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Nutrition and exercise in cancer survivors

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Obesity has reached epidemic proportions in the United States in the past 2 decades. According to a recent report, 36% of the adult population currently has a body mass index of more than 30 kg/m², which is the diagnostic for obesity.¹ If we focus only on the US adult cancer survivor population, then the magnitude of being overweight or obese is notably higher, ranging from 52% to 68%.² In adult survivors of childhood cancer, several factors are associated with increased risk for obesity, such as hypothalamic or pituitary radiation, the use of certain antidepressants, and lifestyle factors.³

Chronic conditions such as heart disease, stroke, and diabetes are more common in obese individuals, in addition to which obesity has been found to account for several cancers, including esophageal, colon, postmenopausal breast, endometrial, pancreatic, and kidney.^{4,5} Specifically, in a prospective study of women, investigators evaluated the role of dietary patterns and risk of mortality from cardiovascular disease, cancer, and all-cause, and found that the refined-food Western-type diet was associated with increased mortality in cancer (16%; 95% CI, 3-30) as well as cardiovascular disease and all-cause,⁵ and the EPIC study, conducted in Europe among 223,008 women who were followed for just over 6 years, showed that body fat distribution and upper body and abdominal adiposity were associated with a risk of endometrial cancer.⁶ Although data are limited on whether or not losing weight actually reduces risk of cancer development, there is confirming evidence for that being the case in postmenopausal breast cancer.⁷ These findings suggest that weight control through exercise and healthy diet is paramount for the prevention of future cancers.

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Physical activity

In the past, clinicians would advise cancer patients to have plenty of rest and avoid activity. The last 2 decades, however, have brought a growing body of evidence on the vital role of exercise in cancer prevention and control. The American Cancer Society (ACS),⁸ the American College of Sports Medicine,⁹ the US Department of Health and Human Services (HHS),¹⁰ the American Heart Association,¹¹ and the American Diabetes Association¹² all have published guidelines on nutrition and physical activity (Table 1). Findings from the 14-year Cancer Prevention Study-II Nutrition Cohort showed that nonsmoking participants who adhered to the ACS's cancer prevention guidelines for obesity, diet, physical activity, and alcohol consumption had a reduced risk for mortality from cancer, cardiovascular diseases, and all causes.¹³ A meta-analysis demonstrated that physical activity interventions are not only safe for cancer survivors but also improve their aerobic capacity, strength, and quality of life.¹⁴

In addition to exercise having a role in weight loss, it also results in improved fitness, which is more closely associated with greater longevity than are body mass index or waist circumference. Some findings have demonstrated decreased cancer-related fatigue, emotional distress, and lymphedema in individuals who engage in cardiovascular and resistance training programs after cancer treatment.¹⁵ The beneficial effect of exercise has been shown in breast, gynecologic, and colorectal cancers.^{4,16} In a large, population-based study with colon cancer patients and controls, investigators reported that an increased level of activity (60 or more minutes a week) provided greater risk reduction for colon cancer.¹⁷

The ACS's 2012 Guidelines on Nutrition and Physical Activity recommend that all adults perform at least 150 minutes of moderately intense or 75 minutes of vigorous physical activity each week, in addition to one's activities of daily living

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TABLE 1 Published guidelines on exercise and nutrition

Society and reference
American Cancer Society 2012 ⁸
American College of Sports Medicine 2010 ⁹
Physical Activity Guidelines for Americans 2008 ¹⁰
American Heart Association 2007 ¹¹
2010 Dietary Guidelines for Americans ²⁰
American Diabetes Association 2008 ¹²
World Cancer Research Fund/American Institute for Cancer Research 2007 ⁴

Sources: American College of Sports Medicine and Centers for Disease Control and Prevention.

TABLE 2 Guidelines for moderate and vigorous physical activity

Activity category	
Moderate	Vigorous
Walking 3-4.5 mph	Race walking 5 mph or faster
Yoga	Running
Water aerobics	Step aerobics
Cycling 5-9 mph	Cycling > 10 mph
Ballroom, square, or folk dancing	Backpacking
Golf (walking, no cart)	Martial arts
Weight training	Circuit weight training (short rest intervals < 30 sec)
Doubles tennis	Competitive sports
Rowing machine (moderate effort)	Stairmaster (fast pace)

Sources: American College of Sports Medicine and Centers for Disease Control and Prevention.

(Table 2).⁸ It is worth noting, however, that 68%–80% of survivors do not meet the US physical activity guidelines,¹⁸ which underscores the need for community-based oncologists and their support staff to be familiar with and follow the guidelines for cancer patients and survivors. Obesity prevention should start with guiding individuals to make healthy lifestyle choices that can be supported by interventions at the local community and broader national policy levels.

Nutrition and dietary factors

Meat

Several epidemiologic studies have evaluated the connection between cancer and dietary risk factors. The risk with

red and processed meat consumption and alcohol use has been investigated, as well as the benefits of a vegetable-, fruit-, and whole grain-based diet. High red meat (beef, pork, lamb, and goat) and processed meat consumption is linked to cancers of the colon, rectum, and stomach.⁴ As little as 100 g of red meat or 50 g of processed meat intake daily is associated with 15%–20% increase in colorectal cancers.⁸ The carcinogenicity is mediated by N-nitroso compounds caused by smoking meats or adding nitrites for preservation.

Cured meats such as sausages, bacon, and salted fish are particularly rich in nitrosating agents. Pan frying, barbecuing, and grilling meats to a heavily browned texture increases the risk of colon cancer by 2.8-fold and rectal cancer by 6-fold.¹⁹ Techniques such as steaming, poaching, sauteing, or stewing minimize the production of these chemicals. The evidence suggests that diets low in red and processed meat and based on whole grains, fruits, and vegetables are associated with decreased colorectal cancer risk.⁸

Vegetables and fruits

Vegetables and fruits contain multiple beneficial vitamins, minerals, fibers, carotenoids, and bioactive substances such as sterols, indoles, and phenols that may prevent cancer.⁴ Although recent literature weakened the link between a diet rich in vegetables and/or fruits and cancer risk reduction, the summary of evidence still suggests lower risk for several cancers.⁴ Allium vegetables (onion, garlic, shallots) are believed to offer protection against stomach and colorectal cancers. Observational studies found lower risk of breast cancer in women whose diet was rich in vegetables, fruit, fish, and low-fat milk.⁴ The ACS⁸ and the HHS²⁰ dietary guidelines recommend at least 2.5 cups of vegetables and fruits daily for cancer risk reduction.

A cross-sectional study found that only 20% of Americans adhere to recommendations for fruits and vegetables intake and exercise.²¹ It should be noted that dietary antioxidant use in the form of supplements does not yield cancer preventative properties, and in some studies, beta carotene and selenium have increased cancer development. It is therefore recommended that antioxidants are consumed through food sources rather than supplements.

Alcohol

Alcohol consumption is an established risk factor for throat, esophagus, liver, pancreas, colorectal, and most recently, breast cancers.^{4,22} Intake of 3 or more alcoholic drinks a day was associated with a 1.4-fold increase in colorectal cancer, and each daily drink added 10%–12% higher breast cancer risk than that in nondrinkers.²² The

Features

recommended limit on alcohol consumption is 2 drinks per day for men and 1 drink per day for women.²⁰ (In the United States, 1 drink of alcohol is defined as 12 ounces of beer, 4 ounces of wine, or 1.5 ounces of liquor.)

Summary

The best overall strategy is to advise patients and survivors to consume whole foods in a healthy dietary pattern, with special emphasis on controlling total caloric intake to maintain a healthy weight. There are several ongoing clinical trials that assess the role of nutrition. The NIH website currently lists 105 active clinical trials with key words “obesity” and “cancer,” the majority of which are behavioral intervention studies.²³ Based on the available evidence, we summarize here the recommendations that are most important for cancer survivors.

Individual level

- Know your body mass index.
- Maintain normal body weight.
- Engage in regular physical activity at a moderate or vigorous activity level.
- Consume diet rich in vegetables and fruits.
- Reduce consumption of red meat, salt and processed food.
- Limit alcohol intake.
- If obese, use supportive weight-loss programs.

Community and workplace

- Integrate active transportation (pedestrian and bicycle routes) to commuting choices.
- Health plans should embrace programs and practices that increase physical activity.
- Provide access and incentives to use wellness centers.
- Create healthy food and beverage varieties in work sites and schools.

Society and environmental

- Ban smoking in the workplace.
- Achieve healthy and sustainable food and water system.
- Regulate hormone and antibiotic use in farming.

Individual behavior change is hard, especially when it comes to making healthy choice the easy choice. It is our task as providers to disseminate information and create a broader clinical culture that promotes the benefits of nutrition and exercise from diagnosis throughout survivorship.

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