Cancer Reports and Reviews

Commentary Article ISSN: 2513-9290

Physical exercises programs for cancer patients: what is the latest?

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Abstract

Scientific evidences show that people living with and surviving cancer may practice physical activity with several benefits and without particular side effects if type, timing and intensity of the activities are targeted on their clinical status. Physical exercise may prevent or reduce cancer-related fatigue before, during and after therapy. This commentary would like to show that despite these evidences, little is still known about the effectiveness of physical exercise programs from hospitalization. Therefore, in reporting on an Italian example of multidisciplinary model of rehabilitation and educational program, started during hospitalization in the Oncology ward and continued after discharge, we would like to underline the importance of promoting safe life styles with the objective of increasing the quality of life and not only the number of cancer patients.

As reported by the EUROCARE-5 study, survival for cancer patients increased from 1999-2001 to 2005-2007 despite some differences across Europe, with lowest survival rate observed in Eastern Europe [1-3]. In Italy, in the last years [4], an increase in survival rate by about 20% has been recorded after cancer diagnosis, based on the numbers provided by the Italian Association of Cancer Registries (AIRTUM) [5] database [6,7]. Despite the increasing survival rate, about 4.9% of the Italian population has been diagnosed with cancer and there were 365,800 new diagnoses in 2016; breast and colon cancer localizations being the most frequent, with 52,000 new diagnoses for colon-rectus cancer and 50,000 new diagnoses for breast cancer [6]. In this scenario, cancer networks and multidisciplinary approach may play a key role [8], including rehabilitation and physical exercise programs for people living with and surviving cancer [9]. The goal today is to increase the quality of life and not only the length of survival in cancer patients [10].

We know that disability, risk of cardiovascular disease, morbidity, and mortality are positively influenced by several physical benefits of exercising, including peak oxygen consumption, functional capacity, muscle strength and lean mass, cardiovascular risk factors, and bone health. There are many evidences that physical activity has a positive impact on physiology, body composition, physical functions, psychological outcomes, quality of life in cancer patients during therapy [11-14], after completion of cancer-related main treatment [15,16], after and during adjuvant treatment [17] and in reducing long-term side effects [18], especially in breast cancer [19] and colorectal cancer patients [20]. Those benefits are not dependent on the type of cancer, in particular cardiorespiratory improvements and diminished fatigue following rehabilitative exercise [21].

Exercise therapy is effective for decreasing pain in patients during and following cancer treatment [22,23], and to improve quality of life during active treatment and for survivors [11,13,14].

Physical exercise may prevent or reduce cancer-related fatigue (CRF) before, during and after therapy [24-27], but little is known about effectiveness of physical exercise programs for CRF in advanced cancer patients [28]. Exercising during cancer therapy probably results in less fatigue and improved physical fitness and resistance exercise programs appeared to contribute in maintaining quality of life. Both aerobic and resistance exercises can be regarded as beneficial for patients with therapy-related side effects. For these reasons, clinicians should prescribe exercise, eventually in associations with psychological interventions, as first-line treatments for CRF [29]. Nevertheless, further research is required to determine the optimal type, intensity, and timing of exercise intervention [30-32].

The existing reviews and guidelines on physical activity and rehabilitation are generic; the target is to avoid inactivity. Some benefits are evident for regular sessions and for moderate intensity exercise [33], additional benefits of multi-dimensional over mono-dimensional rehabilitation have not been clearly identified. Home- based programs are also effective and a favorable cost-effectiveness is shown. Further research is needed to develop more personalized programs that should take into consideration interests and preferences of patients to optimize the interventions [23,34-40].

As stated earlier, it is known in literature that people living with and surviving cancer may practice physical activity with several benefits and without particular side effects if type, timing and intensity of the exercise are targeted on the patients' clinical status. However, many patients are inactive and do not follow exercise recommendations.

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Key words: *breast cancer patients, cancer-related fatigue, colon-rectus cancer Patients, hospitalization, physical exercise, rehabilitation*

Received: June 15, 2017; **Accepted:** June 23, 2017; **Published:** June 30, 2017

Clinicians should promote exercise from hospitalization, discussing with patients the benefits of physical activity and implementing educational programs to bridge the gap between research and practice [37,41-43].

On this basis, the Rehabilitation Service of Parma University-Hospital, in collaboration with the Clinical Oncology Unit, is proposing a model of rehabilitation and promotion of life style for cancer patients starting from the hospitalization in the Oncology ward. It is an inpatient rehabilitation project based on a program of aerobic and resistance exercises supervised by a physical therapist specialized in oncological rehabilitation and dedicated to this activity. The goal of the intervention is to promote an educational program of good life style in cancer patients by explaining the benefits of physical activity and by training the patients and the caregivers to perform the exercises correctly. Upon the discharge a personalized home-based exercise program is explained and described to patient and caregivers, in line with the one performed during their hospitalization.

The rehabilitation and promotion of life style programs are conducted according to international standards of good practice, such as the Declaration of Helsinki and Good Clinical Practice.

A physical and rehabilitation specialist selected patients of the Clinical Oncology ward of Parma University Hospital with different types of cancer and in different phases of treatment, aged between 18 and 70 years, with no clinical complications that could interfere with physical activity (e.g. sepsis, fever, immunocompromised patients) nor apparent cognitive impairment, and recovery time of at least 5 days. Before starting the rehabilitation program, patients were required to accept to participate in an informational interview and completion of informed consent form.

During the first 2 months of the program, 65 patients were hospitalized in the Clinical Oncology ward. 43.08% were male (n=28) and the 56.92% female (n=37), 28 patients did not meet inclusion criteria, 14 (i.e. the 38%) refused to participate to the program. Twenty-three patients were recruited for the study, but 12 dropped out because of clinical complications. Only 11 patients completed the program during two months of recruitment (7 males: mean age of 64 ± 11.5 SD years; 4 females: mean age 69 ± 5.8 SD years).

After history taking and first physical examination, patients were divided into 2 groups according to their disability level: patients able to walk were assigned to group A, patients that for different clinical conditions were not able to walk were assigned to group B.

Both groups were evaluated at admission using the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30) version 3.0 questionnaire to assess quality of life [44,45], Mini Mental State Examination (MMSE) to assess cognitive functioning [46], Modified Barthel Index (BIM) to assess independence and disability [47], Karnofsky Performance Status scale (KPS) to quantify the functional status [48], handgrip strength was assessed with Jamar dynamometer [49] and Numeric Rating Scale (NRS) for pain and fatigue. Two-minute walking test (2MWT) [50,51] and Short Physical Performance Battery (SPPB), to test physical performance and balance [52,53], were used only for group A and Trunk Control Test (TCT) only for group B [54]. At discharge, patients were assessed with a specific satisfaction questionnaire concerning rehabilitation treatment received and BIM, KPS, NRS, handgrip test. SPPB, 2MWT and TCT were performed depending on the group of belonging.

The 5-session exercises program was initiated the day after the first physical examination and baseline evaluation, according with the patients' clinical conditions. Sessions lasting approximatively 45 to 60 minutes, depending on the patient's physical ability and on the group, took place every day. Vital signs were assessed before and after each session, at the end of the session even NRS for pain and fatigue and presence of dyspnea were assessed. Participants were allowed to make up for sessions missed due to clinical complications as long as they would complete the entire exercise program. During a 10-minute warm-up period, patients performed ranges of motion and stretching exercises for the trunk and lower and upper limbs. Participants then completed 15 minutes of aerobic exercise on an arm bike. For the strength training part of this exercises program, patients performed 3 sets of 10 repetitions of 6 different exercises (e.g. 3 lower extremity and 3 upper extremity movements), for a total of approximatively 20 to 30 minutes, exercises were modified or discontinued for patients that were unable to complete them. A cool down period of 1 minute followed every repetition. Then only participants of group A completed another 15 minutes of aerobic exercise session with walk at middle speed on a flat, straight and hard surface path. A cool down period of 2 to 5 minutes followed the aerobics session either on the bike or walking.

At discharge, it is expected that a restricted group of patients with breast or colon cancer after adjuvant treatment and in good clinical conditions, will be trained in a personalized exercises program in a professional gym. They will be evaluated by a Sport Medicine Specialist to determine the best physical performance in order to meet the set level of intensity for the aerobic exercise (heart rate between 70 and 85% of their maximum) and the strength of major muscle groups associated with performing activities of daily living (the maximal amount of weight that each muscle group can move through the available range of motion). Based on this evaluation they will be trained by specialized personnel in a personalized 12-sessions exercise program, each lasting approximately 60 minutes, to be performed twice weekly over the course of 1 month. After this training, patients should continue their physical activity in a gym or with a home-based program. This is a rehabilitation clinical model based on physical exercise that starts in the hospital and continues for outpatients to support cancer survivors in prevention of recurrences and managing of cancer-related long term complications.

For all participants (inpatients and outpatients) a follow-up at the 6 months mark with EORTC QLQ-C30 is expected to assess quality of life after discharge and to verify whether the patient practice their physical activity with home-based program or in a gym.

An Anova Repeated Measure will be performed to keep track of variations in the information collected at admission, at discharge and in the 6-month Follow-up check. As of now, no patients have completed the entire program. The small sample investigated (n=11) during the 2 months of recruitment cannot be used to statistically demonstrate the effectiveness of the structured exercises and promotion of life style programs for cancer patients. However, some improvements in physical performance for both group A and group B patients were observed.

The group A data reported improvements in the distance in meters walked during 2MWT and in the energy produced during arm bike session between admission and discharge. Furthermore, an improvement in fatigue has been observed. Group B has shown an improvement in number of repetitions for the strength training part of the exercise program, an improvement in pain, fatigue and SPPB.

The survey relative to usefulness and satisfaction of the treatment has shown a positive judgment, supporting the model of inpatients treatment proposed.

The aim of the Italian research is to evaluate the effectiveness of a brief program of inpatients rehabilitation and promotion of life style (at least a 5-day duration) in the Oncology ward of Parma University Hospital. Preliminary data reflected a positive trend for both the participants' performance and the satisfaction concerning the treatment proposed.

As stated earlier, the small sample investigated (n=11) during the 2 months recruitment does not offer a statistical demonstration of the effectiveness of the structured exercises and promotion of life style program for cancer patients. Nevertheless, this experience is different from those reported in literature, to our knowledge, for the presence of a therapeutic program for an inpatient limited in time. Furthermore, we have proposed a structured, reproducible and easy exercises protocol that, according to current clinical and scientific recommendations, could be compared with other experiences.

Considering the degree of comorbid disease and health status of inpatients in the Oncology ward of Parma University Hospital, we consider a 70% rate of participation to be an acceptable goal. Our target during the 2- year study period is to have approximately 100 patients. It will be necessary to continue the study to evaluate the efficacy of the model proposed in the short term with the inpatients assessment. In medium and long term, the effectiveness of our rehabilitation model will be evaluated with follow-ups and with the participation to the personalized exercises program in the professional gym for a restricted group of patients with breast and colon cancer after adjuvant treatment.

Evidences show that physical activity have a positive impact on physical functions, psychological outcomes, and quality of life for patients living with and surviving cancer [11-18], especially breast cancer [19] and colorectal cancer survivors [20].

If the results of this study are positive it will be possible to implement current local clinical practice for cancer patients, by providing a rehabilitation and clinical care pathway based on physical exercise which starts during hospitalization and continues with outpatients after adjuvant treatment. This model of rehabilitation is in accordance with the Evidence Based Medicine and Practice.

Acknowledgment

We are grateful to the multidisciplinary team members of Parma who worked in creating the on-going rehabilitation program and to all the patients that accepted to participate. Special thanks are due to Dr. Alberto Anedda, Director of the Sport Medicine Unit, NHS Local Agency of Parma, Italy, for having contributed to continue, for the first time in Parma, a physical exercise program for cancer patients, also after discharge.

Funding information

The Parma experience is a No Profit Research. However we have to be grateful to the not-for-profit association A.VO.PRO.RI.T. (Associazione Volontaria Promozione Ricerca Tumori), for Financial support.

Authorship and contributors

1. Substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data: FR, FeP, VS, CC, VF, FaP, RB
2. Drafting the article or revising it critically for important intellectual content: FR, FeP, VS, CC, VF, FaP, RB
3. Final approval of the version to be published: FR, FeP, VS, CC, VF, FaP, RB
4. Agreement to act as guarantor of the work (ensuring that questions related to any part of the work are appropriately investigated and resolved): FR, FeP, VS, CC, VF, FaP, RB

Competing interest

The authors declare that they have no competing interests.

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