

## ASSESSMENT OF EPIDEMIOLOGICAL FACTORS ASSOCIATED WITH BREAST CANCER

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### ABSTRACT

Breast cancer is the most common life-threatening cancer and the most common cause of cancer mortality among women in all over the world. It is a disease of multifactorial aetiology, and it seems highly probable that environmental factors, socio-economic status are related to the disease in several ways. Demographic studies have documented extensively the incidence of breast cancer in the Western population but the available information in India is limited and more work needs to be done. The present study was design to be undertaken as an in- depth study on multi-factorial aspects of breast cancer with special reference to epidemiology. The study population comprised 65 patients of breast cancer (BC) as cases and same number of normal healthy people as control groups. Data was collected on the parameters like identification data, socio-demographic parameters, and common addiction. In our study, socio- economic status and reproductive history of the subjects were surprisingly not associated with the risk of breast cancer. Frequent abortion and addictions was found to be causative factor for breast cancer.

**Key Words:** Breast cancer, Socio- economic Status & Reproductive Factors, Addiction

### INTRODUCTION

Carcinoma of the breast is the most common site-specific cancer in women and is the leading cause of death from cancer in females. The mortality from breast cancer appears to have decreased by 30% over the last decade in Western world. In the 1970 the probability of a women in the United States developing breast cancer was estimated 1 in 13; in 1980 it was 1 in 11 and in 1996 it was 1 in 8 (Bland *et al*, 1999)<sup>1</sup>. Data from the Surveillance Epidemiology and End Results (SEER) program indicate that white women in the US have a 13.1% life time risk of developing breast cancer while African women have 9.6% life time incidence (Ries *et al*, 1999)<sup>2</sup>.

In India breast cancer is the second cancer in female after carcinoma cervix. It is rapidly catching up with cervical cancer as the most common cause of cancer among Indian women. Incidence of advanced breast cancer is more commonly than early breast cancer, this is because of illiteracy or patients hide their disease till it causes more symptoms. A recent publication also confirmed earlier observations that breast cancer has replaced cervical cancer as the leading site of cancer among women in Indian cities (Mudur G, 2005)<sup>3</sup>. Presently, 75,000 new cases occur in Indian women every year (Chopra R, 2001)<sup>4</sup>. While in 1970 the incidence of breast cancer among women was 20 per 1,00,000 and 28.6 per 1,00,000, in the year 2000, showing nearly a 50% increase. In India age adjusted incidence of breast cancer in women was 15-25 / 100,000 in the year 1996 (ICMR, 2001)<sup>5</sup>.

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Demographic studies have documented extensively the incidence of breast cancer in the Western population but the available information in India is limited and more work needs to be done. The present study was design to be undertaken as an in-depth study on multi-factorial aspects of breast cancer with special reference to epidemiology.

## MATERIAL & METHODS

In this study 65 patients of breast cancer, attending the Department of Surgical Oncology OPD, Banaras Hindu University, Varanasi from September 2006 through February 2007. The study included breast cancer patients (as cases) and their matched controls (normal healthy person). Controls were selected on the basis of matched sampling method by matching the age and sex. The ratio of case: control was 1: 1.

A through investigative evaluation of each subject was done as per the pre-designed interviewer- administered questionnaire. Detailed history was obtained with particular emphasis on the age, reproductive history, parity, menstrual status, and common addiction. Subjects were evaluated for assessment of socio- economic status, per capita monthly income was calculated followed by classifying into various socio- economic groups according to modified Prasad's social classification, which is linked with the All India Consumer Price Index (Kumar, 1993)<sup>6</sup>.

For categorical variables, Chi-square ( $\chi^2$ ) test and for the continuous variables t- test was performed. To calculate the significance of the variables, the univariate logistic regression analysis (unadjusted odds ratio and 95% confidence interval) was used in the study. The result was considered significant at 5% level of significance.

## RESULT & DISCUSSION

Table 1 shows the number of women who will get breast cancer over different time periods. The time periods are based on the person's current age. Most of the subjects in each group belonged to fourth decade of life. Mean age of breast cancer patients was  $44.60 \pm 9.75$  years and it was  $44.97 \pm 8.88$  years for control groups; however this difference was statistically not significant. A study conducted on Chicago amongst 674 women of breast cancer reported a significant trend in risk association between age and breast cancer. Younger age was found to be at high risk (Nancy et.al.; 1997)<sup>7</sup>. In a study conducted in India, the mean age of the breast cancer patients was found to be 48.4 years (Paymaster et al., 1972)<sup>8</sup>. Another case control study conducted in India found that the mean age of breast cancer patients was 46.2 years (Rao et al., 1994)<sup>9</sup>.

Table- 1: Age distribution of the study subjects

Age Range (yrs.)	Breast Cancer (n= 65)		Controls (n= 65)		t- value
	No.	%	No.	%	
≤ 40	25	38.5	25	38.5	0.22, Not Significant
41-50	22	33.8	22	33.8	
51-60	16	24.6	16	24.6	
≥ 60	2	3.1	2	3.1	
Mean age	44.60 ± 9.75		44.97 ± 8.88		

Sex is an important contributing factor, as there is one male breast cancer for every hundred cancer of breast in females. This brings females at almost hundred time's greater risk of developing cancer of breast than males. (Haagensen, 1986)<sup>10</sup>.

Socio-economic status of the cancer patients was higher as compared to the controls (Table 2). Breast cancer occurs more often among high income group than among low income group women. The major evidence comes from studies conducted by Stock (1955) who determined the incidence of breast cancer among different socio-economic classes in England and Wales and

The incidence rates, education level, and income are higher in urban areas compared with rural areas in Indian scenario (Singh, 1999)<sup>11</sup>.

Table -2: Distribution according to socio- economic status (SES)

Socio- Economic Status	Breast Cancer (n= 65)		Controls (n= 65)		$\chi^2$
	No.	%	No.	%	
Upper	19	29.2	14	21.5	5.62, Not Significant
Upper Middle	17	26.2	23	35.4	
Middle	06	9.2	6	9.2	
Lower Middle	13	20.0	6	9.2	
Lower	10	15.4	16	24.6	
Mean age	44.60 ± 9.75		44.97 ± 8.88		

\* SES based on modified Prasad's Social Classification

There was no significant difference observed between the subjects for parity. Number of abortion was significantly higher in the patients of breast cancer as compared to the control group (Table 3), as 48% of the cases of breast cancer had abortion history ( $p < 0.05$ ). Results of other studies are not conclusive, while few reporting an increase in risk with induced abortion (Lipworth *et al.*, 1995)<sup>12</sup>, few reporting a decrease in risk of breast cancer (Erlandsson *et al.*, 2003)<sup>13</sup> and few studies reporting no association (Sanderson *et al.*, 2001; Goldacre *et al.*, 2001)<sup>14-15</sup>.

Table - 3: Mean number of parity and abortion

Socio- Economic Status	Breast Cancer (n= 65)	Controls (n= 65)	't' value
Parity	3.26 ± 2.26	3.82 ± 1.90	1.51, Not Significant
Abortion	1.02 ± 1.36	0.52 ± 1.00	2.35, $p < 0.05$ Not Significant

It has been suggested that abortions leave the breast epithelium in a proliferative state with an increase susceptibility to carcinogenesis (Erlandsson *et al.*, 2003)<sup>13</sup>. There was no significant difference recorded for use of OCP and menstrual status between the subjects (Table 4).

Table- 4: Distribution according to reproductive history

Variables	Breast Cancer (n= 65)		Controls (n= 65)		$\chi^2$
	No.	%	No.	%	
<b>Parity</b>					1.14, Not Significant
• ≤ 3	41	63.1	35	53.8	
• > 3	24	36.9	30	46.2	
<b>Abortion</b>					4.68; $p < 0.05$ , Not Significant
• No	34	52.3	46	70.8	
• Yes	31	47.7	19	29.2	
<b>OCP use</b>					0.53; Not Significant
• No	62	95.4	60	92.3	
• Yes	03	4.6	05	7.7	
<b>Menstrual status</b>					0.13; Not Significant
• Pre-menopause	24	36.9	22	33.8	
• Post-menopause	41	63.1	43	66.2	

The age at puberty and pregnancy-related factors, such as parity, abortion, age at giving birth to the first baby, and number of children, are factors possibly related to breast cancer (Sinha R, 2003)<sup>16</sup>. Addiction was present in 47.7 percent of the breast

cancer cases where as it was only in 20 percent of controls. Risk of breast cancer was 3.64 times higher with addiction as compared to the control group (Table 5). Frequency of the addiction showed no significant difference between the study subjects. Duration of addiction (>20 years) showed a significant positive association with risk of breast cancer. Results of the present study revealed that none of the patients had a history of smoking and consumption of alcohol. However, consumption of tobacco and pan showed a significant increase risk of breast cancer (Table 5).

Table- 5: Risk of breast cancer associated with addiction

Addiction Details	Breast Cancer (n= 65)		Controls (n= 65)		OR & 95% CI	$\chi^2$
<b>Addiction</b>						
• No	34	52.3	52	80.0	1.00 <sup>a</sup>	11.13**
• Yes	31	47.7	13	20.0	3.64 (1.67- 7.94)#	
<b>Frequency</b>						
• Occasionally	18	58.1	10	76.9	1.00 <sup>a</sup>	1.40; Not Significant
• Daily/ Weekly	13	41.9	03	23.1	2.40 (0.55- 10.51)	
<b>Duration (yrs.)</b>						
• ≤ 20	06	19.4	08	61.5	1.00 <sup>a</sup>	7.51**
• > 20	25	80.6	05	38.5	6.66 (1.59- 27.83)#	
<b>Type of Addiction</b>						
<b>Smoking</b>						
• No	65	100.0	62	95.4	—	3.07; Not Significant
• Yes	0	0.0	03	4.6		
<b>Tobacco &amp; Pan</b>						
• No	34	52.3	55	84.6	1.00 <sup>a</sup>	15.71***
• Yes	31	47.7	10	15.4	5.01 (2.18-11.51)#	

a: reference category, \*\* p < 0.01, #: significant

The association between addiction and breast cancer risk has been observed regardless of the type of addiction consumed, and has been shown to be associated with a higher risk for both premenopausal and postmenopausal breast cancer (Singletary KW, 2001)<sup>17</sup>. Several epidemiological studies have shown an association between moderate drinking and breast cancer. Alcohol exerts a carcinogenic effect on breast tissue, including interference with hepatic metabolism and clearance, stimulation of prolactin secretion, alteration of cell membranes and circulation of cytotoxic protein products of ethanol metabolism (Freud, 1979; Wickramasinghe et al., 1986)<sup>18-19</sup>.

## CONCLUSION

In the present study majority of the subjects belonged to fourth decade of life. The history of abortion was found to be significantly higher in breast cancer cases as compared to controls (p<0.05). Addiction was significantly associated with the risk of breast cancer.

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