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Original Research Article

Risk factors associated with carcinoma breast: a case control study

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ABSTRACT

Background: The burden of breast cancer is increasing in both developed and developing countries; the peak occurrence of breast cancer in developed countries is above the age of 50 whereas in India it is above the age of 40. Reproductive factors contribute most to the development of breast cancer. Nulliparity, more age at first live birth and no breastfeeding are major reproductive risk factors for breast cancer in the developed countries. The role of reproductive factors in the development of breast cancer in Indian population is different as compared with that seen in the western population. Objective of this study was to find out some of the various risk factors of breast cancer among patients attending the tertiary care hospital in Hassan.
Methods: The case control study was conducted at surgery wards of Sri Chamarajendra district hospital which is a teaching hospital. The calculated number of cases was 110, including 110 controls total 220 individuals were included in the study. A case was defined as any female patient histopathologically confirmed to have breast cancer.
Results: The maximum cases (38%) were between 51 to 60 years of age group. Age at menarche, age at first child birth, age at marriage and age at menopause reported significant risk for breast cancer.
Conclusions: Information, education and communication activities regarding these risk factors, early signs and symptoms of breast carcinoma, and breast self-examination should be imparted to the women to create awareness about this fatal disease.

Keywords: Breast cancer, Cases and controls, Risk factors

INTRODUCTION

Cancer is one of the major health issues worldwide. At global level, it accounted for 11.4 million new cases and 7.4 million deaths (around 13% of all deaths) in 2004.[1] Cancer incidence in South East Asia region was 1.7 million in 2004.[2] Cancer has become one of the ten leading causes of death in India.[3] It is estimated that there are nearly 2 to 2.5 million cancer cases at any given point of time in India.[4]

Over 7 to 9 lakh new cases and 3 lakh deaths occur annually in India due to cancer, whereas in Karnataka there are about 1.5 lakh prevalent cases of cancer and about 35,000 new cases are added to this every year.[5,6] Based on the consolidated report of cancer registries the overall common cancer sites in South India are stomach for males and cervix for females.[7-9]

In India and other developing countries, breast carcinoma ranks second only to cervical carcinoma among women. But the incidence of breast cancer is on the rise and may become number one cancer in females in the near future. The burden of breast cancer is increasing in both developed and developing countries; the peak occurrence of breast cancer in developed countries is above the age of 50 whereas in India it is above the age of 40.[10] In India, the age standardized incidence rate of breast cancer varies between 9 to 32 per 1,00,000 women. To generate the reliable data on magnitude and pattern of cancer,

India started National cancer registry program in 1981.[11] Upto 2003 the program comprised of six population based cancer registry and one registry serving rural area covering the total population of 35.7 million (only 3.5% of the Indian total population) and an increasing trend in incidence is reported from various registries of national cancer registry project and now India is a country with largest estimated number of breast cancer deaths worldwide.[12-14]

Reproductive and hormonal factors contribute most to the development of breast cancer. Nulliparity, more age at first live birth and no breastfeeding are major reproductive risk factors for breast cancer in the developed countries. The role of reproductive factors in the development of breast cancer in Indian population is different as compared with that seen in the western population. This is because parity, younger age at first live birth, and lactation practices are part of our culture, whereas these factors are far less prevalent in western women. Geographic variation in the incidence of breast cancer can be attributed to exposure to various risk factors. Risk of breast cancer increases in successive generations of people moving from low risk areas to high risk regions proving that changes in reproductive behavior and lifestyle are more important than hereditary factors in the development of breast cancer.[15] The reasons for varying incidence of breast cancer among women are not fully understood, which are likely to be explained by reproductive and lifestyle factors such as literacy, diet, age at menarche and menopause, age at first delivery, abortion, family history of breast cancer.[16-20]

The objectives of the present study were to find out some of the various risk factors of breast cancer among patients attending the tertiary care hospital in Hassan.

METHODS

The case control study was conducted at surgery wards of Sri Chamarajendra district hospital which is a teaching hospital. Delayed age at first delivery was considered as a risk factor with an exposure of 30% in control group and an anticipated or of 2 for a power of 80% and 5% level of significance the calculated number of cases was 110.[21] For 1:1 allocation ratio the required number of controls was 110, hence total 220 individuals were included in the study.

A case was defined as any female patient histopathologically confirmed to have breast cancer, reporting to radiotherapy department or surgery department. Those who were very sick or terminally ill were excluded.

One age-matched control (±3 years) without any current breast problems or previous history of breast cancer was enrolled from the medical or surgical wards of the same hospital. If more number of controls were present, controls were selected randomly. Patients, who were not willing to participate in study, or those cases who were seriously ill and male breast cancer patients were excluded from the study.

The study subjects were interviewed with a pre-tested interview schedule after obtaining informed consent. Presence of female attendant was ensured during the interview of the subject. Variables studied were socio-economic status, religion, caste, age at menarche, age at marriage, age at first child, number of children, number of abortions, total months of breast feeding, age at menopause, use of hormones (oral contraceptive pills), previous benign breast disease, biopsy, family history, exposure to radiation etc. Controls were enrolled after explaining to them in detail about the purpose of the study and their role in the study. Their queries regarding health problems were answered.

Data analysis was done using epi info. The data is summarized in the form of tables. Chi-square test, odds ratio and logistic regression were used to identify and quantify the risk.

RESULTS

A total of 220 patients were participated in the study. Among them 110 were cases and 110 were controls. The maximum cases (38%) were between 51 to 60 years of age group. The mean age of the cases was 49.3±10.63 years and that of controls was 47.9±10.92 years. The age of women in both groups varied from 26 years to 74 years. Most of the cases and controls belonged to Hindu religion. The cases had a better education as compared with the controls.

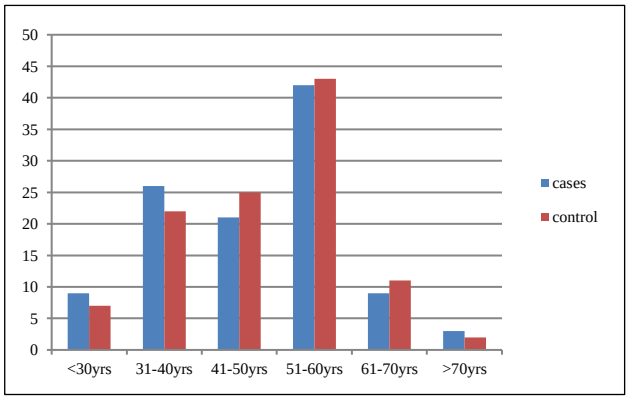

Figure 1: Age wise distribution study subjects.

Almost half of the cases and controls were in 51-60 years of age group and least in >70 years.

Table 1 shows the distribution of socio demographic risk factors associated with breast cancer. Literate women had 1.6 times more risk thzan illiterate women though the difference was not significant. Analysis of occupation showed that non-manual laborers had 2 times more risk than manual laborers. Women belonging to class 1, 2 and

3 had twice the risk than those belonging to class 4 and 5 and the difference was significant. Table 2 reports the results of univariate logistic regression for reproductive factors. Age at menarche, age at first child birth, age at marriage and age at menopause reported significant risk for breast cancer. Parity and breast-feeding duration did not report any significant risk in present study population.

Table 1: Univariate logistic regression analyses for socio demographic factors associated with breast cancer.

Risk factor	Cases N=110 (%)	Controls N =110(%)	OR (95% CI)	P value
Education				
Literate	76 (69%)	63 (57%)	1.66(0.95-2.9)	p>0.05
Illiterate	34 (31%)	47 (43%)	Ref	
Total	110 (100%)	110 (100%)		
Socio economic status (B.G Prasad classification)				
Class 1,2,3	78 (71%)	59 (53%)	2.10 (1.2-3.6)	P<0.05
Class 4,5	32 (29%)	51 (47%)	Ref	
Total	110 (100%)	110 (100%)		
Occupation				
Non-manual labourer	67 (61%)	48 (44%)	2.01 (1.17-3.4)	P<0.05
Manual labourer	43 (39%)	62 (56%)	Ref	
Total	110 (100%)	110 (100%)		

Table 2: Univariate logistic regression analyses for reproductive factors associated with breast cancer.

Risk factors	Cases N (%)	Controls N (%)	OR (95% CI)	P Value
Age at menarche (years)				
<=13	58 (52.7%)	53 (48%)	Ref	
>13	52 (47.2%)	57 (52%)	1.19 (0.70-2.03)	>0.05
Total	110 (100%)	110 (100%)		
Age at marriage (years)				
<=30	94 (87.8%)	104 (95.4%)	Ref	
>30	13 (12.1%)	5 (4.5%)	2.87 (0.98-8.37)	<0.05
Total	107 (100%)	109 (100%)		
Parity				
Nulliparous	14 (13%)	8 (7.3%)	Ref	
Parous	93 (86.9%)	101 (9.2%)	1.9 (0.76-4.73)	>0.05
Total	107 (100%)	109 (100%)		
Age at first child birth (years)				
<=20	28 (30.1%)	43 (42.5%)	Ref	
21-30	47 (50.5%)	49 (48.5%)	0.6 (0.36-1.26)	>0.05
>30	18 (19.3%)	9 (8.9%)	4.04 (1.33-13.2)	<0.05
Total	93 (100%)	101 (100%)		
Age at menopause (years)				
<=45	72 (84.7%)	87 (94.5%)	Ref	
>45	13 (15.2%)	5 (5.4%)	3.14 (1.06-9.22)	<0.05
Total	85 (100%)	92 (100%)		
Breast feeding duration				
<=6 months	34 (36.5%)	29 (28.7%)	1.43 (0.78-2.61)	>0.05
>6 months	59 (63.4%)	72 (71.2%)	Ref	
Total	93 (100%)	101 (100%)		
Number of abortion				
At least one abortion	14 (13%)	11 (10%)	1.34 (0.57-3.10)	>0.05
No abortion	93 (86.9%)	98 (90%)	Ref	
Total	107 (100%)	109 (100%)		

DISCUSSION

The present study conducted in a teaching hospital consists of 110 cases and 110 controls. The cases and controls were between 24 to 74 years of age. Ozmen et al, conducted a similar study with the cases and controls between 18 to 70 years of age.[22] Ahmed et al, conducted a similar study with study population between 20 to 65 years age group.[23] In the present study, maximum numbers of subjects (42.3%) were observed between 51 to 60 years of age group. The mean age of the cases was 49.3±10.63 years and that of controls was 47.9±10.92 years, similar findings were noted in the study conducted by Meshram et al, the study reported most of the patients between 40 to 49 years of age with the average age of 48.4 years for cases.[18] Abasi et al, reported average age of cancer cases 47.49 years in a similar study conducted in Iran.[24]

In the present study, higher socio-economic class and non-manual labourers have increased risk of breast cancer. Similarly, the study done by Gajalakshmi et al, reported that higher education is associated with increased risk of breast cancer.[21] The study conducted by Rai et al, reported that education and socio-economic status of the cases was higher as compared to controls.[25]

In the present study, age at first child birth, age at marriage and age at menopause reported significant risk for breast cancer. Helmrich et al, also reported significant trend of increasing risk with increasing age at first birth, women who had first pregnancy after the age of 35 years had 40% increased risk compared with those with first pregnancy before the age of 20 years.[26] This observation supports the hypothesis that, pregnancy at a younger age is associated with a favorable estrogen profile, which drastically reduces the presence of undifferentiated/vulnerable breast cells, differentiates terminal end buds to lobules, and/or reduces the pool of estrogen receptor positive cells.

In the present study, women who got married before 30 years of age have decreased risk compared with women who got married after 30 years of age. The difference was found to be statistically significant. A study done by Ebrahimi et al, found that never married women were at a higher risk for breast cancer.[27] Although marital status by itself is not a determining factor for increased or reduced breast cancer risk, but the main protective effect is from early first full-term pregnancy.

In the present study, risk of carcinoma increased as the age at menopause increased. The risk of carcinoma was more among cases who have had menopause after 45 years as compared with cases who have had menopause before 45 years. The difference found was statistically significant. Meshram et al, reported that menopause (≥50 years of age) was observed to be associated with increased risk and the risk was 7.9 times more among women who had menopause at or after 50 years of age as compared with women who had menopause before 45 years.[18] Similar findings were reported by many other studies.[28,29] The effect of age at menopause may be mediated by prolonged exposure of breast epithelium to estrogen.

The present study did not show any association between breast feeding and parity on breast cancer. Purwanto et al, from Indonesia and Brinton et al, from USA have shown that duration of breast feeding (2-16 weeks) was not an independent risk factor for breast cancer.[30] One of the reason for the lactation not showing up as a factor may be that the sample size was ineffective to find this risk. Wrensch et al, from USA showed no association between parity and breast cancer.[31] Rao et al, found that nulliparous women had twice higher risk as compared to parous women.[5]

CONCLUSION

In the present study, late age at marriage, late age at first child birth, late menopause are the significant risk factors for breast cancer, which are modifiable. Information, education and communication activities regarding these risk factors, early signs and symptoms of breast carcinoma, and breast self-examination should be imparted to the women to create awareness about this fatal disease. A targeted intervention to tackle this problem seems to be the need of the hour.

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