

A multidisciplinary intervention to facilitate return to work in cancer patients: intervention protocol and design of a feasibility study

Iris F Groeneveld, Angela G E M de Boer, Monique H W Frings-Dresen

To cite: Groeneveld IF, de Boer AGEM, Frings-Dresen MHW. A multidisciplinary intervention to facilitate return to work in cancer patients: intervention protocol and design of a feasibility study. *BMJ Open* 2012;**2**:e001321. doi:10.1136/bmjopen-2012-001321

► Prepublication history and additional materials for this paper are available online. To view these files please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2012-001321>).

Received 17 April 2012
Accepted 6 June 2012

This final article is available for use under the terms of the Creative Commons Attribution Non-Commercial 2.0 Licence; see <http://bmjopen.bmj.com>

Coronel Institute of Occupational Health, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands

Correspondence to
Iris Groeneveld;
i.f.groeneveld@amc.nl

ABSTRACT

Introduction: Returning to work can be problematic for cancer survivors due to suboptimal workplace support, a heavy workload, decreased physical functioning and fatigue. The timely and permanent return to work (RtW) of cancer patients favourably influences quality of life and economic independence. Multidisciplinary interventions aimed at timely and enduring RtW are lacking. The objectives of this article are (1) to describe the protocol of an intervention aimed at RtW of cancer patients, comprising of counselling by an oncological occupational physician and supervised physical exercise in a clinical setting during treatment and (2) to present the design of the study aimed at evaluating the feasibility of this intervention.

Methods and analysis: The intervention comprises three counselling sessions with an oncological occupational physician and a 12-week moderate-to-high intensity physical exercise programme, starting at the onset of chemotherapy. The intervention is aimed at cancer patients treated with curative intent, aged 18–60 years, employed and on sick leave. It will take place in two large medical centres in the Netherlands. The feasibility of the intervention will be evaluated as follows: the number of sessions, topics discussed and exercises executed will be registered by care providers; patients' and care providers' opinions will be assessed by questionnaires and interviews, respectively; and the proportion of invited patients that participated will be calculated.

Ethics and dissemination: The study results will be used for optimising the intervention content and may serve as a foundation for future implementation. The Medical Ethics Committees of the Academic Medical Center and the participating medical centres approved the study protocol.

INTRODUCTION

In western countries, cancer prevalence has been increasing in recent decades, due primarily to early detection and improved treatment. Approximately a third of new

ARTICLE SUMMARY

Article focus

- The goals of this article are to describe the protocol of an intervention aimed at RtW of cancer patients, comprising of counselling by an oncological occupational physician and supervised physical exercise in a clinical setting during treatment and to present the design of the study used to evaluate the feasibility of this intervention.

Key messages

- Returning to work is problematic for cancer survivors due to, among other factors, suboptimal workplace support, a heavy workload, decreased physical functioning and fatigue.
- Timely and enduring RtW may favourably influence quality of life and economic independence of cancer patients.
- A multidisciplinary intervention for cancer patients consisting of counselling and physical exercise aimed at returning to work is warranted and must be evaluated for feasibility.

Strengths and limitations of this study

- The intervention is innovative in its early onset, clinical setting and the fact that both work- and physical health-related determinants of RtW are targeted.
- The feasibility of the intervention will be investigated thoroughly at the level of the patients and the care providers using qualitative and quantitative methods.
- Only one occupational health professional will be involved in the intervention, and physical exercise will not be continued after chemotherapy treatment has concluded.

cancer cases are individuals of working age.¹ Most of these patients aim to return to work (RtW) eventually because RtW implies a return to 'normalcy', economic independence² and favourably influences quality of life.^{3–4} However, RtW often appears problematic,⁵ and one-third of patients do not RtW at all.⁶ Among those who resume work,

absence due to sickness and impairments in productivity are common.⁷ Work-related issues that impact RtW include a lack of practical and emotional support from the employer and care providers and a heavy workload.⁸ Occupational physicians (OPs) often lack information on the patient's treatment and prognosis.⁹ Due to limited expertise, they may be unaware of the possibilities for adjusting a patient's workplace, tasks and hours.¹⁰ As to the patients, self-reported ability to work⁶ and social support¹¹ are often low. In several qualitative studies, cancer patients express a need for emotional and practical support,^{12–14} such as the provision of disease-related information on RtW, adjustments in workplace and working hours and development of a comprehensive plan for RtW.^{14 15} Also, physical complaints, induced by the disease and its treatment, may constrain enduring RtW in cancer patients. These complaints include persistent fatigue,^{16 17} reduced cardiorespiratory fitness¹⁸ and reduced physical functioning.⁸

Although RtW is widely acknowledged as an important issue in cancer rehabilitation, studies on enhancing RtW are rare. Indeed, a recent review stated that moderate-quality evidence exists for positive effects of multidisciplinary interventions involving physical exercise and education or counselling on RtW in cancer survivors.¹⁹ In the studies showing positive effects, the counsellor provided information and discussed coping skills²⁰ or encouraged RtW.²¹ However, none of the studies detailed in this review focused on promoting *timely* or *enduring* RtW.^{20–22} Timely and enduring RtW may be facilitated by combining two strategies. The work-related barriers could be overcome by tailored counselling with an OP with expertise in cancer. Fatigue and physical functioning may be positively influenced by a physical exercise programme.^{23 24}

Currently, it is recommended that cancer rehabilitation, including counselling and/or physical exercise, starts during treatment if the treatment is curative in intent. With regard to counselling, patients can be advised on how to deal with work while on sick leave and informed about disease- and treatment-related barriers to and possibilities for RtW. Furthermore, patients can be offered a physical exercise programme to prevent a severe decline in physical functioning and cardiorespiratory fitness. According to the American College of Sports Medicine, moderate-to-high intensity physical exercise during and after treatment is safe and can have positive effects on cardiorespiratory fitness, muscle strength and fatigue of cancer patients. The training intensity should be individualised according to pretreatment fitness, monitored throughout the exercise programme and preferably include both aerobic and resistance exercises.²⁴

Thus far, studies on early rehabilitation in cancer patients that combine work- and physical health-related strategies are lacking. Thus, it is important to investigate an intervention involving these two strategies. However,

adding several care providers to a multidisciplinary care team implies an extensive change to usual care. Before studying the effectiveness of the intervention, a feasibility study should be performed that evaluates the execution of the intervention, patients' and care providers' opinions and the proportion of invited patients who participate. The goals of a feasibility study are to determine whether an intervention is appropriate for further testing or implementation and to identify changes necessary for optimising the intervention.²⁵

The objectives of this article are (1) to describe the protocol of an intervention aimed at RtW of cancer patients, comprising counselling by an oncological occupational physician (OOP) and supervised physical exercise in a clinical setting during treatment and (2) to present the design of the study aimed at evaluating the feasibility of this intervention.

METHODS AND ANALYSIS

Intervention protocol

The intervention was based on scientific literature and the opinions of care providers in the field of occupational health, oncology, sports medicine and physiotherapy. The methods and findings of the intervention development can be found in a supplementary file. Based on these findings, an intervention protocol was defined. The timing of each activity of the intervention is depicted in [figure 1](#).

Counselling by an OOP

The counselling sessions will be performed by an OOP. The OOP has expertise on the consequences of cancer and its treatment on work and experience in counselling cancer patients on RtW. The OOP is situated at the sports medicine outpatient department at the hospital. Directly after inclusion, a sports medical assessment, to be supervised by a sports medicine physician, will be scheduled and the assessment will be followed by a counselling session with the OOP. Depending on the patient's preference, the second counselling session will be 6 or 12 weeks after the first, and the last session will be 6 weeks later or at the end of treatment. The content to be covered in the counselling sessions is presented in [table 1](#). Most topics can be discussed in each session, and some topics will be discussed in the first session only. Additionally, four written materials will be provided: (1) a brochure on the consequences of cancer for work for the patient; (2) a comparable brochure for the employer; (3) a leaflet describing websites on cancer and work and (4) a leaflet, upon which the patient can write their attitude, self-efficacy and short- and long-term goals for RtW. Before the first counselling session, the OOP will retrieve the medical file and the results of the first sports medical assessment including peak oxygen consumption²⁶ and information on physical disabilities from the hospital administration. In the following months, the results of the second sports medical assessment and changes in a patient's medical situation can be

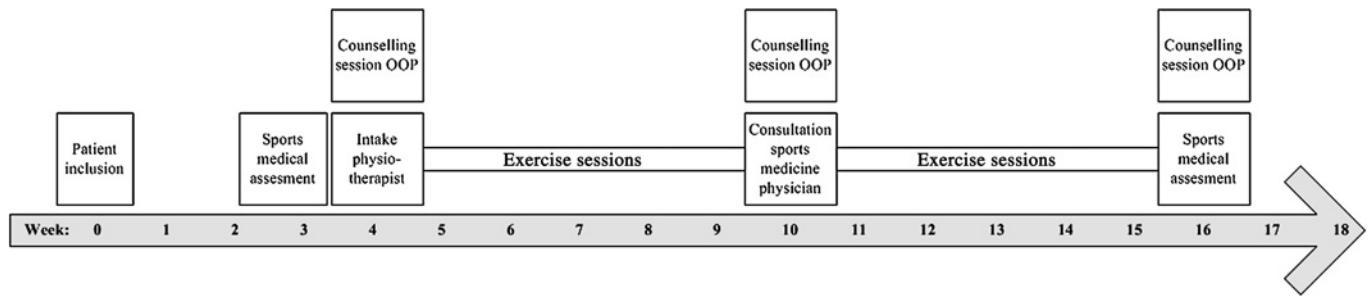


Figure 1 Timing of activities in the intervention.

retrieved. If necessary, the OOP can discuss with the oncologist, a possible referral of the patient to an additional care provider. At the end of each counselling session, the patient will receive a letter containing the notes from that session. The patient will be encouraged to hand over this letter to his company’s OP to facilitate continuation of occupational support at the workplace.

Supervised physical exercise

Each physical exercise session will start and end with 8 min of interval training. The patient will pedal at a rate of 70 rpm, starting with a 1-min warm-up. For 8 min, the intensity will alternate over 30 s intervals. The intensity of the interval training will be expressed as a percentage of the maximal workload (W_{max}). The W_{max} will be determined in the first session using an adapted version of the steep-ramp test²⁷ and again after 4 and 8 weeks. Throughout the 12-week physical exercise programme, the intensity of interval training will increase, starting at alternations of 30 s at 35% and 30 s at 65% of W_{max} in the first session to alternations of 30 s at 40% and 30 s at 70% of W_{max} in the last session. Seven different exercises will be conducted during resistance training: vertical

traction, leg press, bench or chest press, deltoid pulley, abdominal crunch, squats and step ups. The weights to be used will be expressed as a percentage of the 1-repetition maximum (1RM). The 1RM will be derived from 4 to 6 RM tests²⁸ performed at baseline and again after 4 and 8 weeks. Throughout the 12-week programme, the intensity of resistance exercises will increase from 65% to 75% of the 1RM, and the number of repetitions will decrease from 3×12 to 2×8. No 1RM value can be determined for the abdominal crunch, squats and step-up exercises. The amount of weight, and height if applicable, will be based on the patients’ ability to conduct the exercise while moving continuously at a semi-fast pace. In the case of pain or discomfort, the intensity of the interval and/or resistance exercises will be adjusted. In the case of fever or vomiting, training will be discouraged. To prevent cytostatic cross-contamination, preventive measures will be taken according to the hospital’s hygiene protocol. The Patient Specific Complaint list will be used to stimulate adherence to the exercise sessions. The patient will indicate one to three activities related to daily living, work or sports that he would like to improve upon.

Table 1 Counselling session numbers and topics to be discussed during counselling with the oncological occupational physician

Topic	Session number	Content
A	1	Discuss diagnosis, treatment and prognosis
B	1	Discuss job type, company and current work status
C	1	Explain Dutch laws on sickness absence and social security
D	1	Advise the patient to keep in touch with colleagues and employer
E	1, 2, 3	Discuss the patient’s overall physical and mental health
F	1, 2, 3	Discuss the patient’s opinions on his perceived physical and mental work ability and his perceived possibilities to and barriers for RtW
G	1, 2, 3	Discuss the patient’s attitude towards RtW and self-efficacy regarding RtW and means to improve these determinants. Assist in setting short- and long-term goals
H	1, 2, (3)	Check the results of the sports medical assessment to support estimation of the patient’s physical work ability
I	1, 2, 3	Using topics A, B, E, F, G and H estimate a patient’s physical and mental work ability and possibilities for and barriers to RtW
J	(1), 2, 3	Provide advice on gradual resumption of work and relevant necessary adjustments in working hours, tasks and responsibilities and recommend discussing this advice with the supervisor and the company’s OP
K	(1), 2, 3	If a return to the former job is impossible: advise the patient on reintegration to another job

OP, occupational physician; RtW, return to work.

He will score his ability to execute these activities and revise his scores after 4, 8 and 12 weeks. Six weeks after the first exercise session, the patient will complete a 20-min consultation with the sports medicine physician to discuss his progress and barriers to training. During the last session, the physiotherapist will encourage the patient to remain physically active. A sports medical assessment will be performed before and after the physical exercise programme.

Feasibility study

Study design

In this feasibility study, a maximum of 130 patients will be recruited over a 2-year period. The intervention will take place in two large medical centres in the east and the west of the Netherlands. Data will be collected and analysed using both quantitative and qualitative methods during and immediately after the intervention.

Study population and recruitment

The criteria for inclusion in the feasibility study are as follows: diagnosis of cancer, undergoing adjuvant chemotherapy with curative intent, aged 18–60 years, having paid employment, being absent from work or intending to report sick before the start of treatment. Exclusion criteria are as follows: having testicular cancer,¹¹ unable to speak, read or write the Dutch language, having severe mental disability or being physically unable to perform exercise training. For recruitment, shortly before the onset of chemotherapy, the oncologist will provide an information letter to the patient during their first meeting. One to three weeks later, the oncology nurse will ask the patient whether he wishes to participate. If the patient agrees to participate, he will sign the informed consent form.

Study outcomes and measurements

Three aspects of the intervention will be evaluated in this feasibility study. First, the number of intervention sessions, counselling topics and exercises that are executed will be registered. Second, the patients' and care providers' opinions on the intervention will be assessed. Third, the proportion of invited patients that participate in the study will be calculated. Data on sex, date of birth, diagnosis and type of chemotherapy will be obtained from the hospital's medical records.

Execution of intervention

The number of counselling sessions performed and the topics discussed will be obtained from the letters written by the OOP after each counselling session. Similarly, the number of exercise sessions and the exercises performed will be derived from the physiotherapists' registration forms used during the physical exercise programme. The reasons for not conducting certain sessions, counselling topics or exercises will be addressed in these letters and forms by the OOP and physiotherapist, respectively. By doing so, we may reveal where the patient is noncompliant to the protocol and where the care provider fails to adhere to the protocol.

Patients' opinions on the intervention

The patients' opinions, for example, on the content and timing of the intervention and its perceived usefulness, will be assessed using two questionnaires. One will be sent within 2 weeks of completion of the first counselling session with the OOP, and the other will be sent within 2 weeks of the final sports medical assessment. The contents of these questionnaires are outlined in [table 2](#).

Care providers' opinions on the intervention

The physiotherapists' opinions on the intervention will be assessed following completion of the intervention using 60 min focus group interviews in both participating centres separately. The interviews will cover the timing, frequency, duration, content and facilitators of and barriers to the intervention. Similarly, during a 45 min personal interview, the OOP's opinions on the same topics will be assessed. The OOP will also be asked to indicate the usefulness of the sports medical information. The personal and focus group interviews will be audio-taped and transcribed verbatim.

Proportion participating

The number of patients invited to take part in the study, obtained from the hospital medical files, will be used to calculate the proportion of invited patients who actually participate in the study. To enable the comparison of characteristics between participants and non-participants, sex, date of birth and diagnosis of all invited patients will also be retrieved from the hospital medical files.

Analyses

The means (and SDs) will be calculated for the number of counselling and exercise sessions executed; the number of topics discussed per counselling session; the number of exercises performed per exercise session and the number of written materials provided by the OOP. Additionally, the percentage of the participants who attended all three counselling sessions and all 24 exercise sessions will be calculated. To analyse patients' answers to the closed-ended questions in the questionnaires, frequencies will be calculated. In the qualitative analysis of open-ended questions, two raters will define codes independently, that is, keywords or short descriptors that describe the various topics identified. They will then discuss their findings until they reach agreement on a set of codes that covers all topics. The various codes will be presented along with the frequencies in which these codes were identified in the patients' answers. The qualitative analysis of the personal and focus group interviews with care providers will begin with open coding, that is, assigning keywords or short descriptors to all statements, followed with axial coding, that is, structuring codes and defining transcending codes and concluded with selective coding, that is, clustering axial codes into broader categories.²⁹ To analyse the proportion of participating patients, the number of participants will be divided by the number of patients who were invited to take part in the study. The qualitative analyses

Table 2 The content of two evaluation questionnaires aimed at determining the patient's opinion on the intervention

Outcome variable	Measurement
Questionnaire 1: after the first counselling and exercise session	
Opinion on the timing of the sports medical assessment, intake to the study and first counselling and exercise session	Too early–too late (3-point scale)
Opinion on the content of the first counselling and exercise session	Very pleasant–very unpleasant (4-point scale)
Questionnaire 2: upon completion of the intervention	
Opinion on the content of the counselling and exercise sessions	Very pleasant–very unpleasant (4-point scale)
Opinion on the duration of the intervention as a whole	Too short–too long (3-point scale)
Opinion on the overall competence of the OOP and physiotherapist	Report mark (10-point scale)
Perceived competence of the OOP with regard to various counselling strategies, for example, listening well, providing useful information, adequately answering questions	Highly disagree–highly agree (5-point scale)
Perceived usefulness of counselling components, for example, discussing possibilities for and barriers to RtW	Very useful–not useful (3-point scale)/not applicable
Most and least useful components of the counselling and exercise sessions	Open question
Perceived interference between medical treatment and counselling and/or exercise sessions	Yes/no
Main reasons for not attending or not finishing counselling and exercise sessions	Open question
Fulfilment of expectations regarding intervention as a whole	Yes–partly–no
Causes of unfulfilled expectations regarding intervention as a whole	Open question
Suggestions for improvements of the counselling and exercise sessions	Open question

RtW, return to work; OOP, oncological occupational physician.

of the personal and focus group interviews will be conducted using MAXQDA (V.2007, Marburg, Germany).

ETHICS AND DISSEMINATION

We aim to disseminate the results of this study by publication in peer-reviewed scientific journals and presentations at international conferences. The Medical Ethics Committee of the Academic Medical Center and the Medical Ethics Committees of the participating medical centres approved the study protocol. All patients will provide signed informed consent prior to inclusion in the study.

DISCUSSION

The goals of this article were to describe the protocol of a multidisciplinary intervention for cancer patients aimed at RtW and to present the design of a study used to investigate the feasibility of the intervention.

The intervention was based on scientific literature and the opinions of care providers in the field of occupational health, oncology, sports medicine and physiotherapy. With regard to the first aim, the intervention will consist of three counselling sessions with an OOP and a 12-week, twice-weekly, moderate-to-high intensity-supervised physical exercise programme, both of which are conducted in the clinical setting. With regard to the second aim, a feasibility study will be conducted involving a maximum of 130 cancer patients who are treated with curative intent, aged 18–60 years, employed

and on sick leave. To determine the feasibility of the intervention, three aspects will be evaluated: the extent to which the intervention is executed, the patients' and care providers' opinions on the intervention and the proportion of invited patients who participate in the study. Data will be collected and analysed using quantitative and qualitative methods.

In the majority of previous studies on RtW in cancer survivors, encouragement, education, counselling or advice alone had no significant effects.³⁰ In contrast, moderate-quality evidence existed for the effectiveness of education or counselling combined with physical exercise,¹⁹ although exercise in those studies was of lower intensity²⁰ than in our feasibility study, or home-based only.²¹ Recently, physical exercise of high intensity showed a statistically significant positive effect on the number of working hours,³¹ presumably by influencing fatigue and physical functioning. Thus, we expect that combining counselling with moderate-to-high intensity physical exercise will be an appropriate strategy for enhancing RtW.

Several strengths of the intervention can be mentioned. First, the timing of the intervention is advantageous. At an early stage, the advice of an OOP on dealing with work while on sick leave, on recruitment of social support from the workplace and making adjustments in working hours and tasks may increase the likelihood of a timely and enduring RtW.⁸ Additionally, an early start in physical exercise may contribute to maintenance of physical functioning and prevention of fatigue.³² Thereby, the capacity to perform activities of

daily living during treatment can be enhanced and a return to pre-illness conditions following treatment can be facilitated. Moreover, physical exercise may reduce disease symptoms,³³ anxiety and self-esteem³⁴ during treatment. Second, the setting of the intervention is favourable. Offering both treatment and rehabilitation efforts within the hospital is expected to be convenient for the patient and may enhance his or her compliance. Furthermore, the OOP can obtain (sports-) medical information easily from the hospital administration. The study design is also advantageous. In contrast to most other studies,³³ patients with a broad range of cancer diagnoses will be recruited, optimising the generalisability of the results. Furthermore, recruitment via oncologist may enhance the proportion of patients who participate because trust in one's medical doctor may be a cause for participating.³⁵ Both quantitative and qualitative methods will be applied in data collection and analysis to obtain a thorough picture of the feasibility of the intervention.²⁵ A limitation of the intervention is that only one OOP will be used for the occupational part of the intervention. Currently, this OOP is one of the few OOPs skilled in occupational rehabilitation of cancer patients in the Netherlands. In future interventions, involvement of more OOPs is recommended. We would also recommend continuation of physical exercise following treatment to further maintain and increase cardiorespiratory fitness.

In this article, we described the protocol of a multi-disciplinary intervention aimed at RtW, and we also presented the study design to investigate its feasibility. The results of the feasibility study may be used for optimisation of the intervention and may serve as a basis for implementation of the intervention.

Acknowledgements We are grateful to the Alpe d'Huzes Foundation/Dutch Cancer Society for funding the study. This study is part of the A-CaRe 2 Move program: <http://www.a-care.org/>. The authors thank the A-CaRe 2 Move Research Collaboration. Furthermore, Mr Th. C. de Winter, MD, MSc; Mr T. Brandon, MD, MSc; Mr G. Schep, MD, PhD; Mr T. Rejda, MD, MSc, and the physiotherapists and sports medicine physicians of the Medisch Centrum Haaglanden and Isala Klinieken are acknowledged for their contribution during the design of the intervention.

Contributors IFG wrote the manuscript. AGEMdB and MHWF-D were involved in critically revising the manuscript and providing intellectual input. All authors contributed to the development of the intervention and the study design. All authors read and approved the final manuscript.

Funding This work was supported by the Alpe d'Huzes Foundation/Dutch Cancer Society, grant number NKI 2010-4854.

Competing interests None.

Ethics approval Ethics approval was provided by Medical Ethics Committee Amsterdam Medical Center.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- World Health Organization: International Agency for Research on Cancer. *GLOBOCAN: Cancer Incidence and Mortality Worldwide in 2008*. 2010. <http://globocan.iarc.fr> (accessed 18 Oct 2011).
- Butler RJ, Johnson WG, Gubler T. Economic burden. In: Feuerstein M, ed. *Work and Cancer Survivors*. 1st edn. New York: Springer, 2009:25–72.
- Bieri S, Roosnek E, Helg C, et al. Quality of life and social integration after allogeneic hematopoietic SCT. *Bone Marrow Transplant* 2008;42:819–27.
- Ferrell B, Grant M, Schmidt GM, et al. The meaning of quality of life for bone marrow transplant survivors. Part 2. Improving quality of life for bone marrow transplant survivors. *Cancer Nurs* 1992;15:247–53.
- Roelen CA, Koopmans PC, Schellart AJ, et al. Resuming work after cancer: a prospective study of occupational register data. *J Occup Rehabil* 2011;21:431–40.
- de Boer AG, Verbeek JH, Spelten ER, et al. Work ability and return-to-work in cancer patients. *Br J Cancer* 2008;98:1342–7.
- Goetzel RZ, Long SR, Ozminkowski RJ, et al. Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting U.S. employers. *J Occup Environ Med* 2004;46:398–412.
- Taskila T, Lindbohm ML. Factors affecting cancer survivors' employment and work ability. *Acta Oncol* 2007;46:446–51.
- Verbeek J, Spelten E, Kammeijer M, et al. Return to work of cancer survivors: a prospective cohort study into the quality of rehabilitation by occupational physicians. *Occup Environ Med* 2003;60:352–7.
- Amir Z, Brocky J. Cancer survivorship and employment: epidemiology. *Occup Med (Lond)* 2009;59:373–7.
- Spelten ER, Sprangers MA, Verbeek JH. Factors reported to influence the return to work of cancer survivors: a literature review. *Psychooncology* 2002;11:124–31.
- Tamminga SJ, de Boer AG, Verbeek JH, et al. Breast cancer survivors' views of factors that influence the return-to-work process—a qualitative study. *Scand J Work Environ Health* 2012;38:144–54.
- Taskila T, Lindbohm ML, Martikainen R, et al. Cancer survivors' received and needed social support from their work place and the occupational health services. *Support Care Cancer* 2006;14:427–35.
- Tiedtke C, de Rijk A, Dierckx de Casterlé B, et al. Experiences and concerns about 'returning to work' for women breast cancer survivors: a literature review. *Psychooncology* 2010;19:677–83.
- Yarker J, Munir F, Bains M, et al. The role of communication and support in return to work following cancer-related absence. *Psychooncology* 2010;19:1078–85.
- Sesto ME, Simmonds MJ. Fatigue, pain and physical function. In: Feuerstein M, ed. *Work and Cancer Survivors*. 1st edn. New York: Springer, 2009:123–46.
- Weis J. Cancer-related fatigue: prevalence, assessment and treatment strategies. *Expert Rev Pharmacoecon Outcomes Res* 2011;11:441–6.
- Kaleta D, Makowiec-Dabrowska T, Jegier A. Leisure-time physical activity, cardiorespiratory fitness and work ability: a study in randomly selected residents of Lodz. *Int J Occup Med Environ Health* 2004;17:457–64.
- de Boer AG, Taskila T, Tamminga SJ, et al. Interventions to enhance return-to-work for cancer patients. *Cochrane Database Syst Rev* 2011;(2):CD007569.
- Berglund G, Bolund C, Gustafsson UL, et al. One-year follow-up of the 'Starting Again' group rehabilitation programme for cancer patients. *Eur J Cancer* 1994;30A:1744–51.
- Maguire P, Brooke M, Tait A, et al. The effect of counselling on physical disability and social recovery after mastectomy. *Clin Oncol* 1983;9:319–24.
- Burgio KL, Goode PS, Urban DA, et al. Preoperative biofeedback assisted behavioral training to decrease post-prostatectomy incontinence: a randomized, controlled study. *J Urol* 2006;175:196–201.
- McNeely ML, Campbell KL, Rowe BH, et al. Effects of exercise on breast cancer patients and survivors: a systematic review and meta-analysis. *CMAJ* 2006;175:34–41.
- Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Med Sci Sports Exerc* 2010;42:1409–26.
- Bowen DJ, Kreuter M, Spring B, et al. How we design feasibility studies. *Am J Prev Med* 2009;36:452–7.
- European Respiratory Society (ERS) Task Force on Standardization of Clinical Exercise Testing. Clinical exercise testing with reference to lung diseases: indications, standardization and interpretation strategies. *Eur Respir J* 1997;10:2662–89.
- De Backer IC, Schep G, Hoogeveen A, et al. Exercise testing and training in a cancer rehabilitation program: the advantage of the steep ramp test. *Arch Phys Med Rehabil* 2007;88:610–16.
- Dohoney P, Chromiak JA, Lemire D, et al. Prediction of one repetition maximum (1RM) strength from a 4-6 RM and a 7-10 RM submaximal strength test in healthy young adult males. *J Exerc Physiol* 2002;5:54–9.
- Boeije H. Methods and techniques in qualitative analysis. In: *Analysing in Qualitative Research*. 1st edn. Den Haag: Boom Onderwijs, 2005:84–117.

30. Tammaing SJ, de Boer AG, Verbeek JH, *et al.* Return-to-work interventions integrated into cancer care: a systematic review. *Occup Environ Med* 2010;67:639–48.
31. Thijs KM, de Boer AG, Vreugdenhil G, *et al.* Rehabilitation using high-intensity physical training and long-term return-to-work in cancer survivors. *J Occup Rehabil* 2012;22:220–9.
32. American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 8th edn. Philadelphia: Lippincott Williams & Wilkins, 2009.
33. Schmitz KH, Holtzman J, Courneya KS, *et al.* Controlled physical activity trials in cancer survivors: a systematic review and meta-analysis. *Cancer Epidemiol Biomarkers Prev* 2005;14:1588–95.
34. Speck RM, Courneya KS, Masse LC, *et al.* An update of controlled physical activity trials in cancer survivors: a systematic review and meta-analysis. *J Cancer Surviv* 2010;4:87–100.
35. Ellis PM. Attitudes towards and participation in randomised clinical trials in oncology: a review of the literature. *Ann Oncol* 2000;11:939–45.

A multidisciplinary intervention to facilitate return to work in cancer patients: intervention protocol and design of a feasibility study.

Iris F. Groeneveld, Angela G. de Boer, Monique H. Frings-Dresen

Supplementary file.

Development of the intervention

Methods

To develop the intervention, we 1) searched scientific literature, 2) conducted interviews, and 3) organised an expert meeting with relevant care providers. First, we used PubMed to search for publications on the effects and content of interventions aimed at RtW of cancer patients, and on the effects and content of interventions for cancer patients that consisted of physical exercise. In our search, we used the following text words: 'return to work', 'work resumption', 'occupational rehabilitation', 'vocational rehabilitation', 'counselling', 'cancer rehabilitation', 'physical exercise', 'exercise training', 'cancer patient', 'cancer survivor', 'intervention', 'program', 'trial', and 'effect*'. We also searched for qualitative studies on cancer patients' needs for and experiences with RtW by using the text words 'experiences', 'needs', 'views', 'opinions', 'interviews', and 'qualitative'. Second, we performed interviews and conducted an expert meeting to assess care providers' opinions on counselling and physical exercise for cancer patients. With regard to work-related counselling, we interviewed two Dutch occupational physicians because they were qualified as clinical occupational physicians and specialised in counselling of cancer patients following primary treatment. In the Netherlands, these two oncological occupational physicians (OOPs) were unique in their expertise. We also interviewed a social worker who was involved in in-hospital counselling on RtW of cancer patients during and after primary treatment as part of a randomised controlled trial.[1] We asked these three care providers for their opinions on the appropriate moment to initiate counselling and on the optimal frequency and content of counselling sessions. Moreover, we asked what medical information would be required to support counselling. For the physical exercise aspect of the intervention, we held an expert meeting with two sports medicine physicians and a physiotherapist. These three care providers were recruited because they were employed in one of the few hospitals in the Netherlands that offers in-hospital physical exercise for cancer patients. One sports medicine physician and the physiotherapist had been involved in a randomised controlled trial on physical exercise following cancer treatment.[2] The other sports medicine physician had been involved in a physical exercise program conducted during cancer treatment. Because of their experience, these three care providers were involved in the current feasibility study. Using open questions, we asked for their opinions on the initiation point, the frequency, and the content of physical exercise for cancer patients during treatment. To enable determination of baseline exercise work load in cancer patients, we also asked for

appropriate methods of exercise testing. Additionally, we interviewed an oncologist regarding the appropriate timing of physical exercise and possible interference of physical exercise with chemotherapy.

Results: Literature search

Three systematic reviews were obtained that detailed interventions aimed at RtW of cancer survivors.[3-5] The most recent systematic review showed moderate-quality evidence of positive effects of multidisciplinary interventions comprising education or counselling, and exercise on RtW.[3] In the studies showing positive effects, the counsellor provided information and discussed coping skills[6] or encouraged RtW.[7] In more recent studies on RtW in cancer patients, we found determinants of RtW that were addressed during counselling, e.g., self-reported ability to work,[8] positive attitude towards RtW, and social support.[9] From the qualitative research, we learned that cancer patients expressed a need for emotional and practical support from their supervisor and occupational physician,[10-13] such as the provision of disease-related information on RtW, adjustments in workplace and working hours, and development of a comprehensive plan for RtW.[12;13] Some patients indicated that RtW counselling should be incorporated into regular cancer care.[10] With regard to physical exercise, we found a recent guideline on physical exercise for cancer survivors from the American College of Sports Medicine (ACSM). The ACSM concluded that moderate-to-high-intensity physical exercise during and after treatment can be safe and can have positive effects on cardiorespiratory fitness, muscle strength, fatigue, and quality of life.[14] The training intensity should be individualised according to pre-treatment fitness and monitored throughout the exercise program.[14] In exercise prescriptions, comorbidities, response to treatment, and the persistent and immediate negative effects of treatment should be taken into account.[14] Training should preferably include both aerobic and resistance exercises. Interval training during treatment appeared safe[15] and had greater effects on cardiorespiratory fitness than endurance training.[16] Moderate-to-high-intensity resistance training appeared feasible and more effective than low-intensity resistance training.[17] To prevent loss of cardiorespiratory fitness, initiating exercise soon after diagnosis was recommended, which enabled the patient to remain physically active in daily life and ensured a higher motivation to start exercising.[17] Based on this literature, we concluded that multidisciplinary interventions can be effective in RtW. Counselling could include the provision of information and a discussion on work ability and social support. Physical exercise could consist of carefully monitored moderate-to-high intensity interval and resistance training.

Results: interviews and expert meeting

During the 3 interviews with the OOPs and social worker, we learned that some cancer patients return to work during treatment, whereas others do not return until the end of treatment. The OOPs and social worker suggested that to enhance timely RtW, counselling should start at the onset of therapy.

Because patients differ in their pace and requirements for RtW, up to three tailored counselling sessions should be offered throughout treatment. These care providers suggested that counselling sessions include provision of information on regulations regarding sick leave and the consequences of cancer for work. Furthermore, the physical and mental capacity to work, the support from colleagues and supervisor, and possibilities for and barriers to work should be discussed. Finally, advice should be provided on a gradual resumption of work, if applicable, and the relevant necessary adjustments in hours, tasks, and responsibilities. The OOPs stated that they required information on the patient's diagnosis and treatment. Furthermore, an opportunity to view the results of a sports medical assessment of the patient would be appreciated. Specifically, they suggested that cardiorespiratory fitness could be used as an indicator of capacity to work, as previously described by Kaleta et al.[18] Moreover, they noted that information on physical disabilities, as determined by the sports medical assessment, could aid in the estimation of a patient's ability to perform certain work-related tasks. Finally, the three occupational care providers concluded that the OOP's advice could serve as a basis for the RtW plan, which should be composed by the patient, the supervisor at work, and the company's OP. With regard to physical exercise, the oncologist, sports medicine physicians, and physiotherapist agreed on initiating physical exercise early during treatment, preferably prior to the first chemotherapy cycle. The oncologist did not expect interference between chemotherapy and physical exercise. The sports medicine physicians and the physiotherapist agreed that physical exercise should be provided twice a week for at least 12 weeks, to achieve an effect from the training. The sports medicine physicians and the physiotherapist suggested moderate-to-high intensity interval and resistance training, in groups of four to six patients. The intensity of exercises could be adjusted every four weeks. They recommended an interval training consisting of two blocks of eight minutes and a resistance training involving seven exercises covering all large-muscle groups. Thus, we concluded that the OOP could offer up to three counselling sessions throughout treatment, comprising several topics including capacity to work, barriers to, and possibilities for work. Sports medical information may be used to support advice on RtW. Additionally, a 12-week twice-weekly group-based moderate-to-high intensity exercise training can be offered, to initiate at the onset of chemotherapy, which can be adjusted at four-week intervals.

Reference List

- 1 Tamminga SJ, de Boer AG, Verbeek JH, et al. Enhancing return-to-work in cancer patients, development of an intervention and design of a randomised controlled trial. *BMC Cancer* 2010;10:345.
- 2 De Backer IC, Vreugdenhil G, Nijziel MR, et al. Long-term follow-up after cancer rehabilitation using high-intensity resistance training: persistent improvement of physical performance and quality of life. *Br J Cancer* 2008 Jul 8;99(1):30-6.
- 3 de Boer AG, Taskila T, Tamminga SJ, et al. Interventions to enhance return-to-work for cancer patients. *Cochrane Database Syst Rev* 2011;2:CD007569.

- 4 Hoving JL, Broekhuizen ML, Frings-Dresen MH. Return to work of breast cancer survivors: a systematic review of intervention studies. *BMC Cancer* 2009;9:117.
- 5 Tamminga SJ, de Boer AG, Verbeek JH, et al. Return-to-work interventions integrated into cancer care: a systematic review. *Occup Environ Med* 2010 Sep;67(9):639-48.
- 6 Berglund G, Bolund C, Gustafsson UL, et al. One-year follow-up of the 'Starting Again' group rehabilitation programme for cancer patients. *Eur J Cancer* 1994;30A(12):1744-51.
- 7 Maguire P, Brooke M, Tait A, et al. The effect of counselling on physical disability and social recovery after mastectomy. *Clin Oncol* 1983 Dec;9(4):319-24.
- 8 de Boer AG, Verbeek JH, Spelten ER, et al. Work ability and return-to-work in cancer patients. *Br J Cancer* 2008 Apr 22;98(8):1342-7.
- 9 Spelten ER, Sprangers MA, Verbeek JH. Factors reported to influence the return to work of cancer survivors: a literature review. *Psychooncology* 2002 Mar;11(2):124-31.
- 10 Tamminga SJ, de Boer AG, Verbeek JH, et al. Breast cancer survivors' views of factors that influence the return-to-work process - a qualitative study. *Scand J Work Environ Health* 2012;38(2):144-54.
- 11 Taskila T, Lindbohm ML, Martikainen R, et al. Cancer survivors' received and needed social support from their work place and the occupational health services. *Support Care Cancer* 2006 May;14(5):427-35.
- 12 Tiedtke C, de Rijk A, Dierckx de Casterlé B, et al. Experiences and concerns about 'returning to work' for women breast cancer survivors: a literature review. *Psychooncology* 2010 Jul;19(7):677-83.
- 13 Yarker J, Munir F, Bains M, et al. The role of communication and support in return to work following cancer-related absence. *Psychooncology* 2010 Oct;19(10):1078-85.
- 14 Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Med Sci Sports Exerc* 2010 Jul;42(7):1409-26.
- 15 Adamsen L, Quist M, Andersen C, et al. Effect of a multimodal high intensity exercise intervention in cancer patients undergoing chemotherapy: randomised controlled trial. *BMJ* 2009;339:b3410.
- 16 Helgerud J, Hoydal K, Wang E, et al. Aerobic high-intensity intervals improve VO2max more than moderate training. *Med Sci Sports Exerc* 2007 Apr;39(4):665-71.
- 17 De Backer IC, Schep G, Backx FJ, et al. Resistance training in cancer survivors: a systematic review. *Int J Sports Med* 2009 Oct;30(10):703-12.
- 18 Kaleta D, Makowiec-Dabrowska T, Jegier A. Leisure-time physical activity, cardiorespiratory fitness and work ability: a study in randomly selected residents of Lodz. *Int J Occup Med Environ Health* 2004;17(4):457-64.