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## Role of nutrition for cancer patients

Singh Nirupma and Paul Virginia

### Abstract

Cancer is a catabolic inflammatory disease that causes patients to often experience weight loss, or even cachexia in severe cases. Undernourishment in patients with cancer impairs the quality of life and therapeutic response, further leading to poor prognosis. It is proved that 30–40 percent of all cancers can be prevented by their healthy dietary habit lifestyle and dietary measures alone. Obesity, nutrient sparse foods such as concentrated sugars and refined flour products processed food products that contribute to impaired glucose metabolism (which leads to diabetes), low fiber intake, consumption of red meat, and imbalance of omega 3 and omega 6 fats all contribute to excess cancer risk. Nutrition is a process in which food is taken in and used by the body for growth, to keep the body healthy, and to replace tissue. Good nutrition is important for good health. Eating the right kinds of foods before, during, and after cancer treatment can help the patient feel better and stay stronger. A healthy diet includes eating and drinking enough of the foods and liquids that have important nutrients (vitamins, minerals, protein, carbohydrates, fat, and water) the body needs.

**Keywords:** Catabolic inflammatory disease, cancer, glucose metabolism, low fiber intake, good nutrition

### Introduction

Nutritional problems are usually diagnosed during the treatment of cancer. An observational study reported that 51.1% of all cancer patients have seen nutritional impairment, and 64% of patients showed reduction in weight 6 months after diagnosis of cancer M. *et al.* (2017) [1]. Weight loss, especially cachexia, are widely recognized as not only reduced physical function and quality of life, but also poor prognostic factors in cancer patients. Classically, BMI is often used for measuring nutritional status of a patient, and recent studies have focused more on Sarcopenia MP *et al.* (2017). However, nutritional problems are complex and vary depending on the location and stage of cancer. Therefore, nutritional support for cancer patients should be based on the assessment of each patient's condition and appropriate planning of the outcome. In this review, we will look at what should be considered to prevent malnutrition by providing adequate nutrition to cancer patients. Cancer and cancer treatments may affect taste, smell, appetite, and the ability to eat enough food or absorb the nutrients from food. This can cause protein energy malnutrition, which is a condition caused by a lack of key nutrients. Alcohol abuse and obesity may increase the risk of malnutrition. Malnutrition can cause the patient to be weak, tired, and unable to fight with infection or finish cancer treatment. It may be made worse if the cancer grows or spreads. Eating the right amount of protein and calories is important for healing, fighting infection, and having enough energy.

### Prevalence of Cancer

Cancer accounts for approximately 13 per cent of all deaths each year with the most common lung cancer, stomach cancer, colorectal cancer, liver cancer, and breast cancer. In 2008, approximately 12.7 million cancers were diagnosed and 7.6 million people died of cancer worldwide. This makes cancer the leading cause of death in the developed world, and the second leading cause of death in the developing world (Jemal, 2011). According to National Institute of Cancer, a wing of National Institute of Health in 2016, a rough and ready 1, 685, 210 new cases of cancer will be identified in the USA and about 595, 690 individuals will pass away from the disease. In 2016, the most common cancers are proposed to be bladder cancer, breast cancer, bronchus cancer, colon and rectum cancer, lung cancer, prostate cancer, melanoma of the skin, leukaemia, thyroid cancer, kidney and renal pelvis cancer, pancreatic cancer, and endometrial cancer. The probability of developing cancer may either increase or decrease depending on what individuals eat and how often they exercise.

Nutritional factors are estimated to account for approximately 30 per cent of cancers in industrialized countries, making diet secondary only to tobacco as a hypothetically avoidable cause of cancer. Research to date has revealed few explicit relationships between exact nutritional factors and cancer risk. Studies have investigated the definite role of diet in the progress of major cancers. In developing countries, 60 per cent of these cancers are attributed to a diet low in fruit, vegetables, and animal products. All the way through the world, consumption of thermally very hot drinks and food raises the risk of these cancers.

#### Dietary factors contribute to increased risk of cancer

- **High Energy Intake:** Eating too much food is one of the main risk factors for cancer this can be shown two ways: (1) by obesity and (2) by the protective effect of eating less food. It was estimated in a recent study, from a prospective cancer prevention cohort, that overweight and obesity accounted for 14 percent of all cancer deaths in men and 20 percent of those in women. Significant positive associations were found between obesity and higher death rates for the following cancers: esophagus, colon and rectum, liver, gallbladder, pancreas, kidney, stomach (in men), prostate, breast, uterus, cervix, and ovary.
- **Alcoholic beverages:** Another aspect of diet clearly related to cancer incidence is consumption of alcoholic beverages, which convincingly increases the risk of cancers of the oral cavity, pharynx, larynx, oesophagus, liver and breast (and probably colorectum). The increase in risk appears to be primarily due to alcohol per se rather than specific alcoholic beverages. Whereas most of the excess risk occurs with high alcohol consumption, a small (about 7%) increase in risk of breast cancer has been observed with approximately one drink per day. Recent studies suggest that the excess risk of breast and colon cancer associated with alcohol consumption may be concentrated in persons with low folate intake.
- **Aflatoxin:** Food contaminated with aflatoxin convincingly increases the risk of liver cancer. However, this contamination occurs mainly in areas where hepatitis viruses are a major cause of liver cancer, and the importance of aflatoxin in the absence of hepatitis virus infections (for example, after immunisation) is not clear.
- **Chinese-style salted fish:** High intake of Chinese-style salted fish, predominantly consumed in some Asian populations, convincingly increases the risk of nasopharyngeal cancer.
- **Low Fiber:** Unrefined plant foods typically have an abundance of fiber. Dairy products, eggs, and meat all have this in common – they contain no fiber. Refined grain products also have most of the dietary fiber removed from them. So, a diet high in animal products and refined grains (a typical diet in the USA) is low in fiber. In prospective health studies low fiber was not found to be a risk for breast cancer. It is possible that fiber measurements are just a surrogate measure for unrefined plant food intake.
- **Red Meat:** A recent meta-analysis also found red meat, and processed meat, to be significantly associated with colorectal cancer. Meat, and the heterocyclic amines formed in cooking, have been correlated to breast cancer in a case-control study in Uruguay as well.
- **Omega 3:6 Ratio Imbalance:** Omega 3 fats (alpha-

linolenic acid, EPA, DHA) have been shown in animal studies to be protective from cancer, while omega 6 fats (linoleic acid, arachidonic acid) have been found to be cancer promoting fats.

- **Acrylamide:** is a chemical found in tobacco smoke and some foods. It can be produced when certain vegetables, such as potatoes, are heated to high temperatures. Studies in animal models have found that acrylamide exposure increases the risk for several types of cancer. However, there is no consistent evidence that dietary acrylamide exposure is associated with the risk of any type of cancer in humans.
- **Artificial sweeteners:** Studies have been conducted on the safety of several artificial sweeteners, including saccharin, aspartame, acesulfame potassium, sucralose, neotame, and cyclamate. There is no clear evidence that the artificial sweeteners available commercially in the United States are associated with cancer risk in humans. For more information.
- **Food Additives & Contaminants:** may increase the risk for certain types of cancers through agricultural exposure to growth hormones and endocrine disrupting chemicals such as bisphenol A and phthalates; unintentional chemical or environmental fungal contamination; and elemental carcinogen transfers through soil, water, and food supplies (i.e., heavy metal, cadmium, or mercury). The Food and Drug Administration (FDA) has declared that any new, intentional additives must be tested and cleared prior to public distribution.
- **Omega 3:6 Ratio Imbalance:** Omega 3 fats (alpha-linolenic acid, EPA, DHA) have been shown in animal studies to be protective from cancer, while omega 6 fats (linoleic acid, arachidonic acid) have been found to be cancer promoting fats. Omega 3 fats (alpha-linolenic acid, EPA, DHA) have been shown in animal studies to be protective from cancer, while omega 6 fats (linoleic acid, arachidonic acid) have been found to be cancer promoting fats.

#### Specific components in food affecting the development of cancer

Plant based diet contain many natural components with cancer-preventive properties. At the same time, modern methods of agriculture and animal husbandry apply hundreds of chemicals (pesticides, fertilizers, hormones and antibiotics) which contaminate and affect the quality and safety of food (BI 1985) [8]. Although exposure to traces of individual chemicals may not pose a significant health risk (BN 1983) [12] these agents are commonly used in various combinations and potencies and repeated exposure to them for long periods negatively affects health MC *et al.* (2007).

Growth hormones and antibiotics used in animal farming; Pesticides and herbicides in plant-based foods; and chemical compounds such as bisphenol A (BPA) or phthalates that enter food from packaging can increase cancer risk by acting as hormone-like substances in the body. They can also become carcinogens through their cumulative effects on cellular metabolism. In addition, many synthetic antioxidants commonly used in food processing to prevent microbial contaminations, enhance flavor or prolong shelf-life can affect cancer risk (KB 2005).

### Dietary Factors Decreasing Cancer Risk

To decrease cancer risk the diet must be optimized, primarily to reduce calorie intake, monounsaturated fat and red or processed meat. Consumption of fruits, vegetables, and cereals, which are the major source of vitamins and fiber, should be adequate in the daily diet.

**Protein:** The building blocks of the human cell. Cancer patients need more protein than the average person in order to heal the “good” cells damaged by treatment. Some valuable sources of protein include the following:

- Plant-based proteins such as nuts, seeds, and legumes, including split peas, kidney beans, cannellini beans, chick peas, black-eyed peas and lentils
- Lean meats like chicken, fish, beef and pork in addition to eggs
- Dairy products such as Greek yogurt, low-fat cheese and milk

### Carbohydrates

They provide fuel for our bodies and energy for life. Carbohydrates come in many forms including:

- Starches
- Fruits
- Vegetables
- Dairy products
- Desserts

Choose whole grain breads and cereals, fruits, vegetables and low-fat dairy products for your primary source of carbohydrates. It's a common misconception that sugar “fuels” cancer growth. It's true that cancer cells require more energy because of their accelerated growth rate; however, it's not true that avoiding all sugar will starve or stop cancerous growth. It is best for cancer patients to consume more natural sugars such as those from fruit than added sugars from processed foods.

- **Fats:** Our bodies need fat for energy and to absorb vitamins and minerals. There are good and bad fats. Good fats come mainly from vegetables, nuts, seeds and fish. Healthy fats also help fight inflammation and are part of an anti-inflammatory diet.
- **Fruits and vegetables:** Overall, a high intake of fruits and vegetables probably reduces the risks of cancers of the oral cavity, oesophagus, stomach and colorectum. Previous reviews of diet and cancer, including the 1997 WCRF/AICR review, have given greater emphasis to increasing fruit and vegetable consumption for cancer prevention, and have included cancers of the larynx, lung, pancreas, breast and bladder.
- **Vitamins and minerals:** Vitamins and minerals help ensure proper growth and development. In addition, they allow the body to use the energy (calories) supplied in foods. A person who eats a balanced diet with enough calories and protein usually gets plenty of vitamins and minerals. However, eating a balanced diet can be challenging when you are receiving cancer treatment, particularly if treatment side effects persist for long periods of time.
- **Water:** Water and fluids are vital to health. If you do not take in enough fluids or if you are vomiting or have diarrhea, you may become dehydrated. Ask your medical team how much fluid you need each day to prevent dehydration.
- **Flavonoids:** Flavonoids (specifically flavonoids such as

the catechins) are “the most common group of polyphenolic compounds in the human diet and are found ubiquitously in plants [33].” While some studies have suggested flavonoids may have a role in cancer prevention, others have been inconclusive or suggested they may be harmful.

- **Tea and coffee:** Green (unfermented) tea, *Camellia sinensis*, has a reputation for being healthy and reducing cancer risk. Limited preclinical and clinical data seem to support this beliefs. In particular, a positive effect on the incidence of hepatocellular cancer was reported.

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