Physical Activity and Cancer Care

Subjects: Oncology

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Cancer treatments cause numerous side effects and have a negative impact on all body systems. Physical activity is important for cancer patients.

cancer care physical activity survivors

1. Introduction

In 2020, 19.3 million new cancer cases were diagnosed, and almost 10 million deaths from cancer were recorded [1]. Cancer patients may experience fatigue, depression, anxiety, reduced quality of life (QoL) and sleep problems [2][3][4].

Cancer treatments have many side effects. They exert a negative impact on: the cardiovascular system, the endocrine system, the digestive system, the immune system, the nervous system, the respiratory system, systemic symptoms such as fatigue, which can persist for many years after treatment, and lymphedema [5].

Physical activity (PA) is important for cancer patients. The World Health Organization distinguishes between two types of physical activity: aerobic physical activity and anaerobic physical activity. Physical activity can be classified according to intensity as: light-intensity physical activity, 1.5–3 metabolic equivalents of task (METs), which does not result in a significant increase in heart rate or respiratory rate (one example of light-intensity physical activity is slow walking); moderate-intensity physical activity, 3–6 METs; and vigorous-intensity physical activity, more than 6 METs [6].

PA improves QoL, increases aerobic fitness, has a positive influence on mental health and reduces the side effects of cancer treatment, fatigue and mortality in cancer patients [2][3][7][8][9]. The type of physical activity should depend on the condition of the individual patient. A patient's response to a given physical activity stimulus may vary due to the side effects of treatment, demographic factors (age), mobility restrictions or comorbidities [10]. However, patients should undertake physical activity unless the disturbances are severe enough to prevent them from exercising [11]. Moreover, a patient's ability to tolerate exercise may vary during a disease. This is caused by the variability in the intensity of the symptoms [5].

With patients facing a life-threatening illness, recommending additional physical activity may seem to be unnecessarily burdensome or too simplistic, as it would require an investment of time and energy from the patient [10].

Although there are many research papers about the benefits of physical activity in cancer patients, in practice combining PA with treatment is rare. In 2020, as many as 35.5% of the cancer survivors aged 18 years and older reported physical inactivity [12]. Only 7% of cancer patients perform adequate exercises [13].

2. Side Effects of Cancer Treatment

Chemotherapy and radiotherapy inhibit physical activity due to their side effects, such as severe fatigue, lack of energy as well as hair loss and mental health problems [14]. Chemotherapy is more likely than chemoradiotherapy to cause fatigue and reduce motivation to exercise. While chemoradiotherapy involves a more intensive treatment schedule, it is better tolerated by patients [15]. Physical activity has been shown to reduce the side effects of treatment and fatigue in cancer patients. The reduction was seen in those patients who, despite the side effects of treatment, underwent physical activity [7]. Studies report that regular PA reduces disease-specific side effects in patients with MM [16][17]. However, there is no evidence that physical activity mitigates the cardiotoxicity induced by cytostatic drugs [18].

3. Fatigue

One study included in the review found that regular physical activity combined with an appropriate diet (the patients completed 71% of the aerobic exercise sessions of 41 ± 25 min and 58% of the resistance exercise sessions planned as part of the intervention) reduced the fatigue resulting from intensive cancer treatment. The QoL was improved as well as lower limb muscle mass and endurance in breast cancer patients undergoing chemotherapy or radiotherapy. An important finding from the study was that the beneficial effect on QoL and fatigue persisted one year after the intervention [2]. Combined aerobic and resistance exercise has been found to reduce fatigue in patients with breast cancer [8]. In a study by Singh et al. [3], analysing the findings from 19 clinical trials, physical activity was observed to have a significant effect on fatigue in patients with colorectal cancer as compared with usual cancer care. Physical activity reduces the level of fatigue in cancer patients. The association between exercise and reduced fatigue has been demonstrated in patients with breast, prostate, colon and lung cancers [4]. Moreover, moderate-intensity physical activity has been found to reduce cancer-related fatigue in patients with colorectal cancer [19].

4. Quality of Life

Physical activity improves physical and social QoL and reduces anxiety and depression in cancer patients [2][3]. Unlike moderate to vigorous intensity physical activity, sedentary time negatively affects QoL and wellbeing of cancer patients [4]. Findings from one randomised controlled trial showed that aerobic and resistance exercise improves QoL by reducing depression, fatigue and physical deconditioning, which are the most common symptoms reported by breast cancer survivors [20]. Combined aerobic and resistance exercise performed during chemotherapy results in better longer-term QoL outcomes in breast and colorectal cancer patients, improving sleep quality, reducing anxiety and depression and having a positive impact on happiness [3][8]. Researchers also

included studies investigating the effects of physical activity on QoL in paediatric cancer patients with the use of the Paediatric Quality of Life Inventory. The studies showed that exercise interventions significantly improved QoL in the patients [21][22][23][24], even patients with haematological malignancies such as multiple myeloma [25][26][27]. Physical activity has also been shown to improve QoL and reduce anxiety and depression in ovarian cancer patients [24]. The findings from one study indicated that physical activity improves QoL in cancer patients despite the bothersome side effects of cancer treatment [7].

5. Mental Health

Physical activity has a positive impact on the mental health of cancer patients and adds positivity to their daily life [7]. One study showed that aerobic, resistance and flexibility exercises undertaken by prostate cancer patients with bone metastases for 3 months resulted in self-reported improvements in physical functioning, which had a positive influence on the mental health of the patients studied [28]. Another study found that an 8-week exercise intervention programme consisting of twice-per-week sessions of 60 min of resistance, flexibility and cardiorespiratory exercises performed by patients with different types of cancer improved the capability of the patients to express positive emotions, improved their functional capacity and had a positive influence on their mental health [29].

6. Physical Fitness, Muscle Strength, Impact on Body Weight

Studies have shown that exercise improves aerobic fitness and upper-body strength and reduces BMI and body fat in colorectal cancer patients. The results of a meta-analysis conducted by Singh et al. showed a greater effect for exercise interventions lasting over 12 weeks and interventions conducted during chemotherapy in patients with colorectal cancer [3]. Combined aerobic and resistance exercise has been found to be associated with superior upper and lower body muscle endurance in breast cancer patients [8].

7. Mortality and Longer Survival

There is an association between greater physical activity and reduced mortality in colorectal, breast and prostate cancer patients, with 40–50% risk reductions observed among individuals undertaking physical activity [30]. A study by Palesh et al. found that engaging in moderate physical activity was associated with longer survival and reduced hazard of cancer-related mortality in patients with advanced breast cancer [31]. In their study, Di Maso et al. noted that only vigorous physical activity had the advantage over inactivity in terms of reduced risks of cardiovascular and cancer mortality [32]. The cohort studies referred to by the authors reported approximately 40% reduction in mortality from prostate cancer in physically active men. Physical activity has also been found to reduce the risk of mortality in breast and colorectal cancer patients [33]. Barnard et al. [34][35] reported that intense physical activity reduces insulin resistance and insulin levels, with greater effects observed for a combination of intense physical activity and a low-fat, high-fibre diet. One study reported that breast cancer patients who met the minimum physical activity guidelines (PAGAs) had lower hazards of mortality compared with physically inactive patients (HR = 0.74, 95%, CI = 0.56 to 0.96; HR—hazard ratio; CI—confidence interval) [9]. A cohort study carried out by Wang et al. [36]

that investigated the effects of recreational physical activity in patients with non-metastatic prostate cancer found that engaging in ≥17.5 MET-h/week of recreational physical activity, compared with 3.5 ≤ 8.75 MET-h/week of recreational physical activity, was associated with a 31% lower risk of prostate cancer-specific mortality (HR 0.69, CI 95%, $p = 0.006$), with no differences between the TNM stage of a tumour.

8. Recurrence

Combined aerobic and resistance exercise reduces the incidence of metabolic syndrome in cancer survivors, particularly breast cancer survivors. Metabolic syndrome is a risk factor for breast cancer recurrence [20][37]. A randomised controlled trial conducted among 100 breast cancer survivors, assigned either to exercise or usual care, showed an improvement in BMI and levels of circulating biomarkers, i.e., insulin, IGF-1, adiponectin and leptin, in the exercise group after the exercise intervention. An improvement in all metabolic syndrome variables persisted at the 3-month follow-up in the exercise group. Another study found that breast cancer patients meeting the minimum PAGAs both before and after their diagnosis had >50% reduced hazards of recurrence in comparison with patients not meeting this minimum at either time point. The study also found reduced hazards of recurrence for patients not meeting the minimum physical activity guidelines prior to diagnosis but who reported meeting the guidelines after their treatment (2-year follow-up) [9].

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