

## **Introduction:**

A malignant tumor that originated from breast cells is referred to as **breast cancer**. The lobules, the milk-producing glands, or the ducts, the passageways that carry milk from the lobules to the nipple, are typically where breast cancer starts. Cancer cells can slowly infiltrate neighboring healthy breast tissue and travel to the underarm lymph nodes, which are tiny structures responsible for filtering out foreign substances from the body. Cancer cells have a route into other body organs if they enter the lymph nodes. The breast cancer stage describes the extent of the cancer cells' dissemination from the primary tumor. A genetic anomaly (a "error" in the genetic code) is always the root cause of breast cancer. Only 5% to 10% of malignancies, though, are brought on by a defect you received from your mother or father. Instead, around 85% of breast cancers are caused by genetic anomalies that arise as a result of age and typical life wear and tear.

## **Extent of breast cancer**

Breast cancer accounts for 12.5% of all new cases of cancer each year, making it the most prevalent cancer in the world right now. The American Cancer Society has provided the following projections for breast cancer in the US until the year 2022: Invasive breast cancer will affect roughly 13% (or 1 in 8) of American women during their lifetime. In the United States, women are anticipated to receive diagnoses for 287,850 new instances of invasive breast cancer and 51,400 new cases of non-invasive (in situ) breast cancer in 2022. In 2022, it's anticipated that 2,710 new instances of invasive breast cancer would be found in men. About 1 in 833 men may develop breast cancer in their lives. In the U.S., there are more than 3.8 million women who have had breast cancer in the past as of January 2022. Women who have completed treatment as well as those who are presently receiving it are included. Worldwide, breast cancer causes more lost disability-adjusted life years (DALYs) for women than any other type of cancer. Every country in the globe experiences breast cancer in women at any age after puberty, although the incidence rates rise as people age. From the 1930s until the 1970s, there was no change in the mortality of breast cancer. In nations with early detection programmes and various forms of treatment to remove invasive disease, improvements in survival started in the 1980s.

The most frequent malignancy among women is breast cancer. About 30% of newly diagnosed malignancies in women are predicted to be breast cancers in 2022.

If a woman has a first-degree family (mother, sister, or daughter) who has been diagnosed with breast cancer, her risk of developing the disease practically doubles. 15% of women who develop breast cancer have a family member who has been diagnosed with it.

Between 5% and 10% of breast tumors have known gene alterations that can be passed down from one's mother or father. The most frequent gene mutations are in the BRCA1 and BRCA2 regions. A BRCA1 mutation increases a woman's lifetime risk of breast cancer by up to 72%. Up to 69% of women are at risk if they carry a BRCA2 mutation. Breast cancer that has either a BRCA1 or BRCA2 mutation tends to strike younger women more frequently. These genetic variants are linked to an elevated risk of ovarian cancer.

## **Risk of breast cancer**

Breast cancer is not an infectious or contagious illness. There are no known viral or bacterial infections linked to the development of breast cancer, in contrast to several cancers that have infection-related origins, such as human papillomavirus (HPV) infection and cervical cancer. Only gender (female) and age, the only known risk factors for breast cancer in women, account for almost half of all cases (over 40 years). Ageing, being overweight, drinking excessively, having a family history of breast cancer, having been exposed to radiation previously, having had late pregnancy, smoking, and postmenopausal hormone therapy are some variables that raise the risk of breast cancer.

Behavioral choices and related interventions that reduce the risk of breast cancer include:

- Long-term breastfeeding
- Regular exercise
- Maintaining a healthy weight
- Abstaining from harmful alcohol use
- Limiting exposure to tobacco smoke
- Abstaining from long-term hormone use, and
- Limiting exposure to excessive radiation.

Unfortunately, even if all of the possibly controllable risk factors could be avoided, the risk of developing breast cancer would only be decreased by a maximum of 30%. The biggest risk factor for breast cancer is female gender. Men make up between 0.5 and 1% of breast cancer cases. Men with breast cancer

are treated using the same management strategies as women. Although having a known family history of the disease reduces the risk of developing breast cancer, the majority of women who are diagnosed with the disease do not. A woman is not always less at risk if her family history is unknown.

### **Treatment**

When the disease is detected early on, breast cancer treatment can be very successful, with the survival probability of 90% or higher. Surgery and radiation therapy are typically used as part of treatment to cure and/or prevent the spread of the illness to the lymph nodes, breast, and adjacent areas (locoregional control). Systemic therapy also includes anti-cancer medications administered intravenously or orally (metastasis). Endocrine (hormone) therapy, chemotherapy, and occasionally targeted biologic therapy are anti-cancer medications (antibodies). In the past, mastectomy was the only surgical procedure used to treat breast cancer (complete removal of the breast). Even with big malignancies, mastectomy may still be necessary.

Most breast cancers can now be treated with a less invasive treatment called a "lumpectomy" or partial mastectomy, in which only the breast tumor is removed. To reduce the likelihood of recurrence in the breast in these situations, radiation therapy to the breast is typically necessary. For aggressive tumors, lymph nodes are removed during cancer surgery. Previously, it was believed that in order to stop the spread of cancer, the lymph node bed under the arm (full axillary dissection) had to be completely removed.

Sentinel node biopsy, a method that removes fewer lymph nodes, is increasingly preferred since it has less consequences. To locate the first few lymph nodes where breast cancer can spread, a dye or radioactive tracer is used. Based on the biological subtyping of the malignancies, medical treatments for breast cancers may be administered either before ("neoadjuvant") or after ("adjuvant") surgery. Endocrine (hormone) therapy like tamoxifen or aromatase inhibitors are likely to be effective against cancers that express the oestrogen receptor (ER) and/or progesterone receptor (PR). These drugs lower the likelihood of these "hormone-positive" tumors recurring by almost half when taken orally for 5–10 years. Menopause symptoms may be brought on by endocrine therapy, however they are typically well tolerated.

Cancers that lack ER or PR expression are referred to as "hormone receptor negative" and, unless the disease is very tiny, must be treated with chemotherapy. The chemotherapy regimens that are currently available are often administered as outpatient therapy and are quite effective in lowering the likelihood of cancer spread or recurrence. In the absence of problems, chemotherapy for breast cancer typically does not necessitate hospitalization. A chemical known as the HER-2/neu oncogene may be overexpressed by breast tumors on their own. Treatment options for these "HER-2 positive" malignancies include targeted biological medicines like trastuzumab.

Due to the fact that these biological agents are antibodies rather than chemicals, they are not only incredibly expensive but also very effective. Targeted biological therapies are used in conjunction with chemotherapy to maximise their capacity to eradicate cancer cells. Additionally, radiotherapy is crucial in the management of breast cancer. Radiation therapy for early-stage breast cancers can spare a woman from needing a mastectomy. Even after a mastectomy, radiation can lower the chance of cancer recurrence in patients with advanced malignancies. In some cases, radiation therapy for advanced breast cancer may lessen the chance of death from the condition. The entire course of treatment determines how well breast cancer medicines work. A successful outcome is less likely to result from partial treatment

### **Links:**

<https://www.cancer.org/cancer/breast-cancer.html>

<https://www.breastcancer.org/>

<https://www.bcrf.org/>

<https://www.lbbc.org/>

<https://www.nationalbreastcancer.org/>

<https://www.breastcancer.org/facts-statistics>