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European Journal of Cancer 41 (2005) 216–224

European Journal of Cancer

www.ejconline.com

Review

Evaluation and outcome of behavioural changes in the rehabilitation of cancer patients: a review☆

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Received 8 June 2004; received in revised form 2 September 2004; accepted 10 September 2004
Available online 5 November 2004

Abstract

The global increase in the number of newly diagnosed cancers has led in most affected countries to increased numbers of cancer survivors, who have specific needs for physical and psychosocial rehabilitation. In spite of recent progress, little is known about the specific rehabilitation measures that could increase the quality of life for cancer survivors. We reviewed published interventions that focussed on changing known risk factors for cancer recurrence and improving physical well-being; those we selected were exercise, smoking, alcohol consumption, diet and the use of sun screens. The published trials varied in the quality of the methods used, often had inadequate sample sizes and showed difficulty in validating outcomes. We conclude that there is still insufficient evidence to assess the importance of these behavioural risk factors in the rehabilitation of cancer patients. Future interventions should be designed to assess the separate effects of dietary changes, exercise and psychosocial interventions.

Keywords: Cancer; Rehabilitation; Exercise; Smoking; Alcohol consumption; Diet; Sun screens

1. Introduction

Cancer is diagnosed in more than 10 million persons throughout the world each year, and the World Health Organisation has predicted that this number may increase by as much as 50% over the next 20 years. As detection and cure rates are also improving steadily, a further increase in the life expectancy of patients with newly diagnosed cancer – and hence a larger number of cancer survivors – can be predicted [1,2]. The 5-year survival rates are greater than 75% in most developed countries [3], and, in the United States of America (USA) alone, up to 9 million people have lived with cancer for 5 years or more [4]. Such increases in the size of the 'survivor' group mean that cancer must now be managed as a chronic disease, and the community must be taught to adapt treatment for long- and short-term survivors.

Cancer survivors face a diversity of physical and emotional sequelae, of which the most important include the recurrence of cancer, decreased quality of life and psychosocial effects after treatment. These side-effects are more and more commonly addressed through physical and psychosocial rehabilitation. In 1978, Lehman and colleagues [5] stated that up to 59% of cancer patients might have impairments or limitations that could potentially be improved by rehabilitation. Today, it is difficult to estimate how many cancer patients require rehabilitation, as there are large national and international differences in the timing and type of rehabilitation offered. Nevertheless, it is generally accepted that any form of rehabilitation is likely to have positive effects on psychological and physical problems in cancer patients e.g. [6,7]. Apart from the obvious gains for the

☆ This study was supported by the Danish Cancer Society.
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doi:10.1016/j.ejca.2004.09.018

patient, cancer rehabilitation can also be important in socioeconomic terms, by reducing demands on health system resources and increasing the working population.

In the past, rehabilitation was targeted mainly at cancer patients with visible disabilities. However, research since the early 1970s has shown that even patients without physiological effects are preoccupied about their disease and future health [8], often leading to psychological disturbances [9]. Rehabilitation has many aspects, ranging from psychosocial interventions to more concrete forms, such as lifestyle changes. Ideally, they should be combined or targeted to specific patient needs in order to achieve the major goal: restoration of vocational, social, familial and sexual life, primarily through self-help programmes [10].

Optimising life after a diagnosis of cancer and treatment has become a significant subject of research, but knowledge about how to streamline post-treatment opportunities and tailor rehabilitation to patients' needs is still lacking. A common problem with regard to cancer survivors is identifying behavioural risk factors related to the cancer and finding ways to modify their behaviour after diagnosis. We sought to identify rehabilitation measures that might reduce the risk for cancer recurrence and possibly increase survival. This was done by reviewing intervention studies conducted among cancer patients and survivors that focussed on behaviour patterns known to be related to the risk for cancer: exercise, smoking, alcohol consumption, diet and use of sun screens.

2. Patients and methods

We searched PubMed for studies published in English since January 1975 to April 2004 in which interventions of changes in exercise, smoking, diet, alcohol and sun screens in cancer survivors (or patients) were investigated. Although interventions with a psychosocial outcome are highly relevant to this article, they were not included in the search as they have already been reviewed extensively elsewhere in references [11–13].

For the search, the words *cancer, cancer rehabilitation* and *cancer survivor* were used in combination with *exercise*, *physical activity*, *smoking*, *tobacco*, *alcohol*, *diet*, *nutrition*, *sun*, *sun screen* and *solar radiation*. This strategy of mutually overlapping searches was used to ensure the widest possible coverage of the subject. For studies to be included in the review, they had to be intervention studies with a pre- and post-test design or case–control comparisons; all cross-sectional and retrospective studies were thus excluded. A second inclusion criterion was a sample size larger than 50. For interventions with respect to smoking, the sample size was lowered to 20, as there was only one trial with a sample size greater than 50.

The original search identified 90 853 references based on keywords alone. Of these, only 69 studies were interventions in the areas of interest. A total of 27 studies fulfilled the sample size criterion, but four of these were interventions in people without cancer and were subsequently dropped from the review.

3. Results

3.1. Exercise

Exercise is considered to be highly effective in relieving side-effects of cancer such as mood swings, weight gain, sleep problems, poor body image and fatigue [14–16]. In populations other than cancer patients, exercise has been shown to have a positive effect against anxiety, depression and self-image e.g. [17,18], probably through a combination of direct and psychological effects.

The primary literature search revealed 37 interventions with exercise in cancer patients. Of these, only eight fulfilled the second selection criterion (Table 1), and 78% of the studies identified had less-than-optimal sample sizes. For instance, although Mock and colleagues [19] reported decreased anxiety, depression, fatigue and nausea among patients who participated in a structured exercise programme, the sample of only nine cases and five controls is much too small to derive statistically valid results. A similar problem was found in other published trials e.g. [20,21]. Other common disadvantages were a lack of randomisation, a too short or non-existent follow-up period [22] or no control groups [23].

When considering the trials reviewed (Table 1), patients in the intervention groups seem to experience reduced distress and improved well-being. However, in these studies it is difficult to quantify the exercise dose and also to attribute the observed effects to exercise alone, making it difficult to properly evaluate the outcome. We conclude that the evidence for the beneficial effect of exercise on cancer survivors is still patchy and the subject needs further investigation.

3.2. Diet

The link between cancer and dietary habits has been the subject of much interest over the past few decades. Much of the published literature has focussed on the prevention of cancer through changes in diet, such as eating more fresh fruit and vegetables and less saturated lipids and alcohol [26]. If these lifestyle factors have an impact on the initial development of cancer, they will probably also affect the adjustment and survival of cancer patients.