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BREAST CANCER AND ABORTIONS: A STUDY AMONG THE BENGALEE FEMALES OF WEST BENGAL, INDIA

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Abstract: **Hormonal and reproductive factors have been identified as major determinants of breast cancer risk. Breast Cancer is the one of the diseases affecting the world wide women population. The Indian subcontinent presents Breast Cancer to be one of the leading cancers, and West Bengal represents it to be the most common carcinoma among females. The present study attempts to understand the association of abortion and breast cancer in Bengalee Hindu Caste Females of West Bengal. To best of the knowledge abortions and breast cancer risk among the females is yet to be taken in consideration in Bengalee Hindu caste females. To fulfill the objective 108 diagnosed breast cancer patients were considered along with 120 age matched controls without the history of breast cancer in the family. Result indicated abortions have significant ($p<0.001$) association with breast cancer. Therefore, the present study vindicated other than genetic predisposition modification of reproductive and lifestyle factors might be taken into consideration in early prognosis of breast cancer among the studied population.**

Keywords: **Bengalee Hindu caste females, breast cancer patients.**

1. INTRODUCTION

Cancer is the leading cause of death worldwide including India and second leading cause of death in developing countries (Jemal *et al*., 2011). According to Siddhartha Mukherjee, Cancer is the "emperor of all Maladies" (Mukherjee, 2010). Evidence based strategies for cancer prevention,management and early detection can be the ways of implementation for Cancer prevention and control. Early detection can cure one third of cancers, and treatment basis as early stage treatments are more effective. In addition, more than 30% of cancers could be prevented simply by behavioral changes that include absence of using tobacco, healthy diet and weight, being physically active and preventing infections that may cause cancer death (Danaei *et al*., 2005).

According to the epidemiological studies, 80 to 90% of all cancers are due to environmental factors of which, lifestyle related factors are the most important and preventable. The major risk factors for cancer are tobacco, alcohol consumption, infections, dietary habits and behavioral factors. Dietary practices, reproductive and sexual practices account for 20 to 30% of cancers. Studies have shown that appropriate changes in lifestyle will reduce the mortality and morbidity caused due to cancer. This offers the prospect for initiating primary and secondary prevention measures for control and prevention (Murthy and Mathew, 2004). . Thus, nowadays it is believed that breast cancer is a complex multi-factorial, polygenic and multi-step process (Beckmann *et al*., 1997; Ponder 2001; Antoniou and Easton, 2003).

Some studies have reported an increased risk of breast cancer among women who have had induced abortions (Newcomb *et al*., 1996; Zeng *et al*., 2010). In incomplete pregnancy, the breast is exposed only to the high estrogen levels of early pregnancy and thus may be responsible for the increased risk seen in these women. However, some other studies have found no association between abortions and increased risk of breast cancer (Erlandsson *et al*., 2003).

To best of the knowledge abortion and breast cancer risk among the females is yet to be taken in consideration in Bengalee Hindu caste females. The present study attempts to understand the association of oral contraceptives use and breast cancer in Bengalee Hindu Caste Females of West Bengal.

2. METHODOLOGY

Study participants included cases and controls ranging in age from 30-72 years. The cases included subjects visiting the main cancer referral centers of West Bengal; Cancer Center Welfare Home and Research Institute, Kolkata, National Medical College and Hospital, Kolkata. The controls were such selected that none of them had any personal or family history of breast cancer.

Data on reproductive performances included parity, age at first child, menarche, menopause, duration of breast feeding, physical activity and diet with detailed information regarding OCP use and abortion incidents. History of breast cancer and oncologic data was retrieved from the medical records after consent from the patients. Demographic data were also collected for all participants.

Data collected were analysed using SPSS 20.0. Binary logistic regression was used to assess the correlation of any other possible risk factors and the degree of their contribution to breast cancer.

Oral contraceptive use has been defined as use of Oral Contraceptive pills for a total or more than 6 months. Women who never used oral contraceptives or who never used them for less than 6 months were classified as non-users.

3. RESULTS

Age is a well established risk factor for breast cancer. The older the woman is, the more likely she is to get breast cancer. Aside from being female, age is the most significant risk factor for breast cancer (NCI, 2009; Sinicrope *et al*., 2009). The older the woman the higher the risk. The incidence of breast cancer increases with age, doubling about every 10 years until menopause, when the rate of increase slows dramatically.

Table 1: Mean Age of the Studied Population

	Mean ± SD	Range (Years)	Total
Patients	54.037 ± 0.383	30 – 78	108
Controls	54.609 ± 8.005	38 – 72	128

A total of 108 patients and controls comprise the studied population. The mean age for patients (54.037 ± 10.383) years and controls (54.609 ± 8.005) years were similar.

Induced abortion increases the risk of developing breast cancer. In early pregnancy, levels of estrogen increase, leading to breast growth in preparation for lactation. The hypothesis proposes that if the process is interrupted by an abortion before full maturity in the third trimester-then more relatively vulnerable immature cells could be left than there were prior to pregnancy, resulting in greater potential risk of breast cancer over time.

Table 2: Distribution of History of Abortion in the studied population

History	Patients		Controls	
	No.	%	No.	%
No	74	68.5	120	93.8
Yes	22	20.4	8	6.2
NA	12	11.1	0	0
Total	108	100	128	100

Interestingly, only 6.2% of the controls underwent abortion, on the other hand 20.4% of the patients experienced abortions which is significantly associated ($p<0.0001$)

Binary Logistic Regression analysis among the various lifestyle, reproductive variables and the patients and controls.

Characters	Status (Patients)
Education (Graduate)	NS
Occupation (Service)	0.30** (0.129 – 0.682)
Marital Status (Unmarried)	NS
Family History (No)	0.028*** (0.0009 – 0.092)
Age at Menarche (Below 12 years)	NS
Regularity of Menstrual Periods (Irregular)	9.40*** (2.092 – 42.22)
Use of Oral Contraceptive Pills (Yes)	2.578*** (1.00 – 6.65)
Abortions (Yes)	17.02*** (2.03 – 143.15)
Parity (Nulliparity)	NS
Number of Issues (Only One)	NS
Breast Feeding Duration (>3months)	0.261** (0.09 – 0.690)
Which Breast Fed (Only one)	NS
Menopausal Status (Post-menopause)	NS
Age at Menopause (Below 50 years)	NS
Post Menopausal Therapy (No)	0.191* (0.034 – 1.07)
Hysterectomy (Yes)	6.03** (1.426 – 25.48)
Smoking/Alcohol (No)	0.31* (0.141 – 0.669)

**p<0.01; **p<0.001; ***p<0.0001*

Stepwise logistic regression (backward conditional) analysis revealed that there are some lifestyle and reproductive variables, which can significantly predict a person's risk of developing the disease. A person in service as means of occupation is 0.3 times less likely to have breast cancer (OR-0.30, 95% CI=0.129 – 0.682, p<0.001), likewise having no family history of breast cancer reduces the risk of developing the disease by 0.028 times (OR-0.028, 95% CI=0.0009 – 0.092, p<0.0001). Irregular menstrual periods are seen to increase the risk of breast cancer by 9.40 times (OR-9.40, 95% CI= 2.092 – 42.22, p<0.0001). Prolonged used of oral contraceptives is likely to elevate the breast cancer risk by 2.59 times (OR-2.578, 95% CI= 1.0 – 6.65, p<0.0001). A women's risk of having breast cancer gets 17.02 times increased if she has history of abortions (OR-17.02, 95% CI= 2.3 – 143.15, p<0.0001). The potential risk of breast cancer gets increased to 0.26 times if a woman feed her breast for less than 3 months (OR- 0.26, 95% CI= 0.09 – 0.69, p<0.001). Likewise, the risk is modified to 0.19 times (OR- 0.19, 95% CI=0.034 – 1.07, p<0.01) if a woman undergoes post menopausal hormone therapy and 6.03 times if she has been operated with hysterectomy (OR-6.03, 95% CI=1.43 – 25.48, p<0.001). Consumption of alcohol and smoking increases the risk of developing breast cancer by 0.31 times (OR-0.31, 95% CI=0.141 – 0.669, p<0.01).

4. DISCUSSION

Age and family history are commonly considered to have effect on prognosis and survival of breast cancer. The present study revealed substantial variation in breast cancer risk among the mutation carriers, particularly in terms of age variation and cancer type which basically envisaged that the concomitant effect of genetic variability and environmental factors which eventually modify the expression of the status.

The implication of natural hormones specially the sex hormones on developing cancers such as endometrial cancer (Key and Beral, 1992), breast and prostate cancer (Sharma and Ray, 2000) (among sex organ related neoplasm) or colon cancer (English *et al*., 2001), gall bladder cancer (Ray and Gupta, 2001), kidney cancer (Li *et al*., 1985) etc (non sex organ related neoplasm) have been reported globally. Furthermore, breast cancer risk is enhanced by increasing the duration of exposure to endogeneous hormones (Endogenous Hormones and Breast Cancer Collaborative Group, 2011). It has also been reported that age at menarche, parity and age at first full-term pregnancy are risk factors for breast cancer (Kelsey *et al*, 1993, Russo *et al*., 2005). In addition to that breast cancer risk is associated with several reproductive factors. It is well established that breast cancer risk increases with early age at menarche (Dumitrescu and Cotarla, 2005).

Induced and spontaneous abortion increases the risk of developing breast cancer. In early pregnancy, levels of estrogen increase leading to breast growth in preparation for lactation. The hypothesis proposed that if this process interrupted by an abortion before full maturity in the third trimester then more relatively vulnerable immature cells could be left than there were prior to the pregnancy, resulting in a greater potential risk of breast cancer over time. Though many studies (Jernstrom *et al*., 1999; Beral *et al*., 2004) have reported association between abortion and breast cancer risk, the exact influence is still speculative. Present study also revealed significant ($p<0.0001$) association and increased risk as well between abortion and breast cancer. There are a very few studies on abortions and breast cancer risk from India, but the few available reports also showed similar finding (Brind, 1996).

The study executed logistic regression analysis which revealed occupation (housewife), positive family history, irregularity of menstrual periods, use of oral contraceptives, abortions, breast feeding for less than 3 months, post menopausal hormone therapy, hysterectomy and smoking/ alcohol consumption has been analyzed to be significant predictor variables for breast cancer risk.

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