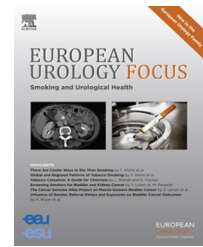


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Platinum Priority – Review – Prostate Cancer

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The Effects of Exercise on Fatigue, Quality of Life, and Psychological Function for Men with Prostate Cancer: Systematic Review and Meta-analyses

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Article info

Article history:

Accepted February 22, 2016

Associate Editor:

James Catto

Keywords:

Prostate cancer
Exercise intervention
quality of life
psychological function
meta-analysis

Abstract

Context: Conflicting data exists on the role of exercise interventions in patients with prostate cancer (PCa) regarding quality of life (QOL) endpoints.

Objective: To evaluate the effects of exercise interventions on fatigue, QOL, depression, and anxiety in PCa patients.

Evidence acquisition: We searched seven major databases (MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, Web of Science, and Scopus) for randomized control trials (RCTs) of supervised exercise interventions for men with PCa from database inception to October 2015. For meta-analyses, studies required standardized fatigue, QOL, or mood-related scales with standard-care control groups. The effect size was measured in terms of mean difference (MD) with 95% confidence interval (CI) for continuous outcomes using a random-effects model. Statistical heterogeneity between studies was assessed using the Cochrane Q test and I^2 statistic.

Evidence synthesis: We selected 13 RCTs enrolling 1057 PCa patients (mean age 69.4 ± 2.1 yr) undergoing exercise interventions, of which eight studies involving 675 patients qualified for meta-analyses. The study duration varied from 4 wk to 6 mo. A 12–16-wk exercise intervention significantly improved fatigue symptoms (MD 4.83, 95% CI 3.24–6.43; $p < 0.00001$) as assessed according to the Functional Assessment of Cancer Therapy (FACT)-Fatigue scale. Fatigue remained improved at 6 mo (MD 3.60, 95% CI 2.80–5.12; $p < 0.00001$). Furthermore, exercise interventions improved QOL measured using the FACT-General (MD 3.93, 95% CI 1.37–5.92; $p = 0.003$) and FACT-Prostate (MD 3.85, 95% CI 1.25–6.46; $p = 0.04$) scales. The pooled data did not reveal a significant improvement in depression or anxiety.

Conclusions: Combined evidence from RCTs shows improvement in QOL and fatigue according to FACT scales. No significant differences in depression or anxiety were observed.

Patient summary: Exercise improves fatigue and quality-of-life outcomes in patients with prostate cancer. Further studies are necessary to identify patient-specific exercise regimens to optimize these benefits.

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1. Introduction

In 2015, 220 800 new cases of prostate cancer were diagnosed in the USA, with an estimated 27 540 related deaths [1]. Prostate cancer, regardless of treatment offered, can lead to chronic fatigue, psychological distress, fear of sexual failure, guilt, depression, and anxiety, which can contribute to poor quality of life (QOL). Up to 30% of men who are diagnosed with prostate cancer experience anxiety, fear, and stress regarding the disease and complications arising from treatment [2,3]. Poor QOL may lead to noncompliance with treatment. In addition, the coexistence of cancer and psychological distress is associated with a significant increase in risk of death [4]. Therefore, appropriate management of factors contributing to poor QOL among cancer patients is of major clinical importance.

A major component of persistent fatigue in cancer patients is related to overactivation of the inflammatory network [5]. Chronic inflammation may also increase the risk of morbidity and mortality [6]. Because inflammation is lower in active individuals than in sedentary people, regular exercise reduces not only fatigue but also inflammation [7–9]. Furthermore, exercise lowers blood pressure and serum cortisol levels, increases lung capacity, improves respiratory function and heart rate, boosts circulation, and strengthens muscle tone. Consequently, exercise interventions are of current interest for cancer patients. Accumulating evidence suggests that exercise training after a diagnosis of cancer may improve QOL and reduce cancer-related fatigue. Further data suggest that exercise interventions have beneficial effects on several psychological and physical outcomes for patients with cancer.

Previous systematic reviews of randomized control trials (RCTs) have evaluated the role of exercise in prostate cancer [10–15]. All of these comprehensive evaluations investigated changes in physical performance, bone mineral density, biochemical markers, and/or QOL with exercise in prostate cancer patients. However, given the increased emphasis on QOL for cancer patients, a focused review solely examining the impact of exercise on QOL and mood-related outcomes is warranted. The aim of our overarching systematic review was to provide a comprehensive and up-to-date summary of the effects of a wide array of supervised exercise interventions on QOL, fatigue, depression, and anxiety. We completed meta-analyses to quantify the changes associated with exercise for each individual mood-related outcome. We describe actual clinical benefits derived from improvements in QOL and mood-related scores, and identify areas for future research.

2. Data acquisition

2.1. Search methods

A comprehensive search of several databases from inception to October 21, 2015 was performed. The databases included Ovid Medline In-Process & Other Non-Indexed Citations, Ovid MEDLINE, Ovid EMBASE, Ovid PsycINFO,

Ovid Cochrane Central Register of Controlled Trials, and Scopus. The search strategy was designed and conducted by a professional librarian (L.P.) with input from two study investigators (D.K., B.S.). Controlled vocabulary supplemented with keywords was used to search for RCTs evaluating the effects of exercise on psychological function and QOL in prostate cancer patients. The search strategy is shown in Supplementary Tables 1 and 2. A search for unpublished abstracts and manuscripts was not performed. Our systematic review was registered with PROSPERO (Registration ID CRD42014015658). We followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines for conducting a meta-analysis of clinical trials [16].

2.2. Study selection

RCTs published in English were eligible for inclusion in our systematic review. Abstracts from RCTs were not eligible for inclusion if no associated manuscripts were published. The population of interest was men with clinically diagnosed prostate cancer and participation in a prescribed exercise program. Acceptable exercise interventions included Pilates, yoga, mind-body stress reduction, tai chi, walking alone or in combination with cycling, cycling, resistance training, strength training, qigong, aerobic exercise, anaerobic exercise, and/or stretching. Generalized advice to engage in physical activity was not considered an appropriate exercise prescription. Included studies had to contain one of the following primary outcome measures: cancer-specific QOL, overall QOL, fatigue, depression, and/or anxiety. No limit was placed on the duration of exercise intervention or length of follow-up.

For inclusion in meta-analyses, studies had to use standardized outcome assessments for comparison purposes with access to raw outcome data. In addition, a usual-care or standard-care control group without a prescribed self-exercise program had to be included in quantitative syntheses. Studies were nonetheless eligible for inclusion in the overall systematic review for qualitative discussion if they did not meet the inclusion criteria for meta-analyses.

2.3. Data extraction

Three reviewers (V.V., B.S., D.K.) performed the study selection procedure. Disagreements were resolved by discussion with the co-authors and consensus. Titles and abstracts were used to screen for initial study inclusion. A full-text review was carried out on the remaining records that matched inclusion criteria. The same reviewers performed all data extraction including evaluating study characteristics and outcome data. Disagreements were resolved by consensus. A data collection form was designed and pilot-tested to ensure completeness and agreement for the first three studies. If trials had multiple publications, manuscripts with the longest follow-up were selected and older publications were accessed to clarify methods if required.

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