

BREAST CANCER: A SYSTEMATIC REVIEW

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Abstract

The incidence of Breast Cancer is increasing, particularly in previously low incidence area such as developing Asian country such as India, Pakistan, and Bangladesh. In the present article, authors tried to review the Breast cancer statistics with the help of Graphical data. The study also review with special account on causes, cancer types, different stages sign and symptoms, methods of detection with their treatment such as Radio therapy, Chemotherapy, Surgery. In the present article, we have shown the various food and nutraceuticals which can be used as a preventive food for cancer.

Key Words: Breast cancer, statistics, carcinoma.

Introduction

The incidence of breast cancer is rising in every country of the world especially in developing country such as India. There has been no improvement in breast cancer presentation over the past 5–10 years, in spite of breast awareness programmers. Much of the increase of breast cancer in India has been associated with greater urbanization and changing life styles. Breast cancer continues to affect a young population and patients still present late with advanced disease. Breast Cancer is cancer originating from breast tissue, most commonly from the inner lining of milk ducts or the lobules that supply the ducts with milk. Cancers originating from ducts are known as Ductal carcinomas; those originating from lobules are known as lobular carcinomas. Breast cancer is a disease of humans and other mammals. Breast Cancer occurs when a mutation takes place in the cells that line the lobules that manufacture milk or more.

Breast Cancer Statistics¹⁻³

- ❖ Every three minutes, a woman in the United States is diagnosed with breast cancer.
- ❖ Every twelve minutes a woman dies from breast cancer.
- ❖ This year, approximately 182,800 women in the United States will be diagnosed with invasive breast cancer.
- ❖ Approximately 40,800 women will die from breast cancer.
- ❖ The most common form of cancer among women.
- ❖ The second most common cause of cancer related mortality.
- ❖ 1 of 8 women (12.2%).
- ❖ One third of women with breast cancer die from breast cancer, no one dies of cancer in the breast, only of cancer that has spread to other parts of the body.

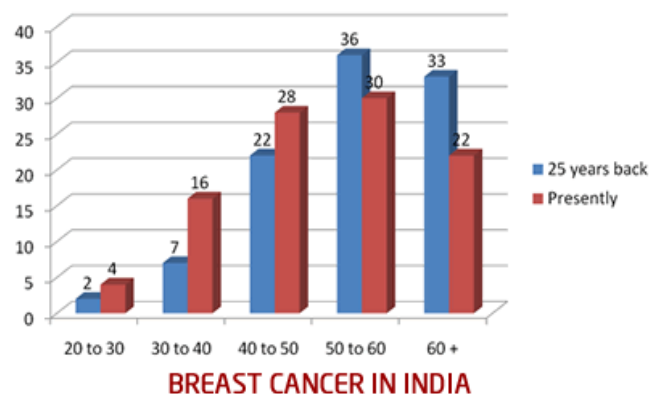
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Graphical representation of breast cancer in India

In India, the average age of developing a breast cancer has undergone a significant.

- a) The horizontal line lower down represents the age groups: 20 to 30 years, 30 to 40 yrs and so on. And the vertical line represents the percentage of cases.
- b) The blue color represents the incidence 25 years back, and maroon color represents the situation today.
- c) 25 years back, out of every 100 breast cancer patients, 2% were in 20 to 30 years age group, 7% were in 30 to 40 and so on.
- d) 69% of the patients were above 50 years of age. Presently, 4% are in 20 to 30 yrs age group, 16% are in 30to 40, 28% are in 40 to 50 age group. So, almost 48% patients are below 50. An increasing numbers of patients are in the 25 to 40 years of age, and this definitely is a very disturbing trend.



Causes and Risk Factors for Breast Cancer⁴⁻⁸

Some of the causes that have been collectively associated with breast cancer are:

1. **Hormone therapy:** To reduce symptoms menopause.
2. **Exogenous Estrogen:**
 - Hormonal replacement therapy (HRT) 30% increased risk with long term use.
 - Oral Contraceptives (OC).
3. **Pregnancy:** An early first pregnancy reduces the risk of breast cancer.
4. **Genetic factors:** Play a big rule in the type of breast cancer affecting young women.
5. **Breast cancer virus:** Since the 1930s researchers have been looking for a virus analogous to the mammatumorvirus causing benign cancer in mice.

6. Birth control pills: The adverse effect of these drugs hasn't been completely discovered; however there is a moderate risk increase if the medication has been taken for longer than 5 years.

7. Age: The chance of breast cancer depends on age, as the person gets older the chances of it are more.

8. Inheritance: Family history of close relative like mother, sister and daughter who has been diagnosed with breast cancer increases the risk factor.

9. Early menses or menopause: Early start onset of menses and early menopause are also associated with breast cancer.

10. Radioactivity: Exposure to radioactive rays is carcinogenic and increases the chances of breast cancer.

11. Hormone Replacement Therapy: Using hormone replacement therapy might also cause it.

12. Exposure to harmful chemicals: Working in a chemical factory that uses harmful chemicals like Organ chlorines.

Abnormal Signs and Symptoms

Lump formation: A lump in the breast, is often the first apparent symptom of breast cancer, breast lumps are usually painless, although some may cause a prickly sensation. Lumps are usually visible on a mammogram long before they can be seen or felt.

Pain or tenderness: Pain & tenderness occur in the breast

Redness: Reddish, pitted surface like the skin of an orange is symptomatic of advanced breast cancer.

Change in nipple position: A change in the nipple, such as an indrawn or dimpling look, Itching or burning sensation, or ulceration, scaling of the nipple is symptomatic of Paget's disease, a localized cancer.

Scaling around nipples: Any change in the contour, texture or temperature of the breast, reddish or pitted surface like the skin of an orange symptomatic of advanced breast cancer.

Sore on breast that does not heal: The sore or wound on breast that cannot be heal early.

Dimpling: An indrawn or dimpling look, itching or burning sensation, or ulceration.

Retraction: A noticeable flattening or indentation on the breast which may indicate a tumor that cannot be seen or felt.

Nipple discharge: Unusual discharge from the nipple that may be clear, bloody or of another color, usually caused by benign conditions but possibly due to cancer.

Stages of Breast Cancer

The stages of breast cancer has designated as TNM.

T= tumor size

N = lymph node involvement

M = metastasis

Stage I

- Tumor < 2.0 cm in greatest dimension
- No nodal involvement
- No metastases

1. The first stage is stage 0 this stage is sometimes referred to as a 'non-invasive carcinoma'

2. In this stage there are abnormal cells present that might suggest that one is at higher risk for cancer.

3. Some women chose to have a double mastectomy to avoid the potential of cancer, while others take tamoxifen.

4. Either way it's important to have regular checkups with your doctor.

Stage II

- Tumor > 2.0 < 5 cm
- Ipsilateral axillary lymph node (N1)
- No Metastasis

Stage II is when the cancer is anywhere from 1-2 cm across, and has spread into the surrounding areas including the lymph nodes (which must also be removed to prevent the further spread of the cancer).

Stage III

- Tumor > 5 cm (T3)
- or ipsilateral axillary lymph nodes fixed to each other or other structures (N2)
- involvement of ipsilateral internal mammary nodes (N3)
- Inflammatory carcinoma (T4d)

This is the stage for cancer in the advanced stages. It's more than 2 cm across and has spread to the lymph nodes. A type of cancer most associated with this is called inflammatory breast cancer, because the breast is inflamed because the cancer is blocking the lymph nodes.

Stage IV (Metastatic breast cancer)

- Any T
- Any N
- Metastasis (M1)

1. The last stage of cancer is stage IV. In stage IV, the cancer has spread past the breast and the lymph nodes and needs immediate treatment of chemotherapy and hormonal therapy to keep it under control.

2. Then there is remission. If you are in remission you have an extremely high risk of reoccurrence with in the first 5 years after the last know cancer is killed.

Types of Breast Cancer²⁴

A) In Situ Breast Cancer

a. In Situ Breast Cancer remains within the ducts or lobules of the breasts.

b. This type of cancer is only detected by mammograms – not by a physical examination.

➤ **Intraductal:** If the cancer is in the duct it is called Ductal Carcinoma.

➤ **Intralobular:** If the cancer is in the lobule of the breast, it is called Lobular Carcinoma (Intralobular *in situ*).

a. This type of cancer is most common among pre-menopausal women.

b. There is also a slight chance that if a woman has this type of cancer she is at risk that it would occur in the other.

B) Invasive Breast cancer

Infiltrating Breast Cancer

- Breast cancer is considered infiltrating or invasive if the cancer cells have penetrated the membrane that surrounds a duct or lobule.
- This type of cancer forms a lump that can eventually be felt by a physical examination.

Infiltrating ductal carcinoma

- Called "Infiltrating Ductal Carcinoma"
- It is the most common type of breast cancer.
- Cancer cells that are invading the fatty tissue around the duct, they stimulate the growth of noncancerous scar like tissue that surrounds the cancer making it easier to spot.

Infiltrating Lobular carcinoma

- Called "Infiltrating Lobular Carcinoma"
- Occurs when cells stream out in a single file into the surrounding breast tissue. This type of cancer is harder to detect on a mammogram because there is no fibrous growth.

Methods of Detection of Breast Cancer⁶⁻⁹

A) Clinical examination

- Performed by doctor or trained nurse practitioner
- Annually for women over 40
- At least every 3 years for women between 20 and 40
- More frequent examination for high risk patients

B) Mammography

- It is an x-ray examination with a special apparatus.
- The breast is comprised between two plates of plexiglass to keep the breast in position
 - The applied x-rays are rather soft (26-30 keV) to increase the contrast small neoplastic tissue formations can be seen
 - Has been shown to save lives in patients 50-69
 - Data mixed on usefulness for patients 40-49
 - Normal mammogram does not rule out possibility of cancer completely
 - American Cancer Society recommends that Women (asymptomatic) 40 years of age and older should have a mammogram every year.

C) Breast Self Examination

- Opportunity for woman to become familiar with her breasts
- Monthly exam of the breasts and underarm area
- May discover any changes early
- Begin at age 20, continue monthly

Other Forms of Detection

- Sonogram
- Thermography
- Transillumination
- Xeromammography
- CT Scan
- MRI

Treatment of Breast Cancer⁹⁻²¹

Treatment of breast cancer is performing with the help of various methods like:-

- Chemotherapy
- Radiation Therapy
- Drugs
- Surgery

A) Chemotherapy of breast cancer

Chemotherapy works by destroying cells that are dividing and multiplying all the time.

- Chemotherapy is used for treatment of breast cancer because there is a possibility of the cancer to spread to other parts of the body.
- Chemotherapy works better for premenopausal women.
- Systemic chemotherapy can prevent the spread of cancer.
- Chemotherapy drugs are administered intravenously.
- Chemotherapy affects the whole body even if the cancer has not spread.
- Chemotherapy is often administered prior to surgery to reduce the size of the tumor to leave clear margins.
- Chemotherapy also reduces your leukocytes (white blood cells that is also our immune system), making you more susceptible to every day bugs.
- The side effects include nausea and, losing all your hair. It's administered through and IV or its also available in pill, and liquid form.
- As always it's your choice and should not be taken lightly.

Chemotherapy Agents

- Cyclophosphamide (Cytoxan)
- Doxorubicin (Adriamycin)
- Paclitaxel (Taxol)
- Tamoxifen (Nolvadex)
- Trastuzumab (Herceptin)

Alkylating Agents

Example: Cytoxan, Cyclophosphamide, Thiopeta

- These types of drugs usually damage the programs that control the growth in tumor cells.

Antimetabolites

Example: Methotrexate, 5-fluorouracil, 6-Mercaptopurine

- This type of drug interferes with the making of nucleotides, which are the substances that make up DNA.

Natural Products

Example:- Vincristine, Vinblastine, Bleomycin, Dactinomycin

- These drugs interfere with cell structure as well as cell division.

Hormones

Example: Prednisone, Testosteronepropionate, Tomoxifen

- Hormones affect the growth of hormones and usually enhance the effects of other cytotoxic drugs.

B) Radiation Therapy

- Radiation, at high energy levels, has the ability to destroy what is in its path, including normal and abnormal cells.
- Fortunately new technologies have found a way to battle cancer with radiation.
- Radiation usually destroys rapidly dividing cancerous cells.
- Normal cells have the ability to repair themselves.
- Radiation kills the cancer cells left after surgery.
- Radiation therapy doesn't make you radioactive.
- Radiation is painless when it's delivered, but it will become more painful over time.
- Treatments will be given up to 5-7 weeks, 5 days a week.
- Treatments only take ½ hour so you can keep your routine.

C).Surgery

- Oldest treatment
- Lots of advancement have taken place over last few years
- Surgery has role in prevention of cancer – removal of non-vital organ.

Mastectomy:-

- A mastectomy is the surgical removal of the breast, non-protruding breast tissue, the lymph nodes in the armpits and some pectoral muscle.
- Breast reconstruction surgery may be conducted after the removal of the breast.

Lumpectomy:-

- In this surgical procedure, the breast is conserved and the tumor is removed.
- Radiation commonly follows a lumpectomy to try to rid the body of any other cancerous cells.

Prevention of Breast Cancer

Various substance or factor that can help an individual to prevent breast cancer which is as follows:

1. Fat

- Research shows that dietary fat should be 20% or less in order to gain meaningful protection against cancer.
- Fat cells make estrogen, which promotes breast cancer.
- Diets high in fat are associated with the increasing breast density in mammograms, which makes interpretation more difficult.

2. Fiber

- Fiber provides protection against breast cancer because it has a mechanism that decreases the amount of estrogen in the body.
- The amount of fiber in the diet affects the activities of intestinal bacteria, which affects the amount of reabsorbed estrogens

3. Antioxidant nutrient-

- Antioxidants are important in fighting breast cancer because they can disarm cancer-causing substances called free radicals.
- Vitamin C
- Vitamin E
- Beta-carotene
- Vitamin A
- Selenium

Other Preventative Measures

- Early Detection
- Exercise
- No Smoking
- Good Diet

Conclusion:

There are two important aspects in breast cancer prevention: early detection and risk reduction. Screening may identify early noninvasive cancers and allow treatment before they become invasive or identify invasive cancers at an early treatable stage. Treatments are constantly evaluated in randomized, controlled trials, to evaluate and compare individual drugs, combinations of drugs, and surgical and radiation techniques. Education needs to be intensified, in addition to the usual lifestyle recommendations, may also be considered. Further research is needed to address these issues and change the trend.

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