

Sociodemographic and Reproductive Factors Associated with Breast Cancer: A Case-Control Study in a Cancer Specialized Hospital of Dhaka City, Bangladesh

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Abstract

Background: Breast cancer is the most common cancer in women in the world. In Bangladesh, the breast cancer is estimated to have the age-standardized incidence rate of 25.2 per 100,000 females of all ages. **Objective:** The objective of this study was to identify the sociodemographic and reproductive factors associated with the development of breast cancer in Bangladesh. **Materials and method:** A case control study was conducted on 136 female subjects, in a cancer specialized hospital of Dhaka city (68 subjects for case group with breast cancer and 68 subjects for control group without any known cancer) aged ≥ 20 years. Data was collected by face to face interview with structured questionnaire. The results were reported by adjusted odd ratios (ORs) and corresponded 95% confidence intervals (CIs). A p-value less than 0.05 were considered statistically significant. Independent factors associated with breast cancer were established using multivariate logistic regression analysis. **Result:** Among the reproductive factors, women with the history of hysterectomy are 84% less likely and post-menopausal women are 27.83% more likely to get breast cancer. On sociodemographic background women who received 12+ years of schooling and 6 to 10 years of education are 14.91% and 4.91% more likely to get breast cancer. Women with the monthly family income of 5000 Tk to 25000 Tk are 76% less likely to get breast cancer than women with more monthly family income. Women married for more than 20 years are 7.27% more likely to get cancer. Women with 3 or more children are 81% less likely to get breast cancer than women with fewer children. **Conclusion:** Our study suggests that, age, level of education, monthly family income, history of hysterectomy of the patient may play an important role in risk of breast cancer in Bangladeshi women. Further research is needed to better understand the complex interactions between environmental, reproductive and genetic factors.

Keywords: Sociodemographic factor; Reproductive factor; Breast cancer.

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Introduction

Breast cancer is the most common cancer in women both in the developed and less developed world. It is estimated that worldwide over 508,000 women died in 2011 due to breast cancer.¹ Although breast cancer is thought to be a disease of the developed world, almost 50% of

breast cancer cases and 58% of deaths occur in less developed countries (GLOBOCAN 2008). Reproductive and hormonal factors play an important role in the cause of this neoplasm. Hormonal factors have the greatest effect on the mammary glands during puberty, pregnancy, and

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lactation, influencing cellular alterations. Numerous studies have focused on the relationship between reproductive factors and breast cancer risk. The main factors studied have been age at first delivery, parity, age at menarche, and age at menopause.^{2,3} Prevention is difficult because many factors are endogenous, thus making preventive interventions more difficult.^{4,5} Bangladesh is a low-income country situated in South Asia, bordered by Burma, India and the Bay of Bengal. In recent decades, Bangladesh has achieved significant progress in socioeconomic development, health and population control.⁶ Like other South Asian countries, breast cancer is the most common malignancy among women of Bangladesh. Unlike women in high income countries, more women in South Asian countries (including Bangladesh) are diagnosed with breast cancer before menopause. In Bangladesh, the breast cancer is estimated to have the age-standardized incidence rate of 25.2 per 100,000 females of all ages.⁷ According to the Bangladesh Bureau of Statistics, cancer is the sixth leading cause of death. International Agency for Research on Cancer has estimated cancer-related death rates in Bangladesh to be 7.5% in 2005 and 13% in 2030. The two leading causes are in males are lung and oral cancer and in females is breast cancer. Owing to its high prevalence throughout the world breast cancer prevention is one of the major concerns for every woman.⁸

Breast cancer has become a major concern for public health in Bangladesh. Despite that only few studies have been conducted regarding breast cancer and a very few of published works are available discussing breast cancer and its risk factors in the aspect of Bangladesh. The purpose of this study is to identify these risk factors to identify and understand their association in breast cancer development. This knowledge might provide resources for planning and effective screening strategy by which early diagnosis and curable treatment can be possible.

Materials and method

Study area, design and sample size: This case control study was conducted on the female patients, visiting Delta Medical College and Hospital, a private cancer specialized hospital in Dhaka, Bangladesh. On an average around 60 to 70 different types of cancer patients come per day to the outpatient department. The study took place from 1st August to 30th September in the year 2017. For case group, female patients aged ≥ 20 years with breast cancer were selected and for control group, female patients aged ≥ 20 years not having breast cancer or any other cancer were selected. We excluded patients suffering from any type of other cancers for both cases and controls. We collected data from 136 patients (68 subjects for case group and 68 subjects for control group). Purposive sampling technique was followed while selecting subjects.

Data collection and ethical consideration: Formal requests were taken from appropriate authority for getting permission to collect data and informed consent was taken from every respondent. Data was collected by face to face interview with structured questionnaire. Pre-tested structured questionnaire was used in a pilot study to collect data with 10% of the cases and controls. They were designed according to the objectives and variables stated in the study.

Statistical analysis: We analyzed the data using software R. We calculated the descriptive statistics for all of the variables which included continuous variables (presented as a mean and standard deviation) and categorical variables (presented as frequencies and percentages). The results were reported by adjusted odd ratios (ORs) and corresponded 95% confidence intervals (CIs). A p-value less than 0.05 was considered statistically significant. Independent factors associated with breast cancer were established using multivariate logistic regression analysis.

Results

Table I shows sociodemographic factors associated with breast cancer in unadjusted odds

ratio of each covariates and case control. Among them age, level of education (schooling) and monthly family income, occupation and number of children were significantly associated with breast cancer.

Table I: Patients' characteristics corresponding to case control and unadjusted analysis (sociodemographic factors)

Factors	Categories	Case	Control	Unadjusted OR (CI)	p-value
Age	Pre-menopause	29(38.67%)	46	2.81 (1.41 – 5.73)	0.00376
	Post-menopause	39(63.93%)	22		
Schooling	5 years	10(27.03%)	27	2.00 (0.80 – 5.20)	0.143
	6-10 years	20(42.55%)	27		
	12+ years	38(73.08%)	14		
Marital Status	Divorced/Widow	16(47.05%)	18	1.17 (0.54 – 2.57)	0.692
	Married	52(50.98%)	50		
Duration of Marriage	<10 year	12(38.71%)	19	1.45 (0.49 – 4.38)	0.504
	11-20 Years	11(47.83%)	12		
	>20 Years	45(57.69%)	33		
Income (Tk)	5000-25000	35(37.23%)	59	0.16 (0.066 – 0.365)	<0.001

Table II shows clinical and behavioral factors associated with breast cancer in unadjusted odds ratio of each covariates and case control. Among them hormonal therapy was significantly associated with breast cancer.

Table II: Patients' characteristics corresponding to case-control and unadjusted analysis (reproductive factors)

Factor	Categories	Case	Control	Unadjusted OR (CI)	p-value
Age of menarche	8-10	15 (57.69%)	11	0.93 (0.37-2.31)	0.874
	11-13	38 (55.88%)	30		
	14-15	15 (35.71%)	27		
Abortion /miscarriage	No	31 (46.27%)	36	1.34 (0.69-2.65)	0.392
	Yes	37 (53.62%)	32		
H/O breast feeding	No	11 (35.48%)	20	2.16 (0.96-5.09)	0.0691
	Yes	57 (54.29%)	48		
Family planning method	No	32 (43.24%)	42	2.12 (0.93-4.96)	0.076
	OCP	21 (61.76%)	13		
	Others	15 (53.57%)	13		
H/O hysterectomy	No	57 (50.89%)	55	0.82 (0.33-1.98)	0.653
	Yes	11 (45.83%)	13		
Hormone therapy	No	48 (45.28%)	58	2.42 (1.05-5.85)	0.042
	Yes	20 (66.67%)	10		
H/O cancer in 1st degree relative	No	38 (45.78%)	45	1.54 (0.77-3.11)	0.219
	Yes	30 (56.60%)	23		

In Table III, we fit a multivariate logistic regression model with breast cancer after adjusting all the factors.

Table III: Adjusted relationship between covariates and case control using multivariate logistic regression model

Factors	References	Estimate	OR	LCI	UCI	p-value
(Age) Post-menopause	Pre-menopause	3.33	27.83	4.59	302.83	0.001
(Schooling) 6 -10 years	5 years	1.59	4.91	1.23	22.79	0.03
(Schooling) 12+ years	5years	2.70	14.91	2.26	124.87	0.008
(Marital status) Married	Divorced/Widow	-0.34	0.71	0.18	2.63	0.61
(Duration of marriage) 11-20 years	<10	0.12	1.13	0.20	6.05	0.89
(Duration of marriage) >20 years	<10	1.98	7.27	1.01	67.28	0.05
(Monthly family income) 5000-25000 Tk	>25000	-1.43	0.24	0.05	0.92	0.04
(Occupation) Housewife	Employed	-1.10	0.33	0.06	1.63	0.18
(Number of children) 3-5	1-2	-1.67	0.19	0.03	1.03	0.06
(Age of menarche) 11-13 years	8-10	-0.37	0.69	0.11	3.83	0.68
(Age of menarche)14-15 years	8-10	-1.41	0.24	0.03	1.42	0.13
(Abortion, Miscarriage) Yes	No	-0.02	0.98	0.31	3.04	0.97
(H/O breastfeeding) Yes	No	1.24	3.46	0.69	19.84	0.14
(Family planning method) OCP	No	1.07	2.93	0.46	23.54	0.27
(Family planning method) Others	No	0.90	2.47	0.35	20.74	0.38
(H/O hysterectomy) Yes	No	-1.81	0.16	0.02	0.88	0.04
(Hormonal therapy) Yes	No	1.36	3.93	0.92	19.07	0.07
(H/O cancer in 1 st degree relative) Yes	No	-0.52	0.59	0.17	1.85	0.38

Multivariate analysis: For post-menopausal women (age more than 47 years), it reviews that with 95% confidence interval when the age is postmenopausal than premenopausal (OR= 27.83, CI: 4.59-302.83, p-value=.001) is a significant variable. This means post-menopausal women are 27.83% more likely to get breast cancer than premenopausal women. The women who received 12+ years of schooling in comparison to the women receiving 1 to 5 years of schooling are highly significant (OR=14.91, CI: 2.26-124.87, p-value=0.008) and are 14.91% more likely to get cancer than women receiving 5 or less years of education. Women receiving 6 to 10 years of education are also a significant variable (OR=4.91, CI: 1.23-22.79, p-value=0.03) meaning they are 4.91% more likely to get cancer than women receiving 5 years of education. Monthly family income has proven to be another significant variable from the analysis. Women with the monthly family income of 5000 Tk to 25000 Tk (OR=0.24, CI: 0.05-0.92, p-value=0.04) are 76% less likely to get breast cancer than

women with monthly family income greater than 25000 Tk. Amongst the reproductive factors, history of hysterectomy has been found as a significant variable (OR=0.16, CI: 0.02-0.88, p-value=0.04). It shows that women with the history of hysterectomy are 84% less likely to get breast cancer than women having no history of hysterectomy. Duration of marriage (>20 years) (OR=7.27, CI: 1.01-67.28, p-value=0.05), which shows women married for more than 20 years are 7.27% more likely to get cancer. Number of children (3-5 years) (OR=0.19, CI: 0.03-1.03, p-value=0.06), which means women with 3 or more children are 81% less likely to get breast cancer than women with fewer children. Hormonal therapy (yes) (OR=3.93, CI: 0.92-19.07, p-value=0.07) meaning women taking hormonal therapy have 3.93% more chance on being cancer cases than the women who don't. These three variables are found near to significant and need more investigation.

Discussion

After concluding the study, several variables have been found significant in association with breast cancer. Amongst the socio demographic factors the most prominent variables were age, level of education or schooling, monthly family income. Duration of marriage and number of children were also proven to be near significant. In India, a comparative study of pre and postmenopausal breast cancer was conducted in recent years where overall 75 patients were diagnosed with stage 3 disease in which 39 were premenopausal and 36 were postmenopausal women. Totally, 16 patients were diagnosed with stage 2 consisting equal number of pre and post menopausal women. Six postmenopausal women were diagnosed with stage 4 disease in which 3 had spine metastasis, one with brain metastasis and 2 with nodal recurrente. Study also concluded that most of the patients showed late clinical presentation at postmenopausal state.⁹ A cross sectional study in Turkey showed higher level of the education in women help in more regular practice and better use of self breast examination (SBE). They tend to

be more self-aware and seek medical help whenever deemed necessary.¹⁰ American Journal of Epidemiology published a result showing higher education was associated with postmenopausal breast cancer. Educated women had fewer births and were older at their first birth than women with fewer years of education. They were more likely to have ever taken oral contraceptives.¹¹ In Lahore, Pakistan a study concluded that family with higher monthly income has more cases of breast cancer. It discussed that families with high social economic status have history of late marriage which is a possible cause of increased breast cancer incidence.¹² A USA based study showed the risk of breast cancer declines with the number of children born. Women who have given birth to three or more children have half the breast cancer risk of women who have not given birth at all.¹³ History of hysterectomy is a significant variable in our study. It shows that women with the history of hysterectomy are less likely to get breast cancer than women having no history of hysterectomy. Few years back a study in USA showed bilateral oophorectomy was associated with reduced breast cancer risk overall (OR=0.59, 95% CI: 0.50-0.69) and among women <45 years of age (ORs ranged from 0.31 to 0.52), but not among those who were older at surgery. It was also associated with a reduced risk for estrogen and progesterone receptor positive tumours (OR=0.63, 95% CI: 0.52-0.75) but not receptor negative tumours. Hysterectomy with ovarian conservation (OR=0.83, 95% CI: 0.72-0.96 and hysterectomy with partial ovary removal (OR=0.73, 95% CI: 0.59-0.91) were also associated with lower risk. No association with breast cancer risk was observed with tubal sterilization only or partial oophorectomy without hysterectomy.¹⁴

Conclusion: It is not possible to pinpoint what has caused a woman's breast cancer. This is because there is no single cause of breast cancer. It results from a combination of our genes, the complex activity of different hormones inside our body and the way we live our lives in our surrounding environment. But detection of risk factors might

warn us about the impending consequence. Thereby we can diagnose the cancer in its early stage through screening tests and cure it. The main objective of this study was to evaluate the risk factors associated with breast cancer in Bangladesh. Our study suggests that, age, level of education, monthly family income, and history of hysterectomy of the patient may play an important role in the risk of breast cancer in Bangladeshi women. Further research is needed to better understand the complex interactions between environmental, reproductive and genetic factors in the etiology of breast cancer in Bangladesh. History of hormonal therapy also plays an important role in increasing rate of breast cancer which needs further attention. It is important for public health and other relevant agencies in our country to promote breast cancer awareness programmes and ensure available and affordable screening facilities throughout the country. Government and NGOs should work on prevention of risk of breast cancer to enhance the knowledge of the women.

Recommendation: The study has revealed several significant variables in association with breast cancer. Though the study had some limitations (limited sample size, possibility of recall bias) but we, the investigators, identified some further steps that might be taken for the better way for further research. The recommendations would be as follows –

Need to promote self-breast examination (SBE).

Government and female health related NGOs who especially work on reproductive health must work on cost effective screening.

Further studies with wider data might improve our knowledge about risk factors of breast cancers among Bangladeshi women.

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