

Lifestyle Change Can Lower the Risk of Cancer: A Report

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Cancer is a group of complex and multifaceted diseases that pose significant threat to global health. It has become one of the most common diseases of this era, and a leading cause of death worldwide. More people die of cancer each year compared to any other diseases. Cancer is progressive, but not incurable. If detected at an early stage, several chemotherapeutic treatments can be provided to the patient to get rid of the cancerous cells from the body. But the real challenge is its detection, since cancer is sometimes asymptomatic in certain individuals (1). Cancer can be of several types, though four major types are mostly predominant in the population, viz the lung cancer, female breast cancer, pancreatic cancer and prostate cancer. Other forms of cancer include skin, ovaries, colon, penile, kidney etc. It has become the second leading killer in the US, accounting to 25% of all deaths each year in the country. While genetic factors play a significant role in cancer development, research evidences show that lifestyle factors, including exposure to chemical carcinogens (smoking, vaping, etc.), diet and physical inactivity also play a vital role in development of the most common cancer types. To realize how lifestyle changes might affect the onset of these common cancer types, we must first understand how cancer develops in the human body.

In humans, carcinogenesis occurs due to mutations in several critical genes, causing tumor formation. In most tumors, a tumor suppressor gene p53 is found. This p53 is a protein that guards the cell cycle

checkpoints and the inactivation of this protein leads to uncontrolled division of cells. The mutations can be enhanced by certain mutagens, like tobacco, lead, etc. Cell division a major factor in mutagenesis, because during cell division, a DNA lesion can give rise to point mutation, deletion or translocation thereby creating an increment in the background cell division (2).

Cancer can be caused by both internal factors (hereditary, hormones, immune conditions) and environmental or acquired factors (diet, smoking, infectious organisms). The role of lifestyle factors in the development of cancer was also shown in the study of monozygotic twins. Only 5-10% of all cancers are due to inherited gene defects. There are observations and researches which show that most cancers are not of hereditary origin but involves lifestyle factors such as unhealthy diet, smoking, alcohol consumption, infections, etc. Although hereditary factors cannot be modified, lifestyle factors can be modified by changing one's mode of living. Smoking is by far the primary cause of cancer, and accounts to 87% of deaths from lung cancer alone.

Consumption of alcohol in a chronic way leads to cancer in the esophageal cavity, larynx, pharynx as well as buccal cavity, liver and pancreas. The relation between alcohol and esophageal cancer was first observed in 1910.

In 1981, Doll and Peto observed that approximately 30-35% of all deaths in USA and other countries were linked to diet (3).

Heavy consumption of red meat is a risk factor and is associated with cancers of prostate, bladder, pancreas, buccal cavity and GI. The heterocyclic amines produced during cooking of red meat are carcinogens. PhIP is the most abundant mutagen in cooked beef and is responsible for 20% mutagenicity in beef. Nitrites and nitrates are used in meat since they bind easily to the myoglobin and prevents botulinum exotoxin production, however they are carcinogens, and are extremely detrimental when consumed heavily (4).

Other causes of cancer through lifestyle factors are obesity, infections, environmental pollutions, etc.

The fact that only 5-10% of cancers are hereditary and the majority are caused due to lifestyle factors such as smoking, alcohol consumption and unhealthy food habits, it provides major opportunities in prevention of cancer. Embracing a proactive approach to health through major lifestyle changes, we can reduce the risk of cancer, if not eradicate it (5).

Healthy Diet: Consumption of fruits and vegetables have proven to be effective against prevention of cancer. Several fruits and vegetables rich in carotenoids were reported to have anti-inflammatory and anti-cancer activities. Lycopene is one of such carotenoids. Other secondary metabolites in fruits and vegetables such as resveratrol, quercetin, indole-3-carbinol has also shown anti-cancer properties. More consumption of fruits and vegetables rich in these metabolites can help reduce the risk of cancer. Spices such as curcumin, capsaicin, gingerol have therapeutic and preventive potential against cancer. Limiting processed foods and red meat intake are additional steps towards prevention of cancer (6).

Physical Activity: There has been extensive evidence that regular physical exercise and activities like playing outdoor games can reduce the incidence of various cancers. A sedentary lifestyle is associated with most chronic illnesses. Physical inactivity results in increased risk of breast, prostate, colon and skin cancer. Men with no physical activity and women with higher body mass index have a Ki-Ras mutation in their tumors which occurs in 30-35% of colorectal cancers (7). At least 150 minutes of exercise of moderate intensity per week should be incorporated in one's life. Jogging, swimming, running or cycling helps maintain the immune function, hormonal regulation and blood circulation in the body.

Sun Protection: Skin cancer or melanoma is one of the most preventable types of cancer. Protecting the skin from harmful UV rays of the sun by applying sunscreen lotions, taking shade and wearing protective clothes significantly reduces risk of cancer.

Stress Management and Regular Health Check-ups: Chronic stress negatively impacts the body's immune systems and increases the risk of cancer significantly. Incorporating stress management techniques like yoga, meditation and mindfulness can help mitigate cancer and promote overall well-being (8). Routine check-ups and screening are vital for early detection of cancer. It allows medical personnel to initiate necessary therapeutic and surgical procedures to cure cancer.

In conclusion, though genetics and heredity plays a crucial role in cancer susceptibility, the power to make positive lifestyle changes lies in each individual. Embracing a lifestyle that prioritizes health through proper nutrition, regular exercise and avoiding unhealthy habits may reduce the risk of cancer.

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