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Contemporary Issues in Cancer Rehabilitation

A Systematic Review of Exercise Systematic Reviews in the Cancer Literature (2005-2017)

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Abstract

Background: Evidence supports the benefits of exercise for patients with cancer; however, specific guidance for clinical decision making regarding exercise timing, frequency, duration, and intensity is lacking. Efforts are needed to optimize clinical recommendations for exercise in the cancer population.
Objectives: To aggregate information regarding the benefit of exercise through a systematic review of existing systematic reviews in the cancer exercise literature.
Data Sources: PubMed, CINAHL Plus, Scopus, Web of Science, and EMBASE.
Study Eligibility Criteria: Systematic reviews and meta-analyses of the impact of movement-based exercise on the adult cancer population.
Methods: Two author teams reviewed 302 abstracts for inclusion with 93 selected for full-text review. A total of 53 studies were analyzed. A Measurement Tool to Assess Systematic Reviews (AMSTAR) was used as a quality measure of the reviews. Information was extracted using the PICO format (ie, participants, intervention, comparison, outcomes). Descriptive findings are reported.
Results: Mean AMSTAR score = 7.66/11 (±2.04) suggests moderate quality of the systematic reviews. Exercise is beneficial before, during, and after cancer treatment, across all cancer types, and for a variety of cancer-related impairments. Moderate-to-vigorous exercise is the best level of exercise intensity to improve physical function and mitigate cancer-related impairments. Therapeutic exercises are beneficial to manage treatment side effects, may enhance tolerance to cancer treatments, and improve functional outcomes. Supervised exercise yielded superior benefits versus unsupervised. Serious adverse events were not common.
Limitations: Movement-based exercise intervention outcomes are reported. No analysis of pooled effects was calculated across reviews due to significant heterogeneity within the systematic reviews. Findings do not consider exercise in advanced cancers or pediatric populations.
Conclusions: Exercise promotes significant improvements in clinical, functional, and in some populations, survival outcomes and can be recommended regardless of the type of cancer. Although generally safe, patients should be screened and appropriate precautions taken. Efforts to strengthen uniformity in clinical trial reporting, develop clinical practice guidelines, and integrate exercise and rehabilitation services into the cancer delivery system are needed.

Introduction

Exercise interventions are well-established as safe and beneficial for individuals receiving cancer treatment [1]. Exercise contributes to improved health and functional outcomes in the cancer population [2,3]. Although most national guidelines recommend that cancer survivors meet the public health guidelines for physical activity, exercise prescription is nuanced and requires consideration of many factors to positively and safely impact individuals with a cancer diagnosis [4,5]. Different types of exercise interventions have been studied in the cancer population and have resulted in general recommendations for increasing overall physical activity and including specific resistive or aerobic exercise regimens to the cancer care plan [1,6,7]. Therapeutic exercise also is recommended as a rehabilitative approach for individuals

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experiencing more specific functional impairments and disability [8].

Oncology care providers are challenged to identify and synthesize the significant volume of relevant literature on exercise prescription. The complexities of the health status, clinical history, and functional abilities of the individual being treated for cancer introduce a spectrum of considerations that further challenge exercise recommendations [4]. Models of care that provide access to exercise and rehabilitation professionals have been developed but are not used broadly and the workforce supporting them is still developing [9]. As a result, exercise prescription frequently is overlooked in cancer care planning [10,11]. Although recommendations have urged greater integration of exercise into the cancer care continuum, active integration will require more precise guidelines to support provider decision making [12].

The cancer exercise research generally demonstrates significant and positive impact on variables of interest; however, most studies have focused on exercise within specific types of cancer (breast, colorectal, etc) or on a single cancer-related impairment (cancer-related fatigue [CRF], muscle weakness, etc) using widely variable modes of exercise. Further complicating the ability to harmonize information around exercise prescription is the variability across studies regarding optimal timing, frequency, duration, and intensity for exercise prescription. Systematic reviews, although prevalent in the cancer exercise literature, tend to follow a disease-specific or impairment-specific focus (eg, systematic review of strength training in androgen-deprived patients with prostate cancer) whereas in the clinical setting, providers see a wide range of oncologic patients with varying disease stages often experiencing multiple comorbidities and functional impairments. A review of the existing literature is needed to compile and synthesize evidence from the numerous and varied systematic reviews to aggregate the most meaningful literature with a broad perspective on exercise and rehabilitation interventions for individuals with cancer [13].

The purpose of this report is to present the results of a systematic review of published systematic reviews on exercise interventions for the cancer population to identify key common features of exercise programs in the cancer population. The aggregate findings provide a comprehensive resource of current evidence that support health care providers in selecting exercise-based interventions for the individual being treated for or with a history of cancer.

Methods

The methodology for conducting a systematic review of systematic reviews is supported by the Cochrane group and articulated by Smith et al [13]. This approach is recommended when attempting to apprise, summarize, and aggregate research findings from separate systematic reviews to compare and contrast results to provide clinical decision makers with relevant evidence [13].

Search

The search strategy was designed to identify existing, published systematic reviews and meta-analyses. Search terms were formulated using the PICO structure, ie, participants (P) included adults (18-80 years old) with any type of cancer who were not considered to have advanced cancer or were not receiving palliative care. Intervention (I) included exercise and its various forms, including therapeutic exercise, physical activity, strength training, aerobic conditioning, rehabilitative exercise, and stretching, etc. Comparisons (C) broadly addressed exercise intervention versus none, supervised versus unsupervised, varied frequency and duration of exercise interventions, as well as comparison of different types of exercise. Outcomes (O) included functional gains such as neuromusculoskeletal and cardiometabolic function, improvement in physical impairment, functional measures, overall quality of life, blood count and biomarker improvements, and psychological and psychosocial gains.

The search terms and strategy were developed by an informationist at the National Institutes of Health, National Institutes of Health Library in consultation with the author team. The comprehensive search strategy is provided in Table 1. Five databases were searched: PubMed, CINAHL Plus, Web of Science, EMBASE, and Scopus with date range from 2000 to 2017.

Study Identification and Selection

Figure 1 presents the Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram. The initial search yielded 9337 results. Additional filters were then added for systematic reviews and meta-analyses only, yielding 5453 records. After we removed duplicate records and abstracts not available in English, as well as those not relevant to the topic of interest, 302 abstracts were agreed on by the author team for screening. Authors worked in paired teams for the initial abstract screening reviews (J.B./K.W.S. and A.S./N.S.), and each team reviewed one half of the abstracts. In instances of disagreement by the team, the co-lead authors (N.S. and J.B.) made a final determination of inclusion.

A priori, the authors agreed that reviews focusing on movement-based exercise, such as yoga, qigong, etc, would be included, as well as studies that used various traditional forms of exercise, including aerobic and resistive conditioning, flexibility, and muscle retraining activities. Studies that reviewed behavioral interventions to promote exercise or to encourage lifestyle