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### *Research Paper*

## **URBANIZATION: A MAJOR CULPRIT OF RAMPANT BREAST CANCER**

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### **Abstract**

Breast cancer is kind of cancer that develops in the breast tissue composed of glands for milk production, called as lobules and the ducts that connect the lobules to the nipple. In the last 3 decades, the period was covered by large and rapid urbanization, which has led to increased incidence rate breast cancer in developed countries. Nowadays, it has become the most lethal form of cancer in women, in all countries around the globe. Breast cancer specialists and consultants have found out that urban women are more susceptible to breast cancer when compared with their rural counterparts. Urbanization and lifestyle vicissitudes are playing a key role in increasing cases of the disease. Westernized life style, raised economic standards and changed food habits lead to obesity, which is a major culprit for breast cancer. This proportion was higher in high-income countries (27%) when compared with middle income countries (10%) and moreover, the most significant contributor was obesity and overweight. Adaptation of westernized life style is fundamental factor that encourages progress of breast cancer, which involves use of oral contraceptive, late child birth, late marriages, shorter breast feeding, night shift working, smoking, alcohol consumption, sedentary lifestyle and obesity. According to the statistical data, developed countries are more prone of breast cancer as compared to developing ones. However, researchers have estimated that growing breast cancer cases across the world could be obviated by creating awareness amongst women, doing physical exercise, drinking less alcohol and maintaining a healthy weight. Smoking and alcohol consumption must be avoided. Hormonal replacement therapy and use of contraceptive pills must not be recommended by doctors. Early pregnancy and breast feeding must be encouraged. Also, young women must be educated about the various precautions to be taken and also the causes of breast cancer, in order to get rid of breast cancer.

Key words: Urbanization; breast cancer; global burden; westernized lifestyle; developed countries; developing countries.

## INTRODUCTION

Cancer is characterised by uncontrolled proliferation of cells, these cells often dedifferentiate and undergo metastasis and show invasiveness. The cancerous cells form a lump or tumour. The cancer is named after the tumour, found in particular part of the body. Breast cancer develops in the breast tissue that is composed of glands for milk production, called as lobules and the ducts that connect the lobules to the nipple<sup>1</sup>. The other part of the breast is composed of fatty, connective and lymphatic tissue. Breast cancer specialists and consultants have found out that urban women are more susceptible to breast cancer when compared with their rural counterparts. Urbanization and lifestyle vicissitudes are playing a key role in increasing cases of the disease<sup>2,3</sup>.

More than a few risk factors that leads to breast cancer have been well documented; however few of them remained unidentified<sup>4-6</sup>. Potential risk factors includes: familial history of breast cancer (which increases risk factor twice or thrice), mutations in BRCA1, BRCA2 and P53 genes (these mutations occur rarely)<sup>7</sup>. Moreover, reproductive factors that are linked with extended exposure to endogenous oestrogen involving early menarche, late menopause, giving birth to first child at late age, use of contraceptive pills, hormone replacement therapy<sup>8</sup>. Modifiable risk factors like smoking, alcohol consumption, sedentary lifestyle and obesity are majorly responsible for causing breast cancer. Danaei et al., 2005 concluded that 21% of breast cancer deaths are resulted from alcohol use, over weight and obesity and physical inactivity<sup>6</sup>. Furthermore, regardless of the risk factors which increase the threat towards breast cancer, IARC, 2008, Lacey et al., 2009 found that breast feeding has a protective effect against the breast cancer<sup>4</sup>, but nowadays women are not showing interest in breast feeding their babies that puts them on more risk of causing breast cancer.

Westernized life style, raised economic standards and changed food habits lead to obesity, which is a major culprit for breast cancer<sup>9</sup>. Also physical inactivity leads to obesity which has direct link with breast cancer. This proportion was higher in high-income countries (27%) when compared with middle income countries (10%) and moreover, the most significant contributor was obesity and overweight.

International health experts clearly revealed that the burden of breast cancer is shifting from developed countries to developing countries and underdeveloped countries in Asia and Africa, as the westerners have chosen to follow disciplined and healthier lifestyles.

## BREAST CANCER BURDEN:

In the last 3 decades, the period was covered by large and rapid urbanization, which has led to increased incidence rate breast cancer in developed countries. Nowadays, it has become the most lethal form of cancer in women, in all countries around the globe. Breast cancer survival rates vary among the countries worldwide, as 80% or over in developed countries like North America, Sweden and Japan to 60% in developing countries and below 40% in under-developed countries<sup>10</sup>. According to the statistical data, developed countries are more prone of breast cancer as compared to developing ones. The Belgium has reported highest rate of breast cancer (109.2 cases per 100,000 women) which is approximately double the number breast cancer cases reported in Jamaica (56.8 cases of per 100,000 women) (<http://globocan.iarc.fr>).

Health care professionals have found out that the urban women are more prone to breast cancer than rural women. One of the main reasons for increased breast cancer cases may be the urbanization and lifestyle changes. However, the global burden of breast cancer is shifting towards the less developed countries because of the lack of adequate diagnosis, poor treatment facilities and also the disease is detected in the last-stage.

The World Health Organization (WHO), International Agency for Research on Cancer (IARC) has given a statistical data that breast cancer is one of the most commonly diagnosed cancer worldwide in 1.7 million people and accounts 11.9% of total cancers. WHO has estimated that over 522000 women died in 2012 due to breast cancer. WHO 2013, estimated that over 508000

women died worldwide in 2011 due to breast cancer. Breast cancer is a lifestyle disease, also called as the disease of developed world, but still 50% of breast cancer cases and 58% of deaths are seen in developing countries and underdeveloped countries (GLOBOCAN 2008).

#### **RISK FACTORS:**

##### **Alcohol and Breast Cancer:**

One in five (21.6%) of all the alcohol related deaths are due to cancer. Consuming alcohol increases the risk of developing breast cancer. A study found that drinking every day even a small amount increases the risk of developing breast cancer by 10.6%. According to the million women study run by Oxford University "the risk towards breast cancer increases by 6% for each 10 grams of alcohol you drink, slightly over a unit of alcohol a day". The more you drink alcohol, the level of risk towards cancer rises. So it must be consumed with in government's daily unit guidelines. It is about 2 – 3 units of alcohol (approximately 175 ml) <sup>11-13</sup>.

Alcohol is found to act by many mechanisms, there by triggering the breast cancer. Alcohol breaks into acetaldehyde and further to acid. The acetaldehyde causes genetic mutations and breaks the DNA and genes, disturbing the genetic makeup of the individual. Moreover, alcohol increases the oestrogen levels in pre as well as post-menopausal women, further high oestrogen levels provoke breast cancer. It is also reported that alcohol alters the immune system by decreasing the levels of folic acid, essential nutrients and vitamins A, B6, D, E and Zinc <sup>11-13</sup>.

##### **Smoking and Breast Cancer:**

Tobacco contains harmful chemicals like hydrogen cyanide, carbon monoxide and ammonia and many other harmful chemicals that cause cancer. Smoking causes a variety of cancers like lung, oesophagus, mouth, larynx, throat, stomach, kidney, bladder, acute myeloid leukaemia as well as breast cancer <sup>14</sup>. The researchers of American Cancer Society found that smoking increases the risk of breast cancer by 12% in smoking women than non-smokers. Also, women who begin smoking before the age of 20 years or even before first child birth, are comparatively at higher risk to develop breast cancer <sup>15, 16</sup>.

##### **Hormonal Replacement Therapy:**

Women use hormonal replacement therapy to reduce the menopausal symptoms. Women who use combined hormonal replacement therapy including oestrogen and progesterone are at higher risk, than oestrogen hormonal replacement therapy. Studies revealed that women with high levels of oestrogen and testosterone in blood are at 2 to 3 times higher risk than normal women. Endogenous hormone levels increases by the use of hormonal replacement therapy. Also post-menopausal obesity and alcohol use triggers and elevates the hormonal levels. A recent study conducted by American cancer society, showed that pre-menopausal women with highest quantity of total and free testosterone are at 80% greater risk to develop breast cancer than normal women with low levels of testosterone. Also, pre-menopausal women with high oestrogen levels are slightly at high risk to develop breast cancer <sup>17-20</sup>.

According to study published in 2011, more than 3 out of 100 breast cancers patients were linked to HRT use, and such 1,530 cases were reported in United Kingdom. Almost 3 out of 4 of these extra breast cancers are associated to the use of combined progesterone and oestrogen HRT whereas 1 out of 4 are linked to oestrogen only HRT. Discontinuation of hormone replacement therapy, reduces the risk within 5 years <sup>21-24</sup>.

##### **Oral Contraceptive Pills and Breast Cancer:**

Contraceptive pill mainly contains oestrogen, which triggers the breast cancer. Women who are the current users of birth control pills are at higher risk of developing cancer, especially the teenager women who use contraceptive pills are at highest risk. The risk diminishes after 10 years, when the pills are discontinued. Regular use of contraceptives increases the risk of breast cancer about 10% to 30% <sup>25-28</sup>.

##### **Chest X-Rays/ Radiotherapy:**

Some medical procedures like X-rays & CT-scans uses radiation, this may increase the risk of developing breast cancer. Radiations causes many types of cancer. Researchers estimated around 60 cases of breast cancer in the UK each year, are linked to diagnostic X-rays <sup>29-32</sup>.

### **Shift Work and Breast Cancer:**

Night shift workers experience circadian rhythm disruption caused by crossing the multiple time zones. Nevertheless, exposure to light at night decreases the levels of melatonin. Melatonin acts as tumour suppressor and also found to affect oestrogen levels. Sleeping for shorter durations reduces the levels of hormone melatonin, this may lead to breast cancer, whereas sleeping for longer durations reduces the risk of breast cancer. Night shift work also induces stress, which may provoke cancer. A research revealed that, not only the artificial light exposure at working environment acts as a potential risk for breast cancer, but also the light-at-night in the sleeping habit causes breast cancer<sup>3, 33-35</sup>.

### **Being Over Weight / Obese:**

Urbanization has a high impact on western life style including food habits, which is the main cause for obesity. Being obese after the menopause, leads to the increased production of oestrogen, as fat tissue is the largest source of oestrogen. Therefore, high levels of oestrogen increases the risk of developing breast cancer. Obesity is the major risk factor for type 2 diabetes, which may trigger breast cancer too. Physical inactivity and high calorific intake leads to obesity. Following good diet and regular exercise leads to healthier life style. A survey revealed that little brisk walking for about 1.25 to 2.5 hours a week reduces the risk of breast cancer by 18%<sup>36-40</sup>.

### **Bearing Child after 30:**

Women who have their first child after the age of 30 years or women who have no children are at higher risk of developing breast cancer. Generally, pregnancy reduces the women's total number of menstrual cycles. So, having early pregnancy or having more number of children decreases the risk to develop breast cancer<sup>41</sup>.

### **Shorter Breast Feeding:**

A study conducted by researchers at Columbia University's Mailman School of Public Health, showed that Breast-feeding reduces the risk for oestrogen receptor-negative and progesterone receptor-negative breast cancer. Also, Women who had children but did not breast-feed had about 1.5 times the risk for ER/PR-negative breast cancer. Studies revealed that Breast feeding is recommended for 1½ to 2 years and decreases the over-all risk of developing breast cancer. In a review, including 47 studies in 30 countries, it is shown that breast feeding reduces the risk of breast cancer by 4.3%, for every 12 months of feeding. Breast feeding reduces the total number of menstrual cycles through the lifetime and also structural changes occur in the breast, which directly reduces the risk towards breast cancer. But, due to urbanization and changed lifestyle, women do not show interest in breast feeding their babies. This is seen especially in developed countries. So, such woman who do not feed for longer durations, are at higher risks to develop breast cancer<sup>42</sup>.

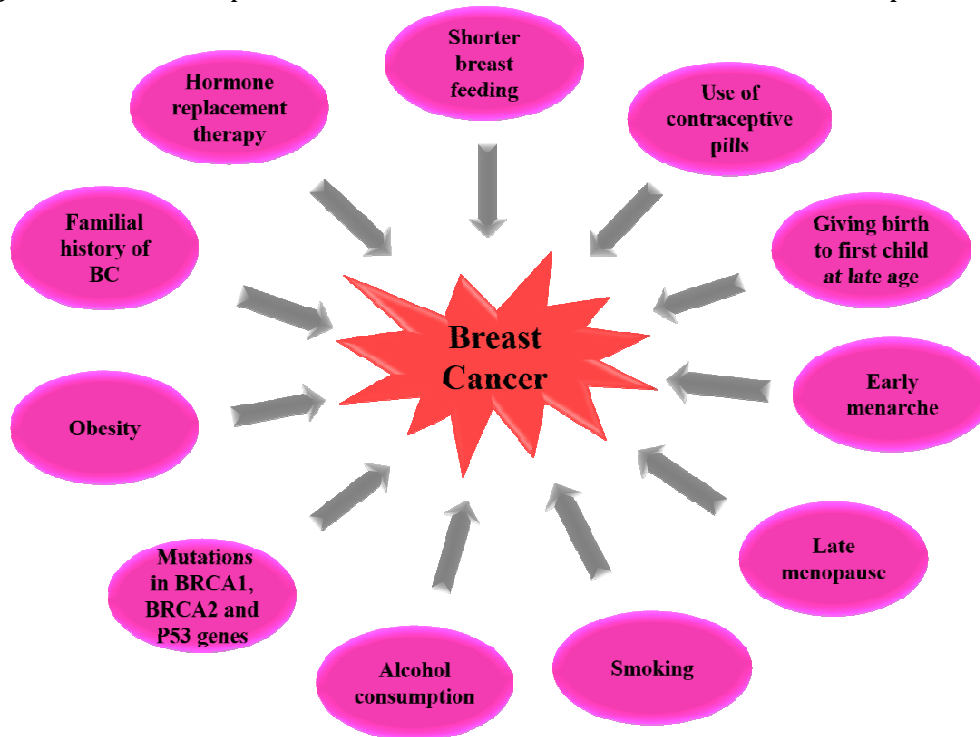
### **CONCLUSION:**

As breast cancer is a lifestyle disease, it can be prevented by modifying the life style factors like drinking less alcohol, being physically active and maintaining healthy weight. As obesity is one of the major factors, limit the consumption of high calorific and fatty food. Regular exercise is recommended. Calories must be burned based on the food intake<sup>43</sup>.

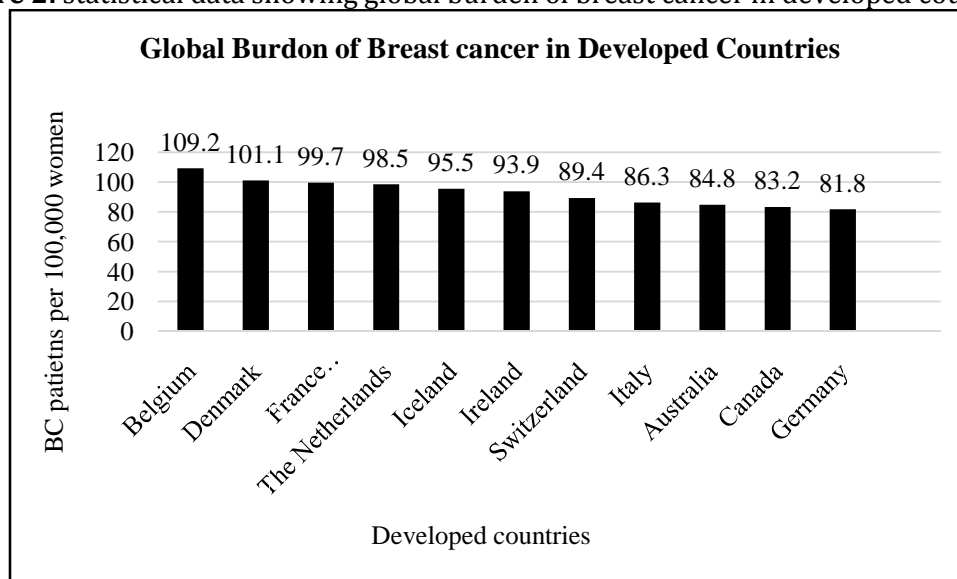
Increasing breast cancer cases are seen in developing countries, where the cancer is diagnosed in late stages. So techniques for the diagnosis of disease must be implemented and treatment facilities must be made available for increasing the life span of patients. Till date, mammography screening is found to be the best screening method of breast cancer. According to Anderson et al., 2008, early detection of breast cancer is essential to control breast cancer. People with the familial history of breast cancer must consult oncologist for preventive measures. If a cancer is detected at stage 0, it can be cured easily, whereas difficulties arise in the treatment when diagnosed at last stage and this can be lethal.

Young women must be educated about the various precautions to be taken and also the causes of breast cancer, in order to get rid of breast cancer. Smoking and alcohol consumption must be avoided. Hormonal replacement therapy and use of contraceptive pills must not be recommended by doctors. Early pregnancy and breast feeding must be encouraged.

**Figure 1:** Pictorial representation of risk factors of breast cancer in developed countries.

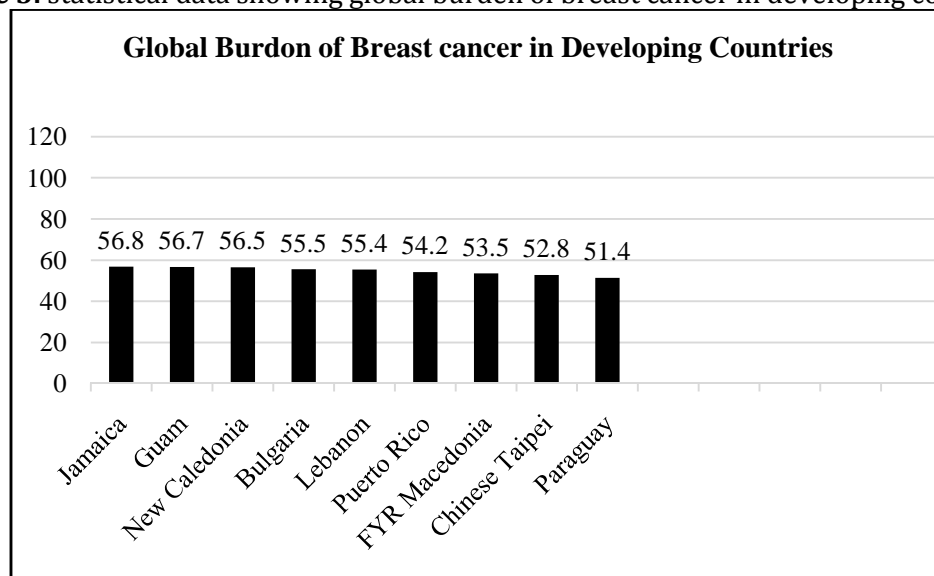


**Figure 2:** statistical data showing global burden of breast cancer in developed countries.



Note: values in graph are per 100,000 women

**Figure 3:** statistical data showing global burden of breast cancer in developing countries.



Note: values in graph are per 100,000 women

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#### CONFLICT OF INTEREST

The authors declare that they have no competing interests or conflict of interests.

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