

Risk factors and prevalence of breast cancer — a review

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Abstract

Breast cancer represents a significant health problem because of the number of individuals affected by this disease. Thirty per cent of all cancers in women occur in the breast, making it the most commonly diagnosed female cancer. Breast cancer is among the top 20 causes of deaths in Pakistan. Various phenomena serve as protective as well as risk factors for breast cancer. Several characteristics proving to be risk factors include age, weight, family history, physical activity, smoking, hormonal and reproductive factors. Women with advanced age, having middle class family background, higher body mass index and a high ratio of incomplete pregnancies are at significantly increased risk of breast cancer. Despite the treatment strategies applied on patients, the satisfaction regarding the course of treatment is not of standard. Psychiatric guidance and moral help can assist to improve a patient's quality of life.

Keywords: Breast cancer, Risk factors, Prevalence, Awareness, Pakistan.

Introduction

Cancer

Uncontrolled and undefined growth of abnormal cells in the body is known as cancer. It is the second leading cause of death in the world. In a normal cycle of multiplication, the cells in the body multiply in a regular manner according to the body's need and die accordingly. In cancer however, the cells in the body divide quickly and their growth becomes uncontrollable. It may also occur because the cells forget their life span and do not die. There are different kinds of cancers. Cancer may develop in any organ or tissue such as blood, brain, liver, ovary, breast, lungs, kidneys, bones and colon. There is a high rate of incidence of major type of cancers worldwide.¹

Breast Cancer

Malignant breast neoplasm or breast cancer is a type of cancer that originates from tissues of the breast — either

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from the inner lining of milk ducts or the lobules that supply the ducts with milk. Two main types of breast cancer usually exist: lobular carcinoma and ductal carcinoma. Breast cancer may also start in other areas of the breast, but that is rare. Therefore, sometimes it may also be classified as invasive or non-invasive. Non-invasive breast cancer is called carcinoma in situ.² A lump different from the rest of the breast tissue is felt as the first noticeable symptom of breast cancer. Other indications include dimpling of the skin, spontaneous single-nipple discharge, inversion of the nipple or change in the size or shape of the breast. Pain of the breast, normally referred to as mastodynia, may be indicative of any breast health issue, and is not considered to be a reliable tool to determine the presence or absence of breast cancer.³

Prevalence of Breast Cancer

Breast cancer is considered to be the most common malignancy in women. Its prevalence data indicate that one million new cases are reported each year in the world and it accounts for nearly 18% of all female cancers. According to a report of the American Cancer Society (ACS) published in 1992, Australia, North America, New Zealand and Europe are considered to be the high-risk zone while, Africa and Asia represent the zone of lower risk. Similarly, in Japan and China the incidence is low, while in Pakistan, breast cancer is the most common malignancy in females.⁴ Except for Jews in Israel, Karachi is supposed to have the highest incidence of breast cancer among Asian population.⁵

Risk Factors

A risk factor is anything which increases the incidence of getting a disease. Different kinds of risk factors exist for different cancers. Some factors cannot be changed; these are known as non-modifiable risk factors. These include a person's race or age. Some factors are linked to the environment. Other factors which are related to personal behaviour, such as drinking, smoking and diet, can be controlled. These factors are known as modifiable risk factors. Different cancers have different risk factors and same is the case with breast cancer. However, risk factors are not the ultimate signs of developing breast cancer. Many patients having breast cancer do not have any predominant

risk factors, whereas many females having one or more risk factors do not develop this pathology at all.⁶

Types of Risk Factors

1. Non-modifiable risk factors

According to ACS, non-modifiable risk factors for breast cancer include gender, advancing age, genetic factors, family history, race, ethnicity, dense breast tissue, tobacco smoke, certain benign breast conditions, previous chest radiations and diethylstilbestrol exposure.

2. Modifiable risk factors

Lifestyle-related risk factors include the number of children given birth to, birth control, hormone therapy, breastfeeding, alcohol use, overweight or obesity and physical activity.

3. Controversial risk factors

Some factors have uncertain, controversial or unproven effect on the risk of developing breast cancer. These factors include diet and vitamin intake, anti-perspirants, bras, induced abortions, chemicals in the environment, and night-shift works.⁶

Age

Age is the strongest risk factor for breast cancer. Age is proportional to risk i.e. the older the woman, the higher the risk throughout her life, but chances increase markedly in post-menopausal years. After age, women of higher socio-economic status, who experience early age of menarche, late menopause and those conceiving in their 30s are at a higher risk to develop breast cancer.⁷

Socio-Economic Status

Socio-economic status is a powerful risk factor for breast cancer. Women above 40 and of higher social class carry an elevated risk of developing breast cancer.⁸ As high socio-economic status is directly related with increased risk, women in developed countries are at a greater risk of breast cancer development than women of less developed countries. According to different studies, this relationship is associated with the fact that women in developed countries have fewer children on average, and limited and less frequent duration of breastfeeding.⁹

Reproductive Factors

Reproductive factors also account for the risk associated with the disease. In developed countries, the average age of menarche fell from 16-17 years to 12-13 years in the mid 19th century, and this is consistently associated with increased risk of breast cancer.¹⁰ Late menopause also increases the risk of breast cancer. Risk increases each year

for older women at menopause, either induced by surgery or naturally, by about 3%. Therefore, a woman experiencing menopause at 55 years of age will have 30% higher risk than one who experiences it at 45 years of age.¹¹

Age at First Child-Birth

Childbearing age is inversely related to the risk of breast cancer i.e. the younger the woman is when she begins childbearing, the lower the risk to develop breast cancer. It is estimated that a 3% increase in risk occurs for each year of delay. It is also an established fact that childbearing not only reduces the risk, but the higher number of full-term pregnancies ensures higher protection for females. In comparison to nulliparous women, there is a 30% reduced risk in women who have had children, and with each full-term pregnancy the risk reduces by 7% overall. Similarly, a woman with single issue is at 15% higher risk than a woman with two issues.¹²

Breastfeeding

Breastfeeding is also a protective factor for breast cancer. Women who breastfeed their children are at a reduced risk, while those who do not are at an increased risk of breast cancer. Duration of breastfeeding is directly related to protection - the longer the duration, the greater will be the protection. However, breastfeeding is an uncertain protective factor as the results are inconclusive. Still, it is regarded as a modifiable risk factor, as the breast never having been lactated is more prone to cancer than a lactated breast.¹³

Endogenous Hormones

It has been hypothesised that higher levels of endogenous hormones increase the risk of breast cancer. Post-menopausal women with highest levels of testosterone and oestrogen have 2-3 times the risk compared to women with lowest levels.¹⁴ In oestrogen-receptor-positive tumours, higher levels of prolactin are associated with increased risk of breast cancer. In women not taking hormone replacement therapy (HRT), there is a lesser risk of breast cancer due to increased levels of insulin. Similarly, insulin-like growth factor 1 is associated positively with breast cancer risk.¹⁵

Oral Contraceptive Pills

Risk of breast cancer increases due to the use of oral contraceptives (OC), but the risk is not significant.¹⁶ Women taking HRT are at an increased risk — at least 66% in comparison with the non-users.

Breast Density

Breast density is an independent and a strong risk factor.¹⁷ The composition of breast is epithelial tissue, connective

tissue and fat. Less dense breast is described as the one having high proportion of fatty tissue. Women with less dense breast have almost five times lower risk of breast cancer than women with denser breast.

Family History

Family history of breast cancer increases the risk, especially in the case of a first-degree affected relative (mother or sister). The risk is about double in women with some family history of breast cancer in one of the first degree relatives than in those with no family history. The risk increases further if two (or more) relatives are affected and even more if the diagnosis of the disease occurs below 50 years of age.¹⁸

Obesity, Overweight and Physical Activity

Among the modifiable risk factors for breast cancer are obesity and being overweight. Both parameters are determined by high body mass index (BMI). They increase the risk of post-menopausal breast cancer moderately.¹⁹ A strong association is shown between physical activity and breast cancer in post-menopausal women. More active women are at 15-20% decreased risk.²⁰ There should be at least 150 minutes of physical activity per week.²¹

Diet and Vitamin Intake

Many studies have been conducted to check the link between dietary habits and breast cancer risk. However, the results are conflicting. There is persuasive evidence that high fat food content causes obesity which is related to breast cancer. Intake of fruits, vegetables and vitamins have also been studied as breast cancer risk factors, but the results are conflicting.⁶

Alcohol Consumption

Alcohol consumption is also associated with an increased risk of breast cancer. There is a higher level of sex hormones in the blood stream in alcohol consumers compared to the non-consumers. In UK, more than 6% breast cancers are alcohol-linked.²²

Sleep Routine and Night Shift

Sleep routine and working in the night shifts also influences the incidence of breast cancer.²³ Less sleep and increased night shift work-load increases the risk of breast cancer.²⁴ According to one theory, this is due to the fact that melatonin is released in lesser amount due to shorter or disrupted duration of sleep. As melatonin is believed to have anti-carcinogenic properties, and also suppresses other hormone production directly or indirectly linked to the development of breast cancer, less release causes an increased risk. Night-time shift is classified as probably carcinogenic to humans by the International Agency for

Research on Cancer (IARC). In the UK, more than 4% breast cancers are associated with shift workers.²⁵

Health-Related Issues and use of Medicines

Use of anti-hypertensive drugs for 5 years or more,²⁶ oestrogen use during pregnancy,²⁷ Grave's disease²⁸ and longer exposure to ionising radiations²⁹ increases the risk of breast cancer. While regular usage of (NSAIDs), especially aspirin, reduces the risk in up to 25% in women.³⁰ Similarly, people with coeliac or other autoimmune diseases also have a reduced risk of breast cancer with an unclear mechanism behind.³¹

Smoking

According to previous IARC studies, there was no evidence of relation between the risk of breast cancer and smoking and second-hand smoke.³² However, modern studies prove that there is an increased risk of breast cancer for women who started smoking before delivering the first baby, or before the age of 20. Smokers have 10-20% increased risk than non-smokers. However, this relationship is inconsistent in explaining whether smoking causes breast cancer before or after menopause.³³

Conclusion

Breast cancer is a common malignancy among women all over the world, especially Pakistan. It may be influenced by the presence or absence of many factors known as risk factors, but these are not the ultimate tool to report the risk of breast cancer. However, they may predict the chances to develop the breast cancer to some extent. The most common and major risk factors include age, family history, socio-economic status, high BMI, age at menarche, hormonal therapy after menstruation and physical activity. Alcohol consumption, night-shift working, smoking and use of medicines are also described as risk factors. Successful full-term pregnancies and breastfeeding have proved to be protective factors. Above all, eating a healthy diet and a happy lifestyle may reduce the risk of developing the malignancy.

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