CANCER: ENVIRONMENTAL AND HABIT-LINKED CAUSES

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Cancer today is one of the most dreaded diseases the mankind has been suffering from. It is, in fact, a collection of diseases that take a heavy toll of human life. At present, one-fifth of the total human deaths in the world is due to cancer. This situation has compelled thousands of cancer researchers to undertake strenuous round-the clock research to investigate the definite causative organisms or the causal factors behind more than a hundred types of human cancer.

What is Cancer?

Cancer can be described simply as unrestrained and unrestricted proliferation of body cells. All types of tumors are broadly classified into two groups—benign tumors and malignant tumors. When the unrestrained multiplication of cancerous cells remains confined within a very restricted area of the body, it is called benign tumor. Such tumors, though sometimes prove to be fatal, can usually be removed surgically. In the malignant types of cancer, the cancerous cells often invade through the circulating blood and lymph from their sites of origin and reach distant organs and systems. Such dissemination process of malignant cells is called 'metastasis'. It is often found that it is not the original tumor but such metastasis that becomes the ultimate cause of death. In some types of malignancies, the spread of the cancerous cells to different other organs and systems is so fast that even after early detection, all attempts at treating the patients surgically, chemotherapeutically, or radiotherapeutically are often proved to be futile.

What Causes Cancer?

Getting cancer in the body depends very much on the personal, social and cultural habits of man. Like many other diseases, cancer is primarily a product of the interactions between man and his environment. That is why cancer is often described as an insidious environmental and social disease. A large majority of cancer experts claim that almost 70 to 90 per cent of different types of human cancer is normally induced by various environmental factors, and, as such, atleast theoretically, it can be avoided through conscious efforts.

Many of us are already aware that consumption of tobacco and alcohol, presence of some pollutants in air, water and soil; diets and dietary habits; toxic

industrial chemicals; prolonged exposure to sunlight and ionising radiations promote the incidence of cancer in human populations. Although people living in highly urbanised industrial centres are more vulnerable to the disease as a result of polluted environment, people living even in the remotest rural areas are also susceptible to it due to environmental factors and/or personal habits. The recent increase in the incidence of this disease among the people living in industrialised cities as well as rural areas is due mainly to the phenomenal and unplanned growth of chemical and other industries and indiscriminate use of chemicals which have not been properly tested for carcinogenicity (i.e., cancer-inducing properties). Among other factors, changes in eating and personal habits have also contributed to the incidence of cancer.

Many chemical pollutants of the environment can promote incidence of cancer

Some industrial chemicals, drugs, pesticides, tobacco smoke, cosmetics, etc., have been proved to contain cancer-inducing substances. These substances are known as carcinogens. Russell Train, former Chief of the Environmental Protection Agency remarked: 'There are today more than 30,000 chemicals in actual commercial production; every year, this list grows by some 1,000 new compounds. Of the more than two million known chemicals, only a few thousand have been tested for carcinogenicity and—aside from those used in food additives, drugs and pesticides only a few hundred have been adequately tested. We know, in fact, very little about the health effects even of the 30,000 chemicals already in commercial production. We have no way of systematically screening the chemicals that do go into production; we have no way of knowing precisely which chemicals go into production every year. In other words, we not only don't know whether what's going out there is dangerous—we don't even know what's going out there.

We have, however, learned one thing: 'it's what we don't know that can really hurt us, even kill us.'[1]

Therefore, to avoid contracting cancer through environmental exposure to carcinogens, one has to be extremely cautious and obey "do's" and "don'ts" the cancer specialists have continuously been announcing to save human life from the clutches of this dreaded disease.

Some Major Causes

Surely if one counts the environmental and habit-linked causes and promoters of this disease, it will be an alarmingly long list. The general public awareness of these causes and promoters of various forms of malignancies is the urgent need

*1 Russell Train, *Testing Chemicals, Not People*

today. Such awareness will enable us to rectify our personal, social and cultural habits to curb the disease. Let us discuss some major causes which are either proven or suspected causes of different forms of cancer.

Industrial Chemicals

A large number of industrial chemicals which include food additives, cosmetics, dyes, drugs, asbestos, chemical constituents of plastic, etc., can induce different types of human cancer. Evidences as available from different countries of the world have almost conclusively proven that indiscriminate use of many such substances escalates the incidence of the different types of this disease. A few examples of chemical substances which can definitely cause or promote cancer are discussed here.

Asbestos

People working in asbestos factories inhale asbestos dust and minute fibres for a prolonged period of time. As a result, many of them have been seen to contract a rare and fatal cancer of the chest and abdominal lining (mesothelioma). This has become a major health problem among asbestos factory workers in the United States. Often, the disease is detected at a very late stage and the conventional treatment fails to cure it. It has been observed that the asbestos residue on talc-coated white rice could also induce cancer. Unfortunately, Japanese are fond of such rice in their meals.

Vinyl Chloride

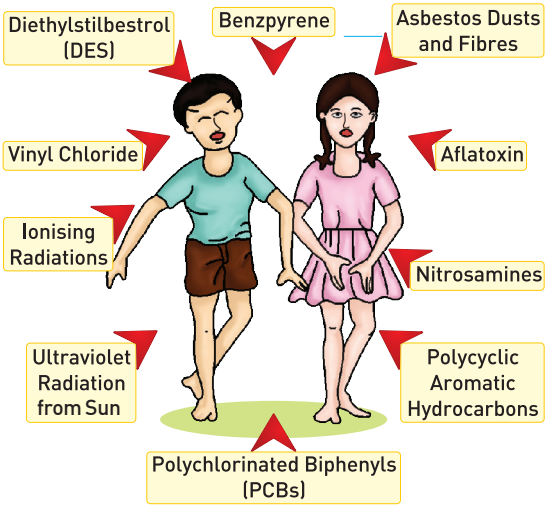
It is a chemical constituent of plastic. It induces a rare form of liver cancer. During the 1970s, a large incidence of this form of liver cancer among the workers engaged in plastic industries around the world was reported. Experts made no mistake in identifying vinyl chloride as the inducing agent for this disease.

Diethylstilbestrol (DES)

It is a proven carcinogenic drug. During the last decade it had created a major health hazard in the form of vaginal cancer in more than hundred young women in the United States. Investigation revealed that mothers of these young women had taken this drug during pregnancy, in the belief that it helps prevent natural abortion.

Since the 1940s, American physicians had prescribed estrogen DES to a vast population (between five hundred thousands and two million) of pregnant women in the United States. The physicians did it in the erroneous belief that this hormonal drug helps prevent spontaneous abortion. Surprisingly, even after the investigation that the drug failed to prevent abortion and that it had carcinogenic effects on the foetus, it was being administered to a large section of pregnant women till the early years of 1960s.

In addition to the three examples given above, a kind of aromatic amine once used in hair-dyes, arsenic in air, chloroform in drinking water and cosmetics, PCBs (polychlorinated biphenyls) in mothers' milk and fish are some of the causal factors of this dreaded disease. The list of chemicals inducing cancer lengthens alarmingly almost every week.



Some of the known cancer-causing chemicals and physical agents

Dietary Habits and Food

Recent findings clearly reveal that some dietary habits and food promote the development of cancer in man. Whether a person stands a chance of getting cancer in his body depends very much on his dietary habits and the types of food he consumes in his regular meals. Specialists hold the view that there are some dietary components, though they themselves are not carcinogenic, probably act as causal factors for the production of carcinogens in the body. Let us discuss here a few known examples of the incidence of the disease where dietary habits or food items play the role of inducers.

Fat-rich Diets

The excessive consumption of even ordinary fats in the everyday meals brings about the hormonal, as also digestive, changes which in turn cause this disease. Regular intake of fat-rich diets is suspected to enhance the chances of getting several malignancies like cancer of the breast, the bowel and the prostrate glands.

Smoked Fishes

The smoked fishes consumed in abundance by the Japanese people every year vulnerably expose them to the chances of contracting stomach cancer, as smoked fishes contain polycyclic aromatic hydrocarbons. These chemicals had already been proved to be carcinogenic in some other contexts. Not only in Japan but also in other countries where people consume a large amount of smoked fish, a high rate of the incidence of stomach cancer has been reported.

Nitrosamines

Nitrosamines, the chemical substrates which get synthesised within the body, have recently been suspected to be the major causes of stomach cancer. Formation of nitrosamines in the body is believed to depend much on the amount of nitrite and nitrate intakes through food and water. Salivary nitrates also often transform naturally into nitrite. Nitrite can enter into chemical combination with certain foods or drugs to form nitrosamines.

Aflatoxin in Food

Aflatoxin, considered to be a highly potent dietary carcinogen, is produced by molds grown on some types of human food (i.e., grains, peanuts, etc.) has been proved to be a known promoter of liver cancer. Food being contaminated by aflatoxin has been linked up with the world's highest incidence of cancer in parts of Africa, Thailand and the Philippines. Aflatoxin-related cancer hazard has alerted food inspectors who have now become

more vigilant to detect each and every aflatoxin contamination of food so that such contaminated food items do not reach up to their consumers.

Nobody knows for certainty how many chemical substrates we consume in our food are linked up with this dreaded disease. Undoubtedly, the cancer caused or promoted through dietary habits and diets is a greater environmental and social problem than any other type promoted or induced by other factors.

Tobacco

Tobacco-smoking is a much talked-about and widely known promoter of lung cancer. A considerably large human population falls victim to the disease and dies prematurely. Since, globally, a much higher percentage of male than female population includes habitual smokers, the males are the worst sufferers. Studies have revealed that persons who regularly smoke cigarettes stand at least ten times more chances than the non-smokers to develop lung cancer. Tobacco smoking combined with air-pollutants and other toxic chemicals which commonly fill the air in factories often expose the workers to carcinogens.

Besides the lungs, the other organs and systems of a heavy smoker also become cancer prone. Tobacco smoking also increases the chances of developing the disease in the mouth, the throat and the voice-box. The chances of contracting this disease are much more if, incidentally, the smoker is also a heavy drinker. Added to it, cigarette smoking increases considerably the chances of getting this dreaded disease in the oesophagus the pancreas and the bladder.

Dr. Gio B. Gori, an expert at the U.S. National Cancer Institute, has already estimated that "people smoking two packs of cigarettes a day for a year expose their lungs to nineteen times more benzpyrene—just one of the possible carcinogens in cigarette smoke—than they would by breathing the polluted air of Los Angeles for a year". The President of the American Cancer Society held the view that simply by stopping tobacco-smoking the world can avoid about 15-20 per cent of deaths due to different forms of the disease in the United States and many other countries. He held such view only after considering the varied types of cancer and their known causes.

By combining the habit of smoking tobacco and drinking alcohol a person becomes twenty-five times more prone to develop oesophageal cancer

Alcohol

Alcohol, many experts believe, does not promote cancer as such, but decidedly increases the fury of carcinogens taken in the body along with other substances. It is now a known fact that by combining the habit of drinking alcohol with

smoking tobacco a person becomes vulnerable to far greater chances of contracting oesophageal cancer. Data available from the United States reveal that the moderate smokers who drink alcohol heavily are twenty-five times more prone to develop oesophageal cancer. It is also believed by experts that almost two-thirds of cancer is caused by the combinations of tobacco and alcohol consumption, and such incidences can be successfully prevented by simply giving up the smoking habit.

Traces of nitrosamines, which are considered to stimulate the development of cancer, have recently been detected by the U.S. specialists in popular brands of scotch whisky and some foreign brewed beers. However, the experts do not know what amount of nitrosarnines in these drinks may cause cancer. Tests on other alcoholic drinks, such as bourbons, ryes and liquors, vodkas, rums and brandies failed to detect any nitrosamines.

Ultraviolet Radiations from the Sun

The ultraviolet radiations we receive through sunlight is an important promoter of skin cancer. The light-skinned people are more susceptible to ultraviolet rays of sunlight to develop skin cancer, than the dark-skinned people. People who work in the scorching sun for long durations stand more chances to develop skin cancer.

In the United States and many other countries skin cancer is very common. But fortunately most of these incidences get cured usually due to some intrinsic functions of the body. Melanoma, a cancerous condition of skin often turns fatal. It takes about five thousand lives annually in the United States alone. It has been observed that the incidence of skin cancer is the highest among the white people who live close to the equator. To get the skin tanned, sun-bathing is very popular among the light-skinned people. This practice enhances the incidence of skin cancer, specially the melanoma, due to the intense exposure of the bare parts of the body to the ultraviolet rays of solar radiations. The ultraviolet rays which induce skin cancer get partially filtered' by the ozone layer of the atmosphere before reaching the earth. The apprehension of the scientific community about the potential depletion of the atmospheric ozone envelope, if proves to be a reality, will further increase the incidence of skin cancer globally.

Ionising Radiations

Ionising radiation, involving nuclear reactions, medical X-rays and naturally occurring radioactive elements, are posing much more serious threats to mankind than the ultraviolet radiations of solar origin. Such radiations induce different types of cancer, and can bring about genetic changes (mutations). The scientific community with full awareness of the hazardous effects of radiations has drastically reduced the levels of permissible exposures to such radiations in the recent years. As a matter of fact, it is not yet fully known which particular dose of radiation received by a person at a time, or in fractions spreading over a prolonged period of time, may be hazardous in terms of contracting the disease.

Indiscriminate or frequent clinical uses of X-rays for the purpose of diagnosing various diseases entail major health risks. Five to ten per cent of the incidence of cancer among children in North America and Western Europe during the 50's and 60's was suspected to be due to X-ray exposures mothers received during their pregnancy. In the year 1964, a WHO Expert Committee had

recommended the need for massive reduction of the medical doses of X-rays. But unfortunately even today exposures to X-rays for medical purposes quite frequently exceed the desired intensity. The faulty X-ray equipment and the callous operators often become the reasons for overexposures. Since X-rays are a known promoter of cancer, even for a medical purpose, a person should get X-ray exposure only when it is absolutely necessary.

With the technological advancement, the nuclear power is now being tapped to harness electricity. This has added to our environment a new source of ionising radiation. The nuclear power system, even after all possible care, leaves enough chances of getting ourselves exposed to the radiations. We should always remember that uranium and plutonium used in nuclear power plants are deadly radioactive elements. Many people apprehend that, by the turn of the century, the continual worldwide growth of nuclear power production system and testing of nuclear weapons would increase, many times, the probability of nuclear pollution of the environment. This would probably result in several hundreds to tens of thousands of deaths globally every year due to radiation-induced cancer. Of course, the magnitude of the radioactive pollution of the environment and its problems would depend much on the magnitude of the radioactive leakage from nuclear power plants and the release and disposal of nuclear wastes.

Virus and other Infection-related Induction of Cancer

For quite sometime, many experts in the field of cancer research have been suspecting that some viruses seem to play a role in inducing at least some kinds of cancer. More than forty different viruses have already been identified which are capable of producing tumors in different animals. No kind of human cancer, however, is known to have been caused directly by viruses. Recent findings indicate that other factors influence the onset of some kinds of human cancer to which viruses are thought to be linked.

A person's susceptibility to a particular type of virus, which seemingly promotes a type of cancer called Burkitt's lymphoma, may increase if he suffers from chronic infection of malarial parasites. Many cancer experts believe that the role played by viruses in the initiation of some other types of human cancer, such as cancer of the lymph nodes, the cervix, etc., will be eventually confirmed.

Conclusion

The chances of falling a victim to one or other form of cancer can decidedly be minimised, if we cultivate desirable personal and social habits. To cultivate anti-cancer habits in our day-to-day life, we have to make sustained conscious efforts. Specially in a country like ours where a rigorous survey to detect cases of varied forms of cancer and the size of population exposed to the different environmental and habit-linked causes of cancer has yet to be undertaken, there is an urgent need to launch an intensive campaign to create more and more public awareness of the causes and preventive measures to fight the disease.

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