Psychoeducational program for breast cancer survivors, effect on cancer-related fatigue and quality of life

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Objectives
To assess the efficacy of the psychoeducational program in alleviating cancer-related fatigue and mood symptoms, and improving quality of life of breast cancer survivors.
Methods
A prospective follow-up case–control study was carried out between June and December 2010. Eighty patients were randomly selected from among women who had recently completed their treatments for breast cancer at the outpatient clinic in the Department of Clinical Oncology, Cairo University (Egypt). They were divided into group A, which received the program, and group B, the waiting control group. Karnofsky Performance Scale was used to exclude physical disability. Assessment was carried out twice, at weeks 0 and 4, using Hospital Anxiety and Depression Scale (HADS), Health-Related Quality of Life-Short Form (HRQL-SF) 36, and Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF). The psychiatric diagnosis was made according to the *Diagnostic and Statistical Manual of Psychiatric Disorders, 4th ed., Text Revised* criteria.
Results
There was a nonsignificant difference between both groups in terms of sociodemographic or medical data, and the mean scores of HADS, HRQL-SF 36, and MFSI-SF at week 0. There was a significant difference between both the groups in terms of the mean scores of HADS, HRQL-SF 36, and MFSI-SF at week 4. There was a significant difference between the mean scores of HADS, HRQL-SF 36, and MFSI-SF in group A before and after the intervention.
Conclusion
Fatigue is a major problem in the majority of breast cancer patients after therapy. A psychoeducational program improves various aspects of patients' physical, emotional, and quality of life.

Keywords:
anxiety, depression, fatigue, psychoeducational program, quality of life

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Introduction

Breast cancer is known to cause long-term treatment effects that begin during the treatment period and continue after therapy. Certain symptoms are more prominent in women with breast cancer, including fatigue, hot flashes, sexual dysfunction, infertility, bone loss, and cognitive dysfunction. Studies indicate that the prevalence of fatigue is high in patients with breast cancer; as many as 99% of these patients experience fatigue during the course of treatment (Loprinzi *et al.*, 2008; Huang *et al.*, 2010).

Nevertheless, breast cancer treatments still have side effects that may negatively impact recovery and quality of life (QOL) after initial treatments. The most frequently reported side effect in breast cancer survivors is fatigue or a low energy level; this can remain for several months or years after the completion of cancer treatments (Young and White, 2006; Shun *et al.*, 2009).

Most cancer patients experience fatigue as a symptom of their disease or as a side effect of treatment with chemotherapy, radiation therapy, immunotherapy, or surgery (National Comprehensive Cancer Network, 2007; Janaki *et al.*, 2010). Fatigue is a pervasive and vexing problem in individuals with cancer. It contributes considerably to suffering and exists across all types and stages of the disease. It has been found to be a problem before, during, and after treatment, sometimes continuing long after the treatment has ended, even in those believed to be disease free (Hofman *et al.*, 2007).

It is described as a subjective feeling of extreme tiredness and decreased functional status, which are not adequate for the activities performed and are not relieved by sleep or rest. The specific manifestations may be physical, mental, or emotional. It is a more distressing symptom than nausea, vomiting, or pain and it impairs the QOL. According to this, everyday life is also severely restricted:

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it leads to prolonged disability with consequences for the resumption of social life as well as work (Stuhldreher *et al.*, 2008; Brown and Kroenke, 2009).

Fatigue is the most frequently reported symptom among cancer patients, with an estimated 60–96% of cancer patients who are undergoing treatment experiencing fatigue, including 60–93% of patients receiving radiotherapy and 80–96% of patients receiving chemotherapy. Compared with the fatigue experienced by healthy individuals, cancer related fatigue is more severe, more distressing, and is less likely to be relieved by rest. Patterns of the occurrence of fatigue may differ according to the type of treatment and the stage of cancer (Mitchell *et al.*, 2007; Berger *et al.*, 2008).

Psychological symptoms, especially depression and, to a lesser degree, anxiety, have been found to have relatively high correlations with cancer related fatigue. In fact, the relationship of depression with fatigue has been shown to be of greater magnitude than that of disease activity as measured by markers such as nutritional status and tumor-specific tests (Hotopf, 2004).

A growing body of research also suggests that cognitive and behavioral factors may contribute toward exacerbation and persistence of fatigue (Jacobsen *et al.*, 2007).

With respect to behavioral factors, attention has been paid to the role of physical activity. Preliminary evidence suggests that cancer patients who reduce their physical activity may experience a worsening and perpetuation of fatigue because of reductions in cardiorespiratory fitness or muscle weakening. With respect to cognitive factors, several studies have shown that the tendency to catastrophize (i.e., have negative expectations in terms of one's ability to cope with fatigue) is associated with worse fatigue (Donovan *et al.*, 2007; Cramp and Daniel, 2008; Haseen *et al.*, 2010).

Appraisal is a cognitive process by which an individual simultaneously evaluates the impact of a stressor (primary appraisal) and the capacity to cope with it (secondary appraisal). When the negative impact perceived exceeds the estimated coping capacity, stress is experienced. Fatigue can be conceptualized as a consequence of inefficient coping strategies and a prolonged stress response. Active coping strategies (emotional, behavioral, or cognitive) seem to be more efficient on both psychological and emotional outcomes than passive ones. Incidentally, active coping strategies, such as stress management (e.g., relaxation and problem solving), improving sleep hygiene (e.g., planning), and physical activity (e.g., active strategies), have been shown to reduce fatigue and improve the energy level (i.e., feeling of vitality) (Gélinas and Fillion, 2004; Fillion *et al.*, 2008). In contrast, passive coping strategies, such as increasing rest and sleep and decreasing physical activity, seem inefficient in relieving fatigue, in addition to creating a vicious cycle of immobility and deconditioning, further contributing toward more fatigue and low energy (Gielissen *et al.*, 2006).

Activity enhancement and psychosocial interventions are two nonpharmacologic interventions with strong evidence for the treatment of fatigue. Regular exercise leads to a decrease in fatigue, depression, and anxiety both during and after cancer treatment in breast cancer patients. However, there is also some evidence that dietary management and sleep therapy can relieve fatigue symptoms (Mustian *et al.*, 2007; Wode *et al.*, 2009; Schmitz *et al.*, 2010).

Other types of behavioral interventions, such as cognitive behavioral therapy, multidisciplinary symptom management, and other integrative/complementary therapies, have been shown to be useful for managing cancer-related symptoms. Exercise is an appealing strategy because of its universal health benefits, potential for mitigating declines in functional status, and its availability to all patients (Temel *et al.*, 2009; Salhi *et al.*, 2010; Hanson and Hurley, 2011).

We hypothesized that a brief intervention that combined information on active coping strategies (cognitive behavioral therapy) and physical activity could be effective in managing this very prevalent and distressing condition of fatigue. It was predicted that the combined program would reduce fatigue and mental and physical QOL, and reduce emotional distress in breast cancer survivors, as compared with patients who would receive usual care.

Patients and methods

Participants

This prospective follow-up case–control study was carried out between June and December 2010. The sample included eighty patients and were randomly selected from among women who had recently completed their radiotherapy treatments for breast cancer at the outpatient clinic in the Department of Clinical Oncology in Faculty of Medicine, Cairo University (Egypt). The inclusion criteria were as follows: women diagnosed with initial nonmetastatic breast cancer, stages I and II (breast cancer survivor); having completed their initial breast cancer treatment before enrollment; consenting to participate in the study; and those with Karnofsky Performance Scale (KPS) scores of 70 and more. Those who had a previous history of major psychiatric disorders; presented with any symptoms of recurrence; and had any known severe health problems other than cancer were excluded.

Methods

All patients were subjected to the following assessment:

Full sociodemographic data, namely, age, marital status, parenthood, education, and employment status. The medical data, namely, the number of days since the diagnosis, menopausal stage, cancer stage, and type of treatment, were collected from the medical file of each participant.

Patients were divided into two groups: group A included 40 patients who had received the program (4 weekly sessions) for 1 month and group B (control group)

included 40 patients who would receive the program after the end of this study (waiting control group).

Patients in both groups were diagnosed according to the *Diagnostic and Statistical Manual of Psychiatric Disorders, 4th ed., Text Revised* (DSM-IV TR) criteria for psychiatric disorders at the start of the study (American Psychiatric Association, 2000).

The program included 4 weekly group meetings (4–8 patients) of 1 h. Fifteen minutes were devoted to the motivation of daily walking training and physical exercise and instructions of the previous sessions and 45 min to the psychoeducative, fatigue management sessions with cognitive behavioral content (CBT). The sessions were performed by a psychiatry consultant and were codirected by the oncology consultant, who attended the sessions. The aims of the program were as follows: to acquire a broader definition of fatigue, to develop relaxation skills, to gain knowledge of effective coping strategies to deal with physical factors associated with fatigue (e.g., circadian cycle and sleep hygiene), to determine the links between thoughts, emotions, and fatigue; to articulate ways to increase self-regulation techniques (e.g., self-recording and goal setting) and apply them to individualized walking programs; and to inform on how to further decrease passive coping strategies (e.g., behavioral and social disengagement and naps). As home-based assignments for the program component, participants were invited to practice relaxation and complete self-rating records of it.

Assessment of all patients was carried out twice: at week 0 and 4 (before and after the program) using the Hospital Anxiety and Depression Scale (HADS), the Multidimensional Fatigue Symptom Inventory-Short Form (MFSI-SF), and the Health-Related Quality of Life-Short Form (HRQL-SF) 36. However, assessment with the KPS scale was carried out only once at the start of the program (week 0) for screening, where patients who scored less than 70 were excluded.

Karnofsky Performance Scale

The KPS index allows patients to be classified in terms of their functional impairment. This can be used to compare the effectiveness of different therapies and to assess the prognosis in individual patients. The lower the Karnofsky score, the worse the survival for most serious illnesses. Scores range from 0% (dead) to 100% (normal no complaints; no evidence of disease). According to the scores obtained, patients could be classified into three categories: 80–100% (able to carry on normal activity and to work; no special care needed), 50–70% (unable to work; able to live at home and care for most personal needs; varying amount of assistance needed), and 0–40% (unable to care for self; requires equivalent of institutional or hospital care; disease may be progressing rapidly), (Schag *et al.*, 1984).

Hospital Anxiety and Depression Scale

We also administered the HADS, a 14-item self-report instrument designed to assess mood and anxiety symptoms in medically ill patients. Used widely in studies of patients with cancer, the HADS consists of two seven-item subscales assessing depression and anxiety symptoms during the past week. Each subscale ranges from 0 to 21, with a score of 0–7 for either subscale regarded as being in the normal range and a score of 11 or higher indicating a probable presence (caseness) of the mood disorder. A score of 8–10 was just suggestive of the presence of the respective state (Zigmond and Snaith, 1983). It was translated into Arabic and back translated.

Multidimensional Fatigue Symptom Inventory-Short Form

The MFSI-SF is a 30-item short form of the MFSI that yields scores only for the empirically derived subscales. Items are rated on a five-point scale indicating how true each statement was for the respondent during the last week (0 = not at all; 4 = extremely). Preliminary research suggests that it has acceptable psychometric properties and may be used as a substitute for the MFSI when time constraints and scale length are of concern (Stein *et al.*, 1998, 2004). It was translated into Arabic and back translated.

Health-Related Quality of Life-Short Form 36 Arabic version

The SF 36 is a multipurpose, 36-item survey that measures eight domains of health: physical functioning, role limitations because of physical health, bodily pain, general health perceptions, vitality, social functioning, role limitations because of emotional problems, and mental health. It provides two scores: a mental health and a physical health component. All questions in the form assess the individual's status of the last period as 'within the last four weeks' (Schmitz and Kruse, 2007). It was translated into Arabic and back translated.

Statistical methods

The coded data were entered into a computerized database developed for data entry on Microsoft Office Excel program 2007 (Mississippi, Washington, USA). Data were transferred to the Statistical Package of Social Science, version 16 (SPSS v.16, Illinois, Chicago, USA), for analysis. Simple frequencies were used to check the data. Descriptive statistics were used for data summarization. Suitable statistical tests of significance were used when appropriate. Differences between the groups studied were considered statistically significant at a *P*-value of less than 0.05.

Results

At the start of this study, the number of patients was 80 (40 patients in each group); at the 1-month follow-up, 10 patients dropped out (12.5%). The distribution of patients was as follows: three patients in group A (7.5%) and seven patients in group B (17.5%). The mean age of the patients was 42.1 years (9.7) in group A and 41.8 years (10.3) in group B, and there was a nonsignificant difference between the two groups ($P > 0.05$).

As shown in Table 1, more than half of the patients had no psychiatric diagnosis. The main diagnosis was

Table 1 Psychiatric diagnosis of patients in both the groups at the start of the program according to the *Diagnostic and Statistical Manual of Phychiatric Disorders, 4th ed., Text Revised criteria*

	N (%)			
Diagnosis	Group A	Group B	Total	*P*-value
Major depression	5 (12.5%)	3 (7.5%)	8 (10%)	>0.05 (NS)
Adjustment disorder (depression and anxiety)	5 (12.5%)	7 (17.5%)	12 (15%)	>0.05 (NS)
Anxiety disorder	3 (7.5%)	2 (5%)	5 (6.25%)	>0.05 (NS)
Dysthymic disorder	2 (5%)	3 (7.5%)	5 (6.25%)	>0.05 (NS)
Depressive disorder NOS	2 (5%)	3 (7.5%)	5 (6.25%)	>0.05 (NS)
No psychiatric diagnosis	23 (57.5%)	22 (55%)	45 (56.25%)	>0.05 (NS)
Total	40 (100%)	40 (100%)	80 (100%)	

Significant correlation at the level of 0.05. NOS, not otherwise specified.

Table 2 Sociodemographic data of patients in both the groups at baseline

	Number (%)		
Variables	Group A	Group B	*P*-value
Marital status			
Single, divorced, widowed	12 (30%)	11 (27.5%)	>0.05 (NS)
Married	28 (70%)	29 (72.5%)	>0.05 (NS)
Parenthood	31 (77.5%)	33 (82.5%)	>0.05 (NS)
Education			
College	2 (5%)	3 (7.5%)	>0.05 (NS)
Secondary	5 (12.5%)	4 (10%)	>0.05 (NS)
Preparatory	7 (17.5%)	6 (15%)	>0.05 (NS)
Primary	11 (27.5%)	10 (25%)	>0.05 (NS)
Illiterate	15 (37.5%)	17 (42.5%)	>0.05 (NS)
Employment status			
Employed	5 (12.5%)	6 (15%)	>0.05 (NS)
Unemployed	35 (87.5%)	34 (85%)	>0.05 (NS)
Total	40 (100%)	40 (100%)	

Significant correlation at the level of 0.05.

Table 3 Health and medical variables at baseline of patients in both the groups

	N (%)		
Variables	Group A	Group B	*P*-value
Menopausal status			
Premenopause	26 (65%)	27 (67.5%)	>0.05 (NS)
Postmenopause	14 (35%)	13 (32.5%)	>0.05 (NS)
Cancer stage			
Stage I	25 (62.5%)	26 (65%)	>0.05 (NS)
Stage II	15 (37.5%)	14 (35%)	>0.05 (NS)
Type of treatment			
Chemotherapy	22 (55%)	23 (57.5%)	>0.05 (NS)
Radiation therapy	40 (100%)	40 (100%)	>0.05 (NS)
Hormonal therapy	16 (40%)	15 (37.5%)	>0.05 (NS)
Lumpectomy (partial mastectomy)	40 (100%)	40 (100%)	>0.05 (NS)
Total	40 (100%)	40 (100%)	

Significant correlation at the level of 0.05.

adjustment disorder with depression and/or anxiety, followed by major depression.

As shown in Table 2, at the start of the present study, there was no significant difference between both the groups in terms of the demographic data, namely, marital status, parenthood, education, and employment status.

The mean number of days since the diagnosis was 346.5 (124.2) for the patients in group A and 345.8 (132.9) for the patients in group B, and there was a nonsignificant difference between the two groups ($P>0.05$). The mean score of KPS was 82.9% (33.1) in the patients in group A and 83.1% (34.5) in the patients in group B, and there was a nonsignificant difference between the two groups ($P>0.05$).

As shown in Table 3, at the start of the present study, there was no significant difference between both the groups in terms of the health and medical variables, namely, menopausal status, cancer stage, and type of treatment.

As shown in Table 4, there was a significant difference between the mean scores of depression and anxiety in the patients in group A before the intervention and after 1 month.

There was also a significant difference between the mean scores of depression and anxiety in the patients in group A and group B after 1 month. There was no significant difference between the mean scores of depression and anxiety in the patients in group A and those in group B before the intervention. There was no significant difference between the mean scores of depression and anxiety in the patients in group B before the intervention and after 1 month.

As shown in Table 5, there was a significant difference between the mean scores of physical component score (PCS) and mental component score (MCS) in the patients in group A before the intervention and after 1 month. There was also a significant difference between the mean scores of PCS and MCS in the patients in group A and those in group B after 1 month. There was no significant difference between the mean scores of PCS and MCS in the patients in group A and those in group B before the intervention.

There was no significant difference between the mean scores of PCS and MCS in the patients in group B before the intervention and after 1 month.

As shown in Table 6, there was a significant difference between the mean scores of fatigue in the patients in group A before the intervention and after 1 month. There was also a significant difference between mean scores of fatigue in the patients in group A and those in group B after 1 month. There was no significant difference between the mean scores of fatigue in the patients in group A and the patients in group B before the

Table 4 Mean scores of Hospital Anxiety Depression Scale of patients in groups A and B at baseline and after 1 month

Hospital Anxiety and Depression Scale						
	Depression			Anxiety		
	Group A	Group B	*P*-value	Group A	Group B	*P*-value
Before	15.6 (6.3)	14.9 (5.7)	>0.05 (NS)	14.8 (4.8)	15.1 (5.3)	>0.05 (NS)
After 1 month	10.7 (4.6)	13.5 (5.1)	<0.05 (S)	9.2 (3.7)	14.3 (5.4)	<0.05 (S)
P-value	<0.01 (HS)	>0.05 (NS)		<0.01 (HS)	>0.05 (NS)	

Significant correlation at the level of 0.05.
HS, highly significant; S, significance.

Table 5 Mean scores of the Helth-Related Quality of Life Scale of patients in groups A and B at baseline and after 1 month

Health-Related Quality of Life						
	PCS			MCS		
	Group A	Group B	*P*-Value	Group A	Group B	*P*-value
Before	40.4 (9.5)	40.2 (9.4)	>0.05 (NS)	49.1 (8.5)	47.9 (9.1)	>0.05 (NS)
After 1 month	46.1 (10.4)	41.7 (9.8)	<0.05 (S)	55.4 (11.2)	49.2 (8.3)	<0.05 (S)
P-value	<0.01 (HS)	>0.05 (NS)		<0.01 (HS)	>0.05 (NS)	

Significant correlation at the level of 0.05.
HS, highly significant; MCS, mental component score; PCS, physical component score; S, significant.

Table 6 Mean scores of the Multidimensional Fatigue Symptom Inventory-Short Form scale of patients in groups A and B at baseline and after 1 month

The Multidimensional Fatigue Symptom Inventory-Short Form			
	Group A	Group B	*P*-value
Before	36.4 (12.6)	35.8 (11.7)	>0.05 (NS)
After 1 month	30.2 (11.3)	34.3 (10.9)	<0.05 (S)
P-value	<0.01 (HS)	>0.05 (NS)	

Significant correlation at the level of 0.05.
HS, highly significant; S, significant.

intervention. There was no significant difference between the mean scores of fatigue in the patients in group B before the intervention and after 1 month.

As shown in Table 7, there was a significant difference between the mean scores of depression, anxiety, PCS, MCS, and fatigue in terms of the stage of cancer and menopausal status before the intervention.

There was a nonsignificant difference between the mean scores of depression, anxiety, PCS, MCS, and fatigue in terms of marital status, parenthood, education, employment status, and type of treatment before the program. Assessment was done for all patients (80) before the start of the program, at week 0. Where no significant difference between the mean scores of depression, anxiety, PCS, MCS, and fatigue in relation to marital status, parenthood, education, employment status, and type of treatment.

Correlative study

A correlative study was carried out for all patients (80) before the start of the program.

As shown in Table 8, our study showed a significant inverse correlation between the mean age of the patients and the mean scores of the KPS scale. There was no significant correlation between the mean age of the patients and duration since the diagnosis, and the mean scores of PCS, MCS scales, HAD Depression, HAD Anxiety, and MFSI-SF scales.

Also, there was a significant positive correlation between duration since diagnosis and the mean scores of MFSI-SF, HAD Depression, and HAD Anxiety scales. However, there was a significant inverse correlation between duration since diagnosis and the mean scores of KPS, PCS, and MCS scales.

There was a significant inverse correlation between the mean scores of the KPS scale and the mean scores of MFSI-SF, HAD Depression, and HAD Anxiety scales. However, there was a significant positive correlation between the mean scores of the KPS scale and the mean scores of PCS and MCS scales.

The mean scores of the PCS and MCS scales showed a significant inverse correlation ($P<0.05$) with the mean scores of Fatigue, HAD Depression, and HAD Anxiety scales ($r=-0.77$, -0.68, -0.57 and -0.56, -0.63, -0.85, respectively).

The mean scores of MFSI-SF showed a significant positive correlation with the mean scores of HAD Depression and HAD Anxiety scales ($r=0.59$ and 0.57, respectively, $P<0.05$).

There was also a significant inverse correlation between the mean score of MFSI-SF and the mean scores of PCS and MCS scales ($r=-0.64$ and -0.73. respectively, $P<0.05$).

The mean scores of PCS showed a significant positive correlation with the mean scores of MCS ($r=0.85$, $P<0.01$), whereas the mean scores of the HAD

Table 7 Comparison between cancer stage and menopausal status in terms of Depression, Anxiety, physical component score, mental component score, and Fatigue before the start of the program for all patients

	Cancer stage			Menopausal status		
	Stage I	Stage II	*P*-value	Pre	Post	*P*-value
Depression	13.8 (5.2)	16.7 (6.9)	<0.05 (S)	13.2 (4.8)	15.9 (5.7)	<0.05 (S)
Anxiety	12.6 (4.7)	15.7 (5.5)	<0.05 (S)	11.3 (4.1)	16.8 (6.3)	<0.05 (S)
PCS	43.2 (10.3)	37.6 (8.4)	<0.05 (S)	42.4 (11.6)	38.7 (9.4)	<0.05 (S)
MCS	52.1 (13.8)	46.5 (12.1)	<0.05 (S)	51.3 (14.2)	47.8 (11.9)	<0.05 (S)
MFSI-SF scale	34.7 (12.5)	38.8 (12.9)	<0.01 (HS)	33.2 (12.3)	40.6 (13.6)	<0.01(HS)

Significant correlation at the level of 0.05.
HS, highly significant; MCS, mental component score; MFSI-SF, Multidimensional Fatigue Symptom Inventory-Short Form; PCS, physical component score; S, significant.

Table 8 Correlation coefficients of age, duration since diagnosis, physical component score, mental component score, Depression, Anxiety, and Multidimensional Fatigue Symptom Inventory-Short Form scales mean scores before the program for all patients

	Age	Duration	KPS	PCS	MCS	MFSI-SF	Depression	Anxiety
Age	–	0.47	−0.53*	0.19	0.41	0.15	0.48	0.07
Duration		–	−0.55*	−0.69*	−0.74*	0.56*	0.85*	0.62*
KPS			–	0.71*	0.67*	−0.81*	−0.76*	−0.64*

KPS, Karnofsky Performance Scale; MCS, mental component score; MFSI-SF, Multidimensional Fatigue Symptom Inventory-Short Form; PCS, physical component score.
*Significant correlation at the level of 0.05.

Depression scale showed a significant positive correlation with the mean scores of HAD Anxiety scales ($r = 0.81$, $P < 0.01$).

Discussion

The aim of this study was to evaluate the effectiveness of a brief (4 week) intervention that combined a psycho-educational program and physical activity (as a part of the program) to reduce fatigue and emotional distress, and increase QOL (mental and physical) in breast cancer survivors. The ultimate objective in developing such a brief intervention was to provide a practical and easily applicable approach, which would become part of available, accessible, and validated survival treatments in cancer treatment centers (Chambless and Hollon, 1998). Our decision to test an intervention in which two approaches are combined (i.e., psychoeducational and physical activity) was two-fold. On the one hand, psychoeducational and psychosocial interventions, although effective, mainly address the emotional and social well-being of cancer treatment survivors (Trijsburg *et al.*, 1992; Helgeson *et al.*, 1999), leaving out physical and functional problems encountered in the same population. Focusing on the functional activity, physical exercise programs will neglect the emotional and social wellbeing of cancer treatment survivors. On the other hand, existing evidence for either approach shows that, separately, they positively affect fatigue and other relevant outcomes (Courneya, 2003). For all of these reasons, a brief, combined approach was better.

In terms of psychiatric diagnosis, which was made according to DSM-IV TR, we found that most patients suffered from depressive disorders (major depression 10%, adjustment disorder 15%, dysthymic disorder 6.25%, and depressive disorder not otherwise specified 6.25%) and 56.25% had no psychiatric diagnosis. This might be because of the impact of the diagnosis of cancer and its physical and psychological consequences. Our results were in agreement with those of Breitbart *et al.* (2010), who reported that the prevalence of the depressive spectrum in cancer patients ranged from 0 to 58%, with adjustment disorders in 16–42%, major depression in 0–38%, and around half of cancer patients with no psychiatric diagnosis. However, our results were not in agreement with those of Abd El-Azim *et al.* (2008) who found a higher prevalence of psychiatric disorders in their patients, as the patients they evaluated were terminally ill cancer patients and patients with head and neck cancer, respectively. Such patients experienced much more physical suffering (than our patients) and hence had more psychological problems.

As predicted, the intervention helped improve fatigue in the intervention group, where a significant difference was observed in the mean scores of fatigue before and after the intervention and also between both the groups after 1 month. This highlights the beneficial effect of the intervention not only on the physical component but also the cognitive component of fatigue. The results of our study were not in agreement with those of Fillion *et al.* (2008), who found that there was little effect of their brief intervention on fatigue. This difference might be because of the weekly assessment of patients in their study, which might not allow them to detect a significant effect of the program as a certain duration of time is required before there is a positive impact on fatigue and/or that those who were exposed to active coping and exercise continued to apply their newly acquired skills and thus gained significantly more over time. Also, the mean age of the patients in their intervention group was 53.09 years, whereas in our study, it was 42.1 years, only 11.4% of the patients in their intervention group were premenopausal whereas in our study it was 65%, and finally, 40.9% of the patients in their intervention group were in stage III of cancer, who were excluded in our study. The effect of menopause and cancer stage on

fatigue in our study was significant, which might be responsible for the difference in the results between the two studies. Our results were in agreement with those of other studies that found a significant reduction in fatigue after the intervention (Trijsburg *et al.*, 1992; Courneya *et al.*, 2003; Azim *et al.*, 2000; Abd El-Azim *et al.*, 2008). However, the results of our study were not consistent with those of Temel *et al.* (2009), who found a nonsignificant difference in the fatigue before and after the intervention, which might have been because of differences in the patients group, type and stage of cancer, and type of intervention.

Despite the relatively brief time of our intervention as compared with standard psychological and exercise programs (the American College of Sports Medicine, 1997, recommends at least 12–15 weeks; Temel *et al.*, 2009, 16 weeks), it seems that the expected beneficial effects occurred during the course of the intervention and became significant within a few months after the patients' exposure to it.

Our intervention helped improve depression and anxiety symptoms in the intervention group, where a significant difference was observed in the depression and anxiety symptoms before and after the intervention and also between both the groups after 1 month.

This might be because of the effect of the sessions in dealing with negative thoughts, which are the core of depression and anxiety symptoms. The behavioral intervention including relaxation and physical exercise may have also helped. The results of our study were in agreement with those of other studies with reported effects of physical activity (Salmon, 2001) and stress management (Lazarus and Folkman, 1984; Cunningham and Edmonds, 1996; Folkman and Moskowitz, 2000; Azim *et al.*, 2000; Abd El-Azim *et al.*, 2008). However, the results of our study were not in agreement with those of Temel *et al.* (2009), who carried out a study of a structured exercise program for patients with advanced nonsmall-cell lung cancer, where they found a nonsignificant difference in the depression and anxiety symptoms before and after the intervention (16 sessions over 2 months). This might be because of the late stage (III and IV) and the more aggressive nature of lung cancer in their study. Another important factor is that although our intervention was brief, it included important elements (cognitive and behavioral therapy) that were lacking in the other longer study.

As expected, there was an improvement in QOL in the intervention group, where a significant difference was observed in QOL before and after the intervention and also between both the groups after 1 month. Our intervention improved QOL in several ways: by alleviating negative thoughts, improving depression and anxiety symptoms, and improving coping with stress, thus resulting in improvements in the mental and emotional components of QOL and the physical component of QOL (physical exercise). Our results were not in agreement with those of Temel *et al.* (2009), who found a nonsignificant difference in the QOL before and after the intervention, which might have been because of the small sample size in their study (25) and the different type of intervention. However, our results were in agreement with those of Fillion *et al.* (2008), Owen *et al.* (2004), and Midtgaard *et al.* (2006).

We found significant differences between stage I and stage II patients in terms of depression, anxiety, fatigue, and QOL, which may have been because of the impact of the duration of cancer on these aspects, and were confirmed by the significant correlation found (in our study) between time since diagnosis and depression, anxiety, fatigue, and QOL (with worsening of depression, anxiety and fatigue, and lowering QOL). Our study found significant differences between premenopausal and postmenopausal patients in terms of depression, anxiety, fatigue, and QOL, which may have been because of the impact of the hormonal changes that occur in this period and also psychological aspects (with worsening of depression, anxiety and fatigue, and lowering QOL). Our findings were in agreement with those of Huang *et al.* (2010), who examined the factors associated with cancer-related fatigue in breast cancer patients; they concluded that clinical stage of cancer and menopausal status are associated with fatigue.

The fewer patient didn't continue the follow-up in the psychotherapy group (7.5%) compared with the other group (17.5%) might be because of the beneficial effect of the program in improving adherence to follow-up directly by the object relation with the therapist and indirectly through improvements in depression, anxiety and QOL, and reducing fatigue.

Our study adds to several recent findings and supports the hypothesis that patients may benefit from increased stress management (i.e., active coping strategies) and physical activity after cancer treatment. Several self-management techniques may be taught by trained and supervised nurses and can be a part of routine supportive care at very low additional costs for the healthcare system. Indeed, the beneficial effect of physical activity in cancer patients may vary as a function of the patient's age, medical treatment, current lifestyle, and current level of physical fitness (Knols *et al.*, 2005). It is recommended that the intensity, duration, frequency, and type of exercise be adapted to each cancer patient (Salmon, 2001; Courneya *et al.*, 2002). Finally, it is hoped that a brief group intervention such as this serves as a preventive approach, that is, breast cancer patients be exposed to this intervention before and during treatment to prevent fatigue and maintain QOL.

Limitations

First, the sample is limited in its representation of the population as breast cancer in early stages has special characteristics (being curable with better physical health); hence, our results cannot be generalized.

Second, follow-up was after 1 month, which is a relatively short period of time. Later assessment (at 3 and 6

months) might allow us to detect changes that need a longer duration of time to evolve.

Third, the physical exercise was not structured and was of a short duration.

Fourth, the intervention's benefits could not be quantified clearly for the psychoeducative versus the exercise component. Therefore, future studies should examine the impact of each component alone, as well as combined, in the same design.

Conclusion

The present findings suggest that breast cancer patients develop many physical and psychological problems after cancer therapy. Fatigue is an important problem in the majority of breast cancer patients after therapy. We found that clinical stage, menopausal status, and duration of illness were associated with fatigue. Psychoeducational programs including physical activity play a significant role in reducing fatigue, depression and anxiety symptoms, and improving QOL.

Recommendations

First, a large-scale study of cancer patients (in terms of diagnosis and number) would be useful.

Second, a structured exercise program can be conducted with special personnel (a professional trainer) to choose the program appropriate for every group of patients.

Third, longer durations of follow-up should be included.

Fourth, using this program will be of help for cancer patients with fatigue.

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Conflicts of interest

There are no conflicts of interest.

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