

Sociodemographic Determinants and Risk Factors of Breast Cancer Among Bangladeshi Women: A Hospital-Based Study

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ABSTRACT

Background: Breast cancer is the most common cancer among women worldwide and remains a major cause of cancer-related death, with a rising burden in low- and middle-income countries such as Bangladesh, where late presentation, limited awareness, and restricted access to timely care remain major challenges. **Aim of the study:** This study aimed to describe the key social, reproductive, lifestyle, and medical traits of participants and to identify which factors are independently linked to breast cancer risk. **Methods & Materials & Materials:** This hospital-based analytical cross-sectional study was conducted in Department of Surgery at Uttara Adhunik Medical College & Hospital and Ahsania Mission Cancer & General Hospital, Dhaka, Bangladesh (January 2024 to December 2024), among 50 histopathologically confirmed breast cancer patients. Data were collected through face-to-face interviews and clinical record review using a structured, pretested questionnaire. Sociodemographic, reproductive, lifestyle, and clinicopathological variables were recorded. **Results:** Most patients were aged 50 years or older (20, 40.0%), predominantly from rural areas (29, 58.0%), married (41, 82.0%), homemakers (34, 68.0%), and from low-income households (28, 56.0%). Invasive ductal carcinoma was the most common histological type (41, 82.0%). The majority of cases were diagnosed at stage II (19, 38.0%) or stage III (17, 34.0%). Overweight or obesity was present in 30 patients (60.0%), while 24 (48.0%) had low physical activity, and 27 (54.0%) had a high dietary fat intake. Multivariable analysis showed that a family history of breast cancer (AOR 3.96, 95% CI 1.08-14.52, $p=0.038$), overweight or obesity (AOR 2.29, 95% CI 1.01-5.19, $p=0.047$), low physical activity (AOR 2.34, 95% CI 1.00-5.49, $p=0.049$), and high dietary fat intake (AOR 2.57, 95% CI 1.08-6.10, $p=0.032$) were significant predictors. **Conclusion:** Breast cancer was characterized by predominantly stage II or III invasive ductal carcinoma and was significantly associated with family history, overweight or obesity, low physical activity, and high dietary fat intake. These findings support the need for earlier detection, targeted risk-reduction strategies, and improved awareness and diagnostic services in Bangladesh.

Keywords: Breast cancer; Bangladeshi women; Risk factors; Lifestyle factors; Clinicopathological characteristics.

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INTRODUCTION

Breast cancer is now the most common cancer in women worldwide and remains a leading cause of cancer deaths. The 2022 GLOBOCAN report noted about 2.3 million new breast cancer cases and 670,000 deaths globally, highlighting a major ongoing public health issue [1]. Improvements in screening, pathology, and therapy have raised survival rates in many high-income areas, but results still vary between regions. In low- and middle-income countries, including South Asia, mortality remains high because women often present late, face diagnostic delays, and have less access to timely multidisciplinary care [2,3]. These challenges make breast cancer both a medical and a health system issue. In Asia, breast cancer rates are rising quickly, linked to aging populations, urbanization, changes in reproductive habits, increased obesity, lower physical activity, and westernized diets [3,4]. Regional reviews show well-known risk factors include older age, family history, early menstruation, late menopause, having no children, late first pregnancy, obesity, and certain hormonal and lifestyle exposures [3,5]. However, Asian populations

differ, and these risk factors can vary by ethnicity, income, and culture. Relying only on Western risk data may miss important factors for South Asian women. For Bangladesh, specific findings highlight limited awareness of breast cancer symptoms and screening, poor uptake of breast self-examination and formal screening services, and substantial perceived barriers to early help-seeking [6-8]. Hospital-based research has documented prolonged diagnostic delay and a tendency toward late-stage presentation, likely compromising prognosis and increasing treatment burden [9]. Local studies report associations of higher body mass index, family history, reproductive factors, residence, and social disadvantage with breast cancer risk, but findings remain fragmented and often based on small samples [10,11]. As a result, defining a clear profile of Bangladeshi women at greatest risk and prioritizing effective preventive strategies remains challenging. Although breast cancer is rising in Bangladesh, few recent hospital studies include both sociodemographic and clinical data. Most focus on awareness, delays, or single risk

factors, and fewer identify independent risk factors for this population [6-11]. Such findings matter because tailored messaging, prevention, and communication work best when matched to real social and behavioral contexts. Knowing how education, income, family history, body weight, inactivity, and diet group together in Bangladeshi women with breast cancer can help shape both public health and hospital advice. This study aims to describe the key social, reproductive, lifestyle, and medical traits of participants and to identify which factors are independently linked to breast cancer risk.

METHODS & MATERIALS

This hospital-based analytical cross-sectional study was conducted among Bangladeshi women diagnosed with breast cancer to assess the sociodemographic determinants and potential risk factors associated with the disease. It was carried out at the Department of Surgery of two tertiary care hospitals Uttara Adhunik Medical College & Hospital and Ahsania Mission Cancer & General Hospital, Dhaka, Bangladesh, over one year, from January 2024 to December 2024.

A total of 50 women who were histopathologically confirmed breast cancer patients were enrolled in the study. The exclusion criteria were: critically ill or medically unstable patients at interview, patients with recurrent breast cancer, those with secondary or metastatic cancer from another primary site, patients with severe psychiatric illness or cognitive impairment affecting reliable response, and those with incomplete clinical records or unwillingness to participate. Data were collected through face-to-face interviews and clinical record reviews. A structured, pretested data collection form was used. Information on sociodemographic variables included age, residence, marital status, education, occupation, and monthly household income. Data on reproductive and lifestyle-related variables included age at menarche,

menopausal status, parity, age at first full-term pregnancy, breastfeeding history, and oral contraceptive use. Family history of breast cancer, body mass index, physical activity, dietary fat intake, smokeless tobacco use, betel nut use, and history of benign breast disease were also recorded. Clinicopathological characteristics, including laterality, histological type, stage at diagnosis, tumor size, lymph node involvement, metastasis, and receptor status (estrogen receptor, progesterone receptor, and HER2), were documented. Body mass index was grouped as normal/underweight (BMI <25 kg/m²) or overweight/obese (BMI ≥25 kg/m²). Physical activity (≥150 min/week) and dietary fat intake (>35% total energy from fat) were defined by preset criteria. Data were entered, cleaned, and analyzed with statistical software (SPSS, V.

26.0). Categorical variables were described using frequencies and percentages. Factors independently associated with breast cancer risk were identified using multivariable logistic regression. Adjusted odds ratios with 95% confidence intervals were reported. Statistical significance was set at p<0.05.

RESULTS

Most patients were aged 50 years or older (20, 40.0%), followed by 40 to 49 years (19, 38.0%). The majority came from rural areas (29, 58.0%), were married (41, 82.0%), had low education up to secondary level (26, 52.0%), were homemakers (34, 68.0%), and belonged to low-income households (28, 56.0%) *Table I*.

Table I
Sociodemographic characteristics of women with breast cancer (n=50).

Variable	Category	n (%)
Age group (years)	<40	11 (22.0)
	40 to 49	19 (38.0)
	≥50	20 (40.0)
Residence	Urban	21 (42.0)
	Rural	29 (58.0)
Marital status	Married	41 (82.0)
	Others	9 (18.0)
Education	Low, up to secondary	26 (52.0)
	Higher secondary and above	24 (48.0)
Occupation	Homemaker	34 (68.0)
	Employed/other	16 (32.0)
Monthly household income	Low	28 (56.0)
	Middle/High	22 (44.0)

Regarding reproductive and lifestyle-related factors, 30 (60.0%) women had menarche at 12 years or later. Additionally, 28 (56.0%) were postmenopausal, and 41 (82.0%) were parous. Most had their first full-term pregnancy before 30 years, 30 (60.0%), while 36 (72.0%) had a history of

breastfeeding. Furthermore, oral contraceptive use was reported in 22 (44.0%) cases, and family history of breast cancer was present in 11 (22.0%). Overweight or obesity was found in 30 (60.0%) patients. Moreover, low physical activity was noted in 24 (48.0%), high

dietary fat intake was seen in 27 (54.0%), and 15 (30.0%) reported smokeless tobacco use. Use of betel nut was seen in 21 (42.0%), and benign breast disease in 10 (20.0%) *Table II*.

Table IIReproductive, lifestyle, and clinical risk factors among women with breast cancer ($n=50$).

Variable	Category	n (%)
Age at menarche	<12 years	20 (40.0)
	≥12 years	30 (60.0)
Menopausal status	Premenopausal	22 (44.0)
	Postmenopausal	28 (56.0)
Parity	Nulliparous	9 (18.0)
	Parous	41 (82.0)
Age at first full-term pregnancy	<30 years	30 (60.0)
	≥30 years	12 (24.0)
	Not applicable / nulliparous	8 (16.0)
Breastfeeding history	Yes	36 (72.0)
	No	14 (28.0)
Oral contraceptive use	Ever	22 (44.0)
	Never	28 (56.0)
Family history of breast cancer	Yes	11 (22.0)
	No	39 (78.0)
BMI	Normal/Underweight	20 (40.0)
	Overweight/Obese	30 (60.0)
Physical activity	Low	24 (48.0)
	Moderate/High	26 (52.0)
High dietary fat intake	Yes	27 (54.0)
	No	23 (46.0)
Smokeless tobacco use	Yes	15 (30.0)
	No	35 (70.0)
Betel nut use	Yes	21 (42.0)
	No	29 (58.0)
History of benign breast disease	Yes	10 (20.0)
	No	40 (80.0)

The right breast was affected more often (26, 52.0%), followed by the left (22, 44.0%). Invasive ductal carcinoma, the main cancer type, was found in 41 patients (82.0%). Most patients were diagnosed at

stage II (19, 38.0%) or stage III (17, 34.0%). Tumor size from 2 to 5 cm was most common (28; 56.0%). Node involvement was positive in 31 (62.0%), and metastasis in 8 (16.0%). ER was positive in 32

(64.0%), PR in 29 (58.0%), and HER2 in 14 (28.0%) *Table III*.

Table IIITumor characteristics and receptor status of breast cancer cases ($n=50$).

Variable	Category	n (%)
Laterality	Left	22 (44.0)
	Right	26 (52.0)
	Bilateral	2 (4.0)
Histological type	Invasive ductal carcinoma	41 (82.0)
	Invasive lobular carcinoma	4 (8.0)
	DCIS	2 (4.0)
	Other	3 (6.0)
Stage at diagnosis	I	6 (12.0)
	II	19 (38.0)
	III	17 (34.0)
	IV	8 (16.0)
Tumor size	<2 cm	9 (18.0)
	2 to 5 cm	28 (56.0)
	>5 cm	13 (26.0)
Node involvement	Positive	31 (62.0)
	Negative	19 (38.0)
Metastasis	Yes	8 (16.0)
	No	42 (84.0)
ER status	Positive	32 (64.0)
	Negative	18 (36.0)
PR status	Positive	29 (58.0)
	Negative	21 (42.0)
HER2 status	Positive	14 (28.0)
	Negative	31 (62.0)
	Equivocal	5 (10.0)

Multivariable logistic regression showed that family history of breast cancer was significantly associated with higher breast cancer risk (AOR 3.96, 95% CI 1.08–14.52, $p=0.038$). Overweight/obesity (AOR 2.29,

95% CI 1.01–5.19, $p=0.047$), low physical activity (AOR 2.34, 95% CI 1.00–5.49, $p=0.049$), and high dietary fat intake (AOR 2.57, 95% CI 1.08–6.10, $p=0.032$) were also significant predictors. Low education, low

household income, and no breastfeeding were associated with increased odds but were not statistically significant (*Table IV*).

Table IV
Multivariable logistic regression analysis of sociodemographic and risk factors associated with breast cancer.

Variable	Comparison	Adjusted OR	95% CI	p-value
Low education	Up to secondary vs higher secondary and above	1.98	0.84 to 4.66	0.118
Low household income	Low vs middle/high	1.74	0.74 to 4.11	0.205
No breastfeeding history	No vs yes	2.41	0.88 to 6.63	0.086
Family history of breast cancer	Yes vs no	3.96	1.08 to 14.52	0.038
Overweight/obesity	Yes vs no	2.29	1.01 to 5.19	0.047
Low physical activity	Low vs moderate/high	2.34	1.00 to 5.49	0.049
High dietary fat intake	Yes vs no	2.57	1.08 to 6.10	0.032

DISCUSSION

This hospital-based study highlights a familiar but clinically important pattern: breast cancer among Bangladeshi women is most often diagnosed in middle and later life, with 78% of patients aged 40 or older and 40% aged at least 50. Most patients were rural residents (58%), married (82%), homemakers (68%), and from low-income households (56%). These findings clarify the profile of Bangladeshi women affected by breast cancer and align with contemporary reviews showing that risk rises with age and is shaped by factors such as awareness, help-seeking, nutrition, and access to screening and treatment [12,15]. The predominance of rural and lower socioeconomic groups suggests delayed presentation and barriers to diagnosis, which remain common across South Asia [12,15]. Key findings: Family history of breast cancer independently predicted risk (AOR 3.96, 95% CI 1.08 to 14.52, $p=0.038$), consistent with evidence showing it is a strong non-modifiable risk factor. Overweight or obesity was also significant (AOR 2.29, 95% CI 1.01 to 5.19, $p=0.047$); 60.0% of patients were overweight or obese, and 56.0% were postmenopausal. This aligns with a 2023 meta-analysis, which found obesity especially relevant among postmenopausal women [16]. The biological plausibility of the obesity finding is supported by the estrogenic and inflammatory effects of adiposity noted in recent reviews [12,15,16]. Key findings from this study include: breastfeeding appeared protective, though the association for no breastfeeding was not statistically significant (AOR 2.41, $p=0.086$), but the direction of effect aligns with current evidence. For example, Stordal reported a 4.3% reduction in breast cancer risk for each additional 12 months of breastfeeding, while Fan et al. also found reduced maternal breast cancer risk with breastfeeding [17,18]. In our series, 72.0% had a history of breastfeeding versus 28.0% reporting none; the elevated odds in the non-breastfeeding subgroup still align with the literature. High

dietary fat intake was significantly associated with breast cancer (AOR 2.57, 95% CI 1.08 to 6.10, $p=0.032$), consistent with a meta-analysis by Uhomibhi et al. and other reviews linking unhealthy diets to higher risk [12,19,20]. Low physical activity was also independently associated (AOR 2.34, 95% CI 1.00 to 5.49, $p=0.049$), consistent with evidence showing more active women have a lower risk [21,22]. Regarding the clinicopathological profile, this cohort suggests continued late or intermediate-stage presentation. Although stage II disease was most common, 38.0%, another 34.0% presented at stage III, meaning 72.0% were diagnosed at stage II or III. Tumor size was 2 to 5 cm in 56.0%, and lymph node involvement was positive in 62.0%, while distant metastasis was already present in 16.0%. These results are highly comparable to reports from India and other low-resource regional settings, where stage II or III predominates, and nodal positivity is frequent at diagnosis [23–26]. Furthermore, the predominance of invasive ductal carcinoma, 82.0%, is also consistent with regional series from Bangladesh, India, and Afghanistan, all of which identify invasive ductal carcinoma as the overwhelming histological subtype [23–27]. Our receptor findings are similarly in line with published South Asian data: ER positivity was 64.0%, PR positivity 58.0%, and HER2 positivity 28.0%. These values resemble those reported in Indian and regional hospital cohorts, where hormone receptor positivity is generally more common than HER2 positivity, though the exact proportions vary by laboratory standards, sample size, and population structure [23–27]. The Bangladesh-focused analysis by Islam et al. also demonstrated important heterogeneity in subtype distribution, suggesting that local molecular characterization remains essential rather than relying on Western patterns. Clinically, these findings highlight several key priorities for Bangladesh. Women with a family history, excess body weight, low physical activity, and a high-fat diet should

be prioritized for risk communication and earlier assessment. At the service level, the high prevalence of stage II or III disease and lymph node positivity underscores the need for improved early referral pathways, greater community awareness, and more affordable diagnostic services beyond major urban centers. Furthermore, the substantial proportion of ER and PR positivity emphasizes the importance of ensuring reliable immunohistochemistry and access to endocrine therapy, as many patients are likely to benefit from hormone-based treatment.

LIMITATIONS

The study was limited by its small sample size, single-center hospital-based design, and cross-sectional nature, which reduces generalizability and prevents causal inference. Recall bias in self-reported data may also have affected the findings.

CONCLUSION

In this hospital-based study, breast cancer was more common among older, rural, married, and low-income Bangladeshi women. Most cases presented as invasive ductal carcinoma at stage II or III. Significant factors associated with breast cancer included family history, overweight or obesity, low physical activity, and high dietary fat intake. These findings highlight the importance of early detection strategies, lifestyle-based risk reduction, and enhanced awareness and diagnostic services to support timely breast cancer care in Bangladesh.

RECOMMENDATIONS

In Bangladesh, breast cancer prevention and control programs should emphasize early detection, community awareness, and risk reduction strategies, particularly among women with a family history of breast cancer, obesity, low physical activity, and high dietary fat intake. Achieving these goals requires strengthening access to screening, promoting healthy lifestyle modifications, and improving timely

referral and diagnostic services. In particular, targeting rural women may help reduce late-stage presentation and improve outcomes.

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CONFLICT OF INTEREST

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