

HEALTH BEHAVIOUR INTERVENTIONS FOR CANCER SURVIVORS: AN OVERVIEW OF THE EVIDENCE AND CONTEMPORARY AUSTRALIAN TRIALS

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Abstract

Cancer survivors experience significant ongoing health problems, primarily as a result of cancer treatment, pre-morbid health status and lifestyle. While significant public health resources have been directed at cancer prevention via reducing health risk behaviours such as smoking, physical inactivity and excessive alcohol consumption, considerably less attention has been directed at promoting health enhancing behaviours in cancer survivors. Emerging research suggests that such a focus can significantly improve health outcomes for cancer survivors. This article reviews the evidence in more detail and highlights contemporary Australian research in the field.

Advances in the early detection and treatment of cancer, coupled with the ageing population, have resulted in a dramatic increase in the number of cancer survivors,¹ and the numbers are expected to grow considerably.²⁻⁵ Current estimates indicate that there are over 380,000 cancer survivors in Australia,⁶ and while the rise in cancer survivors reflects improved survival, the long-term health effects of cancer and its treatment represent a major public health concern.

Compared to the general population, cancer survivors are at a greater risk of developing secondary cancers and other chronic diseases or conditions, such as heart disease, diabetes and functional decline.⁷⁻⁹ There are a number of possible reasons for this increased risk, including genetic predisposition, cancer treatment related sequelae and importantly, lifestyle behaviours.¹⁰ Unhealthy lifestyle behaviours such as smoking, physical inactivity, poor diet, and related obesity/overweight, are associated with an increased risk of cancer, cardiovascular disease and other chronic diseases.¹⁰⁻¹³ Conversely, recent cohort data suggest that post-diagnosis physical activity may reduce the risk of cancer recurrence and potentially extend survival for survivors of colorectal and breast cancer.^{8,9,14,15} In addition, research indicates that a low-fat diet combined with moderate weight loss, may reduce cancer recurrence in postmenopausal breast cancer survivors.¹⁶ Interventions that target smoking cessation indicate that cancer survivors will experience improvements in a variety of health outcomes.¹⁷

Recent national health surveys in the US indicate that a large proportion of cancer survivors do not adhere to national physical activity and dietary guidelines.^{1,18} Data reveals few lifestyle differences between individuals diagnosed with cancer and healthy populations, or non-cancer controls.^{1,18} In recent Australian studies, cancer

survivors and controls who did not have a cancer history had similar rates of smoking, physical inactivity and obesity.^{19,20} Cancer survivors were more likely to report a range of co-morbid chronic medical conditions.^{19,20}

There is a growing number of studies evaluating smoking cessation, exercise and dietary interventions in cancer survivors.^{21,22} Many of the studies have yielded promising results, with exercise interventions showing improvements across psycho-social, quality of life and biological measures.^{21,23-27} These interventions are outlined below in more detail and we highlight current Australian research in the field.

Smoking cessation interventions

Smoking has a causal relationship with a number of cancers.²⁸ Continued smoking after a cancer diagnosis is associated with increased risk of second primary tumours, recurrence, other co-morbidities and death.²⁹ High spontaneous quit rates of up to 50% are reported following a cancer diagnosis.³⁰ Yet about one third of smokers continue to smoke after a cancer diagnosis.¹⁷ However, smoking cessation interventions for those with cancer have reported abstinence rates of up to 70% at one year post treatment.³¹ Combined interventions that utilise both behavioural counselling and pharmacotherapy appear to be most effective, however, this type of intervention is not routinely offered in the majority of cancer treatment centres.²⁴

Physical activity interventions

Recent research has provided important data on the relationship between exercise and cancer survival. Three longitudinal cohort studies examining patients with colorectal cancer or women with breast cancer, reported that increased post-diagnosis physical activity

is associated with a significantly lower risk of overall mortality and, in breast cancer, with significantly lower risk of breast cancer death.^{8,9,14,15} Among women with breast cancer, activity levels (consistent with current physical activity guidelines -150 minutes/week of moderate-level activity) were associated with significantly lower risk of death compared to low activity (RR/HR from 0.58 to 0.71)^{8,14} and no activity (RR/HR=0.36).¹⁵ Changes in activity from pre to post-diagnosis have also been shown to influence survival. Among women with breast cancer, and compared to those who were inactive before and after diagnosis, those who increased their activity by about 60 minutes/week or more of moderate-level activity, halved their risk of breast-cancer death, as well as all-cause mortality, compared with those who had no change. Conversely, women whose activity decreased by 60 minutes or more per week of moderate-level physical activity increased their risk of death four-fold.¹⁵

More than 70 intervention trials of physical activity for cancer survivors have been published, the majority focusing on breast cancer and colorectal cancer survivors.³²⁻³⁶ Emerging evidence in other cancer groups suggests that physical activity interventions have similar benefits for men with prostate cancer.³⁷ However, further research is required across other cancer types.^{23,30} Overall, these studies suggest that physical activity interventions implemented during or following treatment may improve: cardio-respiratory fitness; body composition (ie. muscle mass and bone health); immune function; strength and flexibility; body image; self-esteem and mood; chemotherapy completion rates; and allow for better adjustment to illness. Physical activity during and after completion of treatment has also been associated with improved quality of life and reduced fatigue.^{36,38-41}

The now very large literature base on physical activity interventions in cancer survivors strongly supports the efficacy and safety of interventions commenced both during and following cancer treatment.^{23,35,42-45} The general exercise recommendation for people undertaking or having completed cancer treatment is low to moderate intensity, regular frequency (3–5 times/week) for at least 20 minutes per session involving aerobic, resistance or mixed exercise types,⁴² which is largely consistent with recommendations for the general adult population.^{12,34} Future work needs to more thoroughly assess what constitutes optimal exercise prescriptions including mode of delivery, cost effectiveness, frequency, duration, intensity and type, and how individual characteristics (eg. age, cancer type, treatment, presence of specific symptoms) affect this prescription.⁴²

Dietary and weight loss interventions

The evidence regarding the importance of weight loss and dietary interventions in cancer survival is less clear.^{16,46,47} Findings from the *Women's Intervention Nutrition* study, suggest that reduced dietary fat intake and corresponding weight loss conferred a modest improvement on relapse-free survival in the intervention group, compared to the control group: HR of relapse events in the intervention group compared with the control group was 0.76 (95% CI = 0.60 to 0.98, P = .077 for stratified log rank and

P = .034 for adjusted Cox model analysis).¹⁶ Conversely, the *Women's Healthy Eating and Living* study found that dietary changes did not alter the incidence of breast cancer recurrence/new primary or death from other causes in breast cancer survivors. About 17% of women in each group experienced a new primary or recurrence and there was no difference in mortality between the two groups.⁴⁷

Evidence suggests that dietary interventions may improve quality of life, although findings are limited.⁴⁸ Only four studies have evaluated weight loss interventions in women with breast cancer, with all reporting significant weight loss.⁴⁹⁻⁵² Based on the epidemiological evidence, it is suggested that weight management be an integral part of breast cancer care.^{12,46,53}

Contemporary Australian trials

Exercise for Health* is a nearly completed National Breast Cancer Foundation funded randomised control trial, addressing how exercise interventions can be delivered in 'real world' contexts, with the greatest possible population reach, and in a manner that assists women to become appropriately active during breast cancer treatment and into longer term survivorship. The eight month, moderate intensity exercise intervention (aerobic and resistance based), has been delivered by exercise physiologists, either face-to-face or over the telephone, commencing at six weeks post-surgery. Two modes of delivery are being tested to evaluate the most effective (and cost-effective) modes of delivery, an issue with important implications for translating evidence into practice. The study has two settings. In the first, women who reside in the greater Brisbane area are randomised into one of two exercise intervention groups or a control 'usual care' group. In the second setting, women from regional/rural areas are randomised into telephone intervention or usual care. Baseline characteristics are assessed pre-randomisation and short and longer term compliance, as well as potential benefits assessed mid-way through the intervention (six months post-surgery) and three months following completion of the intervention. Primary outcomes are feasibility of delivery, quality of life, upper body function and physical activity.

Previous research has suggested that interventions to improve quality of life after colorectal cancer (CRC) may be most effective if they target symptom management, psychosocial and lifestyle variables, or health behaviours, in a comprehensive and integrated approach.⁵⁴ However, there have been few trials of behavioural interventions to address the specific needs of CRC survivors. As such, for the first time we are conducting a large-scale randomised control trial of a comprehensive telephone delivered intervention to improve lifestyle factors and health outcomes for CRC survivors, 'CanChange'.⁵⁵ CanChange[†] is being conducted at the Cancer Council Queensland and is funded by Cancer Australia (2008-2010). The trial is in collaboration with: The University of Queensland;

* Exercise for Health is being conducted by researchers from the Institute for Health and Biomedical Innovation (IHBI) at the Queensland University of Technology, in collaboration with the Cancer Prevention Research Centre, School of Population Health, at the University of Queensland. For more information, contact Dr Sandra Hayes at IHBI.

Queensland Institute of Medical Research; University of Alberta, Canada; and Cancer Council Victoria. Three hundred and fifty people recently diagnosed with CRC are currently being recruited through the Queensland Cancer Registry and randomised to the intervention or 'usual care' control condition. The intervention assists participants to make improvements in lifestyle factors (physical activity, healthy diet, weight management and smoking cessation) and health outcomes. Intervention participants receive up to 11 telephone sessions over six months from a qualified health professional with a focus on symptom management, psychosocial and lifestyle support. Data collection occurs at baseline, post-intervention or six months follow-up, and at 12 months follow-up for longer term effects. Primary outcome measures include physical activity, cancer related fatigue and quality of life. A cost-effective analysis of the intervention is also being conducted from the perspective of health care costs to the government.

Pilot testing demonstrated that 80% of participants (n = 20) said the intervention addressed their issues, 100% said it made them more motivated to make positive life changes, and 100% said they would recommend the intervention to other CRC survivors. From baseline to post-intervention we observed improvements in all CRC specific symptoms and quality of life; a significant decrease in processed meat intake, as well as improvements in sedentary behaviour and the proportion of participants meeting the national guidelines for fruit and vegetable intake.⁵⁶

Two new physical activity studies are about to commence. The first is CHALLENGE[†] – a three year physical activity intervention for colon cancer survivors who are two to six months post adjuvant treatment. A multicentre Phase III RCT study, it is being run as a collaboration between the National Cancer Institute – Canada and the Survivorship Research Group at Sydney University. The aim is to determine the efficacy of physical activity in reducing disease recurrence in patients with localised colon cancer. The primary hypothesis is that a physical activity program will improve three year disease free survival in patients with resected colon cancer. Additional hypotheses are that exercise can improve fatigue, quality of life, physical functioning and body composition. The association of cytokines and insulin axis levels with physical activity fatigue and disease free survival will be sought, as well as a health economic evaluation of the physical activity intervention.

The second RCT, Physical Activity – Lung, will determine the efficacy of physical activity in reducing fatigue and improving quality of life in patients with non-resectable thoracic cancer. This patient population has co-morbidities such as chronic obstructive pulmonary disease (COPD). Although there is a paucity of physical activity research in patients with advanced lung cancer, pulmonary rehabilitation programs in COPD populations have shown evidence of benefit from physical activity. The primary hypothesis is that a physical activity program will improve fatigue, with secondary hypotheses that exercise can

improve quality of life, anxiety and depression, physical functioning, body composition and disease progression. An integral part of the intervention in both trials is a behaviour change component. Both studies will evaluate underlying biological mechanisms by which physical activity may be useful for cancer survivors.

Theory driven interventions have shown success in physical activity behaviour change research, but are not always incorporated into routine clinical care.⁵⁷⁻⁶⁰ Social cognitive factors (such as attitudes) have been shown to play a significant role in behavioural choices about physical activity, thus theoretically driven studies are important, in order to ascertain how best to promote positive attitudes towards healthy behaviour and long-term behaviour change.⁶¹ The aim of this randomised pilot study is to determine the role of social cognitive factors in the uptake of physical activity post-treatment. Approximately 120 breast cancer survivors will be recruited at Peter MacCallum Cancer Centre. Participants are women who have completed primary treatment for stage I-IIIa breast cancer within the preceding 12-18 months. Participants are randomised to one of two intervention groups or a control group. The intervention groups are provided with a theory-based booklet containing information and recommendations concerning physical activity in breast cancer survivors, plus/minus a goal setting intervention. Data collection and intervention occurs at baseline, at three months post-intervention and at 12 months follow-up. The primary hypothesis is that social cognitive factors, including goal setting, will be associated with an increase in self reported minutes of moderate to strenuous activity per week. Primary outcome measures include physical activity, cancer related fatigue and quality of life.⁵

Conclusion

Lifestyle modification is an increasingly important component of cancer survivorship to ameliorate the effects of treatment, minimise the risk of associated co-morbidities and promote longer term health. Translational research that systematically implements and evaluates evidence-based interventions targeting health enhancing behaviours is an important challenge for researchers and clinicians. As one expert in the field points out: "...the longer people survive after a cancer diagnosis, the more likely it is that what they do after their diagnosis might matter."⁶²

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† For more information on CanChange contact A/Prof Anna Hawkes AnnaHawkes@cancerqld.org.au.

‡ The Australian CHALLENGE (Colon Health and Life Long Exercise ChaNGE) arm and newly funded lung cancer trial. For more information contact Janette Vardy at Sydney Cancer Centre, University of Sydney.

§ The Breast Cancer Survivors Healthy Living Study is being conducted by researchers at the Peter MacCallum Cancer Centre (PMCC) and the University of Melbourne. This study is supported by a scholarship from the Victorian Cancer Agency. For more information, contact Annabel Pollard at PMCC.

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