	65%
	no	3	7%
	don't know	12	28%
Change positive/negative	positive	28	100%*
Done homework	never	2	5%
	seldom	6	14%
	often	25	58%
	always	10	23%
Most liked aspects	sharing experiences, learning from others		

*N* = 43 (percentages are calculated on valid *N*)

\*of people perceiving a change

