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Risk factors and genetic causes of breast cancer- with special reference to indian subjects

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Experts believe that India is on the verge of a breast cancer epidemic in view of Indian women increasingly adopting Western lifestyles due to socio-economic obligations. It is however reassuring that, while breast cancer affects approximately 1 out of every 8 women in the US, only 1 of 30 are likely to contract this disease in India. Its incidence however is on the rise and hence, it is important to address this issue with the greatest concern, while also embarking upon a scientific and practicable strategy to contain its growing incidence. Among lifestyle factors that may contribute to its causation, being overweight is considered as an important factor as with most malignancies. Such an attribute results mainly from consumption of high dietary fats and animal products that includes red meat in addition to imbibing a generous dose of alcohol and indulging in smoking. Having no offspring or attaining first full-term pregnancy after the age of 30, limitation of breast-feeding with early weaning, use of oral contraceptives and hormone replacement therapy are also considered relative risks for its development. A positive family history of breast cancer also plays a significant role in its etiology. Thus, while the calculated risk for patients with no known breast cancer incidence in their family is about 8%, it increases to more than 20% for those with a positive history. Age also influences its risk, being of the order of 1 in 20,000 for women around 25years that increases to 1 in 8 among those 80years or older. Certain benign breast diseases like dense breasts, hyperplasia with atypical etc. are known to contribute to its incidence while common conditions like cysts, fibro adenoma, and painful breasts related to the menstrual cycle or otherwise, do not carry any obvious risk but would merit clinical evaluation especially if present for a long duration.

There is no conclusive scientific evidence to associate breast cancer risk with induced or spontaneous abortions, breast implants, usage of brassieres, deodorants etc. Similarly, the role of diet and vitamins is still in the realm of debate but a diet low in fat, red and processed meat and high in fruits and vegetables is known to impart general health benefits. Genetic makeup of an individual also plays a significant role in the development of breast cancer. While about 85% of women get the disease spontaneously, about 15% may have it after having been detected in first degree relatives like mother, sister or daughter or even in second degree relatives e.g. grandmothers or aunts. About 5 to 10% of such genetically influenced cancers are on account of inheritance of Genes that have shown to be linked to breast or ovarian cancer. In normal cells, these genes actually help to prevent cancer by keeping abnormal growth under check and only 0.5% of the general population carries such mutated genes. The lifetime risk of breast cancer in some families with BRCA1 mutation may be around 80% and with BRCA2, around 45%, with the overall average risk probably being in the range of 55 to 65%. Patients carrying such mutation-linked breast cancers are generally younger and contract disease in both breasts (bilateral cancer) as compared to patients without such association. The former also harbour risk for developing other cancers especially that of the ovaries. An ethnic group particularly prone for BRCA mutations is the Ashkenazi Jewish community, members of which can develop multiple types of cancers in both sexes. The relationship of the BRCA genes with either the specific tumour type or overall response to therapy are still the subject of further scientific investigation, as is the role of about a dozen more mutations.

Gene Testing is now available commercially (BRC Analysis) but should be used by high-risk subjects and, although relevant guidelines for its optimum use are still evolving, those published by the National Institute for Health and Clinical Excellence (NICE) of UK, recommend referral of high risk patients to specialist genetics services. Such patients are categorized as those harbouring 1 in 3 chance of getting it during their entire lifetime or more than 1 in 12 probability before the age of 50. It generally includes patients whose relatives were diagnosed at a younger age with breast cancer or with bilateral cancers, besides having ovarian cancer or with an affected male relative in the family. The US Preventive Task Force (USPSTF) does not recommend its use in low-risk women i.e. those without any family history of BRCA1 or BRCA2 genetic mutations. During the last two decades, great strides have been made in understanding the aetiopathology and natural history of breast cancer with spectacular advancements having come about in its management that have led to a sustained decline in its mortality. Nothing could be more gratifying than curtail its incidence which would be achievable by minimizing the risks associated with its occurrence.

These would include lifestyle modifications with special emphasis on physical exercise, abstaining from smoking and exercising dietary control e.g. reducing the consumption of low fats and taking alcohol in moderation. These could help to optimize body weight and cut down the risk of breast cancer by more than 18%, besides also reducing the risk of recurrence in treated cases. While pursuing such preventive strategies, it is equally important to exercise due vigilance for detecting cancer in its formative stages, that itself may allow more than 85% chance of long-term disease eradication. These mainly include monthly Breast Self-Examinations (BSE), periodic clinical check-ups and Mammographic screening. Guidelines for Indian women at normal risk, recommend Mammography (breastcancerindia.net) to be undertaken once every 1 to 3years for women between 20 to 40years of age, annually for those aged 40 to 50years and once in 2years for women 50years and above. For subjects with increased breast cancer

risk (i.e. hailing from proven breast or ovarian cancer families) annual Mammography should start by age 25years as also for those who have received radiotherapy to the chest region in childhood or adolescence. Increasing awareness of the entire community for Breast cancer should go hand in hand with emphasis on early diagnosis and the practice of optimum lifestyle management.

The problem of breast cancer in India is much less than in the West yet, it is on the rise and currently comprises the commonest cancer of urban Indian women. Besides, socio-economic compulsions, lack of awareness and absence of an organized Breast Cancer Screening Program results in the majority of cases presenting at a relatively advanced stage. The irony is that a significant proportion of these cancers are preventable or amenable to early detection. Thus, greater stress on health education and cancer awareness, coupled with proper distribution of optimum public facilities for cancer management are likely to bring about the much desired improvement in early detection and delivery of optimum cancer care delivery for our patients.

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Conflict of interest

The author declares no conflict of interest.

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