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Evaluation of a Comprehensive Rehabilitation Program for Post-Treatment Patients With Cancer

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Recent improvements in diagnostics and treatments have led to increased survival expectancy in patients with cancer. As a result, a growing proportion of patients now is considered to be potentially cured or at least in long-term remission. However, many cancer survivors who have completed medical treatment still are facing distressing physical (e.g., fatigue, impaired physical capacity), psychological (e.g., anxiety, depression, stress, insecurity, decreased self-esteem), and social difficulties (e.g., hindered job reintegration, social isolation), which, in turn, lead to diminished quality of life (QOL) (Curt et al., 2000; De Grève et al., 2005; Ganz et al., 2004; Gotay, Holup, & Pagano, 2002; Korstjens, Mesters, van der Peet, Gijzen, & van den Borne, 2006).

To meet these often under-recognized and insufficiently addressed needs, many physical, psychosocial, or combined interventions have been developed for cancer survivors (Courneya, 2003; Segal et al., 2003; Young-McCaughan et al., 2003). Rehabilitation of patients with cancer and, more specifically, cancer survivors aims to improve QOL by minimizing physical impairments and disability caused by cancer and associated treatments (McNeely et al., 2006; Yadav, 2007). In addition, a more psychological focus using a cognitive-behavioral training program also has beneficial effects on the mental health of cancer survivors (Osborn, Demoncada, & Feuerstein, 2006). As such, combining physical and psychosocial interventions may lead to greater improvements in physical and mental health (May et al., 2009).

Studies evaluating these interventions focused mainly on the effects on general QOL, fatigue, and physical condition and less on psychosocial concepts, such as anxiety, depression, kinesiophobia, and distress. In addition, patient characteristics, intervention methods, and outcome measures were very different between

Purpose/Objectives: To evaluate the effects of a rehabilitation program on quality of life, fatigue, fear of movement (kinesiophobia), distress, anxiety, depression, and physical condition.

Design: Pretest/post-test.

Setting: An outpatient rehabilitation setting in the Oncology Centre at the University Hospital Brussels in Belgium.

Sample: 36 patients who had completed cancer treatment with a curative potential.

Methods: Participants completed a questionnaire and underwent a physical test at baseline and at the end of the program. The measurement instruments used included the European Organisation for Research and Treatment of Cancer Quality-of-Life Questionnaire–Core 30, Functional Assessment of Cancer Therapy–Fatigue, Hospital Anxiety and Depression Scale, RAND-36, Tampa Scale for Kinesiophobia, Distress Barometer, and Tecumseh Step Test.

Main Research Variables: Quality of life, fatigue, kinesiophobia, distress, anxiety, depression, and physical condition.

Findings: Significant improvement was observed in quality of life ($p < 0.001$), physical condition ($p = 0.007$), fatigue ($p = 0.01$), and depression ($p = 0.012$). In contrast, kinesiophobia ($p = 0.229$), distress ($p = 0.344$), and anxiety ($p = 0.101$) did not change significantly.

Conclusions: A general and significant improvement in all aspects affecting quality of life and rehabilitation was observed, but less so for aspects that might be influenced by prognostic concerns. The relative contribution of the program versus spontaneous recovery and long-term impact need to be determined further in a prospective randomized study.

Implications for Nursing: Multidisciplinary rehabilitation should become part of the total care plan for patients with cancer.

studies. For example, only postmenopausal patients with breast cancer that had undergone surgery, chemotherapy, and radiotherapy (Courneya, 2003) and only

men receiving androgen deprivation therapy for prostate cancer (Segal et al., 2003) were included.

This article presents the results of implementing a pretest/post-test design study evaluating a 12-week comprehensive rehabilitation program for patients with cancer who have completed medical treatment. The current program was based on the principles of Herstel and Balans' 12-week program in which physical exercise and psychoeducation were combined (Korstjens et al., 2006). The initial program is described elsewhere (Korstjens et al., 2006). The authors hypothesized that the combined rehabilitation program would not only lead to improvements in QOL, fatigue, physical functioning, and physical condition, but also in fear of movement (kinesiophobia), distress, anxiety, and depression.

Methods

Sample

Patients who had completed cancer treatment (except for long-term hormonal treatments that could be ongoing) with a curative potential were offered participation in the rehabilitation program and could participate if they were capable and willing to do so.

Participants were excluded if they were physically at risk because of the cancer or a serious comorbidity or, in case of prohibitive psychopathology, serious cognitive disturbances or restricting side effects of medication (Korstjens et al., 2006). The content of the rehabilitation program was described in a written protocol and patients received informed consent. The institutional review board of the University Hospital Brussels approved the study. Patients were referred by their oncologist.

Seventy-four patients had an intake interview and were offered the opportunity to participate. Of those, 36 patients (49%) were enrolled in the rehabilitation program in 2008 in the Oncology Centre at the University Hospital Brussels. Thirty-eight patients did not participate because of the following reasons: It was difficult to combine the program with their profession and family life, it would demand too much time and energy to come to the hospital several times a week, the patient wanted to do it on his or her own without professional help, or the patient wanted to try another rehabilitation method first. Nine of the enrolled patients (25%) stopped the rehabilitation program prematurely because of recurrence of disease, job reintegration, or because they moved out of the area.

Rehabilitation Program

The rehabilitation program was a 12-week program for patients with cancer that combined physical exercise, psychoeducation, and individual counseling. The program was developed by Herstel and Balans (Korstjens et al., 2006) for patients with cancer who have completed

primary treatment and who experience a discrepancy between their present level of functioning and their predisease status.

The first component, physical training, was provided three times a week for 60 minutes by an expert physiotherapist. Aerobic exercise and resistance exercise are the most recommended methods for developing cardiorespiratory and muscular capacity (Pollock, Gaesser, & Butcher, 1998). The training included walking, biking, and rowing programs. Sections of the body, including the neck, arms, and shoulders; chest, abdomen, and back; and buttocks and legs were conditioned separately by specific exercises. Coping with complaints such as fatigue and stress also were addressed during the physical training sessions. The training was increased gradually and followed an individual plan based on the baseline physical testing of the participant.

The second component, psychoeducation, was provided eight times during the 12-week program, and each session lasted 90 minutes and followed a physical training session. The aim of psychoeducation was to enhance self-confidence and autonomy and provide support in coping with cancer and side effects. Information about cancer-related topics, such as fatigue, impaired physical capacity, coping with anxiety and stress, job reintegration, and nutrition, was provided. The program was coordinated by a trained advanced nurse practitioner.

The third component, individual counseling, was provided at the start of the program, at the beginning of every exercise session, and at the end of the program. It was planned as time for answering questions and advising the patient and it lasted about 10 minutes. The individual counseling component was introduced to facilitate better follow-up of patients and provide an individualized program.

No financial costs existed for patients, as the program was funded partly by the national cancer plan and partly reimbursed by Belgium's national healthcare program (RIZIV, Rijksinstituut voor ziekte en invaliditeit).

Instruments

A pretest/post-test study design was applied. Participants filled out a questionnaire and underwent a physical test at baseline and at the end of the 12-week program.

The participants filled out a questionnaire that contained multiple measurement instruments, including the European Organisation for Research and Treatment of Cancer Quality-of-Life Questionnaire-Core 30 (EORTC QLQ-C30), Functional Assessment of Cancer Therapy-Fatigue (FACT-F), Hospital Anxiety and Depression Scale (HADS), RAND-36, Tampa Scale for Kinesiophobia, and the distress barometer.

The **EORTC QLQ-C30** is a 30-item self-report questionnaire for patients with cancer that incorporates a global QOL scale, five functional scales (physical, role, cognitive,

emotional, and social), and nine symptom scales (fatigue, pain, nausea, constipation, diarrhea, insomnia, dyspnea, financial difficulties, and loss of appetite). The EORTC QLQ-C30 is a reliable and valid instrument that has been used in many studies evaluating clinical and psychosocial interventions with patients with cancer (Aaronson et al., 1993; Apolone, Filiberti, Cifani, Ruggiata, & Mosconi, 1998; King, 1996; McLachlan, Devins, & Goodwin, 1998).

The **FACT-F** contains 13 items that attempt to identify the intensity of fatigue experienced during the seven days before questionnaire administration. It has been validated for assessing fatigue in patients with cancer (Cella et al., 1993; Yellen, Cella, Webster, Blendowski, & Kaplan, 1997).

The **HADS** is a 14-item scale that originally was designed to detect symptoms of depression and anxiety. It was designed to provide a simple yet reliable tool for use in medical practice and has been validated for screening purposes. The HADS was found to perform well in assessing severity and the number of events of anxiety disorders and depression in somatic and psychiatric cases and in primary care patients and the general population (Bjelland, Dahl, Haug, & Neckelmann, 2002; Spinhoven et al., 1997).

General health-related QOL was measured using the **RAND-36**, a multidimensional self-report questionnaire assessing nine domains of global health-related QOL (physical functioning, social functioning, role impairment due to physical problems, role impairments due to emotional problems, mental health, vitality, pain, general health appraisal, and overall QOL). Medicare uses it for routine monitoring and assessment of care outcomes in adult patients (Hays & Morales, 2001).

The **TAMPA Scale for Kinesiophobia** is comprised of 17 items that assess relationships between pain, activity, and concerns about injury or re-injury. The scale is widely accepted to measure fear of movement or re-injury (Goubert et al., 2004).

The **distress barometer** is a screening instrument for distress in patients with cancer. A combination of the distress thermometer and the colored complaint scale, the distress barometer can be used as an acceptable, brief, and sufficiently accurate method for screening and detecting distress in patients with cancer. The tool is useful in clinical practice for various types of patients with cancer (Bauwens, Baillon, Distelmans, & Theuns, 2008).

Evaluation of Physical Condition

The objective of the Tecumseh Step Test is to monitor the development of participants' cardiorespiratory fitness. The stepping cadence must be a minimum of 22 steps per minute for women and 24 steps per minute for men, with a stepping height of 20 cm. After three minutes of stepping, and 30 seconds after stopping, the pulse is measured for 30 seconds in a standing position. The number of beats per 30 seconds determines the participant's

grade of physical condition based on a tabular reference with age and gender-specific values. The test was used in a normal population to measure physical condition. After 12 weeks, patients were retested to evaluate the progression of cardiorespiratory capacity (Smith et al., 2001).

Statistical Analysis

Statistical analysis was carried out using SPSS®, version 17.0. The Wilcoxon signed-rank test was used to compare baseline and end-of-program values, an alternative to the paired Student's t test when the population cannot be assumed to be normally distributed. For the variable "distress," the McNemar test was used. The McNemar test, which is used primarily in pretest/post-test studies to test for an experimental effect, assesses the significance of the difference between two dependent samples when the variable of interest is a dichotomy.

Results

Patient Characteristics

Eighty-five percent of participants were female. The mean age of participants was 50 and the majority of the patients were married or living with a partner (see Table 1). Breast cancer was the most prevalent malignant tumor in the study population. Eighty-three percent of participants underwent surgery and received chemotherapy and/or radiotherapy, and 56% received hormonal therapy during the rehabilitation program.

Table 1. Sample Characteristics at Baseline

Characteristic	\bar{X}	SD	Range
Age (years)	50	12	28–75
Months after treatment end to rehabilitation	9	14	0–60

Characteristic	n
Gender	
Female	30
Male	6
Marital status	
Married or live together	29
Single	7
Cancer type	
Breast	27
Lymphoma and leukemia	6
Gynecologic	2
Testicular	1
Treatment	
Chemotherapy	35
Radiotherapy	31
Surgery	30
Hormonal therapy	20
Other therapy (e.g., trastuzumab, lapatinib)	3

N = 36

Effects of the Program

Overall QOL improved significantly after the rehabilitation program compared with the baseline assessment ($p = 0$; EORTC QLQ C-30) (see Table 2). The physical condition of patients improved ($p = 0.007$; Tecumseh Step Test). Fatigue ($p = 0.006$; FACT-F) and depression ($p = 0.012$; HADS) decreased significantly after the rehabilitation compared with measurements at the beginning of the program.

After the rehabilitation program, the following subscale items from the EORTC QLQ-C30 improved significantly: physical functioning ($p = 0$), role functioning ($p = 0.001$), social functioning ($p = 0.007$), fatigue ($p = 0.01$), pain ($p = 0.014$), and dyspnea ($p = 0.005$).

The following subscale items from the RAND-36 improved significantly compared with the measurements at the beginning of the program: physical functioning ($p = 0$), social functioning ($p = 0.001$), vitality ($p = 0.001$), pain ($p = 0.017$), mental health ($p = 0.035$), global health ($p = 0.014$), and health change ($p = 0$).

No change was observed for kinesiophobia ($p = 0.229$; Tampa Scale of Kinesiophobia), distress ($p = 0.344$; distress barometer), and anxiety ($p = 0.101$; HADS).

Discussion

The combined rehabilitation program had a positive effect on general and specific aspects of QOL, fatigue, physical condition, and depression for a small, mixed group of motivated cancer survivors. The intervention did not, however, result in changes in anxiety, kinesiophobia, or distress. Improvement in overall QOL, fatigue, and physical and social functioning concurred with previous studies in which exercise and psychoeducation were combined (Berglund, Bolund, Gustavsson, & Sjöden, 1993; Courneya, 2003; Korstjens et al., 2006; Young-McCaughan et al., 2003). However, studies with only exercise under professional guidance showed similar results for overall QOL, fatigue, and physical and social functioning (Courneya, 2003; Segal et al., 2003).

Depression was reduced significantly, whereas anxiety, distress, and kinesiophobia showed no change. A possible explanation might be that kinesiophobia and anxiety require more intensive therapy than the program offered. Similar observations with regard to change in depression scales have been made by Berglund et al. (1993) and Courneya (2003). Both studies combined an exercise program with psychoeducation, but neither found depression or anxiety reduced. Kolden et al. (2002) conducted a study where only exercise was provided and results showed a significant reduction of negative feelings and stress but no reduction of anxiety.

Table 2. Effects of the 12-Week Rehabilitation Program

Scale	Pretest		Post-Test		Z	p
	\bar{X}	SD	\bar{X}	SD		
EORTC QLQ-C30						
Quality of life	54.97	15.19	69.77	14.78	−3.57	0.000
Physical functioning	66.6	20.35	81.38	15.36	−3.981	0.000
Role functioning	56.21	28.45	76.79	20.28	−3.242	0.001
Emotional functioning	60.05	25.26	64.63	27.57	−0.991	0.322
Cognitive functioning	64.62	29.25	75.38	23.18	−1.631	0.103
Social functioning	61.01	27.24	80.25	16.96	−2.69	0.007
Fatigue	50.39	26.58	33.42	19.83	−2.578	0.01
Nausea	5.25	10.04	5.46	12.58	−1.81	0.856
Pain	36.59	24.15	24.58	21.34	−2.465	0.014
Dyspnea	36.6	27.55	15.17	23.94	−2.795	0.005
Insomnia	52.08	35.57	35.79	30.73	−1.911	0.056
Appetite loss	16.55	26.3	11	21.02	−1.318	0.187
Constipation	11.79	20.5	4.13	11.14	−1.897	0.058
Diarrhea	5.91	15.77	6.88	19.41	−	1
Financial difficulties	14.19	24.92	6.88	17.1	−1.89	0.059
HADS						
Anxiety	9.07	4.02	7.08	4.16	−1.641	0.101
Depression	5.71	4.7	4.13	4.36	−2.511	0.012
RAND-36						
Physical functioning	56.11	20.92	76.67	17.79	−3.736	0.000
Social functioning	53.13	25.37	69.19	17.67	−3.327	0.001
Restriction physical problem	17.86	31.81	53.13	41.25	−3.211	0.001
Restriction emotional problem	49.89	44.87	65.13	41.12	−1.784	0.075
Mental health	55.59	19.62	64.67	20.68	−2.106	0.035
Vitality	45.54	17.49	59.35	19.67	−3.403	0.001
Pain	60.33	20.26	70.98	19.48	−2.391	0.017
Global health	46.29	18.72	56.46	20.77	−2.469	0.014
Health change	35.71	37.53	71.88	29.92	−3.555	0.000
Tecumseh Step Test	55	10.09	49	10.54	−2.72	0.007
FACT-F	20.89	9.21	15.5	6.86	−2.731	0.006
Tampa Scale for Kinesiophobia	32.14	9.99	32.79	8.43	−1.203	0.229

N = 36

EORTC QLQ-C30—European Organisation for Research and Treatment of Cancer Quality-of-Life Questionnaire—Core 30; FACT-F—Functional Assessment of Cancer Therapy—Fatigue; HADS—Hospital Anxiety and Depression Scale; p—asymptotic significant two-tailed; Z—Wilcoxon signed-rank test

Note. Bolded p values are less than or equal to 0.05, with a 95% confidence interval.

The current comprehensive rehabilitation program was the first to include distress measurement. Only 24 of the 36 patients filled in the distress barometer at the end of the program. The small number of responses could explain why the reduction in the distress barometer scores was not statistically significant.

The previous (Kortsjens et al., 2006; May et al., 2009) and current studies showed that rehabilitation helps cancer survivors to handle daily difficulties from cancer and cancer treatment, particularly fatigue and physical and psychosocial functioning. In a quantitative and qualitative assessment of rehabilitation needs in patients with cancer, only 26% of participants wanted to receive professional help, largely determined by perceived QOL and social support, and these patients preferred a rehabilitation program that focused on fatigue, reinforcing physical working capacity and psychosocial functioning (van Harten, van Noort, Warmerdam, Hendricks, & Seidel, 1998). In the current study, 49% of potential participants wanted to receive professional help and participated in the rehabilitation program.

Limitations

The first limitation of the study was the sample size and the sample characteristics. The group of participants was small ($N = 36$), and 75% were patients with early-stage breast cancer. A large number of variables were tested on a small sample. The results, therefore, cannot be generalized for all patients with cancer. The most important improvements for variables such as overall QOL, fatigue, depression, physical functioning, social functioning, and physical condition were seen in patients with breast cancer. Patients with other types of cancer may have other needs and difficulties than the patients with breast cancer included in the current study. The 36 patients also represented a selection of motivated persons and it is, therefore, not certain that similar results could be obtained in nonselected patient groups. It could be assumed that motivation might be an important variable in determining the success of such a program.

The second limitation of the single-arm study was the lack of a control group. Determining whether beneficial outcomes were the result of the rehabilitation program or an effect of spontaneous physical and psychosocial restoration after cancer therapy was impossible; acute toxicities of cancer treatment generally resolve within a median of three months after the end of treatment, with some patients still experiencing therapy-related problems six months after ending treatment (Ganz et al., 2004).

Determining whether some or all of the improvements were from the physical training, group psychoeducation, individual counseling, or a combination also was impossible. Some studies have assessed only the effects of physical exercise, whether home-based or in a clinical setting (Kolden et al., 2002; Mutrie et

al., 2007; Schneider, Hsieh, Sprod, Carter, & Hayward, 2007; Young-McCaughan et al., 2003). The results of studies that combined exercise and psychoeducation showed higher benefits, particularly for QOL (Courneya, 2003; Korstjens et al., 2006; van Weert et al., 2008). However, May et al. (2009) showed that combining physical training with a cognitive-behavioral intervention does not add to the beneficial effects of physical training in the short- or long term. Similarly, Cadmus et al. (2009) suggested that, although exercise has clear and important health benefits for breast cancer survivors, the ability of physical activity to produce clinically meaningful benefits in psychosocial QOL may be limited to certain subgroups of survivors.

Many studies focus on the effect of rehabilitation programs on the QOL of cancer survivors; however, variables such as distress and anxiety receive less attention. Additional research is needed to study how to manage and help patients cope with important components of QOL that are not influenced by the current program. Those aspects are likely determined by long-term perspectives, as internalized by patients, and a persistent fear of disease relapse.

Another limitation was the lack of long-term follow-up. The observation period was short and, as a result, the authors do not know if the observed improvements will hold, continue to improve, or decrease. In Rogers et al. (2009), a 12-week physical activity behavior change intervention resulted in sustained improvements in physical activity, strength, central adiposity, and social well-being, with lower-extremity function benefits appearing three months after intervention completion.

In future research, long-term effects of rehabilitation and its impact on social reintegration (e.g., job resumption) should be measured. Rogers et al. (2009) assessed the effects of a rehabilitation intervention three months after intervention completion. A prospective study to assess the long-term effects of the current rehabilitation program three months after completion would provide additional information for clinical practice.

The comprehensive rehabilitation program used in the current study is the first to include individual counseling and distress measurement. A general and significant improvement in all aspects affecting QOL and rehabilitation was observed, but less so for aspects that might be influenced by prognostic concerns. The relative contribution of the program versus spontaneous recovery and long-term impact need to be determined further in a prospective randomized study.

Implications for Nursing Practice

Current standards of oncology care are limited in the care and needs of the growing group of cancer survivors. Multidisciplinary rehabilitation should become a part of the total care package of the patient with cancer.

Rehabilitation should be considered an important and useful component in the standard care for cancer survivors. Care plans for rehabilitation must be developed to give cancer survivors the opportunity to receive help at the most beneficial time in their disease trajectory.

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