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BREAST CANCER: A REVIEW OF RISK FACTORS AND DIAGNOSIS

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ABSTRACT

A Breast cancer is a disease in which cells in the breast grow uncontrollably. It can occur in both women and men, though it's far more common in women. Here's an overview Breast cancer usually starts in the ducts (the tubes that carry milk to the nipple) or lobules (the glands that produce milk). Sometimes, it begins in other tissues of the breast. Common warning signs A wedge or thickening in the breast or armpit Change in breast shape or size Nipple discharge (other than breast milk) Redness, dimpling, or puckering of the skin pain in the breast or nipple area (though often painless in early stages) Inverted nipple or a red scaly patch of skin secondary metabolites for. their signaling mechanism and natural defense a variety of plant derived products have shown promising anti cancer properties in vitro and in vivo rather than recreating the natural production environment ongoing studies are currently setting various strategies to significantly manipulate the quantity of anti cancer molecules in plant.

KEYWORD: Breast cancer, epidemiology, risk factors, diagnosis, treatment.

INTRODUCTION

Breast cancer is a type of cancer that develops in the cells of the breast tissue, most commonly in the ducts (ductal carcinoma) or lobules (lobular carcinoma). It occurs when abnormal breast cells grow uncontrollably and can invade nearby tissues or spread (metastasize) to other parts of the body, such as the bones, liver, lungs, or brain 

Types of Breast Cancer

Non-invasive (in situ)

- **Ductal carcinoma in situ (DCIS):** Abnormal cells confined to the ducts; hasn't spread to surrounding tissue.
- **Lobular carcinoma in situ (LCIS):** Abnormal cells in the lobules; not cancer but a marker for higher risk.

Invasive

- **Invasive ductal carcinoma (IDC):** Most common type (~70–80%); starts in ducts and invades surrounding tissue.
- **Invasive lobular carcinoma (ILC):** Starts in lobules and spreads to nearby tissues.

Other subtypes

- **Triple-negative breast cancer (TNBC):** Lacks estrogen, progesterone, and HER2 receptors; more aggressive.
- **HER2-positive:** Has excess HER2 protein; tends to grow faster but responds to targeted therapies.
- **Inflammatory breast cancer:** Rare, aggressive; causes redness and swelling rather than a lump.

Risk Factors

- **Genetic:** BRCA1/BRCA2 mutations, family history.
- **Hormonal:** Early menstruation, late menopause, hormone therapy, lack of pregnancy or late first pregnancy.
- **Lifestyle:** Obesity, alcohol use, lack of physical activity.
- **Other:** Age, radiation exposure, certain benign breast conditions.

Symptoms

- **A new lump** or thickening in the breast or underarm.
- **Changes in breast size or shape.**
- **Nipple discharge** (other than breast milk).
- **Redness, dimpling, or puckering** of breast skin.
- **Nipple retraction** or pain.
- **Swelling** in part of the breast.

Note: Not all lumps are cancerous — benign cysts or fibroadenomas are common.

 **Diagnosis**

1. **Clinical breast exam**
2. **Imaging tests**
 - o Mammogram
 - o Ultrasound
 - o MRI
3. **Biopsy:** Confirms cancer and determines type, grade, and receptor status (ER, PR, HER2).
4. **Staging:** Based on tumor size (T), lymph node involvement (N), and metastasis (M).

 **Treatment Options**

Treatment depends on type, stage, and receptor status. It may include:

Local therapies

- **Surgery:** Lumpectomy or mastectomy.
- **Radiation therapy:** Targets residual cancer cells.

Systemic therapies

- **Hormone therapy:** For hormone receptor-positive cancers (e.g., tamoxifen, aromatase inhibitors).
- **Chemotherapy:** Destroys rapidly dividing cells.
- **Targeted therapy:** For HER2-positive cancers (e.g., trastuzumab).
- **Immunotherapy:** For certain types, like triple-negative cancers.

 **Previous treatment of breast cancer** depends on several factors, including:

- The **type** of breast cancer (e.g., hormone receptor-positive, HER2-positive, triple-negative)
- The **stage** of the cancer (how large it is and whether it has spread)
- The **patient's overall health and preferences**

Here's a summary of the main treatment options:

1. Surgery

Most patients with breast cancer undergo surgery. The two main types are:

- **Lumpectomy (breast-conserving surgery):** Removal of the tumor and a margin of surrounding tissue.

- **Mastectomy:** Removal of the entire breast. Sometimes both breasts are removed (bilateral mastectomy).

Lymph nodes (in the armpit) may also be removed for staging

2. Radiation Therapy

Used after surgery (especially lumpectomy) to kill any remaining cancer cells in the breast, chest wall, or lymph nodes.

3. Systemic Therapies (Drugs that affect the whole body)

A. Hormone (Endocrine) Therapy

Used for **hormone receptor-positive (ER/PR+)** breast cancers.

- **Tamoxifen** – used in premenopausal and postmenopausal women.
- **Aromatase inhibitors** (anastrozole, letrozole, exemestane) – mainly for postmenopausal women.
- **Ovarian suppression** (with medication or surgery) for premenopausal women.

B. Chemotherapy

Used for more aggressive cancers, advanced stages, or when tumors are not hormone-sensitive.

Common regimens include

- **AC (Adriamycin + Cyclophosphamide)**
- **TC (Docetaxel + Cyclophosphamide)**
- **Taxane-based regimens (Paclitaxel or Docetaxel)**

C. Targeted Therapy

Used when specific molecular markers are present:

- **HER2-positive cancers**
 - *Trastuzumab (Herceptin)*
 - *Pertuzumab (Perjeta)*
 - *Ado-trastuzumab emtansine (T-DM1)*
 - *Fam-trastuzumab deruxtecan (Enhertu)*

D. Immunotherapy

For **triple-negative breast cancer (TNBC)**

- *Pembrolizumab (Keytruda)* or *Atezolizumab (Tecentriq)* combined with chemotherapy.

4. Neoadjuvant and Adjuvant Therapy

- risk. **Neoadjuvant therapy:** Treatment (chemo, targeted, or hormone therapy) given **before surgery** to shrink the tumor.
- **Adjuvant therapy:** Treatment given **after surgery** to reduce recurrence

5. Treatment for Metastatic (Stage IV) Disease

Focuses on **prolonging life and controlling symptoms**

- Systemic therapies (hormone, targeted, chemo, or immunotherapy)
- Palliative radiation or surgery for symptom control

6. Supportive (Palliative) Care

To manage side effects and improve quality of life

- Pain management
- Nutrition support
- Psychological support
- Physical therapy (for lymphedema)

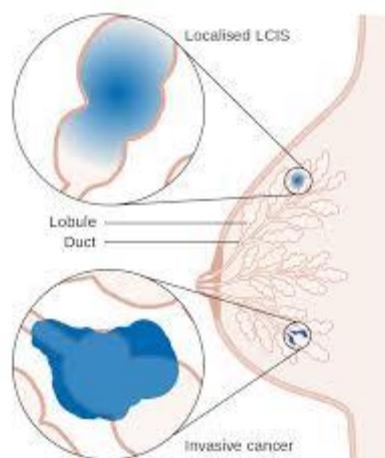
Prevention and Early Detection

- **Regular screening:** Mammograms starting at age 40–50 (depending on guidelines and risk factors).
- **Healthy lifestyle:** Exercise, balanced diet, limited alcohol.
- **Genetic counseling/testing:** For high-risk individuals.
- **Self-examination:** Helps detect changes early.

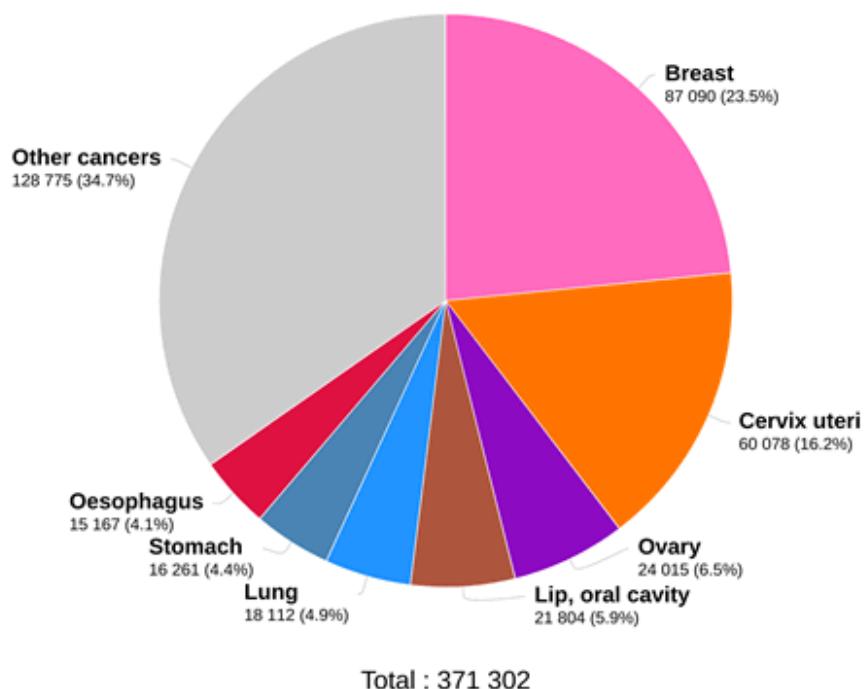
Prognosis

- Survival rates have **improved significantly** due to early detection and better treatments.
- **5-year survival rate** (localized stage): ~99%.
- **Metastatic stage:** ~30%.

Prognosis varies widely by subtype and individual factors.



Estimated number of deaths in 2018, India, females, all ages



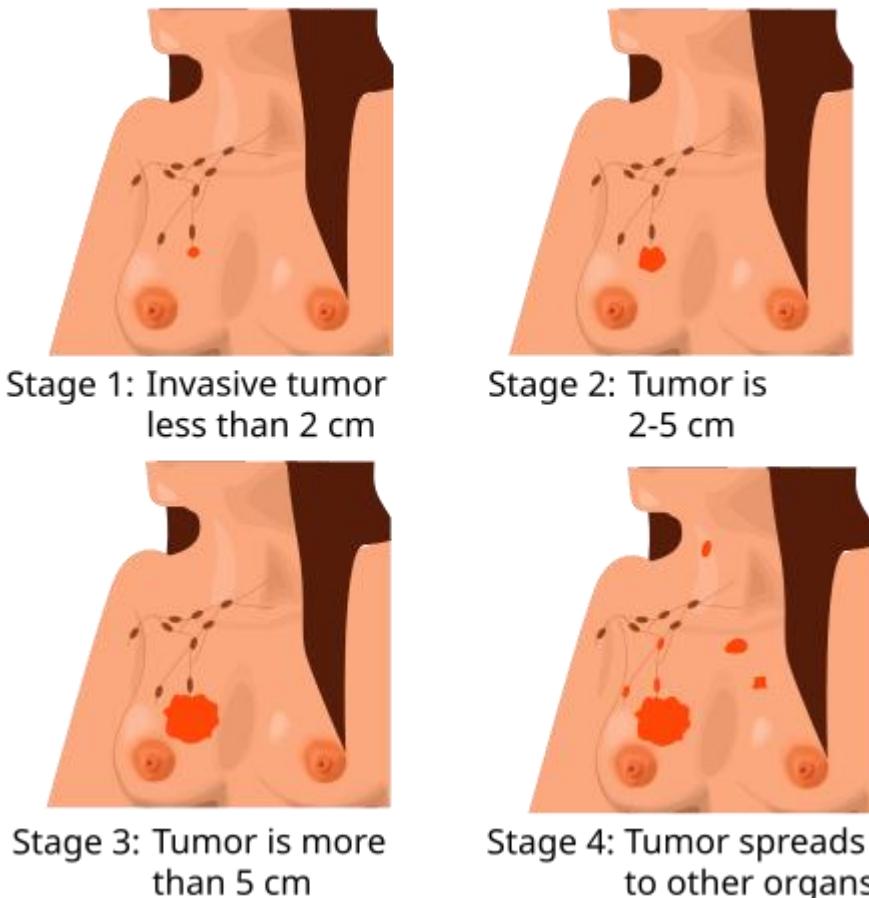
Data source: Globocan 2018
 Graph production: Global Cancer Observatory (<http://geo.iarc.fr>)

International Agency for Research on Cancer
 World Health Organization

RESULT

Maraniol and fucoxanthin are the compounds that are compounds of algae used in the treatment of cancer risk Neo adjuvant therapy: Treatment (chemo, targeted, or hormone therapy) given before surgery to shrink the tumor. Adjuvant therapy: Treatment given after surgery to reduce recurrence to manage the side effects follow up the nutrition support and psychological therapy self inspection and regular checkup is required for the detection of the breast cancer.

Breast Cancer Stages



CONCLUSION

Breast cancer remains one of the most common cancers affecting women worldwide, but advances in early detection, diagnosis, and treatment have significantly improved survival rates and quality of life. Awareness, regular screening, and lifestyle modifications play vital roles in prevention and early intervention. Continued research into genetics, targeted therapies, and immunotherapy offers hope for more personalized and effective treatments in the future. Ultimately, a combination of education, early detection, and medical innovation is key to reducing the global impact of breast cancer.

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