RESEARCH ARTICLE

Risk Factors of Breast Cancer among Women in Eastern India: A Tertiary Hospital Based Case Control Study

Soumen Das[1]*, Santanu Sen[2], Anindya Mukherjee[2], Debadatta Chakraborty[2], Pankaj Kumar Mondal[2]

Abstract

Aim: Breast cancer is one of the most common cancers of women in India with high fatality rate. Over a 1 year study period 105 consecutive biopsy or fine needle aspiration cytology confirmed breast cancer patients were interviewed by direct questionnaire method regarding risk factors attending Surgery and Radiotherapy OPD of Medical College Kolkata, West Bengal while taking other 105 patients attending Surgery Department for some other disease as controls. The data were compiled in MS Excel 2007 and analyzed by Epi info 3.5.1 software. Among the cases, rural residence, illiteracy and low socio-economic status was significantly higher than controls. Late onset of menarche, late onset of menopause, ever OCP usage, breast feeding for 1-2 years and age of 1st childbirth between 20-30 years were found to be significant protective factors. People should be made aware regarding the modifiable risk factors to prevent breast cancer.

Keywords: Breast cancer - multiparity - breast feeding - menarche - menopause - age of 1st child birth - India

Asian Pacific J Cancer Prev, **13 (10)**, 4979-4981

Introduction

Breast cancer (BC) is one of the common cancers of women worldwide with 10 lakh new cases occurring every year amounting to 20% of all malignancies with high fatality rate. Age adjusted incidence rate in India amounts to 15-29 per lakh population per year and is ever increasing (Donegen, 2002; Parkin, 2002). Identification of high risk patient and proper prevention (chemoprevention or prophylactic surgery) potentially reduces mortality (American Cancer Society, 2004). Several reproductive risk factors have been identified and evaluated. Early menarche, late menopause, nulliparity, late age of childbirth is risk factors, whereas multiparity and breast feeding offers protection against breast cancer. Most of these studies were conducted in first –world countries (Zheng, 2001). Mandana Ebrahimi et al in their case-control study in Tehran during April 1997-April 1998 found out nulliparity, family history and unmarried status as risk factors of female BC (Mandana, 2002). Late age of menarche and early age of menopause, early age of 1st child birth, multiparity, history of ever breast feeding and increased duration of breast feeding were found to be significant protective factors for breast cancer in a multicentric case-control study of risk factors of breast cancer conducted in South India (Gajalakshmi, 2009). Only few epidemiological studies have been conducted to assess the risk factors of breast cancer in Indian women and there is acute scarcity of data in the literature from eastern part of India (Gajalakshmi, 1991; 1998; Rao, 1994). This tertiary hospital based case-control study aimed at determination of socio-demographic, genetic and socio-cultural risk factor pattern among the female BC patients attending the OPD in a tertiary care hospital in Kolkata, eastern India.

Materials and Methods

We conducted a tertiary hospital based case-control study where a total of 105 consecutive biopsy or FNAC proved female breast cancer patients attending Surgery and Radiotherapy Outpatient Department of Medical College, Kolkata over a period of one year (January 2010 to January 2011) were interviewed by a pre designed pre tested schedule regarding socio-economic factors including place of residence, literacy status, socio-economic status as per capita monthly family income. Various risk factors that were enquired about were-- age of menarche, age of menopause, total duration of menstrual years, age at first childbirth, parity, cumulative duration of breast feeding and ever usage of OCPs after obtaining their informed consent. Other 105 female persons attending Surgery department for some other disease (without any breast disease) were taken as controls after necessary age matching thus for each registered cases one matched control was also registered simultaneously.

Medical College Kolkata is the oldest medical college in Asia catering to population not only from West Bengal but also other parts of India, especially eastern India. The data were tabulated in MS Excel 2007 software and was

[1]IPGMER&SSKM Hospital, [2]Medical College, Kolkata, India *For correspondence: drsoumen_das@yahoo.co.in

Table 1. Socio-Demographic Profile

Socio-demographic variables			Cases	Controls	ODDS ratio with confidence interval	Test of significance (chi sq, df, p)
Residence	Rural	(n=121)	69 (57.0%)	52 (43.0%)	1.95 (1.12-.41)	5.64, 1, 0.018
	Urban	(n=89)	36 (40.4%)	53 (59.6%)	1	
Literacy	Illiterate	(n=60)	52 (86.7%)	8 (13.3%)	11.89 (5.26-26.91)	45.17, 1, 0.000
	Literate	(n=150)	53 (35.3%)	97 (64.7%)	1	
Socio-economic status	Low	(n=104)	68 (65.4%)	36 (34.6%)	1	19.51, 1, 0.000
	Average	(n=106)	37 (34.9%)	69 (65.1%)	0.28 (0.16-0.50)	

Table 2. Risk Factors

Risk factors of breast cancer			Cases	Controls	ODDS ratio with confidence interval	Test of significance (chi sq, df, p)
Age of menarche	≤12 years	(n=42)	29 (69.0%)	13 (31.0%)	4.46 (1.36-15.14)	7.91, 1, 0.005
	13-15 years	(n=144)	68 (47.2%)	76 (52.8%)	1.79 (0.67-4.90)	1.60, 1, 0.205
	≥16 years	(n=24)	8 (33.3%)	16 (66.7%)	1	-
Age of menopause	<40 years	(n=24)	22 (91.7%)	2 (8.3%)	1	-
	40-49 years	(n=175)	76 (43.4%)	99 (56.6%)	0.07 (0.01-0.32)	17.77 (Yates corrected), 1, 0.000
	≥50 years	(n=11)	7 (63.6%)	4 (36.4%)	0.16 (0.02-1.37)	2.43 (Yates corrected), 1, 0.11
Menstrual years	<30 years	(n=165)	75 (45.5%)	90 (54.5%)	0.417 (0.21-0.83)	6.36, 1, 0.012
	≥30 years	(n=45)	30 (66.7%)	15 (33.3%)	1	-
Parity	Primy	(n=13)	7 (53.8%)	6 (46.2%)	2.33 (0.30-19.97)	0.26, 1, 0.606
	Multiparity	(n=188)	95 (50.5%)	93 (49.5%)	2.04 (0.44-10.66)	0.44 (Yates corrected), 1, 0.50
	Grand Multiparity	(n=9)	3 (33.3%)	6 (66.7%)	1	-
Breast feeding	<1 year	(n=14)	9 (64.3%)	5 (35.7%)	1.45 (0.42-5.26)	0.41, 1, 0.52
	1-2 year	(n=48)	14 (29.2%)	34 (70.8%)	0.33 (0.15-0.70)	9.99, 1, 0.0015
	>2 years	(n=148)	82 (55.4%)	66 (44.6%)	1	-
Age at first child birth	<20 years	(n=100)	66 (66.0%)	34 (34.0%)	1	-
	20-30 years	(n=100)	32 (32.0%)	68 (68.0%)	0.24 (0.13-0.46)	23.13, 1, 0.0000
	>30 years	(n=10)	7 (70.0%)	3 (30.0%)	1.2 (0.26-6.32)	0.01, 1, 0.923
OCP use	Yes	(n=46)	17 (37.0%)	29 (63.0%)	1	-
	No	(n=164)	88 (53.7%)	76 (46.3%)	1.975 (1.01-3.87)	4.01, 1, 0.045

analyzed by Epi info 3.5.1 software for simple proportions and odds ratio was calculated for estimation of risk including confidence interval along with application of Chi square test as test of significance.

Results

Out of 105 cases, 65.7% were from rural areas and rests were from urban communities. Among the controls 49.5% were from rural communities. Though proportion of literates and illiterates were nearly same for the cases but among the controls 92.4% were literates. 64.8% cases were from low socio-economic background (per-capita monthly family income) whereas 65.7% of the controls were from average socio-economic background. We found that urban residence, literacy and average socio-economic income were protective in breast cancers (Table 1).

Among the cases age of menarche was 27.6% for ≤12 years and 64.8% for 13-15 years whereas among the controls age of menarche was 12.3% for ≤12 years and 72.3% for 13-15 years of age. Age of menopause was 20.9% for less than 40 years among the cases and 72.8% for 40-49 years. Among the controls these were 1.9% and 94.3% respectively. This result might be due to the early menopause induced by chemotherapy or hormone therapy used for the treatment of BC itself. Total duration of menstrual years being less than 30 for 71.4% patients and among the controls the same was 85.7%. Primy were 6.6% and multipara were 90.5% among the cases and primy were 5.7% with 88.6% multipara among the controls. Lifetime breast feeding of less than one year were 8.6% followed by 13.3% for 1-2 years among the cases. Among the controls these were 4.8% and 88.6% respectively. Age at first child birth less than 20 years were 62.9% and between 20-30 years being 30.5% among the cases whereas among the controls they were 32.4% and 64.8% respectively. Ever OCP use was 16.2% in cases and 27.6% in controls. The odds ratio of individual risk factors and the test of significance are shown in table 2. Late menarche and menopause, less duration of menstrual years, with age of 1st child birth between 20-30 years with history of breast feeding for 1-2 years and ever use of OCP were found to be protective for breast cancer and the results were statistically significant.

Discussion

Determination of risk factors of BC is important in early diagnosis and prevention of BC. Among the risk factors which are important in population-hormonal factors are of great value. Age of menarche, Age of menopause, Age at first childbirth, parity, Duration of breast feeding1– these are the common hormonal factors which has been discussed thoroughly in different studies. We observed that late onset of menarche and menopause, lesser years of menstruation, ever OCP usage, breast feeding for 1-2 year and age of 1st childbirth between 20-30 years were found to be significant protective factors

from occurrence of breast cancer.

Upon systematic review of the literature on breast cancer it was found that nulliparity (RR 1.1-1.4) was a moderately consistent risk factor for breast cancer. Among the larger studies, the relative risk estimates appeared to decrease by approximately 0.09 for each additional birth (Weir et al., 2007) . Cohort life-table studies of white Catholic nuns have demonstrated the greater mortality due to cancers of the breast and lower mortality due to cancer of the uterine cervix (Gilewski, 1998). Case control studies have indicated pregnancies to be more numerous among controls than among breast cancer patients (Gajalakshmi and Shanta, 1991; Gajalakshmi et al., 1998; 2009; Rao, 1994).

Early menarche was associated with increased risk of breast cancer in primary and secondary research studies (OR 1.0 and RR 1.1) respectively (Weir et al., 2007 ; Gajalakshmi et al., 2009). Late menopause (≥50 years) was also associated with increased risk (OR 1.87) (Gajalakshmi et al., 2009). Breast cancer patients, on the whole, marry at a later age than do women in general. Their age at first pregnancy is therefore later than usual and possibly also they have fewer children. Conversely, increasing parity or surgical menopause before 40 years of age significantly diminishes the relative risk (Ibrahim et al., 2004). A life-long reduction in risk for breast cancer is associated with pregnancy, particularly pregnancy at an early age. A strong relationship between breast cancer risk and age at first pregnancy has been found (OR 1.8) (Gajalakshmi et al., 2009). It appears that total parity is not so directly related to breast cancer risk as is the age at which a woman has her first child.

Lifetime duration of breast feeding less than 1 year has got increased risk of breast cancer as found from various studies (Gajalakshmi, 1991; 1998; 2009; Rao, 1994; Mandana Ebrahimi et al., 2002). The pooled random effects estimate, comparing the risk of breast cancer amongst ever users of OCPs versus never users was 1.17 (95%CI 1.05-1.31) (Weir, 2007). The similar finding was observed in Iranian case-control study (Mandana Ebrahimi et al., 2002).

Lower socio economic status and illiteracy or lesser years of education were important associated risk factors for breast cancer as was evident from our study and the findings were consistent with the studies of Gajalakshmi et al. in south India (1998; 2009). Case control studies are characterized by susceptibility to selection bias and recall bias which is not a problem in nested case control studies. Cohort studies are also susceptible to selection and information bias but relative risk can be calculated. Hence larger nested case-control studies/cohort studies could be undertaken for better results.

In conclusion, so we can conclude that illiterate, poor socio-economic rural female with early menarche and menopause, late first childbirth, less duration of breast feeding, never usage of OCP are at greater risk for breast cancer in eastern India. No relation for parity was found. So early detection of risk factors along with increase in awareness among the population is the key for prevention of breast cancer.

References

American Cancer Society; Breast Cancer Facts and Figures 2003–2004. Atlanta GA, USA.

Donegen WL, Spratt JS (2002). Cancer of the Breast, 5th Ed, Philadelphia, WB Saunders 2002.

Gajalakshmi CK, Shanta V (1991). Risk factors for female breast cancer. A hospital-based case-control study in Madras, India. *Acta Oncol*, **30**, 569-74.

Gajalakshmi CK, Shanta V, Hakama M (1998). Risk factors for contralateral breast cancer in Chennai (Madras), India. *Int J Epidemiol*, **27**, 743-50.

Gilewski T, Ragupathi G, Bhuta S, Williams L, Musselli C (1998). Immunization of metastatic breast cancer patients with a fully synthetic globo-H conjugate: a phase I trial. *PNAS*, **VOL?**, 3270-5.

Gajalakshmi V, Mathew A, Brennan P, et al (2009). Breastfeeding and breast cancer risk in India: A multicenter case-control study. *Int J Cancer*, **125**, 662-5.

Ibrahim NK, Murray J, Parker J, Finke L, Miles D (2004). Humoral immune responses to naturally occurring STn in metastatic breast cancer patients (MBC pts) treated with STn-KLH vaccine. *Proceedings of the Am Society of Clinical Oncology*, **23**, 174.

Mandana Ebrahimi M, Vahdaninia M, Ali Montazeri A (2011). Risk factors for breast cancer in Iran: a case–control study. Breast Cancer Research 2002, Vol 4 No 5. Available online http://breast-cancer- research.com/content/4/5/R10 (accessed on 1.1.2011)

Parkin DM, Whelan SL, Ferlay J, Teppo L, Thomas DB, (2002). Cancer incidence in five continents, vol. VIII. IARC Sci Publ No. 155. Lyon: IARC, 2002.

Rao DN, Ganesh B, Desai PB (1994). Role of reproductive factors in breast cancer in a low-risk area: a case-control study. *Br J Cancer*, **70**, 129-32.

Weir R, Day P, Ali W (2007). Risk factors for breast cancer in women A systematic review of the literature, *NZHTA REPORT*, **10**, 69-71.

Zheng T, Holford TR, Mayne ST, et al (2001). Lactation and breast cancer risk: a case–control study in Connecticut. *Br J Cancer*, **84**, 1472-6.