GENERAL

Breast Cancer: Awareness of Risk Factors

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Introduction: Carcinogenesis can occur due to genetic factors as well as environmental factors. Although cancer may not result in death, but it lowers the quality of life. Death rates due to cancer increased in last three decades.

Breast cancer is one of the most diagnosed cancers in 2020. In breast cancer, there is uncontrolled division of cells in breast tissues which may results in a lump or mass. Breast cancer generally begins in lobules or milk glands or may be in the ducts or tubes which connect milk glands to the nipples. According to GLOBOCAN 2020, with 2.3 million estimated new cases it is leading cause in women and second most common cause of cancer related deaths. Screening programs are important for minimization of breast cancer cases. Breast cancer can be diagnosed with the help of physical examination, Biopsy of tissues and breast imaging. Asia and Africa contribute for 63% of total deaths caused by Breast cancer.

Signs & Symptoms: In case of breast cancer, no symptoms are there when tumor is small in size and treatable. For early detection, screening is a crucial step. A painless lump in breast is most common sign, but it may spread to lymph nodes which are present in underarms and may cause swelling or lump. In addition to this, heaviness, swelling, changes in nipple, bloody or any type of uncommon discharge or any changes in breast may cause Cancer, so these must be assessed by a certified medical practitioner.

Risk Factors: There are so many risk factors which effect the chances of cancer in an individual. These may be modifiable or non-modifiable factors. The most common non- modifiable factors include:

? **Gender:** Females have increased risk of breast cancer than males. Males have small level of estrogen but women have high level of estrogen and progesterone, women have breast cells which may become exposed to possibility of under attack of hormones. These hormones may cause imbalance in their body. Circulation of hormones like estrogen is linked positively with high risk of breast cancer. In USA, 1 in 8 women may develop breast cancer whereas for men of USA, average risk for breast cancer is 1 in 726. Although the (breast) cancer in men is in more advanced stage than in women, when diagnosed.

? **Age:** The risk of breast cancer increases with advancing age. At the age of 40 years the risk is 1.5%, by the age of 50 years the risk increases to 3%. Presently, 80% of breast cancer patients are more than 50 years of age and in those approximately 40% are of more than 65 years of age. But a surprising factor is that there are lower number of cases reported by women over 80 years.

? **Family History:** Approximately 15-20% of patients of breast cancer have already had first degree relative (FDR) i.e. parents, siblings diagnosed with the condition. The individuals with family history are always on higher risks, regardless of any other factor such as age. The mutation in BRCA (i.e. BReast CAncer) gene also play a significant role in causing cancer. BRCA 1 and BRCA 2 mutations may results in Breast and Ovarian Cancer. So, a family history of Ovarian cancer or Breast cancer may cause a high risk of Breast cancer.

? **Mutations:** Genetic mutation of BRCA 1 and BRCA 2 gene may results in elevated risk of breast cancer. These genes are located on chromosome 17 and 13 respectively. Mutation in these genes may result in hereditary syndromes known as HBC-SS (Hereditary Breast Cancer Site Specific) or HBOC (Hereditary Breast Ovarian Cancer). Depending on the type of mutation, the risk may increase up to 65%. Although another fact is that,

during molecular screening, 35-50% of patients have no family history but they carry mutant BRCA gene.

? **Reproduction history:** Irregulation of hormones like estrogen and progesterone may cause high risk of breast cancer in females. The crucial events of a female?s body such as menarche, menopause, pregnancy and breastfeeding are associated with hormonal imbalance. This imbalance may potentially result in causing breast cancer. Early mensuration (<11 years) and late menopause (>55 years) increases the risk of breast cancer by 20% and 12% respectively in females. Possibly, this is due to long term exposure to reproductive hormones. Pregnancy has twofold effects on risk of breast cancer. Lower risk is there for women who have their first full term pregnancy in early twenties or have high number of children as compared to women who have their first pregnancy after 30 years of age. Breastfeeding also plays a significant role as it helps in decreasing the risk of breast cancer. In a review of 47 case studies from 30 countries, it is said that for every 12 months of breastfeeding, the risk of breast cancer is reduced by 4%. Longer duration of breastfeeding is associated with high reduction of risk.

? **Personal History:** Personal history of patients with any type of cancer may have high risk of breast cancer. It is studied that about 5% of breast cancer free individuals may develop a new cancer in the same or opposite breast. Although the rate of cancer in contra-lateral breast is declining but 70% of cases are still of opposite side of breast cancer.

In addition to these some modifiable factors are also there. These are those factors which can be changed or adjusted. These are:

? **Use of Drugs:** Long lasting usage of antibiotics, antidepressants etc. show high risk of breast cancer. Females receiving hormone therapy, longer than 5 to 7 years are at the high risk of breast cancer. Intake of some fertility drugs also show high risk of breast cancer. However, to understand the relationship between fertility drugs and breast cancer more research is required as the data available is not clear enough. According to some recent research studies, use of oral contraceptives pills may also increase risk of breast cancer by 20%.

? **Body Weight:** Increase in weight after menopause can increase the risk of breast cancer by two times as compared to women who are not overweight. This is possibly due to the fact that fat tissues are source of estrogen. Contrastingly studies found that in premenopausal women increased body weight minimizes the risk of breast cancer

? **Physical Activity:** Regular physical activity benefits in significant risk alleviation of breast cancer. The risk is reduced by 10% - 20% in women who are physically active than those who are physical inactive. The benefit is possibly due to energy balance and hormone levels. But this reduced risk of cancer is only for women who are in postmenopausal period.

? **Diet:** Highly processed meat was categorized in Group 1 carcinogen by World Health Organization (WHO). Intake of processed food rich in saturated fat, sugar and sodium may contribute in causing breast cancer. It was noted in studies that an increase of 10% of processed food intake increases 11% of risk of breast cancer. High amount of fruit and vegetable consumption may lower down the risk of breast cancer, although studies available for this claim are limited. Similarly, some studies claim that calcium rich food is associated with reduced risk of breast cancer but a collective analysis found no correlation among two.

? **Alcohol Consumption:** Carcinogenic events may occur in breast tissues due to excessive intake of alcohol. Hormonal imbalance due to elevated levels of estrogens is activated by high alcohol consumption. When compared to women who are non-drinkers, 2-3 alcoholic drinks per day increases the risk by 20% in women drinkers.

? **Tobacco & Smoking:** Carcinogens present in tobacco possibly increase the mutations in oncogenes and suppressor genes (specifically p53). Passive smoking may also elevate vulnerability to breast cancer, when encountered in childhood and in premenopausal women.

? **Environmental Factors:** Radiation exposure, exposure to environmental pollutants and chemicals may also increase the risk of development of tumor in mammary glands. Although research in this particular area is limited and more research is required to develop a conclusion.

Factors not associated with risk of breast cancer: There are certain factors which are not associated with the increasing risk factors of breast cancer. These are:

? **Abortion:** Earlier studies claimed that abortion may increase risk of breast cancer, but these studies were considered inaccurate by American College of Obstetricians and Gynecology. It was conveyed in 2003 by National Cancer Institute that spontaneous or induced abortion have no link with breast cancer.

? **Bras:** There is no scientific evidence to support that bras may cause breast cancer. Although a myth is there that bras may disturb the lymph flow and cause breast cancer.

? **Preventive Surgeries and Drugs:** Prophylactic mastectomy i.e. surgical removal of breasts lowers down the risk of breast cancer by 90%. Women carrying mutated BRCA gene are on the high risk of breast cancer. This surgery may benefit them by reducing risk, although this cannot eliminate the risk completely. Similarly, taking drugs to lower down the risk of breast cancer or any disease is known as chemoprevention. For breast cancer, drugs are categorized as Selective Estrogen Receptor Modulators (SERMs) as the plug the flow of estrogen for some tissues and for some other tissues estrogen flow is there.

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Competing interests

The authors declare that they have no competing interests.

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