Critical Reviews in Oncology / Hematology 122 (2018) 157–163

Contents lists available at ScienceDirect

Critical Reviews in Oncology / Hematology

journal homepage: www.elsevier.com/locate/critrevonc

Review: Effectiveness of implementation strategies to increase physical activity uptake during and after cancer treatment

C. IJsbrandy[a,b,c,*], P.B. Ottevanger[b], M. Tsekou Diogeni[a], W.R. Gerritsen[b], W.H. van Harten[d,e], R.P.M.G. Hermens[a]

[a] Scientific Institute for Quality of Healthcare (IQ healthcare), Radboud Institute for Health Science (RIHS), Radboud University Medical Centre Nijmegen, Nijmegen, The Netherlands
[b] Department of Medical Oncology, Radboud Institute for Health Science (RIHS), Radboud University Medical Centre Nijmegen, Nijmegen, The Netherlands
[c] Department of Radiation Oncology, Radboud University Medical Center, Nijmegen, The Netherlands
[d] Division of Psychosocial Research and Epidemiology, Netherlands Cancer Institute, Amsterdam, The Netherlands
[e] Department of Health Technology and Services Research, MB-HTSR, University of Twente, Enschede, The Netherlands

ARTICLE INFO

Keywords:
Exercise
Health plan implementation
Neoplasms
Rehabilitation
Survivors
Review

ABSTRACT

Background: The purpose of this review was to assess the effectiveness of different strategies to implement physical activity during and after cancer treatment.
Design: We searched for studies containing strategies to implement physical activity in cancer care that meet the inclusion criteria of the Cochrane EPOC group. The primary outcome was physical activity uptake. We expressed the effectiveness of the strategies as the percentage of studies with improvement.
Results: Nine studies met the inclusion criteria. Patient groups doing physical activities via an implementation strategy had better outcomes than those receiving usual care: 83% of the studies showed improvement. Strategies showing significant improvement compared to usual care employed healthcare professionals to provide individual counselling or advice for exercise or interactive elements such as audit and feedback systems. When comparing the different strategies 1) interactive elements or 2) elements tailored to the needs of the patients had better physical activity uptake.
Conclusions: Implementation strategies containing individual and interactive elements, tailored to the individual needs of patients, are more successful in improving physical activity uptake.

1. Introduction

An increase in the relative cancer survival rate is expected in Europe in the coming 15 years (Meulepas et al., 2011; Verdecchia et al., 2007; Berrino and Capocaccia, 2008), resulting in an estimated doubling of cancer survivors (De werkgroep, 2004). These survivors will create unique societal challenges to counteract the detrimental and persistent adverse effects of cancer and its treatment (Hewitt et al., 2006). Symptoms such as loss of quality of life (QoL) (Yang et al., 2012), diminished cardiopulmonary fitness, (Jones et al., 2012) and cancer-related fatigue (Servaes et al., 2002; Bower et al., 2000; Fossa et al., 2003; Hjermstad et al., 2005; Loge et al., 2000; Vistad et al., 2007; Serveas, 2003; Gielissen, 2007) usually evolve during treatment and may persist long after therapy completion (Courneya, 2001; Courneya and Friedenreich, 1999; Argiles et al., 2005; Dimeo et al., 2004; Wagner and Cella, 2004). In view of this, it is important to find ways of either preventing or addressing these symptoms, not only to relieve individual symptoms, but also in view of the societal impact, prolonged medical follow-up, and loss of work opportunities.

Studies have shown positive results of physical activity (PA) in counteracting symptoms related to cancer (Mishra et al., 2012; Cramp and Byron-Daniel, 2012; Markes et al., 2006; van Waart et al., 2015; Kampshoff et al., 2015), such as cardiopulmonary fitness (Schmitz et al., 2010), QoL (Schmitz et al., 2010; Knols et al., 2005; Courneya et al., 2012; Courneya, 2003; Young-McCaughan and Sexton, 1991; Schwartz, 1999; Courneya and Friedenreich, 1997; Kolden et al., 2002;

Abbreviations: EPOC, Effective Practice and Organization of Care; HCP, healthcare professional; IMS, implementation strategy; ITS, interrupted time series; NRCT, non-randomized controlled trail; PA, physical activity; PAU, physical activity uptake; PSI, percentage of studies with improvement; QoL, quality of life; RCT, randomized controlled trail

* Corresponding author at: Scientific Institute for Quality of Healthcare (IQ healthcare), Radboud Institute for Health Science (RIHS), Radboud University Medical Centre Nijmegen, PO Box 9101, Nijmegen, 6500 HB, The Netherlands.
E-mail addresses: Charlotte.IJsbrandy@radboudumc.nl (C. IJsbrandy), Nelleke.Ottevanger@radboudumc.nl (P.B. Ottevanger), m.tsekoudiogeni@student.maastrichtuniversity.nl (M. Tsekou Diogeni), Winald.Gerritsen@radboudumc.nl (W.R. Gerritsen), W.v.Harten@nki.nl (W.H. van Harten), Rosella.Hermens@radboudumc.nl (R.P.M.G. Hermens).

https://doi.org/10.1016/j.critrevonc.2017.09.005
Received 21 April 2017; Received in revised form 11 August 2017; Accepted 11 September 2017

Galvao and Newton, 2005), and fatigue (Cramp and Byron-Daniel, 2012; Schmitz et al., 2010; Schwartz, 1999; Kolden et al., 2002; McNeely et al., 2006; Schwartz et al., 2001; Schwartz, 2000; Dimeo et al., 1997; Winningham, 2001; Anon, 2003; Dimeo, 2001). Improvement of muscular strength (Mello et al., 2003), lean body mass, body fat levels (Winningham et al., 1989), self-esteem, and even better chemotherapy completion rates have been reported (van Waart et al., 2015). Evidence-based guidelines recommend implementing physical cancer rehabilitation programmes or other initiatives to improve PA uptake (PAU) in cancer care. However, it appears that current PAU is low (Stevinson and Fox, 2006; Courneya et al., 2003; Segal et al., 2001; Segal et al., 2003). This may be because (just as other new treatment approaches) PA programmes need active implementation strategies (IMSs) tailored to barriers and facilitators that prevent or promote successful implementation (Grimshaw et al., 2004).

In recent years, many initiatives have been launched to implement PA in daily cancer care, sometimes in clinical trials. The effectiveness and experiences of the strategies were positive overall, but a systematic overview is lacking, particularly one showing which strategies help patients and healthcare professionals (HCPs) in successfully implementing PA in daily cancer care.

Therefore, the purpose of this review was to systematically assess the effectiveness of different strategies for implementing PA during and after cancer treatment.

2. Design

Since the word 'intervention' has multiple meanings, we will use the word 'IMS' instead of 'intervention', for the remainder of this article.

2.1. Search strategy

We searched the MEDLINE, EMBASE, and CINAHL databases from January 2000 to November 2016. The search was limited to studies of human beings written in English. The search terms included the methodological filters of the Cochrane Effective Practice and Organization of Care (EPOC) Group combined with selected MeSH terms and free text terms. The search strategies used are outlined in Supplement S1. We also searched all references of articles selected for inclusion for further relevant trials. Supplement S2 shows the inclusion criteria.

2.2. Selection of articles

Two reviewers (CIJ and NO) independently reviewed the search-generated titles and abstracts to see whether they fulfilled the selection criteria. Differences in the selection of titles and abstracts were discussed and resolved through consultation with a third reviewer (RH). If doubt remained, the full article was acquired for further inspection. The full articles of selected studies were also reassessed and carefully inspected for a final decision about inclusion. The names of the authors, institutions, or journals of publication were not anonymised for the reviewers. The characteristics of each included study (narrative synthesis) were evaluated; for the quantitative synthesis, only the studies with an randomized controlled trail (RCT), non-randomized controlled trail (NRCT), controlled before after (CBA), or interrupted times series (ITS) study design were included, in accordance with the inclusion criteria of Cochrane EPOC Group.

2.3. Data extraction

Two reviewers (CIJ and MTD) independently extracted data from the studies (the study details of which had not been anonymised) using a data extraction form based on the Cochrane EPOC Group Data Abstraction Form 2002, the Cochrane EPOC Group Data Collection Checklist 2002, and the revised EPOC Taxonomy 2015.

We extracted the following information: participant characteristics (number and description of participants), setting characteristics, characteristics of the implementation strategy (including format, deliverer, timing, frequency, and duration), control, outcomes, and study quality characteristics. The reviewers compared the data extracted and resolved disagreement by discussion until consensus was reached. If there was no consensus, a third reviewer settled the matter (RH).

2.4. Quality assessment: assessing the risk of bias

Two reviewers (CIJ and MTD) independently assessed the quality of each study included in the quantitative synthesis using the Cochrane EPOC group's suggested 'risk of bias criteria'. Disagreement was resolved by consultation with a third reviewer (RH).

2.5. Data analysis for quantitative synthesis

We performed two analyses to assess the effectiveness of strategies for improving PAU during and after cancer treatment:

Analysis 1: an IMS group compared to a control group. The effectiveness of the IMS group compared to the control group was expressed in terms of the percentage of studies with improvement (PSI). We calculated the PSI both at the study level and at the IMS group level, since some studies had compared two or more IMS groups to the control group. We calculated the PSI of the primary outcome. Moreover, we calculated the PSIs of the secondary outcomes. We analysed outcomes evaluated for 6 months from the start of follow-up and after the first 6 months from the start of follow-up. We also analysed the PSI of studies using IMSs during treatment and of studies using them after treatment. We intended to perform a random-effect meta-analysis if the different IMS groups and outcomes did not show too much heterogeneity.

Analysis 2: IMS groups compared to each other: We analysed the primary and secondary outcomes. We intended to perform a random-effect meta-analysis if the various IMS groups and outcomes did not show too much heterogeneity. We analysed outcomes evaluated for 6 months from the start of follow-up and after the first 6 months from the start of follow-up. We also analysed the PSI of in studies using IMSs during treatment and of studies using them after treatment.

3. Results

3.1. Selection of studies

Supplement S3 illustrates the literature search and the study selection. Electronic searches and the snowball method identified 11,837 titles. After removing 2460 duplicates, we screened 9381 titles and excluded 8729 studies. We excluded 537 more during abstract screening. We obtained full-text screenings for the remaining 115 studies. Of these, 97 were excluded and 18 articles (van Waart et al., 2015; Bennett et al., 2007; Damush et al., 2006; Jones et al., 2004; Jones et al., 2005; Ligibel et al., 2010; McGuire et al., 2011; Ottenbacher et al., 2012; Pinto et al., 2013; Pinto et al., 2008a; Pinto et al., 2008b; Pinto and Trunzo, 2004; Purcell et al., 2011; Rabin et al., 2011; Vallance et al., 2008a; Vallance et al., 2008b; Vallance et al., 2007; Windsor et al., 2009) were included in the narrative synthesis. Reason for excluding 97 full-text articles is described in Supplement S3. The group of 18 included articles contained 14 original studies. The 9 studies that met the Cochrane EPOC group inclusion criteria were included in the quantitative synthesis (van Waart et al., 2015; Bennett et al., 2007; Jones et al., 2004; Jones et al., 2005; Ottenbacher et al., 2012; Pinto et al., 2013; Pinto et al., 2008b; Purcell et al., 2011; Rabin et al., 2011; Vallance et al., 2008a; Vallance et al., 2008b; Vallance et al., 2007; Pinto et al., 2005). We excluded 5 studies that did not meet the EPOC inclusion criteria (Damush et al., 2006; Ligibel et al., 2010; McGuire et al., 2011; Pinto et al., 2008a; Windsor et al., 2009).