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REVIEW ARTICLE

Review on Cancer

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ABSTRACT

The aim of my study is to research about cancer. Cancer is a disease in which abnormal cells divide frantically and destroy body tissue. Now-a-days, the mortality rate due to cancer has increased tremendously worldwide. So my objective is to provide statistics about the types of cancer, causes of cancer, signs of cancer, the number of death of cancer patients, the number of cancer patients who are in serious condition and about the cancer treatment to raise awareness among the mankind and to reduce the number of deaths from cancer. The incidence of cancer and cancer types are influenced by many factors such as age, gender, race, local environmental factors, diet and genetics. More than 100 types of cancer have been identified so far. They are classified according to their function and location of the cells from which they originate. By 2020, it is estimated that 70% of all cancer cases will be in the lower income countries and approximately one-fifth of this will be in India with its population of over a billion. While research is necessary to inform efficacious programs, it is also time for us to move beyond research to act by implementing programs in cancer prevention and treatment. Cancer is disturbing our growth economy causing more people to death, so my study takes a step to prevent cancer by exploring about cancer and providing information and treatments to eradicate and to create awareness among mankind.

Keywords: cancer, signs, abnormal cells, environmental factors

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1. Introduction

Cancer is becoming a deadly disease worldwide. Hence my study of research about cancer throws a light for people to International Journal of Pharmacy and Natural Medicines

know about the disease, to gather information about cancer and helps for students and graduates to know the recent

developments and problems raising in cancer [1,2,3]. Cancer is the uncontrolled growth of abnormal cells anywhere in the body. These abnormal cells are called as tumor cells, abnormal cells and malignant cells. According to my study anything that causes the normal body cells to develop abnormally results in cancer. Healthy cells (normal cells) are programmed to “know what to do and when to do it”. Cancerous cells do not have this programming and therefore grow and replicate out of control [4,5,6].

Causative Agents:

In my study, by going through many of the review articles, I have encountered some of the major risk factors that cause cancer. They are called as carcinogens [7,8,9,10].

They are,

Chemical or Toxic Compound Exposures:

Benzene, asbestos, nickel, cadmium, vinyl chloride, benzidine, n-nitrosamines, tobacco or cigarette smoke (contains at least 66 known potential carcinogenic chemicals and toxins), aflatoxin [11,12,13].

Ionizing Radiation:

Uranium, radon, ultra violet rays from sunlight, radiation from alpha, beta and gamma and x-ray emitting sources [14,15,16,17].

Pathogens:

Human Papilloma Virus (HPV), EBV or Epstein Barr Virus, hepatitis viruses B and C, Kaposi's Sarcoma associated Herpes virus (KSHV), Merkel cell polyoma virus, Schistosoma spp., and Helicobacter pylori and other bacteria are being researched as possible agents [18,19,20].

Genetics:

A number of specific cancers have been linked to human genes and they are as follows: breast, ovarian, colorectal, prostate, skin and melanoma. Most of 75% of all cancer cases are diagnosed in people aged 55 or older. Only about 5% to 10% of cancers are genetically inherited and those cancers tend to occur earlier in life. Oncogenes are genes that cause cancer while tumor suppressor genes play a role in controlling or stopping cancer [21,22].

2. Signs and Symptoms

In my study about the research of cancer, I have come across abundant of signs and symptoms by going through many reviews articles. I have sorted out the crucial signs and symptoms from that, which the cancer patients might suffer. Let discuss about that,

- Signs and symptoms are both signals of injury, illness, disease-signals that something is not right in the body [23,24,25].
- A sign is a single that can be seen by someone else. Symptoms are also a signal but felt or noticed by the person who has it.
- The sign and symptoms of cancer will depend on where the cancer is, how big it is and how much it affects the organs or tissues. If cancer has spread (metastasized), signs or symptoms may appear in different parts of the body.
- **Metastasis:**
It means the cancer cells break away from the primary tumor, travel through the blood or lymph

system and form a new tumor in other organs or tissues in the body [26,27].

- Sometimes, cancer starts in a place where it won't cause signs or symptoms until it has grown quite large.
- Cancer cells release substances into the bloodstream that cause symptoms that are not usually linked to cancer.
- General signs and symptoms of cancer are listed below, if you have any of these and they last for a long time or get worse, you are supposed to consult a doctor to find what's going on in your body.
- Fever - blood cancers like leukemia or lymphoma.
- Unexplained weight loss - cancers of the pancreas, stomach, esophagus and lung.
- Fatigue - leukemia, some colon or stomach cancers can cause blood loss that's not obvious.
- Pain - bone cancers or testicular cancer
- Headache - symptom of brain tumor
- Back pain - symptom of cancer of the colon, rectum or ovary
- Skin changes - These signs and symptoms include,
 - Darker looking skin (hyper pigmentation)
 - Yellowish skin and eyes (jaundice)
 - Reddened skin (erythema)
 - Itching (pruritis)
- Excessive hair growth\Indigestion or trouble swallowing – cancer in esophagus, stomach or pharynx.
- Nagging cough -lung cancer [28,29].
- Hoarseness –cancer of the larynx or thyroid gland.
- White patches inside the mouth or white spots on the tongue - may be leukoplakia. Leukoplakia can become mouth cancer.

Unusual bleeding or discharge:

- Coughing up blood - lung cancer
- Blood in the stool – colon or rectal cancer
- Abnormal vaginal bleeding – cancer of the cervix
- Blood in urine – bladder or kidney cancer
- Bloody discharge from nipple – breast cancer
- Long term constipation, diarrhoea and change in the size of the stool – colon cancer
- Painful urination, hematuria, change in bladder function – bladder or prostate cancer
- Long lasting sore in mouth – oral cancer

The signs and symptom listed above are the common and crucial ones with cancer, but there are many others that have not listed. If you notice any of these going worse, consult your physician.

3. Types of Cancer

By going through many review articles, I have concluded that there are more than 100 types of cancer worldwide. As my research focuses all, I have explained some of the types of cancers along with their causes, symptoms, occurring age and prevention [29,30]. They are,

The Mortality and Cancer Cases in India:

By going through many journals, I justify that the cancer cases as well as mortality are increasing rapidly among Indian women, primarily because of low awareness and late detection [51,52,53]. India accounts for the third highest number of cancer cases among women after China and US. Cancer among women in India is estimated as 0.7 million. India also ranks among the top two countries globally on mortality for specific cancers in women. Data shows cervical and breast cancer mortality rates in India are 1.6 to 1.7 times higher than the maternal mortality, highlighting the significantly adverse mortality rates for women-specific cancers in the country. By the knowledge gathered from journals, it is clear that India topped the list for mortality for breast and cervical cancers and reported the second highest incidence for ovarian cancer globally. India-based studies have confirmed that screening improves early detection of cancers by 1.5-2.5 times. For instance, cancers such as breast and cervical can be cured if detected early and treated adequately. According to the report, it is very shocking that, of the 2,000 new women diagnosed with cancer every day, 1,200 are detected in late stages. Late detection also adds to the cost of treatment. Estimates show treatment cost for late-stage cancers is 1.5 to 2 times higher than the cost for early-stage cancers.

It also projects cancer incidence among women in India to increase from 110 per 1 lakh population to 190-260 per 1 lakh population by 2025, which will be the mirror incidence rates of China and other upper middle income countries such as Brazil and Thailand. When focusing about the cancers in men, as many as 2,500 men die every day due to tobacco related diseases in India. According to the reports I have come through, it is clear that, smoking accounts for 1 in 5 deaths among men and 1 in 20 deaths among women, accounting for an estimated 9,30,000 deaths[54,55,56].

The exact statistics in India,

- Estimated number of people living with the disease: around 2.5 million
- Every year, new cancer patients registered: Over 7 lakh
- Cancer-related deaths: 5,56,400

Deaths in the age group between 30-69 years,

- Total: 3,95,400 (71% of all cancer related deaths)
- Men: 2,00,100
- Women: 1,95,300

Cancers of oral cavity and lungs in males and cervix and breast in females account for over 50% of all cancer deaths in India [57]. The top five cancers in men and women account for 47.2% of all cancers. These cancers can be prevented, screened for and/or detected early and treated at an early stage. This could significantly reduce the death rate from these cancers.

S.NO	MEN	WOMEN
1	Lip, oral cavity	Breast
2	Lungs	Cervix
3	Stomach	Colorectum
4	Colorectum	Ovary
5	Pharynx	Lip, oral cavity

4. Treatment for Cancer

Since, cancer is becoming a deadly disease, the research on the treatment of cancer is fundamental to improve the outcomes for patients affected by this disease. By going through many reviews, the data collected from molecular and other studies indicate that, even within a given cancer, there are differences in how the cancer behaves and how it responds to treatment. Surplusly, identifying genetic, epigenetic and other molecular changes that promote the growth and development of tumors, researchers have learned about the ways that the tumors can survive and thrive in the body.

This new understanding has created opportunities to develop targeted therapies for cancer treatments that target the specific changes, most often in proteins, that underlie the growth and development of cancer. Surgery, radiation therapy and standard chemotherapy will continue to play an important role in treating cancer, but the emergence in recent years of targeted therapies and of immunotherapies, which harness the power of the immune system to fight cancer have elaborated the treatment options available to patients with certain types of cancer [58,59,60]. According to my knowledge, so far I have gathered from the reviews, it is clear that the treatment of cancer depends on where the cancer is, how big it is, whether it has spread and the general health. There are different types of treatments to heal cancer. I have listed out some, they are,

- Surgery
- Chemotherapy
- Radiotherapy
- Hormone therapy
- Bone marrow and stem cell transplants
- Immunotherapy
- Bisphosphonates
- Gene therapy
- cryotherapy

Surgery:

Surgery is used to diagnose cancer, determine its stage and to treat cancer. A common type of surgery that may be used to help with diagnosing cancer is a biopsy. A biopsy involves taking the tissue sample from the suspected cancer for examination by a specialist in the laboratory. Positive biopsy indicates the presence of cancer. Negative biopsy indicates that no cancer is present in the sample. When surgery is used for the treatment, cancer and some tissue adjacent to the cancer are typically removed. Surplusly, providing local treatment for cancer, information gained during surgery is useful in predicting the probability of cancer recurrence and whether other treatment modalities will be necessary [61,62].

Chemotherapy:

Chemotherapy is the treatment involving the administration of drugs to kill the cancer cells. Cancer chemotherapy consists of single of drugs or combination of drugs that are administered through a vein or injected into a body cavity or delivered orally in the form of pill. Chemotherapy is different from other treatment in that the cancer fighting drugs circulate in the blood to parts of the body where the

cancer may have spread and can kill or eliminate cancer cells. By the reviews, I have gone through, it is clear that half of the patients diagnosed with cancer receive chemotherapy [63,64].

Radiotherapy:

Radiation therapy also known as radiotherapy. This treatment uses high energy rays to damage or kill cancer cells by preventing their growth and division. Radiation therapy is not useful for eradicating the cancer cells that have spread already to the other parts of the body. Radiation therapy may be internally or externally delivered. External radiation delivers high energy rays directly to the tumor site from the machine outside the body. Internal radiation otherwise known as brachytherapy involves the implantation of a small amount of radioactive material in or near the cancer. Sometimes, it is used along with other cancer treatments or used alone [65,66].

Hormone therapy:

Hormones are naturally occurring substances in the body that stimulate the growth of hormone sensitive tissues such as the breast or prostate gland. When cancer arises in that tissue, its growth and spread may be affected by the body's own hormones. Hence, the drugs that block hormone production or change the way that the hormones work and or removal of organs that secrete hormones such as testicles are the way of fighting cancer in this treatment. Hormone therapy is a systemic treatment in that it affects the cancer cells throughout the body [67,68].

Bone marrow and stem cell transplants:

Bone marrow and stem cell transplants are the treatment for some types of cancers like myeloma, lymphoma and leukaemia. This treatment will be with high dose chemotherapy and sometimes radio therapy. When the stem cells are collected from the bone marrow and transplanted into a patient, the procedure is known as bone marrow transplant. Stem cell transplant can be referred to as Bone Marrow Transplant(BMT) or Peripheral Blood Stem Cell Transplant(PBSCT) or Umbilical Cord Blood Transplantation(UCBT) depending on the source of the cells that are transplanted [69,70].

Immunotherapy:

Immunotherapy is otherwise known as biologic therapy. This treatment boost's up the body's natural defenses to fight against cancer. It uses substances made by the body or in the laboratory to improve or restore immune system function. They act by stopping or slowing the growth of cancer cells or to stop cancer from spreading to other parts of the body or help the immune system work better in destroying cancer cells [71,72]. The types of immunotherapies are,

- Monoclonal antibodies
- Non specific immunotherapies
- Oncolytic virus therapy
- T-cell therapy
- Cancer vaccines

Monoclonal antibodies:

Monoclonal antibodies are a specific type of therapy made in the laboratory. These act by attaching to specific proteins on cancer cells. This flags the cells so the immune system can find and destroy those cells or by releasing the brakes

on the immune system so it can destroy cancer cells [73,74].

Non specific immunotherapies:

Non specific immunotherapy also helps the immune system to destroy cancer cells. They are given after or at the same time as another cancer treatment or as a main cancer treatment. The two common immunotherapies are [75,76]

Interferons:

Interferons helps the immune system fight against cancer and may slow the growth of cancer cells [77,78].

Interleukins: Interleukins helps the immune system produce cells that destroy cancer [79,80].

Oncolytic virus therapy:

Oncolytic virus therapy uses genetically modified viruses to kill the cancer cells. It involves injecting the virus into the tumor. the virus enters the cancer cells and makes copies of itself. As a result, the cells burst and die. When they die, they release specific substances called the antigens. This triggers the patient's immune system to target all the cancer cells in the body that have the same antigens.

The virus does not enter the healthy cells. In October 2015, the U.S Food and Drug Administration approved the first oncolytic virus therapy to treat melanoma. The virus used in this treatment is called talimogenelaherparepvecor T-VEC [81,82].

T-cell therapy:

In this treatment, the T-cells are removed from the patient's blood then they are changed in the laboratory to have specific proteins called the receptors. These receptors allow the T-cells to recognize the cancer cells. These changed T-cells are grown in large numbers in the laboratory and returned to the patient's body. There, they seek out and destroy the cancer cells. This type of therapy is Chimeric Antigen Receptor (CAR) T-cell therapy [83,84]. Researchers are still studying about this and the way to modify T-cells to treat cancer. But these treatments are only available in clinical trials.

Cancer vaccines:

Cancer vaccines exposes the person's immune system to antigens. This triggers the immune system to recognize and destroy that antigen or any other related material. There are two types of cancer vaccines. They are prevention vaccine and treatment vaccine [85,86].

Bisphosphonates:

Bisphosphonates are drugs that are used to prevent or slow down bone thinning. They are used to treat some types of cancers that cause bone damage [87,88,89]. They are used to treat lung cancer, myeloma etc.,

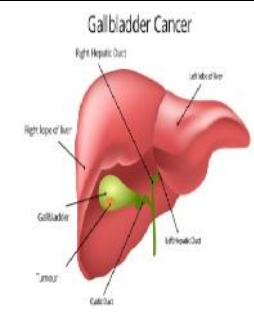
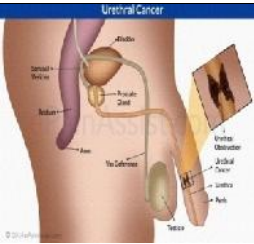
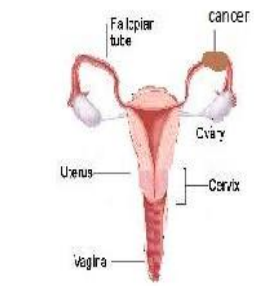
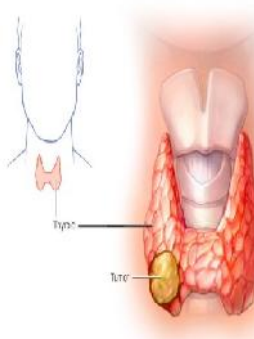
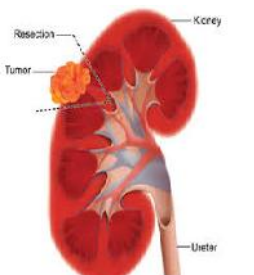
Gene therapy:

Gene therapy changes the function or structure of the genes. Since, cancer may be a disease of genetic cancer, gene therapy has great promise in prevention and treatment [90,91].

Cryotherapy:

Cryotherapy is a treatment that uses extreme cold to destroy the cancer cells. During this treatment, the doctor freezes the cancer cells to kill them. Cryotherapy is otherwise called as cryosurgery or cryoablation. It is a local treatment [92].

S.NO	TYPESOF CANCER	CAUSES	SYMPTOMS	OCCUR NGAGE	PREVENTION	PICTURE
1	Colorectal cancer (cancer of large intestine)	Low fibre, high fat diet, inflammatory conditions, smoking, alcohol, diabetes, obesity	Unexplained weight loss, fatigue, rectal bleeding, persistent abdominal discomfort	Before age 50	Quit smoking and alcohol, o regular exercise, get screened for colorectal cancer[31,32]	
2	Lung cancer (uncontrolled growth of abnormal cells that start off in one or both the lungs usually in the cells that line the air passages)	Smoking, chewing tobacco, air pollution, inhalation of asbestos fibres[33,34]	Persistent cough, hoarseness, blood streaked sputum, bronchitis, wheezing, chest pain	60 to 75 years	Quit smoking, reducing exposure to passive smoking	
3	Prostate cancer (originates in the tissues of the prostate gland that mainly produces fluids for sperms to travel freely through the vagina after ejaculation)	Diet high in red meat, obesity, genetic factors.	Hematuria, painful urination, frequent urges to urinate, less common ejaculation, bone fracture, fecal incontinence	45 to 50 years	Intermittent fasting, increase anti-oxidant consumption, improve your gut motility, consuming omega-3 rich foods[35,36]	
4	Fallopian tube cancer (this cancer grow from the cells that line the fallopian tube)	Never breast feeding a child, never giving birth, women with BRCA mutation	Abdominal bloating, pelvic or abdominal pain, fatigue, indigestion, back pain	Women between 45 to 60 years	No way to prevent this cancer[37,38]	
5	Gall bladder cancer (cancer that	Gall stones, gall bladder diseases	Abdominal pain, jaundice,	65 or older	Consuming plant foods, healthy diet, healthy	

	occurs in the gall bladder)		vomiting, nausea, lump in the abdomen, fever		weight[39,40]	 <p>Gallbladder Cancer</p>
6	Urethral cancer (disease in which malignant cells form in the tissues of the urethra)	Chemical exposure, smoking, urinary tract infection, HPV infection	Hematuria, nocturia, dysurea, itching, incontinence, dyspareunia, recurrent UTI[41,42]	Above 60 years	drinking plenty of fluids, quit smoking, eating healthy fruits and vegetables	 <p>Urethral Cancer</p>
7	Vaginal cancer (a disease in which malignant cells form in the tissues of the vagina)	HPV infection, cervical cancer, uterus cancer, hysterectomy, being exposed to DES (Di Ethyl Stilbosterol) while in the mother's womb	Lump in the vagina, dysurea, pain in pelvic area, dyspareunai	Above 60 years[43,44]	Having regular PAP test, quit smoking, avoiding sexual intercourse with multiple partners, HPV vaccine	 <p>Cancer</p>
8	Thyroid cancer (cancer that develops from the tissues of the thyroid gland)	Hypothyroidism, smoking, diabetes, cells undergoing genetic mutation, exposing to high level of radiation	Tenderness, swelling, warmth in the involved area, dysphagia, pharyngitis, hoarseness	Women – 40 to 50 years Men – 60 to 70[45,46]	Thyroid surgery, take potassium iodide tablets	 <p>Tumor</p>
9	Renal cell cancer (a disease in which malignant cells are found in the lining of the tubules in the kidney)	Smoking, obesity, hypertension, long term dialysis, exposure to certain substances like cadmium	Appetite, unexplained weight loss, tiredness, fever, back pain that doesn't go off [47,48]	Common in people younger than 45	Quit smoking, maintaining healthy weight, control high blood pressure	 <p>Tumor</p>

10	Esophageal cancer	Smoking, consuming alcohol, having barrett'soesop hagus, radiotherapy for other cancers, achalasia 9the rare disease that affects the muscle of oesophagus), tylosis (the rare disease that changes the cells that line your oesophagus)	Continued heart burn, difficulty in swallowing, unexpected weight loss, loss of appetite, pain in your throat, cough that doesn't go away, coughing up blood	Women- above 90, men-85 to 89[49,50]	Don't lie down after eating, taking antacids,	
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5. Conclusion

As a result of my study, it is clear that the cancer is trending a new disease and the mortality due to cancer has increased and hence the treatment to cure them also stands first. Hence, my study about cancer stimulates us to conduct programs involving awareness raising component to educate patients, family and community members about the cancer risk factors and the need for taking preventive measure to avoid developing cancer. The treatment for cancer costs high and some people doesn't know about its serious effects. So we should take a oath to provide diagnose and treatment services to all patients presenting with curable cancers such as breast, cervical and oral cancers that can be detected early. This module on diagnosis and treatment is intended to evolve in response to national need and experience. Though there are many treatments to cure cancer, there are also some side effects along with them. Although the scientists have made great strides in understanding the causes of cancer and the developing treatments, there will always be a risk for developing cancer. Finally, my study concludes by saying, as a individual, we should try to aware of the risks of exposure to suspected carcinogens and take appropriate actions to reduce our exposure.

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