# Breast Cancer: An Overview

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***Key points:***

- Introduction to Breast Cancer
- Causes and symptoms of Breast Cancer
- Diagnosis
- Treatment and Awareness

## Introduction

Breast cancer is the second most prevalent cause of cancer-related deaths among women globally and the most common cancer diagnosed in women, accounting for about 10% of new cancer diagnoses every single year. Risk reduction is essential to lowering the incidence of breast cancer since the risk factors for the disease are well known. Breast cancer normally develops quietly and is found during routine screening. Breast cancer frequently appears as a palpable breast lump in the absence of screening. Depending on the stage and kind of tumor, breast cancer is treated with a combination of radiation, chemotherapy, immunotherapy, and surgery. Both overall survival and patient-reported outcomes have significantly improved because of advancements in these therapy techniques.

## Causes and Symptoms

There are many causes of breast cancer. For example, nutrition and exercise ability are lifestyle-related risk factors that increase the probability. In many BC situations, hormones also play a role. Physical breast cells may become cancerous due to gene changes or mutations. However, inherited defective genes are only known to be linked to 10% of breast cancer cases. Unidentified acquired gene changes account for about 90% of BC cases. Any genes found in normal cells that aid in regulating cell proliferation and the formation of new cells are known as proto-oncogenes. By passing specific mutations, a proto-oncogene can develop into an oncogene. Cell disease can be caused by this mutant oncogene. If a tumor suppressor gene is changed, cells may become cancerous. These acquired mutations in tumor suppressor or oncogene genes can be brought on by radiation or other carcinogens. However, some gene alterations might take place inside a cell without an external cause. Breast cancer frequently shows no symptoms when a tumor is small and most curable, which is why screening is essential for early detection. The most common physical symptom is a lump. Breast cancer can spread into the lymph nodes down the arm and cause a lump even before the primary breast tumor reaches a measurable volume. Breast soreness or heaviness, persistent nipple changes, such as nipple discharge, scaliness, or retraction, are fewer common signs and symptoms.[1] Any persistent changes to the breasts should be examined by a doctor. Pain, fatigue, anxiety and depression are also common conditions in breast cancer and often co-occur with insomnia in symptom clusters, exacerbating one another and decreasing quality of life.[2]

## Diagnosis

With the rapid development of artificial intelligence, computer-aided diagnosis can efficiently assist radiologists in diagnosing breast problems. AI has advanced particularly in machine vision, image

recognition, speech recognition, and other areas that have produced significant achievements. Mammography images, breast thermal images, and breast ultrasound images are the three ways to diagnose breast cancer. Mammography serves as a widely adopted method for the early prediction and detection of breast cancer, however, challenges arise in accurately extracting breast areas in low-contrast images due to abnormalities. The presence of malignant tumors in the breast results in a higher temperature due to increased metabolism and blood flow to support tumor growth. This temperature rise in the tumor region is reflected in changes in the breast skin's surface temperature. Consequently, breast thermal images can be used for breast cancer identification. When compared to other breast tumor imaging techniques, ultrasound offers the advantages of real-time, low cost, no radiation, and good repeatability. Ultrasound is a highly beneficial diagnostic technique that often finds breast tumors that mammography misses in thick breast tissue.[3]

**Treatment and Awareness**

Physicians can better care for their patients throughout and after cancer therapy if they are aware of the available alternatives for treating breast cancer. Radiation therapy and breast-conserving surgery are typically used to treat stage I and II breast cancers. After breast-conserving surgery, radiation therapy reduces death and recurrence. For most breast tumors with clinically negative axillary lymph nodes, sentinel lymph node biopsy is taken into consideration because it does not have the negative side effects of arm pain and swelling that come with axillary lymph node dissection. Induction chemotherapy is usually necessary for stage III breast cancer to reduce tumor size and enable breast-conserving surgery. Despite being classified as stage III, inflammatory breast cancer is aggressive and necessitates induction chemotherapy before mastectomy. Prognosis is poor in women with stage IV breast cancer, and treatment options must balance benefits in length of life and reduced pain against harms from treatment.[4] Awareness about BC is of great importance for early detection, but many women do not have appropriate health-related attitudes toward this disease and do not participate in screening programs, especially in countries like Pakistan. Effective education programs on awareness about BC are urgently needed for women to motivate them to participate in preventive activities.

**References**


1. Koo MM, Von Wagner C, Abel GA, McPhail S, Rubin GP, Lyratzopoulos G. Typical and atypical presenting symptoms of breast cancer and their associations with diagnostic intervals: Evidence from a national audit of cancer diagnosis. Cancer epidemiology. 2017 Jun 1;48:140-6.
2. Fiorentino L, Rissling M, Liu L, Ancoli-Israel S. The symptom cluster of sleep, fatigue and depressive symptoms in breast cancer patients: severity of the problem and treatment options. Drug Discovery Today: Disease Models. 2011 Dec 1;8(4):167-73.
3. Wen X, Guo X, Wang S, Lu Z, Zhang Y. Breast cancer diagnosis: A systematic review. Biocybernetics and Biomedical Engineering. 2024 Jan 1;44(1):119-48.
4. Maughan KL, Lutterbie MA, Ham PS. Treatment of breast cancer. Am Fam Physician. 2010 Jun 1;81(11):1339-46.