Life after cancer: an intervention study on the effectiveness of a multidisciplinary ACT rehabilitation program developed for cancer survivors in the Netherlands

Master Thesis of Rebecka Kuijs

S02408015

University of Twente

Faculty of Behavioural, Management and Social Sciences

Psychology

Supervisors:

Gert-Jan Prosman, PhD

Marijke Schotanus-Dijkstra, PhD

Abstract

Background: Currently, 800.000 people are living with or have survived cancer in the Netherlands and cancer incidents and survival rates continue to grow rapidly. Cancer survivorship is a complex issue, which has led to a rising need for more research and better organised healthcare systems to aid cancer survivors in their transition from the diagnosis and treatment phase to the post-treatment phase. The aim of the current study is to examine the effectiveness of a multidisciplinary ACT rehabilitation program for cancer survivors, in comparison to a low-symptom group and a complex-symptom group. The possible role of self-efficacy as a mediator is also explored. **Methods:** The study is a single-arm intervention study for which data from 731 participants undergoing treatment, was obtained over the course of 10 years. **Results:** Repeated measure analyses showed that for both groups, the multidisciplinary ACT program was effective in improving patients' individual strength, role functioning, emotional functioning, social functioning and self-efficacy. Main effects for group demonstrated that patients from the low-symptom group reported higher individual strength, emotional functioning, cognitive functioning and social functioning at the end of the program. Results from mediation analyses showed that self-efficacy was either a full or partial mediator on all outcome variables at the end of the treatment. When comparing between the low-symptom and complex-symptom group, no mediating effects of self-efficacy were found for the low-symptom group. **Implications:** An implication for future research may be to focus on expanding research on the effectiveness of multidisciplinary treatment interventions in comparison to monodisciplinary treatment interventions. Furthermore, in the development of future interventions for cancer survivors this study suggests to consider incorporating self-efficacy as an element into the treatment.

"Keywords:" cancer survivors, multidisciplinary treatment, acceptance and commitment therapy, intervention study, self-efficacy

Introduction

Currently, approximately 800.000 people are living with or have survived cancer in the Netherlands. With one in three people being at risk for developing cancer during their lifetime (Survivorship, sd). More importantly, societally and globally, cancer incidents and cancer survival rates are growing rapidly and will continue to increase over the coming years as a result of a growing and aging population, lifestyle changes and because of medical advances in the early detection and treatment of cancer patients or otherwise terminally ill patients (Miller, et al., 2016; Menting, et al., 2019). Because of this, many are likely to experience cancer themselves or know someone who has survived cancer. Making cancer a disease that hits very close to home.

According to the Integraal Kankercentrum Nederland, an individual can be defined as a cancer survivor from the moment of diagnosis, lasting throughout the rest of their life (Survivorship, sd). Although many cancer survivors are able to adjust well to their cancer experience, still up to 24-45% of cancer survivors experience significant levels of distress, especially after the diagnosis and treatment phase (Holland & Reznik, 2005). After completion of formal primary cancer treatment, cancer survivors often become ‘lost in transition’, because inadequate attention is being given to appropriate psychosocial guidance and follow-up care (Jacobsen, 2009). Awareness of the under-recognition and undertreatment of the psychosocial problems of survivors is growing, as well as the importance of addressing the high levels of distress survivors experience in the post-treatment phase (Holland & Reznik, 2005). Furthermore, more and more emphasize is being put on understanding the multiple challenges survivors face regarding their health and well-being when transitioning from formal treatment to post-treatment care (Jacobsen, 2009).

Cancer survivors are often confronted with multiple challenges post primary treatment, that arise from and are pertained to different areas of their lives. These challenges may influence survivors on a physical, psychosocial, societal and economical level (Holland & Reznik, 2005). On a psychosocial level, survivors may face issues concerning neuropsychological and cognitive damage, a psychological reaction to experiencing a life threatening disease, changes in body image, increased vulnerability to illness, and survivors guilt. Moreover, the ending of and transitioning from primary treatment may bring forth anxiety about possible cancer recurrence, about changes from their new normal to their old normal daily routines, and anxiety about the future. Also, survivors are often faced with a decrease in self-efficacy, especially when reintegrating into former family, social and

occupational roles. (Holland & Reznik, 2005). With regard to issues from a societal and economical perspective, cancer survivors may have to deal with concerns from possible employers when applying for a job or from health insurance companies about their perceived increased vulnerability to illness and death. This may lead to the experience of job discrimination and a fear of stigmatization (Holland & Reznik, 2005). Physical issues often consist of lingering (side) effects from particular treatments, hypervigilance and increased sensitivity to minor symptoms and pains, enhanced fear of dying, physical bodily changes, sexual disfunction, infertility, urinary/bowel problems, problems with sleep, and (other) chronic health problems such as chronic fatigue (Stanton, 2012). These challenges cancer survivors face, make cancer survivorship a complex issue. The many unique needs of survivors often remain unmet and require proactive assessment (Morgan, 2009). Receiving a certain level of service or support aimed at addressing these needs, is necessary in order for cancer survivors to achieve well-being (Carey, et al., 2012).

The growing numbers of cancer patients, cancer survivors and chronically ill patients have led to a rising need for more and better organised healthcare systems in which the given care is tailored to the complex, individual needs of these patient groups. One of the main goals of healthcare should be to organise and provide care in such a way that the wishes and abilities of patients are taken into account and that the central aim is to strive for an optimal improvement in patients' quality of life (Menting, et al., 2019). However, the development of follow-up care programs and treatments for cancer survivors is still an ongoing and fairly new process because the post treatment phase has been mostly neglected in clinical practice (Howell, et al., 2012). Nevertheless, research on post-treatment interventions for cancer survivors is expanding (Morgan, 2009; Carey, et al., 2012).

Interventions for cancer survivors post-primary treatment span a wide range of approaches aimed at targeting different components such as education, emotional or social support, challenging dysfunctional thoughts and behaviours, mindfulness, and relaxation training (Stanton, 2006). A randomized controlled study testing the effectiveness of a cognitive behavioural approach in treating severely fatigued cancer survivors, showed the therapy was effective in reducing fatigue severity, psychological distress and functional impairment in comparison to wait-listed control patients (Gielissen, et al., 2006). Online approaches may offer a low-cost and effective way to meet the personal needs of survivors on a greater scale. One study aimed at testing the use and appreciation of a tailored self-management eHealth intervention found that the use of topic-specific modules was

demonstrated to be effective in improving fatigue and depressive feelings and in increasing physical activity and dietary consumption (Kanera, et al., 2016). The effectiveness of mindfulness-based approaches has been demonstrated by multiple randomized controlled trials. Showing positive effects such as significant improvements in mean levels of depression, anxiety and fear of recurrence in survivors of breast cancer, elevated energy levels, improved physical functioning, an enhanced quality of life, reduced perceived stress, reduced fatigue, reduced sleep disturbance, and enhanced peace, meaning and positive affect (Lengacher, et al., 2009; Carlson, et al, 2013; Bower, et al., 2015).

In particular, Acceptance and Commitment Therapy (ACT) has been suggested to be useful in improving outcomes for chronically ill patients or patients suffering from long-term conditions (Graham, et al., 2016). ACT is a third wave cognitive behavioural intervention focused on cultivating awareness of one's thoughts, behaviours and emotions instead of changing them directly through behavioural or cognitive change strategies, such as re-appraisal. Through this awareness patients are enabled to disentangle themselves from dysfunctional or limiting thoughts or beliefs about themselves and their experiences (Hayes, et al., 2006). Through committed action patients are invited to pursue meaningful actions that are in alignment with their personal values, even in the presence of discomfort (Hayes, et al., 2006). Since ACT focusses on accepting negative illness beliefs and feelings of distress, while increasing the competency to live meaningfully and effectively, ACT may be an especially fruitful intervention to use with cancer survivors (Graham, et al., 2016).

A review of six studies aimed at evaluating the effectiveness of ACT in reducing distress in people with long-term conditions has shown that ACT led to a significant reduction of distress (Graham, et al., 2016). Additionally, an ACT-based group intervention developed for anxious cancer survivors at the re-entry stage showed significant improvements across all outcomes, post-treatment and at follow-up. Anxiety, depression and fatigue symptoms were largely improved, whereas physical pain, fear of recurrence, sense of life meaning, understanding and manageability showed medium to large improvements (Arch & Mitchell, 2015).

Furthermore, researchers and theorists propose that self-efficacy may be a valuable factor to include in follow-up approaches for cancer survivors. According to Bandura (1994) self-efficacy can be defined as people their beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. People with high self-efficacy often show heightened human accomplishment and personal

well-being and a reduction of stress and vulnerability to depression. Especially in the face of failure or difficult life challenges, having high self-efficacy may trigger people their intrinsic motivation to stay committed to their goals and to keep control over threatening situations (Bandura, 1994).

Previous research demonstrates that self-efficacy may play a mediating role between the diagnosis and treatment phase of cancer and the quality of life and psychological distress, especially during the post-treatment phase (Chirico, et al., 2017). For example, one study demonstrated that patients' self-efficacy significantly related to important aspects of patient functioning such as positive and negative affect, psychological distress, cancer adjustment and behavioural dysfunction (Beckham, Burker, Feldman, & Costakis, 1997)

Although the evidence for effective interventions directed toward cancer survivors is promising, results from a systematic review of interventions aimed at reducing unmet supportive care needs, show that more research effort is needed to develop a best-practice evidence base and to improve psychosocial outcomes (Carey, et al., 2012). Since survivorship involves many different aspects of care and challenges, working with multidisciplinary teams may be especially important within the context of cancer survivorship care (Morgan, 2009). For example, one study demonstrated physical activity to have at least moderate effects on cancer-related fatigue. The study suggested that incorporating treatment aspects aimed at enhancing patients` physical activity, may yield positive outcomes (Bruggeman-Everts, 2017). Multidisciplinary-based interventions may thus be able to uniquely play into the needs of cancer survivors by tackling their psychophysical problems with the use of different approaches employed by a variety of experts (Morgan, 2009; Bruggeman-Everts, 2017). However, research examining the effects of mono-dimensional versus multidimensional or multidisciplinary approaches is still scarce. In particular, evidence for multidisciplinary approaches is needed and may add valuable information for the further improvement of interventions (Mewes, et al., 2012; Duncan, et al., 2017).

To our knowledge, no previous studies have been conducted regarding the effectiveness of a multidisciplinary ACT-based rehabilitation program. Because more research on the effectiveness of multidisciplinary approaches within the field of cancer survivorship is needed, the current study is uniquely able to address this gap in the literature. Furthermore, the current study is of high relevance because the oncology rehabilitation program is currently being revised. Findings from this study may bring valuable information

that can be used to aid in the revision of the program, thereby enhancing the program´s ability to improve patients´ quality of life and long-term health.

The goal of this study is to examine the effectiveness of a multidisciplinary, ACT-based rehabilitation program for cancer survivors at the end of the intervention and at 3 months follow-up when comparing between a low-symptom and a complex-symptom group. Additionally, mediating effects of self-efficacy on the relationship between physical and psychological complaints at the time of the intake and the outcomes at the end of the treatment are explored. In this study it was hypothesized that (1) the multidisciplinary ACT-based intervention leads to improvement on all outcomes at the end of the intervention and at 3 months follow-up for both groups. That (2), the low-symptom group will show higher improvements on all outcomes at the end of the intervention and at 3 months follow-up than the complex-symptom group. That (3), self-efficacy mediates the relationship between psychophysical complaints at the time of the intake and the outcomes at the end of the treatment in both groups.

Methods

Design

This study is a single-arm intervention study for which data was obtained over the course of 10 years, from 2006-2016, at RCR in Enschede. Data collection for research purposes was an eleven year process, starting in 2006 until 2017. During the last year of data collection (2017), a switch in use of questionnaires was made for measuring one of the outcome measures. Given this switch, all data from 2017 has not been included in the current study. Clients undergoing either individual or group treatment at RCR were classified into one group, namely the oncological rehabilitation group. All treatment outcomes were assessed at intake (Ta), at the start of the treatment (Ts), at the end of the treatment (Te), and three months after the completion of the treatment (Tf3). The measurements were self-reported and gathered via the administering of a booklet containing all questionnaires, either in real life or via post. The research included an experimental group, but no control group. To be able to make direct statistical comparisons between two groups, the current study divided the whole sample into a low-symptom and a complex-symptom group based on their scores on the Psycho-neuroticism subscale of the symptom check list (SCL-90), obtained during intake.

Participants

Oncology survivors receiving the multidisciplinary ACT rehabilitation treatment at RCR were eligible for participation in this study. See figure 2 for the flow-chart of the participants. Through referral from their general practitioner, oncology survivors wishing to receive treatment were invited for a diagnostical intake. Prior to the intake, clients received the Ta questionnaires booklet by post. The booklet for the intake contained general background questions, questions concerning the outcome measures and questions concerning physical and psychological complaints at time of intake. Once clients had filled in the questionnaires and send them back to RCR, the intake with a doctor and with a psychologist could be scheduled. Clients who were deemed not eligible for the multidisciplinary ACT treatment did not partake in the treatment and therefore did not participate in the study. Furthermore, clients who did not want their information and data to be used and shared for research purposes, were not included in this study. The age of participants ranged from 50 to 88 years. See figure 1 for number of participants per year.

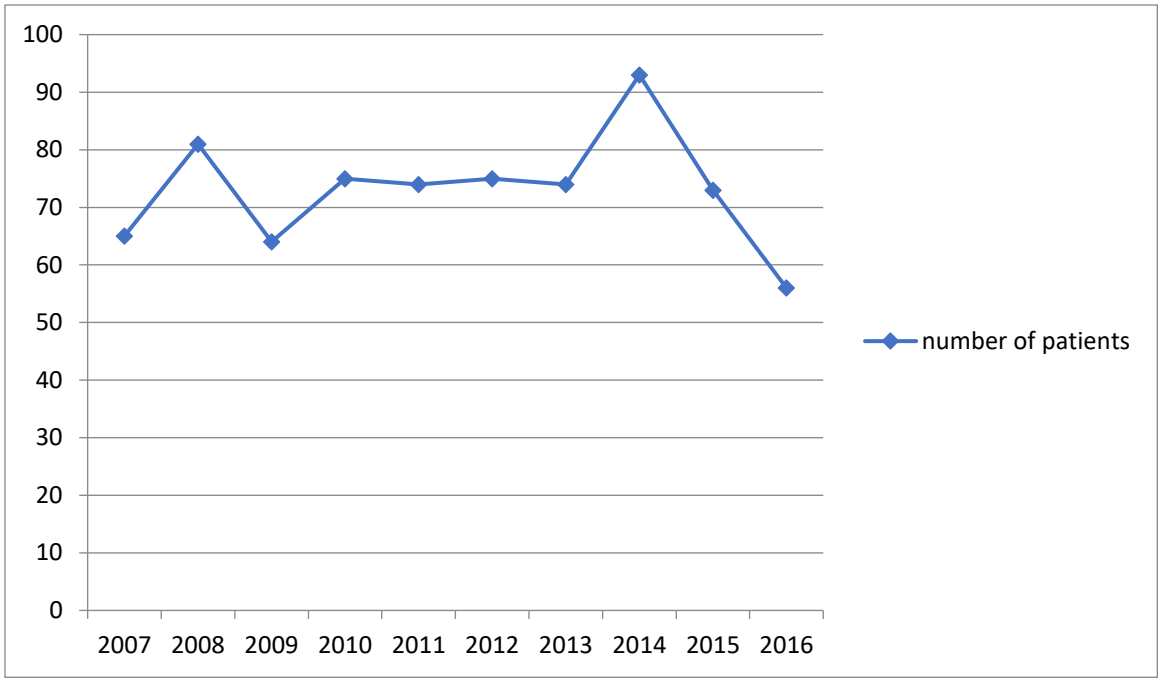

Figure 1. Number of registered patients 2007-2016 at time of intake.

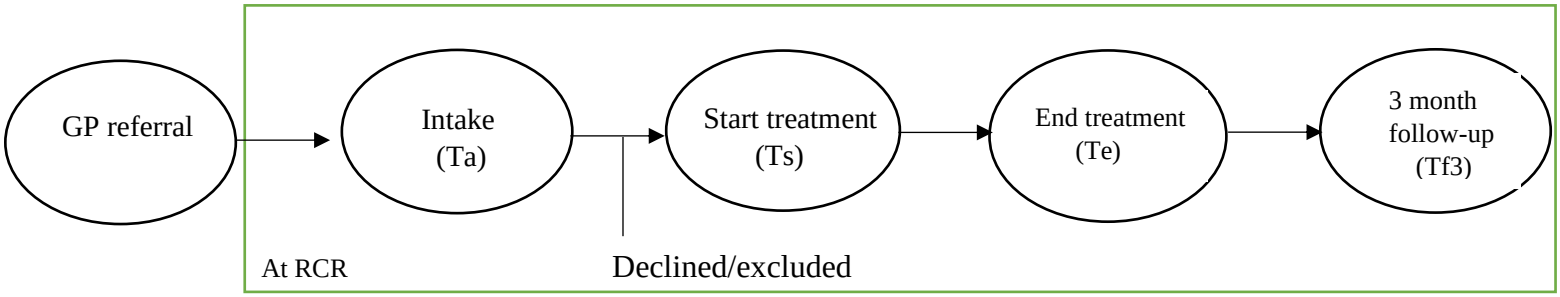

Figure 2. Design of the study and flow-chart of participants

Procedure

Upon referral from the general practitioner, oncology survivors wishing to receive the multidisciplinary ACT treatment were invited for a first consult. After this first consult, informed consent forms and a booklet with all the questionnaires for Ta was send to clients by post. Clients were firstly asked to fill out the informed consent, in which they were asked to grant permission for the usage of obtained data for research purposes. If clients did not agree to this, they were excluded from the study but were still able to undergo the treatment. Secondly, clients were asked to fill in the questionnaires booklet and send them back to RCR. After receiving the results of the questionnaires an intake with rehabilitation doctor and psychologist is scheduled. Depending on the diagnostic outcome after the intake, clients were either deemed eligible for treatment or declined. The criteria for exclusion from the study

consisted of sever psychiatric complaints, physical inability to follow the program, somatic fixation, and inadequate mental capacity to follow the program, for example due to lack of concentration or impaired cognitive functioning. All clients who gave permission for their data to be employed in the study and who were deemed eligible for treatment were included as participants in the study.

After the intake (Ta) clients were either undergoing individual treatment or group treatment. For the clients undergoing group treatment, the questionnaires booklet was administered to them right before the start of the treatment at RCR (Ts) and right after the end of the treatment at RCR (Te). These booklets were administered to them by a psychodiagnostics employee. Clients undergoing individual treatment received the questionnaire booklets by post right before and after the start (Ts) and end (Te) of the treatment. Three months after the cessation of the treatment (Tf3), all clients received the questionnaire booklet by post and were asked to fill them in for the final time.

Intervention

All participants from the study underwent a multidisciplinary ACT program. Clients either followed individual treatment or group treatment both targeting the same factors and consisting of almost the same elements and professionals. The individual treatment lasted for 12 weeks in total and the group treatment had a 10 week duration. Apart from the weekly treatment sessions, multidisciplinary progress meetings were held together with the whole team of practitioners. Important feedback from these meetings were relayed back to and discussed with the clients.

The multidisciplinary team consisted of a rehabilitation doctor, a psychologist or social worker, a physical therapist, an occupational therapist, a movement therapist, an occupational rehabilitation coach, a life and energy coach, and an oncologist. Every week, multiple treatment modules containing elements of acceptance and commitment therapy were given. This translated into all clients having multiple weekly therapy sessions with the therapists from the different disciplinary teams. The various treatment modules consisted of psycho education, movement therapy, coaching and energy distribution, work related rehabilitation, breath and relaxation therapy, psychosocial guidance, oedema and dermatological therapy, and a Q&A meeting with an oncologist.

During psycho-education the main goal was to learn to accept and live with all the changes that accompany living with or surviving cancer, and to enhance the influence one has

on one´s own functioning. Patients are stimulated to reflect on the things that are truly important to them. Increasing awareness and insight into one´s own thoughts, feelings and behaviour is an important aspect of this. Acceptance, processing, social support and anxiety and fatigue are the main themes during this module.

During movement therapy, the main goal is to improve and keep fitness/shape and power. Enjoyment and having fun when moving around, increasing self-confidence and the ability to set healthy boundaries, play an important part in this module. A lot of emphasize is being put on bodily awareness and to learn how to integrate a healthy lifestyle after rehabilitation.

The coaching and energy distribution module is focussed on (re)finding the optimal energetical balance within daily life and functioning. Furthermore, attention is given to education about fatigue and factors influencing fatigue. Together, clients can start thinking about introducing the performance of certain activities back into their lives on a healthy dosage basis.

The main goal during breath and relaxation therapy is to increase awareness regarding tension and stress in the body and mind. Furthermore, clients are stimulated to learn how to regulate stress and tension. This is done by using attention, breathing and movement exercises.

Furthermore, during the course of treatment, a day was organised where client´s significant others were asked to shadow them for one day and to come along with all therapies and activities.

Measures

Checklist Individual Strength (CIS20R) (Michielsen, de Vries, & van Heck, 2002). This scale assesses chronic, subjective fatigue and related behavioural aspects. The scale consists of 20 items in total, subcategorized in subscale 1: subjective sense of fatigue items, subscale 2: concentration items, subscale 3: motivation items, and subscale 4: activity items. On a likert-scale that runs from 1 (yes, that is correct) to 7 (no, that is incorrect), higher total scores are indicative of higher levels of subjective fatigue and lower levels of individual strength. The CIS20 yields good psychometric properties including good internal consistency and split-half reliability (Dittner, Wessely, & Brown, 2004). The reliability coefficient for the CIS20 in total was demonstrated to be .90 for CFS patients (Michielsen, de Vries, & van Heck, 2002).

Hospital anxiety and depression scale (HADS) (Spinhoven, et al., 1997). Consists of 14-items and is a self-report questionnaire developed as a screening measure for the possible presence of depressive and anxiety states in different populations. Each subscale consists of 7 items, one for anxiety and one for depression (Spinhoven, et al., 1997). Items are scored and summed into a total score for anxiety and into a total score for depression, both ranging from 0-21. Individuals with at least mild anxiety or depressive symptoms are usually identified with a cut-off scare of 10 or higher (Schotanus-Dijkstra, et al., 2015). A validation study of the HADS has demonstrated good homogeneity and test-retest reliability of the total score and the subscales. Furthermore, the reliability was shown to be stable across medical settings and age groups (Spinhoven, et al., 1997).

Self-efficacy scale (SE) (Bleijenberg, Bazelmans, & Prins, 2001). The scale consists of 5 items. Patients are asked to cross out the answer they agree with the most, ranging from completely disagree to completely agree on a 5-point scale. The higher the score, the higher the measured self-efficacy. This questionnaire assesses the expectations patients have with regard to their own abilities to influence their own complaints (Pachman, Barton, Swetz, & Loprinzi, 2012). The internal reliability is shown to vary between .68 and .74, depending on the patient population (Bleijenberg, Bazelmans, & Prins, 2001).

36-Item short-form survey (SF-36) (Ware, 2000). This questionnaire consists of 36 items, measuring general health condition using eight scales: physical functioning (PF), social functioning (SF), role functioning (RF), emotional functioning (EF), general health (GH), vitality (VT), bodily pain (BP) and mental health (MH). For this research, the scale was adapted to include only 10 items. Items include questions inquiring about daily activities and if these activities are limited by patients' general health condition at the present moment. Participants rate the items on a 3-point scale ranging from ´yes, severely limited´ to ´no, not limited at all´. The internal consistency has been shown to range between average and good. The alpha coefficients for the different scales range from .71 to .92 (van der Zee & Sanderman, 1993).

Quality of Life scale (QLQ-C30) (Aaronson, et al., 1993). The QLQ-C30 consists of both multi-item and single-item scales with a total of 30 items. Together the QLQ-C30 concludes five functional scales: physical functioning (PF2), role functioning (RF2), emotional functioning (EF), cognitive functioning (CF) and social functioning (SF), six single items, three symptom scales and a global health status/Quality of life scale (QL2) (Aaronson, et al., 1993). From these fifteen subscales in total, only the subscales QL2, PF2, RF2, EF, CF

& SF were deemed relevant and thus included in the current study. The QLQ-C30 was developed for the assessment of health-related quality of life of cancer patients. Numerous studies have demonstrated support for the convergent and discriminant validity of the QLQ-C30 (Luckett, et al., 2011). Previous research has reported a Cronbach´s alpha ranging near .80 or higher (Aaronson & Bergman, et al., 1993).

Symptom Check List (SCL-90) (Schmitz, et al., 2000). This scale consists of 90 items. The SCL-90 is aimed at measuring general psychological and physical disfunction/symptoms, labelled as Psycho-neuroticism (PSNEUR).The scale includes 8 subscales, measuring specific, clinically relevant areas such as: agoraphobia (AGO), anxiety (ANG), depression (DEP), somatic complaints (SOM), insufficiencies in thinking and acting (IN), distrust and interpersonal sensitivity (SEN), hostility (HOS), and sleep problems (SLA). In the current study, only the general psychological and physical disfunction (PSNEUR) was included as a measure. The total score on the SCL-90 comprises the PSNEUR measure. The SCL-90 is considered a widely used symptom inventory for psychological status. A Finnish validation study reported a good discriminant validity and demonstrated the scale to have high levels of internal consistency (Holi, Sammallahti, & Aalberg, 1998).

Statistical analyses

All statistical analyses were performed with SPSS (Statistical Package for Social sciences; IBM, USA), version 25.0. Because there was only an experimental group but no control group included in the research, the current study divided the entire sample into two groups (xxx = 1; xxx = 0), a low-symptom group and a complex-symptom group. This group division was based on the total scores of the clients on psycho-neuroticism from the SCL-90 scale obtained during only the intake (Ta). Creating a low-symptom and complex-symptom group allowed for more in-depth comparisons and complex statistical analyses of the data, and more in-depth, informative answers to the research questions. The cut-off score for the division of the two groups was 147 because that was the median in 2007. For all other years, the median was similar or close to 147, which is why the same cut-off score was used for the remaining years. This led to two groups, one group with SCL scores ≤ 147 (low-symtom group; N= 346) and one group with SCL scores > 147 (complex-symptom group; N= 355).

To examine baseline differences between the two study groups, independent *t* tests and Chi-square statistics were performed. The tests demonstrated that there were no significant differences between the two groups with regard to both gender $\chi^2(1)= 0.813$, $p= .208$, and age

t(698)= -1.94, *p*=.053. Furthermore, Pearson correlations were conducted to assess the associations between the SCL score and the outcome variables at the time of the intake. Correlation coefficients below 0.3 were interpreted as small or weak, from 0.3 to 0.5 as moderate and above 0.5 as strong (Cohen, 1988).

To examine the effects of the multidisciplinary ACT program in comparison between a low-symptom and a complex-symptom group, repeated measures were performed with *time* as within subjects factor and *group* as between subjects factor. To get an initial overview of possible effects, the repeated measures analysis (General Linear Model) was firstly performed separately per year. After these first round of repeated measure analyses, all separate data files from each year were merged into one big total data set. From this total data set, repeated measures were conducted a second time, per outcome measure at all four time points. To correct for the violation of the assumption of sphericity (Mauchly`s test was significant every time), the Greenhouse-Geiser correction for degrees of freedom was applied repeatedly. Additionally, to gain more insight into which factors may potentially play a part in the found effects from the repeated measure analyses, multiple regression analyses were performed using the continuous SCL score as independent variable and the difference between the outcome measures at the end of the treatment (Te) and at the start of the treatment (Ts) as dependent variables.

To test the hypothesis whether self-efficacy has a mediating role, mediation analyses were conducted. The Mediation analyses were performed using the PROCESS tool version 3.5. in SPSS, which was developed by Andrew Hayes in 2012 (Hayes, 2017). Simple mediation analyses were performed including self-efficacy as the mediator variable. In the analyses, X (independent variable) is the physical and psychological complaints at the time of the intake (Ta) and Y (dependent variable) is each outcome measure separately at the end of the treatment (Te). The analyses were performed with year of treatment as covariate, to control for variance in outcome processes over the years. There was no reason to include other covariates, because the performed independent *t* tests and Chi-square statistics showed there were no significant differences between the two groups regarding age and gender. When comparing the role of self-efficacy as a mediator between the low-symptom and the complex-symptom group, the whole sample was divided into the two groups based on the low or high SCL scores obtained during Ta. Then the same mediation analyses were performed, separately per group.

Results

Descriptives and correlations between measures

An overview of the gender distribution and the average age and average score on the SCL at the time of intake (Ta) as well as the average for the outcome measures at Ta are presented in Table 1. With regard to gender there are no significant differences between the two groups. This also holds for age. Obviously, there is a significant difference between the two groups for the average SCL score. A higher SCL-score indicates more complex psychophysiological symptoms. Significant differences between the two groups were also found for the scores on the outcome measures at the time of intake; individual strength, global health status, physical functioning, role functioning, emotional functioning, cognitive functioning, social functioning, hospital anxiety and depression, self-efficacy, and general health condition.

Table 1:
Gender, age, SCL score and outcome scores of participants at intake in the period 2007-2016

	Low-symptom group (SCL-score ≤ 147) (*N*= 346)	Complex-symptom group (SCL-score > 147) (*N*= 355)	test value	p-value
Gender	%	%		
Male	24.9	22.0	$\chi^2(1)= 0.813$,	.208
Female	75.1	78.0		
	M (SD)	M (SD)		
Age	61.17 (12.19)	58.69 (20.10)	*t*(698)= -1.94	.053
SCL-score	124.21 (17.91)	190.15 (38.70)	*t*(699)= -28.83	<.001
Individual resilience	86.27 (21.51)	105.47 (19.06)	*t*(694)= -12.47	<.001
Global health status	64.08 (57.53)	49.21 (20.99)	*t*(625)= 4.34	<.001
Physical functioning	70.60 (21.37)	63.14 (21.60)	*t*(695)= 4.59	<.001
Role functioning	53.41 (27.81)	44.32 (26.42)	*t*(695)= 4.43	<.001
Emotional functioning	73.23 (22.35)	45.33 (22.68)	*t*(697)= 16.38	<.001
Cognitive functioning	74.08 (25.31)	52.86 (27.93)	*t*(697)= 10.51	<.001
Social functioning	67.20 (27.22)	50.98 (28.56)	*t*(697)=7.68	<.001
Hospital anxiety and depression	9.27 (5.67)	17.87 (7.15)	*t*(693)= -17.54	<.001
Self-efficacy	17.45 (5.43)	15.54 (4.91)	*t*(696)=4.88	<.001
General health condition	61.60 (23.76)	55.14 (25.19)	*t*(691)= 3.47	<.001

Table 2 contains the correlations between the SCL score at intake (Ta) and the scores on the outcome variables at Ta. With an exception of the correlation between ‘hospital anxiety and depression’ on the one hand and physical and role functioning and self-efficacy on the other hand, and the correlation between self-efficacy and general health condition, all correlations are significant, though they differ considerably in strength.

Table 2. *Correlations between SCL score and outcome variables at the time of the intake*

	1	2	3	4	5	6	7	8	9	10	11
1. SCL score	1										
2. Individual strength	0.47*	1									
3. Global health status	-0.20*	0.73*	1								
4. Physical functioning	-0.13*	-0.19*	0.83*	1							
5. Role functioning	-0.16*	-0.30*	0.83*	0.61*	1						
6. Emotional functioning	-0.53*	-0.34*	0.82*	0.39*	0.33*	1					
7. Cognitive functioning	-0.39*	-0.35*	0.80*	0.37*	0.39*	0.53*	1				
8. Social functioning	-0.27*	-0.24*	0.81*	0.49*	0.50*	0.48*	0.36*	1			
9. Hospital anxiety and depression	0.59*	0.56*	0.79*	0.00	-0.07	-0.52*	-0.24*	-0.19*	1		
10. Self-efficacy	-0.14*	-0.11*	0.67*	0.55*	0.33*	0.43*	0.34*	0.36*	-0.02	1	
11. General health condition	-0.17*	-0.19*	0.38*	0.76*	0.49*	0.29*	0.26*	0.42*	-0.06	0.49*	1

*$p < 0.001$

The effectiveness of the multidisciplinary ACT program in comparison between a low-symptom and a complex-symptom group

Table 13 provides an overview of the differences in Mean between the SCL groups, the main effects for time and group, and the interaction effects between time and group.

Repeated Measures

Individual strength (CIS20): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 321.17$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.75$. There was a main effect for time on individual resilience, $F(2.24, 1352.08)= 733.30$, $p=.000$ and for group, $F(1, 604)= 6.66$, $p= .001$. The interaction between time and group was also significant, $F(2.24, 1352.08)= 21.91$, $p=.000$. Comparison between the two groups showed that the low-symptom group scored lower on individual resilience ($M= 48.38$, $SD= 1.74$) than the complex-symptom group ($M= 59.89$, $SD= 1.74$). For an overview of the results of the Pair wise comparison for time see table 3.

Table 3.

Results Pair wise comparison for time with means and SD for Individual resilience

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	M= 96.04 SD= 0.81	<.001	<.001	<.001
Ts	M= 53.66 SD= 2.01		<.001	<.001
Te	M= 37.81 SD= 1.62			<.001
Tf3	M= 29.07 SD= 1.54			

Global health status/Quality of life (QLQ-C30): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 959.53$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.51$. A main effect for time on global health status was found, $F(1.52, 811.69)= 15.215$, $p= .000$, but not for group, $F(1, 533)= 0.038$, $p= .845$. The interaction between time and group was also not significant, $F(1.52,$

811.69)= 0.99, *p*= .350. For an overview of the results of the Pair wise comparison for time see table 4.

Table 4.

Results Pair wise comparison for time with means and SD for Global health status/Quality of life (QLQ-C30)

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 58.80 *SD*= 1.93	<.001	<.001	<.001
Ts	*M*= 97.51 *SD*= 10.27		*.144*	*.258*
Te	*M*= 104.81 *SD*= 10.68			1.000
Tf3	*M*= 108.55 *SD*= 11.51			

Physical functioning (QLQ-C30): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 360.68$, *p*= .000. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.73$. There was a main effect for time on physical functioning, *F*(2.19, 1324.67)= 286.14, *p*= .000. No main effect was found for group, *F*(1, 605)= -.29, *p*= .590. The interaction between time and group was significant, *F*(2.19, 1324.67)= 4.43, *p*= .010. For an overview of the results of the Pair wise comparison for time see table 5.

Table 5.

Results Pair wise comparison for time with means and SD for Physical functioning (QLQ-C30)

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 68.67 *SD*= 0.76	<.001	<.001	<.001
Ts	*M*= 33.07 *SD*= 1.53		1.000	<.001
Te	*M*= 38.46 *SD*= 1.67			<.001

Tf3	*M*= 31.63 *SD*= 1.66

Role functioning (QLQ-C30): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 370.18$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.71$. There was a main effect for time on role functioning, $F(2.13, 1291.03)= 119.77$, $p= .000$. No main effect was found for group, $F(1, 605)= 1.38$, $p> 0.05$. The interaction between group and time was significant, $F(2.13, 1291.03)= 3.99$, $p= .016$. For an overview of the results of the Pair wise comparison for time see table 6.

Table 6.

Results Pair wise comparison for time with means and SD for Role functioning (QLQ-C30)

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 50.65 *SD*= 1.08	<.001	<.001	<.001
Ts	*M*= 28.37 *SD*= 1.29		.001	> 0.05.
Te	*M*= 32.18 *SD*= 1.50			<.001
Tf3	*M*= 26.66 *SD*= 1.50			

Emotional functioning (QLQ-C30): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 331.87$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.73$. There was a main effect for both time on emotional functioning, $F(2.19, 1326.66)= 224.33$, $p= .000$, and group, $F(1, 605)=25.86$, $p= .000$. The interaction between time and group was also significant, $F(2.19, 1326.66)= 37.94$, $p= .000$. Comparison between groups showed that the low-symptom group had a higher score on emotional functioning (*M*= 44.21, *SD*= 1.49) than the complex-symptom group (*M*= 33.49, *SD*= 1.49). For an overview of the results of the Pair wise comparison for time see table 7.

Table 7.

Results Pair wise comparison for time with means and SD for Emotional functioning (QLQ-C30)

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 60.82 *SD*= 0.84	<.001	<.001	<.001
Ts	*M*= 31.23 *SD*= 1.34		.007	.359.
Te	*M*= 34.45 *SD*= 1.56			<.001
Tf3	*M*= 28.92 *SD*= 1.56			

Cognitive functioning (QLQ-C30): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 395.39$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.70$. There was a main effect for both time on cognitive functioning, $F(2.10, 1267.83)= 264.06$, $p= .000$ and group on cognitive functioning, $F(1, 605)= 13.99$, $p= .000$. The interaction between time and group was also significant, $F(2.10, 1267.83)= 19.69$, $p= .000$. Comparison between groups showed that the low-symptom group scored higher on cognitive functioning ($M= 43.67$, $SD=1.50$) than the complex-symptom group ($M= 35.78$, $SD= 1.49$). For an overview of the results of the Pair wise comparison for time see table 8.

Table 8.

Results Pair wise comparison for time with means and SD for Cognitive functioning (QLQ-C30)

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 65.18 *SD*= 1.02	<.001	<.001	<.001
Ts	*M*= 31.98 *SD*= 1.40		1.000	. 028
Te	*M*= 33.31 *SD*= 1.54			<.001

Tf3	*M*= 28.42 *SD*= 1.55

Social functioning (QLQ-C30): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 357.04$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.71$. There was a main effect for both time on social functioning, $F(2.17, 1314.98)= 171.74$, $p= .000$ and group on social functioning, $F(1, 605)= 3.57$, $p= .000$. The interaction between time and group was also significant, $F(2.17, 1314.98)= 11.79$, $p= .000$. Comparison between groups showed that the low-symptom group scored higher on social functioning (*M*= 42.61, *SD*= 1.65) than the complex-symptom group. For an overview of the results of the Pair wise comparison for time see table 9.

Table 9.

Results Pair wise comparison for time with means and SD for Social functioning (QLQ-C30)

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 60.75 *SD*= 1.09	<.001	<.001	<.001
Ts	*M*= 33.79 *SD*= 1.46		. 032	<.001
Te	*M*= 36.66 *SD*= 1.68			.076
Tf3	*M*= 30.45 *SD*= 1.67			

Hospital anxiety and depression: Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 1267.74$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.50$. There was a main effect of time on hospital anxiety and depression, $F(1.50, 855.94)= 26.87$, $p= .000$. No main effect was found for group, $F(1,571)=0.12$, $p= .732$. The interaction between time and group was not significant, $F(1.50, 855.94)= 0.55$, $p= .529$. For an overview of the results of the Pair wise comparison for time see table 10.

Table 10.

Results Pair wise comparison for time with means and SD for Hospital anxiety and depression

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 15.58 *SD*= 1.75	<.001	<.001	<.001
Ts	*M*= 67.39 *SD*= 9.80		1.000	.090
Te	*M*= 67.78 *SD*= 10.09			.051
Tf3	*M*= 80.57 *SD*= 11.08			

Self-efficacy: Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 1328.88$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.50$. There was a main effect of time on self-efficacy, $F(1.51, 913.69)= 25.45$, $p= .000$. No main effect was found for group, $F(1, 605)=0.003$, $p= .959$. The interaction between time and group was not significant, $F(1.51, 913.96)= 0.91$, $p= .378$. For an overview of the results of the Pair wise comparison for time see table 10.

Table 11.

Results Pair wise comparison for time with means and SD for Self-efficacy

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*= 20.25 *SD*= 2.29	<.001	<.001	<.001
Ts	*M*= 65.54 *SD*= 9.25		1.000	.037
Te	*M*= 68.45 *SD*= 9.51			.092
Tf3	*M*= 79.53, *SD*= 10.45			

General health condition (SF36): Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(5)= 430.83$, $p= .000$. Therefore Greenhouse-Geiser correction for degrees of freedom was applied, $\varepsilon= 0.74$. There was a main effect for time on general health condition, $F(2.23, 1347.10)= 288.23$, $p= .000$. No main effect was found for group, $F(1, 604)= 0.33$, $p> 0.05$. The interaction between time and group was significant, $F(2.23, 1347.10)= 4.17$, $p= .013$. Pair wise comparison for time showed that the general health condition at time of intake (M=60.25, SD= 0.92) differed significantly, p=.000 (all three comparisons) from the general health condition at the start of the treatment (M= 34.70, SD= 1.45) as well as at the end of the treatment $p= .000$ (M= 34.51, SD= 1.56) and after 3 months follow-up, $p= .000$ (M= 24.68, SD= 1.69). There was no significant difference in the general health condition at the start and at the end of the treatment. However, there was a significant difference in general health condition at the start of the treatment and after 3 months follow-up, $p= 0.000$ and between the end of the treatment and after 3 months follow-up, $p= 0.000$.

Table 12.

Results Pair wise comparison for time with means and SD for General health condition

	Mean and SD for time	Ts (p-value)	Te (p-value)	Tf3 (p-value)
Ta	*M*=60.25 *SD*= 0.92	<.001	<.001	<.001
Ts	*M*= 34.70 *SD*= 1.45		.054	<.001
Te	*M*= 34.51 *SD*= 1.56			<.001
Tf3	*M*= 24.68 *SD*= 1.69			

Table 13. *Overview of the differences in Mean between SCL groups and the main effects for time and group and interaction effects between time and group.*

	Low-symptom group (*N*= 346)	Complex-symptom group (*N*= 355)	Main effect for time (p-value)	Main effect for group (p-value)	Interaction effect time and group (p-value)
	M (SD)	M (SD)			
Individual resilience	48.38 (1.47)	59.89 (1.47)	<.001	<.001	<.001

Global health status	93.97 (11.30)	90.86 (11.20)	<.001	.845	.350
Physical functioning	43.80 (1.59)	42.11 (1.59)	<.001	.590	.010
Role functioning	35.68 (1.46)	33.25 (1.46)	<.001	> .05	.016
Emotional functioning	44.21 (1.49)	33.49 (1.49)	<.001	<.001	<.001
Cognitive functioning	43.67 (1.50)	35.78 (1.49)	<.001	<.001	<.001
Social functioning	42.61 (1.65)	38.21 (1.64)	<.001	<.001	<.001
Hospital anxiety and depression	55.23 (10.75)	60.43 (10.74)	<.001	.732	.529
Self-efficacy	58.81 (10.25)	58.01 (10.24)	<.001	.959	.378
General health condition	39.19 (1.61)	37.88 (1.61)	<.001	> .05	.013

3.3.2 Multiple regressions

Multiple regressions analyses were performed with the continuous SCL score as independent variable and the difference between the end of the treatment and the start of the treatment for individual strength, hospital anxiety and depression, self-efficacy and general health condition as dependent variables.

Individual strength: both year of treatment and SCL score (physical and psychological complaints) are significant predictors for the change in individual strength between the start and the end of the treatment (Table 14). The score on the other measures at the time of intake have no relation with the change in individual strength between start and end of the treatment. These results corroborate the findings of the repeated measures analyses, where a significant difference was found for the factor group, which was based on the SCL score.

Hospital anxiety and depression: SCL score (physical and psychological complaints) is a significant predictor for the change in hospital anxiety and depression between the start and the end of the treatment (Table 15). The score on the other measures at the time of intake and year of treatment have no relation with the change in hospital anxiety and depression between start and end of the treatment. These results corroborate the findings of the repeated measures analyses, where no significant difference was found for the factor group.

Self-efficacy: both year of treatment and SCL score (physical and psychological complaints) are significant predictors for the change in self-efficacy between the start and the

end of the treatment (Table 16). The score on the other measures at the time of intake have no relation with the change in self-efficacy between start and end of treatment. These findings are not in line with the outcomes of the repeated measures analysis, since no significant difference were found for the factor group nor for the interaction between group and time.

General health condition: SCL score (physical and psychological complaints) is a significant predictor for the change in general health condition between the start and the end of the treatment (Table 17). The score on the other measures and at the time of intake and year of treatment have no relation with the change in general health condition between start and end of the treatment. These results are only partly in line with the results of the repeated measures analysis, where no significant effect was found for group, however a significant interaction effect of group and time was found.

Table 14. *Results multiple regression of SCL score and other measures at the time of intake on individual strength (difference between start and end of treatment)*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β	se	β	se	β	se	β	se	β	se	β	se
Year	0.09*	1.11	0.10*	1.11	0.10*	1.11	0.10*	1.11	0.10*	1.12	0.10*	1.13
SCL			0.09*	0.07	0.09*	0.07	0.09*	0.07	0.09*	0.07	0.09*	0.07
Individual strength					0.01	0.07	-0.01	0.17	-0.01	0.17	-0.19	0.17
Hospital anxiety and depression							0.02	0.18	0.02	0.19	0.02	0.19
Self-efficacy									0.00	0.08	0.00	0.08
General health condition											-0.02	0.05
R^2	0.01		0.02		0.02		0.02		0.02		0.02	
ΔR^2	0.01		0.01		0.00		0.00		0.00		0.00	
F	6.01		5.54		3.69		2.77		2.22		1.88	

*: $p < 0.05$

Table 15. *Results multiple regression of SCL score and other measures at the time of intake on hospital anxiety and depression (difference between start and end of treatment)*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β	se	β	se	β	se	β	se	β	se	β	se
Year	0.06	0.86	0.06	0.86	0.06	0.86	0.06	0.86	0.06	0.86	0.06	0.87
SCL			0.10*	0.05	0.10*	0.05	0.09*	0.05	0.09*	0.05	0.09*	0.05
Individual strength					0.01	0.06	0.08	0.13	0.08	0.13	0.08	0.13
Hospital anxiety and depression							-0.07	0.13	-0.07	0.15	-0.07	0.15
Self-efficacy									0.00	0.05	0.00	0.05
General health condition											-0.01	0.04
R^2	0.00		0.02		0.02		0.02		0.02		0.02	
ΔR^2	0.00		0.01		0.00		0.00		0.00		0.00	
F	2.36		4.51		3.05		2.43		1.94		1.62	

*: $p < 0.05$

Table 16. *Results multiple regression of SCL score and other measures at the time of intake on self-efficacy (difference between start and end of treatment)*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β	se	β	se	β	se	β	se	β	se	β	se
Year	0.09*	0.83	0.09*	0.83	0.09*	0.83	0.09*	0.83	0.09*	0.83	0.09*	0.84
SCL			0.14**	0.05	0.14**	0.05	0.13**	0.05	0.13**	0.05	0.12**	0.05
Individual strength					0.02	0.05	0.10	0.13	0.10	0.13	0.10	0.13
Hospital anxiety and depression							-0.09	0.13	-0.09	0.14	-0.09	0.14
Self-efficacy									0.00	0.05	0.00	0.06
General health condition											-0.01	0.04
R^2	0.01		0.03		0.03		0.03		0.03		0.03	
ΔR^2	0.01		0.03		0.00		0.00		0.00		0.00	
F	5.16		8.74		5.90		4.66		3.72		3.10	

*: $p < 0.05$, ** $p < 0.01$

Table 17. *Results multiple regression of SCL score and other measures at the time of intake on general health condition (difference between start and end of treatment)*

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	β	se	β	se	β	se	β	se	β	se	β	se
Year	0.07	0.85	0.08	0.84	0.07	0.85	0.07	0.84	0.07	0.85	0.08	0.85
SCL			0.14**	0.05	0.14**	0.05	0.12**	0.05	0.13**	0.05	0.13*	0.05
Individual strength					0.02	0.06	0.12	0.12	0.12	0.13	0.12	0.13
Hospital anxiety and depression							-0.11	0.13	-0.11	0.14	-0.11	0.15
Self-efficacy									0.01	0.06	0.01	0.06
General health condition											-0.01	0.04
R^2	0.01		0.03		0.03		0.03		0.03		0.03	
ΔR^2	0.01		0.02		0.00		0.00		0.00		0.00	
F	3.61		7,97		5.42		4.39		3.51		2.94	

**: $p < 0.05$

Self-efficacy as a mediator

Mediation analyses.

Individual strength: Table 18 summarizes the results of the mediation analysis for individual strength. The total effect model for physical and psychological complaints on individual strength shows a significant total effect, $t(618)= 2.24$, $p= .013$. The effect of physical and psychological complaints on individual strength is fully mediated by self-efficacy.

Comparison between the low-symptom and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy does have a significant positive relation with individual strength, $t(306)= 3.43$, $p= 0.001$, which indicates that increased levels of self-efficacy lead to higher individual strength for this group.

For the complex-symptom group, there is also a significant positive relation between self-efficacy and individual strength, $t(311)= 22.50$, $p=.000$, but no mediation.

Table 18. *Results regression of physical and psychological complaints (SCL score) at intake on individual strength (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		Individual strength		Total effect model	
	β	SE	β	SE	β	SE
Constant	-35.03	9.29	-19.06	9.26	-50.94	12.45
SCL score	0,17**	0.05	-0.01	0.05	0.15*	0.06
Self Efficacy			0.91**	0.04		
Year	1.95*	0.83	1.01	0.82	2.78*	1.11
R^2	0.03		0.47		0.02	
F	8.76		181.70		5.56	

*$p< 0.05$, **$p<0.01$

Global health status/Quality of life (QLQ-C30): Table 19 summarizes the results of the mediation analysis for global health status. The total effect model shows a positive significant effect of physical and psychological complaints at the time of intake on general health status, $t(617)= 3.50$, $p= .001$. The effect of physical and psychological complaints on global health status is fully mediated by self-efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy does have a significant positive relation with global health status in this group, $t(305)= 19.90$, $p= .000$, indicating that higher levels of self-efficacy lead to a better global health status.

In the complex-symptom group, there is also a positive significant relation between self-efficacy and global health status, $t(311)= 24.78$, $p= .000$, but no mediation.

Table 19. *Results regression of physical and psychological complaints (SCL score) at intake on general health status (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		General health status		Total effect model	
	β	SE	β	SE	β	SE
Constant	-35.23	9.32	-4.68	7.09	-39.57	11.59
SCL score	0,17**	0.49	0.04	0.04	0.21**	0.06
Self Efficacy			0.99**	0.03		
Year	1.96*	0.83	0.51	0.60	2.45*	1.03
R^2	0.03		0.64		0.03	
F	8.78		1745.28		8.79	

*$p< 0.05$, **$p<0.01$

Physical functioning (QLQ-C30): Table 20 summarizes the results of the mediation analysis for physical functioning. The total effect model for physical and psychological complaints on physical functioning shows a significant total effect, $t(618)= 3.74$, $p= .000$. The effect of physical and psychological complaints on physical functioning is fully mediated by self-efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy however, does have a significant positive relation with physical functioning for this group, $t(305)= 23.85$, $p= 0.000$, indicating that higher levels of self-efficacy contribute to better physical functioning. In the complex-symptom group the total effect of physical and psychological complaints at Ta on physical functioning is significant, $t(311)= 2.71$, $p= .007$, thus the relationship between physical and psychological complaints and physical functioning, is fully mediated by self-efficacy.

Table 20. *Results regression of physical and psychological complaints (SCL score) at intake on physical functioning (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		Physical functioning		Total effect model	
	β	SE	β	SE	β	SE
Constant	-35.23	9.32	-1.33	3.07	-35.21	9.46
SCL score	0,17**	0.05	0.02	0.02	0.19**	0.05
Self Efficacy			0.96**	0.01		

Year	1.96*	0.83	-0.21	0.27	1.68*	0.84
R^2	0.03		0.90		0.03	
F	8.78		1849.49		8.82	

*p< 0.05, **p<0.01

Role functioning (QLQ-C30): Table 21 summarizes the results of the mediation analysis for role functioning. The total effect model for physical and psychological complaints on role functioning shows a significant effect, $t(617)= 3.59$, $p= .000$. The effect of physical and psychological complaints on role functioning is fully mediated by self-efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy does have a significant positive relation with role functioning for this group, $t(305)= 14.63$, $p= .000$, indicating that higher levels of self-efficacy lead to better role functioning in this group. For the complex-symptom group, the total effect of physical and psychological complaints at Ta on role functioning is significant, $t(311)= 2.70$, $p= .007$, thus the relationship between physical and psychological complaints and role functioning, is fully mediated by self-efficacy.

Table 21. *Results regression of physical and psychological complaints (SCL score) at intake on role functioning (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		Role functioning		Total effect model	
	β	SE	β	SE	β	SE
Constant	-35.23	9.32	4.56	3.59	-30.96	10.05
SCL score	0,17**	0.49	0.02	0.02	0.19**	0.05
Self Efficacy			1.01**	0.02		
Year	1.96*	0.83	-0.49	0.32	1.48	0.89
R^2	0.03		0.88		0.02	
F	8.78		1475.28		7.69	

*p< 0.05, **p<0.01

Emotional functioning (QLQ-C30): Table 22 summarizes the results of the mediation analysis for emotional functioning. There is a significant total effect of physical and psychological complaints on emotional functioning, $t(617)= 4.39$, $p= .000$. The relation between physical and psychological complaints and emotional functioning is partially mediated by self-efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy however, does have a significant positive relation with emotional functioning for this group, $t(305)=$

16.61, *p*= .000, which indicates that higher levels of self-efficacy contribute to better emotional functioning.

For the complex-symptom group the total effect of physical and psychological complaints at Ta and emotional functioning is significant, *t*(311)= 2.94, *p*= .004. The relationship between physical and psychological complaints and emotional functioning, is fully mediated by self-efficacy in the complex-symptom group.

Table 22. *Results regression of physical and psychological complaints (SCL score) at intake on emotional functioning (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		Emotional functioning		Total effect model	
	β	SE	β	SE	β	SE
Constant	-35.23	9.32	-4.83	3.65	-39.73	9.92
SCL score	0,17**	0.05	0.06**	0.02	0.23**	0.05
Self Efficacy			0.99**	0.02		
Year	1.96*	0.83	-0.06	0.32	1.88*	0.88
R^2	0.03		0.87		0.04	
F	8.78		1398.52		11.75	

*p< 0.05, **p<0.01

Cognitive functioning (QLQ-C30): Table 23 summarizes the results of the mediation analysis for cognitive functioning. The total effect of physical and psychological complaints on cognitive functioning is significant, *t*(617)= 4.37, *p*= .000. The relation between physical and psychological complaints and cognitive functioning is partially mediated by self-efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy however, does have a significant positive relation with cognitive functioning for this group, *t*(305)= 17.03, *p*= .000, indicating that higher levels of self-efficacy contribute to better cognitive functioning. In the complex-symptom group, the relationship between physical and psychological complaints and cognitive functioning is fully mediated by self-efficacy.

Table 23. *Results regression of physical and psychological complaints (SCL score) at intake on cognitive functioning (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		Cognitive functioning		Total effect model	
	β	SE	β	SE	β	SE

Constant	-35.23	9.32	-5.37	3.53	-39.89	9.78
SCL score	0,17**	0.05	0.06**	0.02	0.23**	0.05
Self Efficacy			0.98**	0.02		
Year	1.96*	0.83	-0.18	0.31	1.74*	0.88
R^2	0.03		0.88		0.04	
F	8.78		1450.06		11.38	

*p< 0.05, **p<0.01

Social functioning (QLQ-C30): Table 24 summarizes the results of the mediation analysis for social. There is a significant total effect of physical and psychological complaints at the time of intake and social functioning, $t(617)= 4.09$, $p= .000$. The relation between physical and psychological complaints and social functioning is partially mediated by self-efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediating relation of self-efficacy.

In the complex-symptom group, the relationship between physical and psychological complaints and social functioning, is fully mediated by self-efficacy.

Table 24. *Results regression of physical and psychological complaints (SCL score) at intake on social functioning (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		Social functioning		Total effect model	
	β	SE	β	SE	β	SE
Constant	-35.23	9.32	-1.93	3.91	-37.15	10.09
SCL score	0,17**	0.05	0.05**	0.02	0.22**	0.05
Self Efficacy			0.99**	0.02		
Year	1.96*	0.83	-0.32	0.34	1.64	0.89
R^2	0.03			0.86	0.03	
F	8.78			1237.75	9.89	

*p< 0.05, **p<0.01

Hospital anxiety and depression: Table 25 summarizes the results of the mediation analysis for hospital anxiety and depression. In the total effect model there is a significant positive relation between physical and psychological complaints and hospital anxiety and depression, $t(618)= 2.58$, $p= .010$. The relation between physical and psychological

complaints at the time of intake and hospital anxiety and depression is partially mediated by self- efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy however, does have a significant positive relation with hospital anxiety and depression for this group, $t(305)= 2.65$, $p= .009$. In the complex-symptom group, the total effect of physical and psychological complaints and hospital anxiety and depression is significant, $t(311)= 2.20$, $p= .028$, meaning self-efficacy is a partial mediator.

Table 25. *Results regression of physical and psychological complaints (SCL score) at intake on hospital anxiety and depression (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self Efficacy		Individual strength		Total effect model	
	β	SE	β	SE	β	SE
Constant	-35.05	9.29	10.98	2.82	-23.72	9.61
SCL score	0.17**	0.05	-0.04*	0.02	0.13*	0.05
Self Efficacy			0.99**	0.01		
Year	1.94*	0.83	-0.57*	0.25	1.36	0.86
R^2	0.03		0.92		0.01	
F	8.76		2267.06		4.52	

*$p< 0.05$, **$p<0.01$

General health condition (SF36): Table 26 summarizes the results of the mediation analysis for general health condition. The total effect model for physical and psychological complaints on general health condition shows a total significant effect, $t(625)= 3.45$, $p= .001$. The effect of physical and psychological complaints on general health condition is fully mediated by self-efficacy.

Comparison between the low-symptom group and complex-symptom group demonstrated that for the low-symptom group, there is no mediation. Self-efficacy does have a significant positive relation with general health condition for this group, $t(305)= 17.26$, $p= .000$. In the complex-symptom group, the total effect of physical and psychological complaints at Ta on the general health condition is significant, $t(311)= 2.62$, $p= .009$. The relationship between physical and psychological complaints and general health condition is fully mediated by self-efficacy.

Table 26. *Results regression of physical and psychological complaints (SCL score) at intake on general health condition (difference between start and end of treatment) mediated by Self Efficacy (difference between start and end of treatment) (PROCESS)*

	Self-efficacy		General Health Condition		Total effect model	
	β	SE	β	SE	β	SE
Constant	-33.52	8.99	1.19	2.64	-31.48	9.15
SCL score	0.16**	0.05	0.01	0.01	0.16**	0.05
Self-efficacy			0.97**	0.01		
Year	2.04*	0.81	-0.26	0.24	1.73*	0.83
R^2	0.03		0.92		0.24	
F	8.60		2395.77		7.62	

*$p< 0.05$, **$p<0.01$

Discussion

The aim of the current study was to gain insight into the effectiveness of the multidisciplinary ACT rehabilitation program for cancer survivors at RCR in the Netherlands and to explore self-efficacy as a potential mediator. It was hypothesized that (1) the multidisciplinary ACT-based intervention leads to improvement on all outcomes at the end of the intervention and at 3 months follow-up for both groups. That (2), the low-symptom group will show higher improvements on all outcomes at the end of the intervention and at 3 months follow-up than the complex-symptom group. That (3), self-efficacy mediates the relationship between psychophysical complaints at the time of the intake and the outcomes at the end of the treatment in both groups.

Effectiveness of the multidisciplinary ACT program

In general, for both groups, repeated measure analyses demonstrated that the multidisciplinary ACT program was effective in improving patients' individual strength, role functioning, emotional functioning, social functioning, and self-efficacy, especially between the start of the treatment and at the end of the treatment. For these outcome measures, the difference between the start of the treatment and the end of the treatment indicated a significant improvement. For self-efficacy and individual strength the effects were sustained at three months follow-up. However, no significant improvements were found for global health status/quality of life, anxiety and depression symptoms, and general health condition. These results supports the first hypothesis only to a certain extent, since the patients did not improve significantly on all of the outcome measures.

These findings partially align with current literature and research. For example, research on ACT-based approaches within the cancer setting has demonstrated ACT to have beneficial effects for cancer survivors throughout different stages of the treatment spectrum, specifically for reducing distress (Arch & Mitchell, 2015). Furthermore, literature suggests that ACT interventions have the ability to increase psychological flexibility which in turn acts as a buffer for psychological distress. This because of ACT its focus on psychological processes such as acceptance, whereby patients' adaptability and resilience is positively influenced, rather than just focussing on eliminating physical and psychological symptoms (Hulbert-Williams, Storey, & Kelly, 2014). As demonstrated by the results of the current study, individual strength, self-efficacy, role functioning, emotional functioning, and social functioning were significantly improved, which may reflect an increase in patients' adaptability and resilience. However, according to a review of six studies aimed at evaluating

the effectiveness of ACT in reducing distress, ACT was shown to lead to a significant reduction in distress (Graham, et al., 2016). When considering findings like these, it could be expected that, contradictory to this study´s findings, the multidisciplinary ACT program would have been effective in diminishing psychological distress such as anxiety and depressive symptoms.

Comparison between the low-symptom group and the complex-symptom group demonstrated that, in accordance to what was hypothesized, patients from the low-symptom group showed more increased improvement than patients from the complex-symptom group. Significant differences were found in individual strength, emotional functioning, cognitive functioning and social functioning. For the other outcome measures, group did not have an effect. These findings suggest that the multidisciplinary ACT program may lead to higher improvements for patients with less severe physical and psychological complaints during intake. Nonetheless, a study about pain in cancer survivors suggests that the patients who have complex pain issues, should be given a multidisciplinary treatment program (Glare, Davies, Finlay, et al., 2014). Furthermore, a study regarding physical exercise and depressive symptoms demonstrated that aerobic exercise was successful in reducing depressive symptoms in participants with both low and high depressive symptomatology (Penninx, Rejeski, Pandya, et al., 2002). Findings like these indicate that multidisciplinary treatment programs with a physical exercise component may still also be effective for patients with complex symptoms.

A finding that stood out was that for all of the outcome measures, changes between the time of intake and all other time measures were significant. In particular, patients' individual strength, global health status/quality of life, and self-efficacy were significantly higher during the moment of intake in comparison to the start of treatment, the end of treatment and at three months follow-up. Conversely, for physical functioning, role functioning, emotional functioning, cognitive functioning, social functioning, anxiety and depression, and general health condition, mean scores were significantly lower at the start and end of the treatment and at three months follow-up, in comparison to the mean scores obtained during intake.

A potential explanation for this may be that undergoing an intake interview and filling in self-report questionnaires possibly sparks a heightened focus on and awareness of existing physical and psychological complaints. According to the literature, increased (body) awareness may positively influence behaviours such as self-efficacy, self-management of health problems, expression of emotions, and quality of life (Landsman-Dijkstra, van Wijck,

Groothoff, & Rispens, 2004). Thus, a possible increase in body awareness, set in motion during intake, could then lead to a higher attention to and awareness of their complaints, which may explain the significant increase in physical, social and psychological complaints as seen in the time period following the intake (Landsman-Dijkstra, et al., 2004).

Self-efficacy as a mediator

Self-efficacy was hypothesized to play a mediating role between psychophysical complaints at Ta and the outcomes at Te in both groups. Results from the mediation analyses demonstrated that self-efficacy either fully mediated or partially mediated the relationship, thus almost fully supporting the hypothesis. Individual strength, global health status/quality of life, physical functioning and role functioning were fully mediated by self-efficacy, as only the indirect effect of physical and psychological complaints at intake was significant for these outcome measures. Emotional functioning, cognitive functioning, social functioning, anxiety and depression and general health condition were partially mediated by self-efficacy, as both a significant direct and indirect relationship was found.

When comparing between the low-symptom and complex-symptom group, mediation analyses showed that self-efficacy fully mediated the relationship between physical and psychological complaints during intake and the scores on physical functioning, role functioning, emotional functioning, cognitive functioning, social functioning and general health condition for the complex-symptom group. For the low-symptom group, no mediating effects of self-efficacy were found.

Hospital anxiety and depression was also partially mediated by self-efficacy in the complex-symptom group. In both the sample as a whole and in the complex-symptom group for the HADS in particular, the total effect of the SCL scores on the outcome measure at the end of the treatment was positive, meaning that patients with high SCL scores also scored higher on the HADS. Thus, indicating higher symptoms of anxiety and depression. Furthermore, the direct effect of SCL scores on the HADS, through self-efficacy, was negative. In other words, self-efficacy mediates the positive relationship between the SCL scores and hospital anxiety and depression in such a way that even though higher SCL scores lead to higher anxiety and depressive symptoms, this effect is diminished by patients their self-efficacy. Findings like these demonstrate the benefits of focussing especially on enhancing patients their self-efficacy during and before treatment. By doing this, symptoms of distress may be alleviated and outcome factors such as individual strength, global health

status/quality of life, general health condition, and physical, role, emotional, social and cognitive functioning, may be significantly improved.

The findings from the current study concur with previous research demonstrating that self-efficacy deserves attention as a mediator of psychological interventions. For example, one study, regarding the role self-efficacy plays in cancer patients' quality of life, found a strong positive correlation between self-efficacy and mood and self-efficacy and quality of life (Cunningham, Lockwood & Cunningham, 1991). Another study demonstrated results suggesting that patients' self-efficacy significantly related to valuable aspects of patient functioning such as positive and negative affect, psychological distress, cancer adjustment and behavioural dysfunction (Beckham, Burker, Feldman, & Costakis, 1997). Furthermore, from a theoretical point of view, enhancing self-efficacy during the post-treatment phase is suggested to play a helpful and important role in alleviating the detrimental effects of the diagnosis and treatment phase and enhancing patients' quality of life (Chirico, et al. 2017).

Strengths and limitations

One major strength of this study is that this study was the first to examine the effectiveness and working mechanisms of a multidisciplinary ACT rehabilitation program for cancer survivors and to make a comparison between a low-symptom and complex-symptom group. Apart from the strengths, several limitations do also apply to the present study.

Firstly, there was no control group included in the research design. Even though the current study created two separate groups in order to make statistical comparisons, the participants all followed the same multidisciplinary ACT program.

Second, patients either underwent individual treatment or group treatment. However, individual treatment and group treatment were not included as separate variables during data collection. Although both types of treatment targeted the same factors and consisted of almost the same elements and professionals, existing differences and unforeseen underlying factors may have confined the data. Moreover, research suggests a possible moderating effect of treatment format, in which group-based interventions may further enhance self-efficacy in comparison to individual-based interventions (Chirico, et al., 2017). It could have been interesting to include treatment format as a possible moderator in the current study, in order to analyse its effect on self-efficacy.

Third, the used database unfortunately consisted of a lot of missing data, which may have compromised the accuracy of the outcomes from the current study. Because nearly all

standard statistical methods assume the included variables to contain complete information, missing data can cause problems. For example, a dramatical decrease of the sample size, weakened statistical power, and biased parameter estimates (Soley-Bori, 2013). Since the sample size of the current study was very large, cases with missing values were excluded from the analysis, without jeopardizing having an acceptable sample size.

Lastly, the patient sample consisted predominantly of females (76.3%), which may restrict the generalizability to male patients within the cancer population.

Implications and future directions

Various implications and future directions can be made, both clinically and for research purposes. Results from the present study has shown that a multidisciplinary ACT rehabilitation program for cancer survivors is effective in improving patients' individual strength, role functioning, emotional functioning, social functioning, and self-efficacy. Moreover, self-efficacy was found to play a mediating role between physical and psychological complaints at the time of intake and all of the outcome measures, except for the patients in the low-symptom group. These findings are important, because it underscores the importance of self-efficacy within the cancer setting and in the development of follow-up interventions. The findings demonstrating self-efficacy to be especially beneficial for people with complex symptoms, may be of value when developing interventions tailored to specific patient needs and symptoms. Additionally, as suggested by the literature, ACT-based interventions may have the ability to increase psychological flexibility which in turn acts as a buffer for psychological distress (Arch & Mitchell, 2015). Seeing how the multidisciplinary ACT program was not effective in reducing anxiety and depressive symptoms, among others, it might be fruitful to look into ways of how to increase elements of ACT, and thus indirectly psychological flexibility, within the current treatment program. Alternatively, a consideration can be to add a cognitive behavioural therapy component to aid in alleviating anxiety and depressive symptoms (Osborn, Demoncada & Feuerstein, 2006). Furthermore, since physical exercise has been shown to reduce depressive symptoms, even in patients with high depressive symptomatology (Penninx, Rejeski, Pandya, et al., 2002), it may be a fruitful idea to emphasize the physical parts of the multidisciplinary ACT program at RCR.

An implication for future research may be to focus on expanding research on the effectiveness of multidisciplinary treatment interventions in comparison to monodisciplinary treatment interventions. This could be done by utilizing a research design that includes both treatment forms, so that between-group comparisons can be made.

Lastly, the results of this study notably demonstrated highly significant positive and negative changes on the outcome measures between the time of the intake and all other time periods. As mentioned before, a fruitful implication for future research could be to explore the different factors at play during and after the intake and the effects that undergoing an intake interview may have on patients.

Conclusion

Overall, this study was the first to examine the effectiveness of a multidisciplinary ACT rehabilitation program for cancer survivors. Findings demonstrated that a multidisciplinary ACT rehabilitation program can be successful in improving patients' individual strength, role functioning, emotional functioning, social functioning, and self-efficacy. The main effects for group displayed that patients from the low-symptom group showed higher improvements in individual strength, emotional functioning, cognitive functioning and social functioning in comparison to the high-symptom group. In addition, regression analyses demonstrated that the SCL score (low vs. high) was a significant predictor for the change in hospital anxiety and depression, self-efficacy and general health condition between TS-TE.

Results from the mediation analyses revealed that self-efficacy fully mediated the relationship between physical and psychological complaints during intake and the scores on individual strength, global health status/quality of life, physical functioning and role functioning at the end of the treatment. Furthermore, self-efficacy was also found to partially mediate emotional functioning, cognitive functioning, social functioning, anxiety and depression and general health condition. Performance of the same mediation analyses for both the low-symptom and complex-symptom group led to the finding that self-efficacy did not play a mediating role in the relationship between physical and psychological complaints during intake and the scores on any of the outcome measures in the low-symptom group. However, for the high-symptom group, mediating effects of self-efficacy were found on physical functioning, role functioning, emotional functioning, cognitive functioning, social functioning, general health condition, and hospital anxiety and depression.

These results underscore the importance of the role of self-efficacy in a multidisciplinary ACT rehabilitation program for cancer survivors. Future research should include more mediator analyses to explore the role of important factors such as self-efficacy within the treatment setting for cancer survivors. In this way, knowledge on the working mechanisms within cancer survivor treatments and interventions can be expended and

interventions can be better tailored to the differences between and the needs of cancer survivors.

References

Aaronson, N. K., Ahmedzai, S., Bergman, B., Bullinger, M., Cull, A., Duez, N. J., Takeda, F. (1993). The European Organization for Research and Treatment of Cancer QLQ-C30: a Quality-of-Life Instrument for Use in International Clinical Trials in Oncology. *Journal of the National Cancer Institute*, 365-376.

Arch, J. J., & Mitchell, J. L. (2015). An Acceptance and Commitment Therapy (ACT) group intervention for cancer survivors experiencing anxiety at re-entry. *Psycho-Oncology*.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), Encyclopedia of human behavior (Vol. 4, pp. 71-81). New York: Academic Press. (Reprinted in H. Friedman [Ed.], *Encyclopedia of mental health*. San Diego: Academic Press, 1998).

Beckham, J. C., Burker, J. E., Feldman, E. M., & Costakis, M. J. (1997). Self-efficacy and Adjustment in Cancer Patients: A Preliminary Report. *Behavioral Medicine*, 138-142.

Bleijenberg, G., Bazelmans, H. M., & Prins, J. B. (2001). *Chronisch vermoeidheidssyndroom*. Bohn Stafleu van Loghum.

Bower, J. D., Crosswell, A. D., Stanton, A. L., Crespi, C. M., Winston, D., Arevalo, J., . . . Ganz, P. A. (2015). Mindfulness Meditation for Younger Breast Cancer Survivors: A Randomized Controlled Trial. *Cancer*, 1231-1240.

Carey, M., Lambert, S., Smits, R., Paul, C., Sanson-Fisher, R., & Clinton-McHarg, T. (2012). The unfulfilled promise: a systematic review of interventions to reduce the unmet supportive care needs of cancer patients. *Support Care Cancer*, 207-219.

Carlson, L. E., Doll, R., Stephen, J., Faris, P., Tamagawa, R., Drysdale, E., & Speca, M. (2013). Randomized Controlled Trial of Mindfulness-Based Cancer Recovery Versus Supportive Expressive Group Therapy for Distressed Survivors of Breast Cancer (MINDSET). *Journal of Clinical Oncology*.

Chirico, A., Lucidi, F., Merluzzi, T., Alivernini, F., de Laurentiis, M., Botti, G., & Giordano, A. (2017). A meta-analytic review of the relationship of cancer coping self-efficacy with distress and quality of life. *Oncotarget*, 36800-36811.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Cunningham, A. J., Lockwood, G. A., & Cunningham, J. A. (1991). A relationship between perceived self-efficacy and quality of life in cancer patients. *Patient Education and Counseling*, 71-78.

de Vries, J., Michielsen, H. J., & van Heck, G. L. (2003). Assessment of fatigue among working people: a comparison of six questionnaires. *Occupational and Environmental Medicine Journal*, 10-15.

Dittner, A. J., Wessely, S. C., & Brown, R. G. (2004). The assessment of fatigue A practical guide for clinicians and researchers. *Journal of Psychosomatic Research*, 157-170.

Duncan, M., Moschopoulou, E., Herrington, E., Deane, J., Roylance, R., Jones, L., . . . Bhui, K. (2017). Review of systematic reviews of non-pharmacological interventions to improve quality of life in cancer survivors. *BMJ Open*.

Gielissen, M. F., Bleijenberg, G., & Verhagen, S. (2006). Effects of Cognitive Behavior therapy in Severely Fatigued Disease-Free Cancer Patients Compared With Patients Waiting for Cognitive Behavior Therapy: A Randomized Controlled Trial. *Journal of Clinical Oncology*.

Gielissen, M. F., Verhagen, C., & Bleijenberg, G. (2007). Cognitive behaviour therapy for fatigued cancer survivors: long-term follow-up. *British Journal of Cancer*, 612-618.

Glare, P. A., Davies, P. S., Finlay, E., Gulati, A., Lemanne, D., Moryl, N., . . . Syrjala, K. L. (2014). Pain in Cancer Survivors. *Journal of Clinical Oncology*, 1637-1639.

Graham, C. D., Qouick, J., Krahé, C., & Gillanders, D. (2016). A systematic review of the use of Acceptance and Commitment Therapy (ACT) in chronic disease and long-term conditions. *White Rose Research Online*, 46-58.

Hayes, A.F. (2017). *An introduction to mediation, moderation, and conditional process analysis* (2nd ed.). New York: Guildford Publishers.

Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and Commitment Therapy: Model, processes and outcomes. *ScholarWorks*.

Holi, M. M., Sammallahti, P. R., & Aalberg, V. A. (1998). A Finnish validation study of the SCL-90. *Acta Psychiatr Scand*, 42-46.

Holland, J. C., & Reznik, I. (2005). Pathways for Psychosocial Care of Cancer Survivors. *Wiley InterScience*, 2624-2635.

Howell, D., Hack, T., Oliver, T., Chulak, T., Mayo, S., Aubin, M., . . . Sinclair, S. (2012). Models of care for post-treatment follow-up of adult cancer survivors: a systematic review and quality appraisal of the evidence. *Cancer Survival Journal*, 359-371.

Hulbert-Williams, N. J., Storey, L., & Kelly, G. (2014). Psychological interventions for patients with cancer: Psychological flexibility and the potential utility of Acceptance and Commitment Therapy. *European Journal of Cancer Care*, 15.27.

Jacobsen, P. B. (2009). Clinical Practice Guidelines for the Psychosocial Care of Cancer Survivors. *Wiley Interscience*, 4419-4430.

Kanera, I. M., Willems, R. A., Bolman, C. A., Mesters, I., Zambon, V., Gijsen, B. C., & Lechner, L. (2016). Use and Appreciation of a Tailored Self-Management eHealth

Intervention for Early Cancer Survivors: Process Evaluation of a Randomized Controlled Trial. *Journal of Medical Internet Research*.

Keeman, M. C., Bolman, C. A., Mesters, I., Willems, R. A., Kanera, I. M., & Lechner, L. (2017). Psychometric properties of the Dutch extended Cancer Survivors´ Unmet Needs Measure (CaSUN-NL). *European Journal of Cancer Care*, 1-8.

Landsman-Dijkstra, J. J., van Wijck, R., Groothoff, J. W., & Rispens, P. (2004). The short-term effects of a body awareness program: better self-management of health problems for individuals with chronic a-specific psychosomatic symptoms. *Patient Education and Counseling*, 155-167.

Lengacher, C. A., Johnson-Mallard, V., Post-White, J., Moscoso, M. S., Jacobsen, P. B., Klein, T. W., Kip, K. E. (2009). Randomized controlled trial of mindfulness-based stress reduction (MBSR) for survivors of breast cancer. *Psycho-Oncology*, 1261-1272.

Luckett, T., King, M. T., Butow, P. N., Oguchi, M., Rankin, N., Price, M. A., Heading, G. (2011). Choosing between the EORTC QLQ-C30 and FACT-G for measuring health-related quality of life in cancer clinical research: issues, evidence and recommendations. *Annals of oncology*, 2179-2190.

Menting, J., van Schelven, F., Grosscurt, R., Spreeuwenberg, P., & Heijmans, M. (2019). *Zorgmonitor 2019. Ontwikkelingen in de zorg voor mensen met een chronische ziekte: 2005-2018.* Utrecht: Nivel.

Menting, J., van Schelven, F., Grosscurt, R., Spreeuwenberg, P., & Heijmans, M. (sd). *Zorgmonitor 2019.*

Mewes, J. C., Steuten, L. M., Ijzerman, M. J., & van Harten, W. H. (2012). Effectiveness of Multidimensional Cancer Survivor Rehabilitation and Cost-Effectiveness of Cancer Rehabilitation in General: a Systematic Review. *The Oncologist*, 1581-1593.

Michielsen, H. J., de Vries, J., & van Heck, G. L. (2003). Psychometric qualities of a brief self-related fatigue measure The Fatigue Assessment Scale. *Journal of Psychosomatic Research*, 345-352.

Miller, K. D., Siegel, R. L., Lin, C. C., Mariotto, A. B., Kramer, J. L., Rowland, J. H., . . . Jemal, A. (2016). Cancer Treatment and Survivorship Statistics . *A Cancer Journal for Clinicians*, 271-289.

Morgan, M. (2009). Cancer Survivorship: History, Quality-of-Life Issues, and the Evolving Multidsciplinary Approach to Impelementation of Cancer Survivorship Care Plans. *Oncology Nursing Forum*, 429-437.

Nuijen, J., van Bon-Martens, M., van Doesum, T., Kleinjan, M., & van der Poel, A. (2019). *depressieproblematiek gemeten in Nederland.* Hämtat från www.trimbos.nl: https://www.trimbos.nl/aanbod/webwinkel/product/af1709-depressieproblematiek-gemeten-in-nederland

Osborn RL, Demoncada AC, Feuerstein M. Psychosocial interventions for depression, anxiety, and quality of life in cancer survivors: meta-analyses. 2006. In: Database of Abstracts of Reviews of Effects (DARE): Quality-assessed Reviews [Internet]. York (UK): Centre for

Reviews and Dissemination (UK); 1995-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK73393/

Pachman, D. R., Barton, D. L., Swetz, K. M., & Loprinzi, C. L. (2012). Troublesome Symptoms in Cancer Survivors: Fatigue, Insomnia, Neuropathy, and Pain. *Journal of Clinical Oncology*, 1-11.

Penninx, B. W., Rejeski, J. W., Pandya, J., Miller, M. E., Di Bari, M., Applegate, W. B., & Pahor, M. (2002). Aerobic and Resistance Exercise Effects on Emotional and Physical Function in Older Persons With High and Low Depressive Symptomatology. *The Journals of Gerontology*, 124-132.

Schmitz, N., Hartkamp, N., Kiuse, J., Franke, G. H., Reister, G., & Tress, W. (2000). The Symptom Check-List-90-R (SCL-90-R): A German validation study. *Quality of life research*, 185-193.

Schotanus-Dijkstra, M., Drossaert, C. H., Pieterse, M. E., Walburg, J. A., & Bohlmeijer, E. T. (2015). Efficacy of a Multicomponent Positive Psychology Self-Help Intervention: Study Protocol of a Randomized Controlled Trial. *JMIR Research Protocols*.

Soley-Bori, M. (2013). Dealing with missing data: Key assumptions and methods for applied analysis. *Boston University*, *23*.

Spinhoven, P., Ormel, J., Sloekers, P. P., Kempen, G. I., Speckens, A. E., & van Hemert, A. M. (1997). A validation study of the Hospital Anxiety and Depression Scale (HADS) in different groups of Dutch subjects. *Psychological Medicine*, 363-370.

Stanton, A. L. (2006). Psychosocial Concerns and Interventions for Cancer Survivors. *Journal of Clinical Oncology*, 5132-5137.

Stanton, A. L. (2012). What Happens Now? Psychosocial Care for Cancer Survivors After Medical Treatment Completion. *Journal of Clinical Oncology*, 1215-1220.

Survivorship. (sd). Opgehaald van iknl.nl: https://www.iknl.nl/survivorship

Uher, R., Rietschel, M., Hauser, J., & Schmael, C. (2008). Meassuring depression: Comparison and integration of three scales in the GENDEP study. *Psychological Medicine*, 289-300

van der Zee, K. I., & Sanderman, R. (1993). *Het meten van de algemene gezondheidstoestand met de RAND-36.* Groningen: Noordelijk Centrum voor Gezondheidsvraagstukken.

Verweij, G., & Houben-van Herten, M. (December 2013). *Depressiviteit en antidepressiva in Nederland.* Opgehaald van www.cbs.nl: https://www.cbs.nl/nl-nl/achtergrond/2013/51/depressiviteit-en-antidepressiva-in-nederland

de Vries, J., Michielsen, H. J., & van Heck, G. L. (2003). Assessment of fatigue among working people: a comparison of six questionnaires. *Occupational and Environmental Medicine Journal*, 10-15.

Ware, J. E. (2000). SF-36 Health Survey Update. *Spine*, 3130-3139.

Zorginstituut Nederland. (18 januari 2019). *Plan van aanpak actualisering standpunt medisch-specialistische revalidatie.* Opgehaald van zorginstituutnederland.nl:

https://www.zorginstituutnederland.nl/publicaties/publicatie/2019/01/18/plan-van-aanpak-actualisering-standpunt-medisch-specialistische-revalidatie