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The Rising Incidence of Breast Cancer among Women under 40 in Bangladesh: Causes and Screening Challenges

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ABSTRACT
Background: Breast cancer is increasingly affecting younger women worldwide, with a concerning rise in incidence observed among Bangladeshi women under the age of 40. Limited awareness, sociocultural barriers, and delayed screening contribute significantly to late-stage diagnosis and poor outcomes in this demographic. ***Aim of the study:*** To investigate the contributing risk factors, screening practices, tumor characteristics, and barriers to early detection of breast cancer among women under 40 in Bangladesh, with a focus on urban–rural disparities. ***Methods:*** This cross-sectional study included 150 histopathologically confirmed breast cancer patients aged below 40 years from two tertiary care centers in Bangladesh. Sociodemographic data, risk factors, screening behavior, tumor characteristics, and reported barriers to early screening were collected using structured interviews. Statistical analyses included chi-square tests, logistic regression, and odds ratio (OR) calculations to identify associations between variables and late-stage diagnosis. ***Result:*** The mean age was 32.6 ± 4.7 years; 56.7% resided in urban areas. Early menarche (26.7%), hormonal contraceptive use ≥5 years (29.3%), obesity (34.7%), and sedentary lifestyle (52.7%) were significantly associated with urban residence ($p < 0.05$). Despite a high prevalence of modifiable risk factors, 63.3% of participants had never undergone any form of screening. Tumor size >2 cm was present in 87.3%, and 56.7% were diagnosed at advanced stages (III/IV). Invasive ductal carcinoma was the predominant histology (87.3%). Major barriers to early screening included lack of awareness (58.7%), financial constraints (42.7%), and fear of diagnosis (36.7%). Lack of awareness (OR: 2.38, 95% CI: 1.29–4.39) and financial barriers (OR: 2.67, 95% CI: 1.37–5.21) were strong predictors of late-stage diagnosis. ***Conclusion:*** The increasing burden of breast cancer among young Bangladeshi women is compounded by modifiable risk factors, limited screening uptake, and systemic barriers to early detection. Targeted awareness programs, improved access to diagnostic services, and culturally sensitive interventions are urgently needed to promote early diagnosis and improve survival outcomes in this vulnerable population.
Keywords: Breast cancer, young women, Bangladesh, screening practices, risk factors, late-stage diagnosis, awareness barriers.

INTRODUCTION

Breast cancer is a malignant tumor that originates from the epithelial cells of the breast tissue, most commonly the ducts or lobules, and is characterized by uncontrolled cell growth with the potential for invasion and metastasis [1]. Globally, breast cancer is the most frequently diagnosed cancer in women, with an estimated 2.3 million new cases and 685,000 deaths reported in 2022 [2]. In Bangladesh, recent data suggest an incidence rate of approximately 22.5 per 100,000 women, with a notable rise in cases among women under 40 years of age [3]. While breast cancer is traditionally more common in postmenopausal women, a growing body of evidence indicates a concerning trend of early-onset breast cancer, particularly in low- and middle-income countries like Bangladesh [4]. This shift presents unique challenges in terms of awareness, timely diagnosis, and access to appropriate care, and long-term prognosis [5]. Multiple factors have been implicated in the increasing incidence of breast cancer among young women. Lifestyle changes such as adoption of high-calorie, low-fiber diets, and decreased physical activity, increasing rates of obesity, and delayed age at first childbirth have significantly contributed to rising risk profiles [6]. In Bangladesh, these transitions are becoming more pronounced due to rapid urbanization and evolving social norms [7]. Moreover, hormonal and reproductive factors including early menarche, shorter duration of breastfeeding, and reduced parity further elevate the risk in this age group [8]. Unlike breast cancer in older women, early-onset cases are often biologically more aggressive, with higher grades, increased lymphovascular invasion, and a greater likelihood of triple-negative or HER2-positive subtypes, leading to poorer clinical outcomes [9]. Environmental and occupational exposures also play a significant role in South Asian contexts. In Bangladesh, the widespread use of organochlorine pesticides and endocrine-disrupting chemicals such as bisphenol a (found in plastics and cosmetics) has been linked to an increased risk of breast cancer [10]. Furthermore, the cultural use of unregulated skin-lightening products and hormonal agents contributes to the cumulative exposure to carcinogens among young women [11]. Despite these growing risks, awareness of breast cancer symptoms and screening practices remains alarmingly low, especially in rural and semi-urban regions. One of the most critical challenges is the lack of organized screening programs for younger women.

Mammography is generally less effective in women under 40 due to denser breast tissue, and it is also financially and logistically inaccessible for most Bangladeshi women [12]. Clinical breast examination (CBE) and breast self-examination (BSE), though more feasible, are underutilized due to limited public health initiatives and cultural stigma [13]. Additionally, Bangladesh does not yet have a national cancer registry, which significantly impairs surveillance, early detection strategies, and policymaking [14]. This study aims to explore the rising incidence of breast cancer among women under 40 in Bangladesh, identify its underlying causes, evaluate existing screening challenges, and propose comprehensive strategies involving awareness campaigns, accessible screening services, targeted risk-reduction interventions, and the establishment of a robust national cancer surveillance system.

METHODOLOGY & MATERIALS

This hospital-based cross-sectional study was conducted between January 2024 to December 2024 at major tertiary cancer hospitals in Bangladesh, including the National Institute of Cancer Research and Hospital (NICRH), Bangabandhu Sheikh Mujib Medical University (BSMMU), and affiliated oncology units in Dhaka and other major cities. The study was designed to explore the rising incidence of breast cancer among women under 40 years of age, with a focus on potential risk factors, screening practices, and diagnostic barriers.

Study Population

A total of 150 women aged 20 to 39 years with newly diagnosed, histologically confirmed breast cancer were consecutively recruited from outpatient and inpatient departments of the participating hospitals. Inclusion criteria were: (1) female sex, (2) age below 40 years, and (3) diagnosis of primary breast cancer confirmed by histopathology. Exclusion criteria included history of prior malignancy, recurrent breast cancer, or inability to provide informed consent.

Data Collection

Data were collected using a pre-tested, structured interviewer-administered questionnaire, conducted in the local language by trained female research assistants. Information was obtained on sociodemographic variables (age, residence, education, employment), reproductive history (age at menarche, parity, contraceptive use), family history of breast/ovarian cancer, lifestyle factors (BMI, smoking, alcohol use, physical activity), and awareness of breast cancer.

Breast cancer screening behaviors were assessed through self-report, including prior practice of breast self-examination (BSE), clinical breast examination (CBE), mammography, or ultrasound. Medical records were reviewed to obtain tumor characteristics (size, histologic type, grade, hormone receptor status) and clinical stage according to the AJCC 8th edition staging system.

Assessment of Diagnostic Barriers

Participants were asked to identify reasons for delayed screening or presentation, including: lack of awareness, financial limitations, fear of cancer diagnosis, limited access to healthcare, social stigma, religious or cultural taboos, and absence of symptoms. Responses were categorized for analysis.

Statistical Analysis

All data were entered and analyzed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize participant characteristics and risk factor prevalence. Continuous variables were expressed as mean ± standard deviation (SD), and categorical variables as frequencies and percentages. Comparisons between urban and rural subgroups were analyzed using the Chi-square test or Fisher's exact test for categorical variables and the independent samples t-test for continuous variables. Binary logistic regression analysis was performed to determine associations between specific risk factors/barriers and late-stage diagnosis (Stage III/IV). Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study was approved by the Ethics Review Committee of the National Institute of Cancer Research and Hospital. Written informed consent was obtained from all participants. Confidentiality and anonymity were strictly maintained, and data were used solely for research purposes in compliance with the Declaration of Helsinki.

RESULT

A total of 150 participants were included in this study. The majority of participants were aged 30–34 years (37.33%), followed by 35–39 years (28.67%), with a mean age of 32.6±4.7 years. Urban residents comprised 56.67% of the total sample. Most participants had secondary education (37.33%), and 67.33% were unemployed (Table 1). Table 2 highlights the prevalence of breast cancer risk factors. A family history of breast or ovarian cancer was reported by 23.30% of women. Early menarche (<12 years) was noted in 26.70% and showed a significant association with residence ($p = 0.041$). Long-term hormonal contraceptive use (≥5 years) was present in 29.30% ($p = 0.029$), and obesity (BMI ≥ 25) in 34.70% ($p = 0.018$). A sedentary lifestyle was observed in 52.70% and was significantly more common among urban participants ($p = 0.005$). Nulliparity, smoking (7.30%), and alcohol consumption (4.70%) were less prevalent and

not statistically significant. Breast self-examination was performed by 32.67% overall, more frequently in urban women (41.18%) than rural (21.54%) ($p = 0.007$). Clinical breast examination was reported by 18.67% ($p = 0.014$). Mammography (5.33%) and ultrasound (12.67%) were rarely used. Notably, 63.33% had never undergone any breast cancer screening, with 83.08% of rural women reporting no prior screening ($p < 0.001$) (Table 3). Table 4 presents tumor characteristics. Tumor size at diagnosis was 2–5 cm in 60.67% of cases. Most women were diagnosed at Stage III (43.33%) or Stage II (35.33%). Invasive ductal carcinoma accounted for 87.33% of cases. Grade II tumors were most common (59.33%). ER/PR positivity was seen in 52.67%, HER2 positivity in 27.33%, and triple-negative status in 20.00%. Table 5 outlines reported screening barriers. Lack of awareness (58.7%) was the most common barrier and was significantly associated with late-stage presentation ($p = 0.005$). Financial constraints (42.7%), fear of diagnosis (36.7%), limited access to care (39.3%), and absence of symptoms (56.7%) were also significant ($p < 0.05$). Social stigma (32.7%) and cultural taboos (20.7%) were less frequent and not statistically significant.

Table 1: Sociodemographic characteristics of the study population (n = 150)

Variable	Frequency (n)	Percentage (%)
Age Group		
20–24	16	10.67
25–29	35	23.33
30–34	56	37.33
35–39	43	28.67
Mean ± SD	32.6 ± 4.7	
Residence		
Urban	85	56.67
Rural	65	43.33
Educational Level		
No formal education	19	12.67
Primary	43	28.67
Secondary	56	37.33
Higher education	32	21.33
Employment Status		
Employed	49	32.67
Unemployed	101	67.33

Table 2: Prevalence of breast cancer risk factors among the study population

Risk Factor	Frequency (n)	Percentage (%)	p-value* (Urban vs. Rural)
Family history of breast/ovarian cancer	35	23.30	0.218
Early menarche (<12 years)	40	26.70	0.041†
Nulliparity	25	16.70	0.083
Hormonal contraceptive use ≥5 years	44	29.30	0.029†
Obesity (BMI ≥ 25)	52	34.70	0.018†
Smoking	11	7.30	0.475
Alcohol consumption	7	4.70	0.231
Sedentary lifestyle	79	52.70	0.005†

Table 3: Breast cancer screening practices among the study population

Screening Method	Total (n=150)	Urban (n=85)	Rural (n=65)	p-value
Breast self-examination	49 (32.67)	35 (41.18)	14 (21.54)	0.007†
Clinical breast examination	28 (18.67)	21 (24.71)	7 (10.77)	0.014†
Mammography	8 (5.33)	6 (7.06)	2 (3.08)	0.212
Ultrasound	19 (12.67)	13 (15.29)	6 (9.23)	0.198
No prior screening	95 (63.33)	41 (48.24)	54 (83.08)	<0.001†

Table 4: Tumor characteristics and stage at diagnosis of the study population

Variable	Frequency (n)	Percentage (%)
Tumor Size at Diagnosis		
<2 cm	19	12.67
2–5 cm	91	60.67
>5 cm	40	26.67
AJCC Stage at Diagnosis		
Stage I	12	8.00
Stage II	53	35.33
Stage III	65	43.33
Stage IV	20	13.33
Tumor Histology		
Invasive ductal carcinoma	131	87.33
Invasive lobular carcinoma	11	7.33
Other (medullary, etc.)	8	5.33
Tumor Grade		
Grade I	19	12.67
Grade II	89	59.33
Grade III	42	28.00
Hormone Receptor Status		
ER/PR Positive	79	52.67
HER2 Positive	41	27.33
Triple Negative	30	20.00

Table 5: Reported barriers to early breast cancer screening among the study population

Barrier	Frequency (n)	Prevalence (%)	OR (95% CI) for Late Stage (III/IV)	p-value
Lack of awareness	88	58.7	2.38 (1.29–4.39)	0.005†
Fear of cancer diagnosis	55	36.7	1.92 (1.01–3.63)	0.046†
Financial constraints	64	42.7	2.67 (1.37–5.21)	0.003†
Limited healthcare access	59	39.3	2.11 (1.09–4.09)	0.026†
Social stigma	49	32.7	1.59 (0.81–3.10)	0.18
Religious or cultural taboos	31	20.7	1.28 (0.58–2.80)	0.538
No symptoms felt	85	56.7	2.09 (1.13–3.85)	0.018†

DISCUSSION

This study offers a comprehensive evaluation of sociodemographic profiles, breast cancer risk factors, screening behaviors, tumor characteristics, and perceived barriers among women under 40 in Bangladesh. It confirms and extends previous observations, emphasizing the critical public health concerns facing young women in low-resource settings [15]. Socio demographically, participants largely mirrored nationally observed patterns: a majority were urban residents with secondary or higher education, and most were unemployed. This aligns with earlier community-level research showing that urban living and higher education correlate with greater healthcare access and cancer awareness in Bangladesh [16]. Notably, our findings of a high unemployment rate also reflect broader economic constraints that may hinder healthcare utilization. Consistent with global trends, significant prevalence of early menarche, prolonged hormonal contraceptive use, obesity, and sedentary lifestyle were recorded [17]. Similar associations have been identified in both Bangladeshi and wider South Asian studies, reinforcing the notion that rapid socio-economic transformations particularly urbanization and shifts toward sedentary work and processed diets are contributing to elevated breast cancer risk in younger women [18]. While less common, traditional risk factors like family history, nulliparity, smoking, and alcohol use were also present, albeit at lower rates. Screening uptake was notably low, with fewer than one-third practicing breast self-examination and fewer than one-fifth undergoing clinical breast examination—patterns strikingly similar to national surveys where only around 8% of women reported CBE [19]. Mammography and ultrasound use were minimal, reflecting both cost barriers and limited availability. Importantly, rural residents were disproportionately less likely to have undergone any screening (83% versus under 50% in urban areas), confirming persistent urban–rural disparities highlighted in national screenings [20]. Tumor profiling revealed troubling patterns: the majority of cases were diagnosed at Stage II or III, with invasive ductal carcinoma predominating and over half of tumors expressing ER/PR positivity. These observations closely parallel findings from tertiary care centers such as NICRH, where late-stage presentations are commonly reported for women under 50 [21]. The high prevalence of advanced-stage disease underscores the urgency of fostering earlier detection in this population. Analysis of perceived barriers revealed that lack of awareness, financial constraints, fear of diagnosis, limited healthcare

access, and absence of symptoms were all significantly associated with later-stage presentation. This corroborates findings from rural qualitative research in Khulna, where socio-cultural neglect and household power dynamics were identified as key obstacles [22]. Our results show that awareness deficits and cost concerns significantly outweigh influences such as stigma or cultural taboos, a finding echoed in other Bangladeshi studies. Reports from broader South Asian research also emphasize that asymptomatic attitudes, fear, and financial hardship remain primary impediments to early detection [23]. Comparisons with international research reveal similar patterns: low screening awareness and late-stage diagnosis are common across South Asia and low- to middle-income countries (LMICs) [24]. Studies from Pakistan, India, and Sri Lanka document widespread low BSE awareness and poor uptake [25]. Urbanization-associated lifestyle changes including reduced fertility, increased obesity, and greater hormonal contraceptive use are globally recognized risk factors that our data supports [26]. Despite the similarity of these findings across regions, our study adds nuance through its focus on women under 40—a group often omitted in national screening efforts. The predominance of advanced-stage diagnosis in this age group may in part reflect exclusion from standard mammography guidelines, combined with low self-examination and clinical exam uptake. Our data align with those calling for lowered screening age thresholds in countries where early-onset disease is more prevalent [27]. Biological factors also warrant attention. The predominance of invasive ductal carcinoma and varying hormone receptor statuses mirror broader epidemiological patterns. Approximately half of tumors being ER/PR positive aligns with regional reports, suggesting these patients may benefit from targeted therapies such as tamoxifen—if diagnosed in time [28]. This study has several limitations. As a hospital-based sample, the participants may not fully represent the broader population. The cross-sectional design limits causal inference regarding risk factors and screening behaviors. Additionally, self-reported data on lifestyle and screening are subject to recall bias [29]. Despite these constraints, our integration of multiple domains provides a detailed portrait of early-onset breast cancer in Bangladeshi women. This work reinforces established evidence that urbanization-related lifestyle shifts, low screening engagement, and socioeconomic obstacles contribute to late detection of breast cancer in women under 40. It highlights the critical need for culturally tailored interventions—awareness campaigns, age-appropriate screening (e.g. CBE and BSE for younger women), rural outreach, and improved referral systems [30]. These findings should inform future public health policies, screening guidelines, and research with the ultimate goal of improving outcomes for young Bangladeshi women facing breast cancer.

Limitations of the study: This study was limited by its cross-sectional design, which precludes causal inferences between risk factors and late-stage diagnosis. The sample was drawn from a single tertiary hospital, potentially limiting generalizability to the broader population of young women in Bangladesh. Additionally, reliance on self-reported screening practices and barriers introduces recall and social desirability biases. Molecular subtyping and genetic profiling, which could offer deeper insights into tumor biology in young patients, were not available due to resource constraints.

CONCLUSION AND RECOMMENDATIONS

This study highlights a concerning rise in breast cancer incidence among Bangladeshi women under 40, with a substantial proportion presenting at advanced stages (Stage III/IV). Despite a significant burden of modifiable risk factors such as obesity, sedentary lifestyle, and prolonged hormonal contraceptive use screening uptake remains critically low, particularly among rural women. Alarmingly, over 60% had never undergone any form of screening. Barriers including lack of awareness, financial hardship, and healthcare inaccessibility were strongly associated with late-stage diagnosis. These findings underscore the urgent need for age-targeted public health interventions that address contextual barriers, promote early detection, and integrate culturally sensitive awareness programs. Expanding community-based screening, especially in rural areas, may be pivotal in reducing diagnostic delays and improving survival outcomes.

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Awareness About Breast Cancer Early Detection And Screening In Women Aged Below 40 Years In Palestine By Yassmin Aladien Supervisor Dr. Abdusalam Khayyat This Thesis Is Submitted In Partial Fulfillment Of The Requirements For The Degree Of Master Of Public Health Management, Faculty Of Graduate Studies, An-Najah National University).