Healthy lifestyle interventions in general practice Part 5: Lifestyle and cancer

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Keywords: Cancer, carcinogens, lifestyle

SA Fam Pract 2009;51(2):91-95

Introduction

This article forms the fifth part of the series on the role of lifestyle modification in general practice with specific reference to cancer. It is recognised that cancer is not a single disease entity but rather a collection of diseases with the common feature of excessive uncontrolled cellular proliferation with the potential of cellular spread to distant anatomical sites. Whilst an in-depth discussion of the various types of cancer and the interaction with various lifestyle related factors is beyond the scope of this article, the concept of cancer in general will be discussed and where relevant, comment will be addressed to individual forms of cancer. The major risk factors which constitute an unhealthy lifestyle have been discussed in Part 1 of this series, thus the focus of Part 5 will be to give specific practical guidelines which the general practitioner may incorporate into their practice when counselling patients with cancer.

The causes of death due to the various forms of cancer for both males and females in South Africa are shown in Table I. Lung cancer is the leading cause of cancer death in South Africa accounting for 17% of all cancer deaths. This is followed by oesophageal cancer (13%), cervical cancer (8%), breast cancer (8%) and liver cancer (6%). Males tend to suffer more from lung and oesophageal cancer whilst cervical cancer and breast cancer predominate in females.[1]

The burden of disease estimate studies for South Africa revealed that 17% of colon cancer, and 13% of postmenopausal breast cancer were attributable to a BMI > or = 21 kg/m^2. Furthermore 27% of colon cancer and 17% of breast cancer were attributable to physical inactivity. Smoking caused between 41,632 and 46,656 deaths in South Africa, accounting for 8.0–9.0% of deaths, the majority of these being cancer and cardiovascular disease related. Thus, lifestyle related factors and the management thereof are indeed important in the South African setting.[2-4]

Physical inactivity

Physical activity and cancer prevention

The most convincing evidence for the benefits of physical activity on cancer prevention exists for colon and breast cancer.[5] Moderate to vigorous aerobic activity, for 30 to 60 minutes a day, reduces the risk of colon cancer by about 30%.[6] There appears to be a dose-response relationship with increasing activity associated with reducing risk. The mechanisms responsible for the association of physical activity and colon cancer have not all been elucidated, but it has been suggested that physical activity may reduce body fat and increase insulin sensitivity.[7] Other possible mechanisms may relate to improved immune function and decrease gut transit time which reduces exposure to carcinogens.

More than two dozen cohort studies and even a greater number of population-based studies have found that physically active women have a lower risk of developing breast cancer compared to sedentary

Table I: Percentage of cancer deaths by cause, South Africa 2000[1]

Rank All	Cancer	%	Rank Males	Cancer	%	Rank Females	Cancer	%
1	Lung	16.5	1	Lung	21.9	1	Cervix	17.2
2	Oesophagus	13.4	2	Oesophagus	16.7	2	Breast	15.6
3	Cervix	8.4	3	Prostate	11.8	3	Lung	10.9
4	Breast	7.7	4	Liver	7.8	4	Oesophagus	9.9
5	Liver	6.4	5	Stomach	6.5	5	Colorectal	6.9
6	Colorectal	6.2	6	Colorectal	5.4	6	Liver	4.9
7	Prostate	6.1	7	Mouth and oropharynx	4.6	7	Stomach	4.7
8	Stomach	5.6	8	Leukaemia	3.8	8	Pancreas	3.7
9	Pancreas	3.7	9	Pancreas	3.7	9	Ovary	3.5
10	Leukaemia	3.5	10	Larynx	3.0	10	Leukaemia	3.2

Adapted from Bradshaw et al, Initial Burden of Disease Estimates for South Africa, 2000.[1]

women. Overall there is compelling evidence that moderate and high levels of physical activity are associated with a 20% to 40% reduction in the risk of breast cancer.[5] The effects appear to be more evident in postmenopausal compared to premenopausal women. There are a number of mechanisms whereby physical activity may protect against breast cancer.[7] These include the reduction in oestrogen and androgen concentrations, strengthening of immune function and reduction in body fat. Furthermore, there is accumulating evidence that physically active individuals have a reduced risk of lung, endometrial, prostate and ovarian cancers compared to sedentary individuals.[5-8]

Thus, as in the case of most of the non-communicable chronic diseases described in this series, the accepted recommendation is that all adults do moderately intense cardiorespiratory exercise for 30 minutes a day, five days a week or vigorously intense cardiorespiratory exercise for 20 minutes a day, three days a week. In addition all adults should do eight to 10 strength-training exercises, eight to 12 repetitions of each exercise twice a week.[9]

The role of physical exercise during and after cancer treatment

Until quite recently it was thought that when a patient was diagnosed with cancer, they should undertake rest and avoid physical activity, specifically if the patient was to undertake interventions including surgery, chemotherapy or radiation therapy. However an increasing number of studies have investigated the effects of exercise training during primary cancer treatment and after cancer treatments have been completed.[10-14] Whilst most studies have documented effects of physical exercise in patients with breast cancer and colon cancer, only a few smaller studies have investigated the effects of physical exercise on patients with other cancers.[15] The literature consistently indicates that exercise training during cancer treatment is safe, and has positive effects on cardiorespiratory fitness, quality of life, maintenance of skeletal muscle mass and reduces side effects of cancer treatment.[16,17]

Furthermore cancer survivors are at increased risk for co-morbid conditions including cardiovascular disease, diabetes, osteoporosis, obesity, and hypertension which may be due to genetic predisposition, lifestyle or cancer treatment considerations. However, there are clear benefits for continuation of exercise following treatment, particularly with respect to recurrence, cancer specific mortality and all cause mortality in cancer survivors.

The physiological benefits of exercise training during and after treatment include:

- Improved joint range of motion, increase in muscle strength and endurance capacity.
- Improved quality of life, self esteem, improved fitness, mood and functional capacity with respect to activities of daily living[17,18]
- Modest reduction of fatigue, enhanced body image and sense of control.[19,20]
- Reduced body fat, increased skeletal muscle strength and improved body composition.[10]
- Increased chemotherapy completion rates.[21,22]
- Reduced nausea and other treatment related side effects.[23]
- Favorable changes in concentrations of androgens, oestrogens, growth factors (IGF-I and IGFBP-3), adipokines (leptin and adiponectin) and markers of inflammation (u-CRP).[12,24]
- Participation in 3 hours/week of moderate intensity exercise after diagnosis of colon cancer is associated with a significant (39–59%) reduction in the risk of colon cancer death and reduction (50–63%) in risk of total death compared with patients with colon cancer who do not exercise.[25,26]
- Patients with breast cancer randomised to four months of twice weekly resistance training and 90 minutes per week of home based aerobic training, reduced blood insulin concentrations by 28% compared to 3% in the control group who did not exercise.[27]

Yet, it is estimated that only 37% of colorectal cancer survivors and 28% of breast cancer survivors participate in regular physical exercise during their treatment. In addition, only 32% of breast cancer survivors participate in adequate physical activity after treatment is completed.[10,21,28,29] This finding might be due to the fact that there has been a lack of prioritisation of lifestyle related factors in patient management in the health care system. Indeed, family practitioners and oncologists might not have been aware of the benefits of physical exercise in this patient group. Furthermore, the non-availability of medical aid cover for supervised exercise rehabilitation or lifestyle counselling, lack of adequate facilities or the confusion of patients on whether physical activity might improve their clinical outcome might be contributing factors.

Practical considerations in prescribing exercise for the secondary prevention of chronic cardiovascular disease

Some patients with cancer might prefer to exercise alone or some might enjoy a group setting. It is however important that each patient is individually assessed prior to exercise by a professional expert in exercise rehabilitation. As each patient is influenced by the nature of the particular cancer or tumor, stage of disease, and effects of the various forms of treatments, exercise prescription requires extensive individualisation. Strategies to overcome barriers to increased physical inactivity and promote compliance with healthy eating and exercise interventions have been well reviewed.[15,16,23,30]

The effects of the various treatment options for patients with cancer need to be carefully considered (Table II). Many of the therapies may reduce the patient's capacity for physical activity due to adverse effects on the cardiopulmonary, neurological or musculoskeletal system. Thus, a cardiovascular assessment for patients embarking on an exercise programme is important.

Each patient should be assessed briefly prior to each exercise bout as an acute change in condition might constitute a contraindication to exercise. Furthermore, patients are often in a debilitated state and be limited by pain or general deconditioning. Exercise should therefore start at a very low intensity and duration and progression of the programme should be very gradual, with constant reassessment.

Further clinical considerations for the exercising patient include:[15]

- Patients with indwelling catheters and access lines should avoid water or microbial exposure, and avoid resistance training in the area of the catheter.
- If the patient's platelet count falls below < 50000/mm^3, a danger of bleeding needs to be considered and exercise modified accordingly.
- Severe anaemia (Hb < 10 g/dl) should alert the clinician to delay exercise, lower exercise intensity or consider an increased chance of cardiovascular complications during exercise.
- Patients with peripheral neuropathy might have deficient balance and/or weakness. These patients might have greater benefit from stationary cycling compared to other forms of aerobic exercise
- Patients who are immune-compromised should avoid public gyms until white cell counts return to normal.
- Patients undergoing radiation therapy should avoid chlorine exposure to the irradiated skin.

Table II: Cancer interventions and common side-effects which could affect exercise testing, prescription and training

Surgical interventions	Post surgical pain
	Decreased joint range of motion
	Motor nerve damage
	Sensory nerve damage
	Disability through amputation
	Fatigue
Radiation therapy	Deceased range of motion in irradiated joints
	Cardiac scarring/cardiomyopathy
	Lung scarring/fibrosis/inflammation
	Increased fracture risk
	Radiation dermatitis
Chemotherapy	
Bleomycin	Pulmonary fibrosis
Daunorubicin	Cardiomyopathy
Doxorubicin	Cardiomyopathy
Mitoxantrone	Cardiomyopathy
Vinca alkaloids	Peripheral neuropathy
Above and others	Anaemia
	Thrombocytopaenia
	Fatigue
	Nausea
Growth factors	Bone pain
Immunotherapy	Weight loss
	Weight gain
	Neuropathy
	Fatigue
	Flu like syndrome
	Myopathy

Psychosocial interventions

Cancer is a severe and potentially life-threatening disease which, perhaps more than any other medical condition, affects psychological well-being, daily functioning and efficacy, issues of mortality, managing side-effects of medication, dealing with pain and associated psychiatric morbidity such as anxiety and depression. The oft-observed clinical encounter in primary care in which patients with minor ailments, when pushed, acknowledge that deep down they fear they have cancer, lends credence to the significant subjective dimensions that this disease elicits both individually and culturally.

The role of psychosocial interventions in the management of cancer has been, and continues to be, extensively researched, with the most pressing question (certainly from the perspective of the patient) being whether these interventions significantly improve survival. In 1989 Spiegel and colleagues at Stanford University, described the effect of a one-year psychosocial intervention – including group support, emotional expression and relaxation – on the survival rates of women with recurrent breast cancer.[31] At 10-year follow-up the survival from time of randomisation and onset of intervention was double in the treatment group versus controls (36 months versus 19 months), a significant difference. This study galvanised interest in what is now referred to as psycho-oncology, assessing the value of these forms of interventions not simply for their effect on improved psychological well-being, but on prognosis as well.

Meta-analyses over the last 20 years on the effects of psychosocial interventions on cancer survival are inconclusive. A number of factors potentially contribute to these results: heterogeneous patient populations, differing stages of disease at time of intervention, small study populations and diverse clinical interventions with different therapeutic emphases.[32] How are primary care clinicians (and indeed oncologists) to interpret and utilise these data for the benefit of patients?

Three broad principals are worth consideration:

- Psychological self-regulation and contained emotional expression may enhance longevity in certain patients. Group interventions are most cost-effective and would include health education, stress management, coping techniques and psychosocial group support. All of these interventions may be explored in individual therapy as well.[33-35]
- Psychological self-regulation and emotional expressivity are more likely to enhance well-being irrespective of effect on survival rates.
- Management of associated co-morbidities, especially anxiety and depression, may enhance well-being and quality of life.

These broad principals, alongside clinical common sense and empathic attunement to the subjective experience of the patient, dealing with each patient on their own terms, will at the very least, reduce suffering and anguish in what is invariably a psychologically challenging and life-altering experience and offers the hope of extending survival in certain patients, albeit unpredictably.

Dietary intervention

Once a patient has been diagnosed with cancer, eating well becomes increasingly important during the management process. Selecting the correct foods not only assists the body in potentially fighting the disease, but could also ease the side effects of medical treatment regimens. And once cancer has been successfully treated, a well-selected diet could lower the risk of recurrence.[6]

Early dietary intervention is essential as cancer and nutrition interact in two ways:

- Nutrition can affect cancer at every stage, changing tumor growth and assisting immunity. In this sense, it is important to consume those foods with maximum immune-enhancing potential.
- Cancer can affect a patient's nutritional status. The mere stress of being diagnosed with the disease can disrupt healthy eating habits. Furthermore, both the cancer and its various therapies could deplete the body of vital nutrients, subsequently leading to weight loss or weight gain, each of which could impair the body's immune system.

General dietary considerations

The general dietary guidelines that are advocated to a patient diagnosed with cancer are:

• Adequate protein intake

During times of stress and illness the body generally requires more protein. In addition to this, adequate protein is required to assist in the repair and building of tissues affected by cancer therapy, as well as to support the immune system. Adequate amounts of protein should thus be consumed during all stages of treatment and recovery. Very high protein diets are however not suggested. To ensure the intake of adequate protein, it is advised that protein sources low in saturated fats, such

as fish, lean skinless poultry, eggs, fat trimmed lean cuts of meat, low fat and fat free dairy products, nuts, seeds and legumes, are selected. For specific protein requirements, it is advised that a person seeks the assistance of a registered dietitian.[6]

• Wholegrain carbohydrates

Whole grain foods, as well as fruit and vegetables, are the best recommended sources of carbohydrate, as they are rich in essential nutrients, phytochemicals and fibre. It is advised that these foods should make up the majority of an individual's dietary intake, whilst simultaneously, minimising the intake of refined foods such as white bread, and the like, and products with added sugar, which are energy-dense and not substantial contributors of essential nutrients.[6]

• The role of dietary fat

It is advised that fatty cuts of meats (such as sausages and bacon) be avoided, and that the skin of chicken be removed. Furthermore, fat needs to be trimmed off meat before cooking. Advise patients to opt for low fat or fat free dairy products (unless the aim is specifically to gain weight and/or if the patient is experiencing cachexia). Further advice should include the avoidance of fried foods and commercially baked goods such as pies, pastries and muffins. The type of fat in the diet is also important. Healthier (unsaturated) fats are found in olive oil, canola oil, avocado, nuts and seeds. Also advocate the consumption of foods rich in omega 3 fatty acids, such as fatty fish (e.g. salmon, sardines and mackerel).[6,36]

• Vegetables and fruits

The diet should include a variety of fruit and vegetables of different colours, textures and flavours. The recommendation is to aim for at least five to nine or more servings daily, as this will ensure the intake of a wide range of different vitamins, minerals and other micronutrients. Consuming adequate fruit and vegetables not only improves survival after cancer, but also reduces the risk that the cancer will recur. Cooked vegetables also contribute to the recommended daily intake. Though the cooking process might slightly reduce the vitamin content, it is also known to increase the absorption of many nutrients, and furthermore, decreases the risk for any food-borne infections. Peeling and cooking fruit and vegetables can further reduce the risk of acquiring a food-borne infection.[6,37]

• Hydration

Six to eight glasses of fluids is the daily recommendation, in order to ensure that the patient's tissues are well hydrated.[6]

• Reduce alcohol intake

Drinking alcohol in large amounts increases the risk of developing cancerous tumours in the breast and possibly also in the colon and rectum. Other studies have found that drinking alcohol may also cause cancers of the mouth, pharynx, larynx, oesophagus and liver. It is advised that alcohol intake be limited to two drinks a day for men and one drink a day for women. Reducing alcohol intake can offer additional benefits in susceptible individuals.[6]

• Dietary variety

Throughout cancer treatment and recovery, it is advocated that a patient select from a wide range of different foods, to ensure the intake of all the necessary nutrients in adequate quantities. No single food contains all the nutrients required, hence, the consumption of a varied diet will ensure an overall better nutrient intake from the diet.[6]

Additional nutritional supplementation – is there a need?

• Commercial dietary supplements

It is important to emphasize the fact that food is the best, and preferred, source of vitamins and minerals, and patients should aim to get all their nutrients by following a nutritious diet. Additional vitamin and mineral supplements should only be considered should there be difficulty experienced with dietary intake, particularly during treatment and recovery.

However, high doses of certain vitamins and minerals could lead to potential side effects and could even increase the risk of developing certain cancers. In particular, it is important to avoid high doses of antioxidant supplements, such as vitamin A, C, E, beta carotene, zinc and selenium. Antioxidants support cellular repair, which means that in high doses (as from supplements) they might also promote the survival of cancer cells, and could potentially interfere with cancer therapy. Beta carotene supplements in high doses, for example, have been found to increase the risk of lung cancer.

It is considered safe to take multivitamin and mineral supplements at levels that don't exceed 100% of the recommended daily allowance (RDA). It is advised that a patient consult with their health care practitioner, such as a dietitian or doctor, before commencing the intake of any supplements.[6,37]

Table III: Nutritional interventions in common cancers

Breast cancer	Patients should aim to maintain a healthy weight and a body mass index (BMI) of 18.5–24.9. Even if an ideal body weight is not reached or maintained, a 5–10% weight loss over 6–12 months is adequate to lower the risks associated with the disease. It is advised that soy products be consumed with caution. Soy contains high levels of plant substances called isoflavones, believed to have a variety of anticancer effects, but higher doses of soy could have an influence similar to that of oestrogen, that could stimulate breast cancer progression. While the intake of tofu and the like is both healthful and safe, it's best to avoid the concentrated sources of soy components such as soy powders and isoflavone supplements. The intake of a little, or no, alcohol at all is advised as alcohol increases the risk of developing breast cancer.[36]
Colorectal cancer	The risk of this cancer is increased by diets high in red meat (especially processed meats) and saturated fats, and low in fruit and vegetables. Obesity also increases the risk of this cancer. In contrast, a fibre-rich diet might protect against this malignancy. Should a patient experience chronic bowel symptoms or undergo surgery that affects nutrient absorption, it is recommended that they consult with a registered dietitian regarding making the necessary dietary adaptations.[6,38]
Prostate cancer	It is advised to reduce the intake of foods from animal sources, particularly foods high in saturated fat. Fatty fish, rich in omega-3 fatty acids, have been shown to improve survival after prostate cancer. Diets high in certain vegetables, including tomatoes, tomato products, cooked tomato, cruciferous vegetables (e.g. cauliflower, broccoli, and cabbage), soy beans or other legumes, lower the risk of prostate cancer. [6;39]

• Food supplements

Patients often experience difficulty in consuming adequate energy from food, often due to nausea or difficulty swallowing. Liquid nutritional supplements could assist in providing the nutrients and energy needed to maintain weight/prevent weight loss, in this regard.

Commercial meal replacement supplements are available; however, patients could also try these home-made options:

- Fruit smoothies made by blending fresh fruits and yoghurts, or vegetable juices blended together, will assist in providing more vitamins and minerals.
- Juicing fruits and vegetables might also increase the absorption of certain nutrients.
- Soups can be made by liquidising fresh vegetables and potatoes together with protein sources such as chicken, beans, lentils or chickpeas, which can then be served with soft bread/bread rolls.
- Adding healthy fats to these self prepared dishes – such as raw, unsalted nuts, olive or canola oil and avocado pear – can increase their health benefits and enable the patient to consume more kilojoules.[6,37]

Weight maintenance

The maintenance of a healthy body weight is important as both weight loss, and weight gain, could be detrimental to the patient. All nutrient stores are needed to best cope with any medical treatment regimen, particularly the potential side-effects related thereto, as well as to assist in the recovery period. Unintentional weight loss should thus be combated by attempting to consume adequate kilojoules and protein, aimed at restoring body weight to its pre-cancer level. Suggest that patients increase their meal frequency, and to opt for energy-dense, high quality foods.

Conversely, being overweight increases the risk that cancer might recur. If the patient is overweight or obese, gradual weigh tloss is advised at a maximum of 0.5–1 kg a week. Ensure that the diet is nutritious and well balanced, and that their weight management programme is approved by the oncologist and/or dietitian.

Smoking cessation

Nearly one third of all cancers are caused by smoking, thus there is a high incidence of smokers amongst all patients with cancer. Smoking is associated with poor outcomes including progressive disease, second primaries and increased comorbidity.[40,41] The general practitioner has a critical role to play in advising and assisting smokers to quit by integrating the various aspects of nicotine dependence. Counselling and pharmacotherapeutic interventions for smoking cessation are among the most cost-effective clinical interventions and will be discussed elsewhere in this series of articles.

Conclusion

This article has provided an overview of the basic lifestyle modifications to consider in the management of patients with cancer. A holistic view with respect to exercise training, dietary modification, psychosocial interventions and smoking cessation are all important in patient management. General practitioners and oncologists should particularly be aware of the benefits of exercise and healthy nutritional interventions and assist their patients by suggesting adherence to accepted physical activity and nutritional guidelines. All patients should therefore be afforded the time and interest of their general practitioner so that they may assist their patients in making well informed choices with respect to their lifestyle to promote health and manage disease.

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