

Original Article

Exercise Effect on General Health Status of Greek Cancer Patients: Intervention Effect and Related Comparisons

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Abstract

Background: Cancer diagnosis and therapy imposes a great deal of stress on patients. Psychological interventions and physical activity may reduce depression and help cancer patients to develop stress coping mechanisms.

Objective: The purpose of the present study was to examine the effect of exercise program and a group psychotherapy program on the general health of cancer patients.

Methodology: The sample consisted of 39 cancer patients (10 males and 29 females), assigned randomly in three groups of 13 patients each group, that is, a control, an exercise and a psychotherapy group. The patients of the psychotherapy group received a 10 weeks' supportive-expressive group therapy, at a frequency of one time per week, of 90 minutes each meeting. The duration of the training program for the individuals of the physical activity (PA) group was 10 weeks at a frequency of two sessions per week, 60 minutes each session. The GHQ-28 questionnaire was administered to examine the general health status of the participants. The binary scoring (0/1) was applied, with any score above 4 indicating the presence of "caseness", i.e. strong possibility of psychiatric morbidity.

Results: A statistically significant difference was observed in the PA group, where the "no cases" category was raised to 11 cases at post-intervention level in comparison with the 6 cases before intervention (38% increase, from 46% to 84%), $p=0.031$. In the same group and in the anxiety/insomnia subscale, 6 vs 8 persons were classified as "asymptomatic" before and after intervention respectively.

Conclusions: Physical activity exerts a favorable effect on psychiatric morbidity of cancer patients, especially in the field of anxiety and insomnia, while psychological intervention had a negligible effect. Screening cancer patients for insomnia and anxiety may be helpful to determine treatment intervention programs tailored to their needs

Key words: General health, cancer survivors, exercise, group psychotherapy.

Introduction

Cancer diagnosis imposes a great deal of stress on patients, especially at disease onset, as future strategies and outcomes are yet to be determined. As time goes by, the affected person adapts and accommodates self in a better way with the

situation and consequently reduces morbidity and suffering.

Among non-pharmacological treatments, physical activity (PA) is considered safe and well tolerated by cancer patients and survivors, improving physiologic and psychosocial

outcomes for most patients. PA as defined as any bodily movement produced by skeletal muscles that results in energy expenditure may be unstructured and include everyday life activity, as well as exercise comprising pre-arranged, deliberate and repetitive activity and sports (Courneya et al., 2000; Burr et al., 2012).

However, in cancer patients some precautions are necessary due to PA side effects, depending on cancer characteristics and treatment options that require careful selection and monitoring during training, since, for example, patients with lung cancer or bone lesions might be at particular risk due to increased risk of cardiovascular events and bone fractures respectively. In this case, these patients should be offered preliminary medical exams prior exercise to attend PA programs prescribed for other cancer patients (Burr et al., 2012).

Psychological distress commonly appears among cancer patients, since cancer is a life-threatening disease imposing serious limitations. Distress may develop in any cancer stage affecting treatment outcome and the quality of life (QoL) of patients (Zabora et al., 2001; Yi et al., 2017).

It is estimated that at least one third of cancer patients worldwide suffer from some kind of serious distress, with its prevalence varying among cancer patients with lung, pancreatic, head and neck, Hodgkin's disease, and brain cancer patients reported as being more distressed (Carlson et al., 2004).

PA has a beneficial effect on psychological distress via multiple neuroendocrine pathways, involving the production of cytokines and endorphins (Feroli et al., 2018). Furthermore, psychological interventions also reduce depression and help cancer patients to develop stress coping mechanisms and handle pain, supporting a feasible bio-behavioral route that is relevant to cancer survival (Yeh et al., 2014). Nevertheless, research outcomes concerning the effect of exercise and psychological interventions on health of cancer patients are yet to be drawn.

The purpose of the present study was to examine the effect of an exercise and a group psychotherapy program on the general health of cancer patients and especially to the dimensions of anxiety and insomnia, depression, somatization and social dysfunction, according the GHQ-28 research tool.

Material and methods

Sample

The sample consisted of 39 patients (10 males and 29 females) with cancer, any type, regardless of previous kind of treatment (surgery alone, or with adjunct therapy-chemotherapy/radiation) as diagnosed by their oncologist and able to carry on normal activity with minor signs or symptoms of disease according to Karnofsky performance scale (Azevedo et al., 2013). All patients were volunteers and registered members of the Larissa cancer patients association, Greece. A meeting preceded the initiation of the program. The great importance of health and its relation with physical activity and group psychotherapy for cancer patients were discussed and information was provided concerning the content and safety of intervention procedures. Thus, all participants were aware of any risks associated with participation in the program and had the option to consent to have their information used for research purposes. The sample was randomly assigned into three groups (a control group and two experiment groups – that is, the exercise group and the psychotherapy group- each one consisted of 13 patients). All participants agreed to sign the consent form of participation and completion of POMS instrument prior and after intervention. The study protocol was approved by the University of Thessaly bioethics committee.

Procedure

Supportive therapy group

The patients received a 10 weeks' supportive-expressive group therapy (SEG) that provides several psychosocial advantages (Grassi et al., 2010), at a frequency of one time per week, of 90 minutes each meeting, with the researcher and a therapist present. Engaging in supportive group therapies, members teach each other coping strategies, share mutually beneficial ideas and create a setting for self-disclosure and bonding opportunities which can serve to reduce confusion and fear. SEG has been found to reduce many psychological symptoms of cancer, having a significant and moderate reduction in emotional suppression (Kissane et al., 2007; Ho et al., 2016). This psychotherapy intervention followed an unstructured pattern, designed to encourage expression of emotion, enhance symptom control and communication with

physicians and nurses and deal directly with existential concerns such as fears of dying and death, changes in self and body image, making meaning out of the illness, feelings of isolation and reordering life priorities (Classen et al., 2008). Special attention was paid to the expression of emotion with the therapists using emotion as a marker for what may be important to focus on in that session. No drop outs occurred during sessions.

Exercise group

The duration of the training program for the individuals of the exercise group was 10 weeks at a frequency of two training sessions per week, of 60 minutes each session. Since there is no sufficient evidence supporting precise guidelines for exercise prescription for each different type of cancer (Azevedo et al., 2013) let alone for this sample of patients with heterogeneous types, this study followed the general recommendations of exercise. These include duration of 20 to 60 minutes per session, at a moderate intensity of exercise that does not interfere with conversation and a training frequency of 2 times per week that is better tolerated for deconditioned populations (Schmitz et al., 2010; Courneya et al., 2000) as compared to 3-5 days per week training recommended for healthy individuals. (Mishra et al., 2012)

Each training session included a 5-minute warm-up period of respiratory and flexibility exercises followed by 10 minutes of walking, 35 minutes of aerobic exercises, balance and co-ordination activities and a cool-down period of 10 minutes of breathing and relaxation exercises. Overall, the purpose was to provide a training program that takes moderate physical effort to perform. In general, moderate intensity exercise sessions of between 20 and 60 minutes duration are recommended for cancer patients and survivors, with modifications as necessary. (Mishra et al., 2012)

A medical clearance for exercise was provided by their physician prior commencing of the program, to ensure the absence of general contraindications to exercise participation such as cardiovascular insufficiency, acute infectious diseases, metabolic diseases, anemia (Hemoglobin <10g/dl), absolute neutrophil count less than $0.5 \times 10^9/\mu\text{l}$ and platelet count less than $50 \times 10^9/\mu\text{l}$, mental or physical impairment leading to inability to exercise, significant peripheral

neuropathies and use of indwelling catheter. (Schmitz et al., 2010)

Control Group

Control group individuals did not participate in any supportive therapy or exercise program and they just filled in the POMS questionnaire twice, prior and after intervention.

Instruments

The General Health Questionnaire (GHQ-28), a 28-item measure of emotional distress in medical settings. developed by Goldberg in 1978 was used as a screening tool to detect those likely to have or to be at risk of developing psychiatric disorders. The questionnaire consists of four subscales, that is, somatic symptoms (items 1–7); anxiety/insomnia (items 8–14); social dysfunction (items 15–21), and severe depression (items 22–28) (Goldberg, 1986). It takes less than 5 minutes to complete. In the present study, the GHQ-28 scoring followed the binary method, where "Not at all", and "No more than usual" score 0, and "Rather more than usual" and "Much more than usual" score 1. Using this method any score above 4 indicates the presence of "caseness", i.e. strong possibility of psychiatric morbidity. The latter scoring method was applied in this study.

Statistical analysis

Statistical analysis included the use of Statistical Package of Social Sciences (SPSS 22.0). GHQ "caseness" variables were treated as nominal ones. A binary "yes" or "no" variable was created and the percentage distribution across the three groups was studied. To further study the statistical differences, one more binary variable was created, with those patients scoring over "0" points in each GHQ subscale classified as "symptomatic" and the remaining patients scoring "0" classified as "no symptomatic at all". McNemar's test appropriate for repeated nominal data was applied. Statistical significance was set at $p=0.05$,

Results

In the psychotherapy group, 6 out of 13 persons (46.2%) were considered as "no cases" at pre-intervention level, while in the physical activity group 7 (53.8%) persons were classified as "no cases". Ten persons were classified as "no cases" in the control group. While in the control group there had been no change in the rates of "cases" and no "cases", in the psychotherapy

group “cases” were diminished by one (5 persons at post intervention vs 6 at pre - intervention) ($p=0.625$). A statistically significant difference was observed in the PA group. In this group the “no cases” category was raised to 11 cases at post – intervention level in comparison with the 6 cases before intervention (38% increase, from

46% to 84%), $p=0.031$. (Table 1) When the PA group was further analyzed by GHQ subscales, the greater difference, although not statistically significant was observed in the anxiety/insomnia subscale: 6 persons were classified as “asymptomatic” before intervention, vs 8 persons after intervention, a 15% increase. (Table 2)

Table 1. GHQ caseness differences among treatment groups

| Group | No cases | | | Cases | | p |
|-------------------|----------|------|--|-------|------|-------|
| | Pre | Post | | Pre | Post | |
| Psychotherapy | 7 | 8 | | 6 | 5 | 1,000 |
| Physical activity | 6 | 11 | | 7 | 2 | 0,031 |
| Control | 10 | 3 | | 10 | 3 | 1,000 |
| Mc Nemar test | | | | | | |

Table 2. GHQ subscales differences among treatment groups

| Group | “S” | | “AI” | | “SD” | | “Dep” | |
|--|-------|------|-------|------|-------|------|-------|------|
| | Pre | Post | Pre | Post | Pre | Post | Pre | Post |
| No symptoms | 5 | 5 | 6 | 8 | 8 | 5 | 10 | 11 |
| Symptoms | 8 | 7 | 7 | 5 | 7 | 8 | 3 | 2 |
| p | 0,625 | | 0,508 | | 0,625 | | 1,000 | |
| *S: Somatization *AI: Anxiety & Insomnia *SD: Social Dysfunction *Dep: Depression | | | | | | | | |

Discussion

According to findings, physical activity exerts a favorable effect on psychiatric morbidity of cancer patients especially in the field of anxiety and insomnia, while psychological intervention had a negligible effect. This study was part of a project in fulfillment of Ph.D. requirements concerning also the effect of this program on mood profile and quality of life (QOL) on this sample of patients. Overall, psychotherapy seems to improve mood and quality of life (Papastergiou et al., 2018; Papastergiou et al., 2019), however its effect on general health, as

measured with the GHQ-285 questionnaire is questionable.

There seem to be some psychological evidence underlying this effect. During treatment period patients experience high level of anxiety and depression, and poor QOL. SEG T provides support and help patients and their caregivers cope with their disease related stress (Kissane et al., 2007; Rainburger et al., 2011; Mukherjee et al., 2017), offering a positive perspective that provides a state of comfort and respect to all cancer patients. This is particularly effective when experience of cancer treatment is recent, hopelessness and fatigue are intense and

survivors have not yet sufficiently developed coping strategies of the disease. Indeed, QOL tumor-related fatigue and coping strategies improve following SEGT application (Reuter et al., 2010; Yavuzsen et al., 2012).

Nevertheless, in case cancer diagnosis and treatment with no metastasis present exceeds the five years rate of survival, the psychotherapy benefits are questionable and patients appear to derive only modest benefits in terms of their psychological well-being from either intervention. (Ho et al., 2016) Quality of life and mood are related to stress level but they also comprise a wide range of variables, being discreet from anxiety itself. Exercise exerts its effect on anxiety and insomnia via multiple physiological ways. The relevant to anxiety and insomnia items included in GHQ-28, refer to general symptoms of anxiety that are often alleviated with exercise. GHQ-28 questionnaire is a general health questionnaire and the exercise effect on anxiety and insomnia subscales reflects exercise contribution to improve general health.

Indeed, physical activity is capable to lower anxiety sensitivity and increase the resistance to stressful stimuli by multiple ways, since it promotes the release of IL-6 sleep-mediating cytokines in direct proportion to exercise intensity, muscle mass involved during exercise, duration and training status, along with modulation of the central serotonergic systems and endorphin production (Shephard, 2000).

Exercise directly influences the circadian system, resulting in an increased total sleep time as well as time in deep sleep (slow-wave sleep), that overall improves sleep quality. Increasing the quality of sleep through aerobic exercise and relaxation techniques that are useful for dealing with insomnia symptoms, exercise exerts beneficial effects to anxiety in cancer patients. Both. (Ferioli et al., 2018) According to Tang et al., (2010), simple and home based exercise programs do have an effect, since walking briskly 3 days a week, for 30 min a day over 8 weeks, significantly improves sleep quality.

On the other hand, efficacy of psychological interventions regarding their effect on psychiatric morbidity in cancer survivors is questioned. Although a noteworthy effect on reducing somatic anxiety and sleep problems has been observed (Torre-Luque et al., 2016) these benefits tend to reduce in patients under active treatment. As patients recover from cancer they

tend to adapt more efficiently to different daily conditions than before. Psychological intervention might have a limited effect on certain QoL fields, such as vitality and mental health component of patients with cancer (Papastergiou et al., 2018). Moreover, psychological interventions effect size is rather small regarding improvement of QOL and reduction in depressive symptomatology (Knobf et al., 2014).

Tailored psychological interventions using different formats, durations and facilitators are necessary and future studies should focus on this point. A low psychological distress at baseline may also account for low effectiveness. It has been postulated that screening and assessment to determine clinical levels of anxiety in patients with cancer should be considered in future studies as an inclusion criterion before providing psychological interventions. In a similar manner, the type, frequency and intensity of physical exercise should be related to each specific cancer, prescribed and supervised as a therapeutic program, as it happens with it occurs for the type, dose and duration of a drug treatment (Mosher et al., 2017; Anderson & Ozakinci, 2018; Sanjida et al., 2018).

The small sample size, the mixed population of cancer patients and the relatively short duration of intervention were the major limitations of the present study. In any case, the findings of this study suggest that the effect of physical exercise on cancer patients' general health status could be carried out easily using a widely used, short and patient-friendly questionnaire, such as GHQ-28.

On the other hand, the GHQ-28 widely used for general health assessment and possible psychiatric morbidity screening is more sensitive to short-term distress or psychiatric disorders than to longstanding attributes of the client, assessing and recording client's current state and differences from the usual state. Some confusion may also exist over the different scoring methods and this has implications for interpretation of scores derived from the questionnaire and interdisciplinary comparisons (Wright et al., 1987; Failde et al., 2000) as well as additional concerns over the severe depression subscale which includes some confronting questions for the patient to answer.

All these limitations along with the small sample size might not fully allowed statistically significant differences to come forth. Future

studies with larger samples and prospective design will help to further clarify all issues emerged from this study.

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