

Age-Specific Incidence and Rationale for Initiating Breast Cancer Screening at 35 Years in Bangladeshi Women

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Abstract

Background: Breast cancer (BC) is one of the most common malignancies among women in Bangladesh, contributing significantly to morbidity and mortality within this low- and middle-income country (LMIC) context. Epidemiological evidence suggests that BC onset in South Asia occurs at a considerably younger age than in Western populations, necessitating localized age-specific data for effective public health policy. **Methods:** This retrospective, hospital-registry based study analyzed histopathologically confirmed female BC cases presenting at three major tertiary care facilities in Dhaka, Bangladesh. Descriptive statistics, including Mean, Median, Mode, and Standard Deviation, were calculated, and cases were grouped into 5-year age intervals to determine age-specific incidence patterns. **Results:** A total of N=3117 histopathologically confirmed female breast cancer cases were included in this analysis, representing a wide age range of presentation across three major tertiary care facilities. Breast cancer cases among women aged 30–34 constituted approximately 4% of diagnoses, while incidence doubled to 8.3% in the 35–40 age group.

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This sharp increase occurred five years earlier than peaks observed in Western populations, where incidence typically rises after 40. The trend aligns with reports from other South and East Asian countries showing an earlier onset and higher rates of triple-negative and aggressive subtypes. **Conclusion:** Initiating breast cancer screening at age 35 is evidence-based and contextually appropriate for Bangladesh. Earlier screening could improve detection of treatable disease, reduce late-stage presentation, and align national strategies with the region's distinct epidemiological profile. This shift is a practical approach to strengthen cancer control in resource-limited settings.

Key words: Breast Cancer (BC), Age-Specific Incidence, Peak Incidence, Pre-menopausal Women, Early Detection, Screening Guidelines, South Asia.

Introduction

Breast cancer is the most common malignancy among women globally, imposing a significant public health burden. In 2022, it was estimated that over 2.3 million women worldwide were newly diagnosed with breast cancer, making it the leading cancer and cancer-related mortality in women.¹ While the highest incidence rates are documented in high-income countries, low- and middle-income nations like Bangladesh experience disproportionately high mortality due to limitations in healthcare infrastructure, late

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diagnosis, and insufficient access to timely treatment interventions.

In Bangladesh, breast cancer remains the leading female malignancy, with an age-standardized incidence rate that continues to rise amidst changing demographic and lifestyle factors. Current epidemiological data suggest a dramatic increase in cancer incidence, with a 400% rise anticipated by 2070, presenting severe challenges for the national healthcare system.² Notably, the clinical burden in Bangladesh is exacerbated by delayed presentations, often at advanced stages (III and IV), which significantly impairs survival outcomes compared to those seen in developed nations.³

A crucial feature of breast cancer in South Asia is its earlier age of onset compared to Western demographics. In high-income countries, the incidence curve typically culminates in the post-menopausal period, with the peak age generally falling between 60 and 70 years.⁴ Consequently, national mammography screening guidelines are usually initiated around age 50.⁵ Therefore, in Asian Countries like Bangladesh, 57.8% of cases are diagnosed between ages 35 and 59, and 20% occur during the pre-menopausal years (35-44), 5.6% present before age 35, underscoring the reality of significant early-onset breast cancer in this population.⁶ The younger age profile in Bangladesh is likely attributed to the interplay of traditional reproductive factors and rapid urbanization, resulting in a shift in risk patterns, including hormonal and lifestyle changes as well as genetic predispositions.

Early detection is critical to improving breast cancer outcomes, particularly among women aged 30-40 years a demographic identified to be at substantial risk for early-onset disease.⁷ In recognition of economic constraints, Bangladesh has adopted Clinical Breast Examination (CBE) as its primary nationwide screening modality, targeting women aged 30 and above.⁸ However, the effectiveness of CBE programs is hindered by low community awareness, inconsistent practice, and overlapping screening initiatives, emphasizing the urgent need for robust, age-specific awareness and screening strategies, focusing especially on women in the fourth and fifth decades of life—before the age of peak incidence.

This study aims to establish precise age-specific incidence patterns among female breast cancer cases in Bangladesh and to advocate for early screening campaign for Bangladesh. Emphasizing the importance of early screening and tailored awareness campaigns for women aged 30-40, this research highlights the necessity for recalibration of national cancer control strategies to reduce late-stage diagnoses and mortality.

Methods and Materials

Study Design and Setting

This study employed a retrospective, hospital-registry based study design. The data were collected from three major healthcare facilities in Dhaka, Bangladesh: Ibne Sina Hospital, Central Hospital, and Bangladesh Specialized Hospital. These facilities serve as central referral hubs for a large metropolitan and surrounding semi-urban population, providing a representative sample of clinically significant breast cancer cases requiring advanced oncological care.

Patient Selection and Data Collection

Patient data included histopathologically confirmed cases of invasive breast cancer diagnosed over the study period. Information regarding patients' age, clinical characteristics, and diagnostic details was retrieved from institutional medical record databases using standardized data extraction forms to ensure consistency and accuracy. Prior to data collection, all necessary institutional permissions and ethical approvals were obtained.

Data Management & Storage

All collected data were anonymized during the extraction process by removing personal identifiers to safeguard patient confidentiality. The anonymized datasets were securely stored in password-protected electronic databases accessible only to the principal investigators and authorized research personnel. Data management adhered to institutional data governance policies and followed best practices for medical data preservation in compliance with ethical research standards.

Statistical Analysis

Statistical analyses were conducted using SPSS (version 26.0; IBM Corp., Armonk, NY, USA). Descriptive statistics such as mean, median, mode,

and standard deviation were calculated to summarize patient demographics and age-specific incidence patterns. Data were stratified into five-year age intervals to identify peak incidence clusters, and frequency distributions were plotted to assess trends and central tendencies.

Ethical Statement

This study was conducted following established national and institutional ethical standards for research involving human participants. Ethical approval was obtained from the institutional review boards of the three participating tertiary care hospitals: Ibne Sina Hospital, Central Hospital, and Bangladesh Specialized Hospital, Dhaka. Each institution provided written authorization for access to anonymized patient records for research purposes.

All data utilized in this study were handled with strict adherence to confidentiality and privacy protocols. Patient identifiers were removed prior to analysis to ensure anonymity, and no personally identifiable information was disclosed at any stage of data handling or publication. The study fully complies with the ethical principles outlined in the Declaration of Helsinki (2013 revision) and adheres to data protection standards appropriate for retrospective clinical research.

Results

A total of 3,117 histopathologically confirmed female breast cancer cases were analyzed across three tertiary care hospitals in Dhaka, Bangladesh. The participants represented a wide age range, reflecting both pre- and post-menopausal demographics. The mean age at diagnosis was 52.52/± 11.91/years, with a median age of 52/ years and a modal age of 50/ years, indicating a strong central tendency around the peri-menopausal period. The distribution of cases exhibited a near-normal curve, suggesting a balanced representation of both younger and older cohorts within the sample.

Analysis of age-specific incidence patterns revealed a pronounced peak among women aged 50–54/ years, comprising 490 cases (15.7% of the total cohort) the single most represented age group. When stratified by decade, the 50–59/ year age range accounted for the highest cumulative disease burden, representing 30.3% of all diagnoses. Collectively, women between 35 and 59/ years comprised 57.8% of the total cohort, underscoring a substantial concentration of cases

in the pre- and peri-menopausal phases. Early-onset breast cancer was also notable, with 174 women (5.6%) diagnosed before 35/ years of age and an additional 627 cases (20.1%) within the 35–44/ year category, indicating that over one-quarter (25.7%) of all cases occurred before the age of 45 (Figure 1).

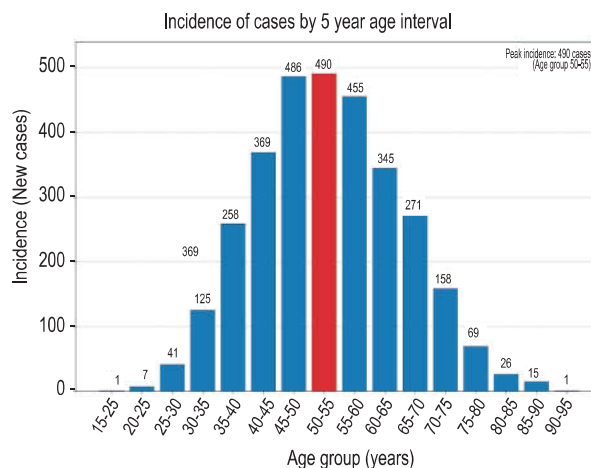


Figure 1: Incidence of Cases by 5-Year Age Interval.

Within the cohort, 4.0% of all breast cancer cases were diagnosed in women aged 30–34 years, while the 35–40 age group accounted for 8.3% of total diagnoses. This sharp increase in percentage from the early to late thirties signals a trend of rising incidence as women approach their fourth decade. These findings reinforce the urgency of enhanced screening and early detection strategies targeting women in their thirties, particularly as incidence rates more than double between the 30–34 and 35–40 subgroups in the Bangladeshi context (Figure 2)

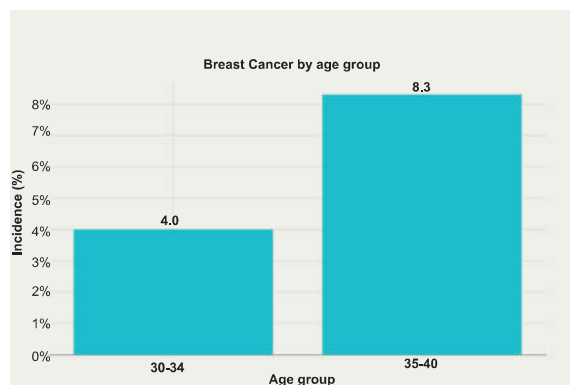


Figure 2: Incidence percentage in age subgroups 30–34 and 35–40 of Bangladesh breast cancer cohort

This pattern confirms a distinct early peak in the Bangladeshi female population compared to Western cohorts, where incidence typically culminates in the 60–70/ year age range. The observed trend highlights the predominance of breast cancer during the productive and family-supporting years in Bangladeshi women, amplifying the socioeconomic and clinical implications of delayed detection. The national age distribution data therefore affirm the necessity for targeted early screening programs, particularly emphasizing the 30–50/ year age group as the critical window for intervention.

Discussion

Our study revealed that breast cancer diagnoses among Bangladeshi women in the 30–34-year age group constituted 4.0% of the cohort, while cases in the 35–40-year group accounted for 8.3%. This more than doubling of incidence between adjacent five-year intervals presents a unique trend when compared with data from other Asian countries, which also report a higher proportion of early-onset breast cancer in early age.⁹ Previous Bangladeshi registry studies have documented increased rates in women under 40 with the highest acceleration at the age of the fourth decade.¹⁰ In contrast, data from European and North American populations generally show a slower incremental increase and lower case burden among women below 40 years.¹¹ This dissimilarity may reflect underlying genetic, reproductive, and lifestyle factors, including earlier age at menarche, lower rates of breastfeeding, metabolic changes, and rapid urbanization observed in Bangladesh and regional South Asia.¹² The observed sharp progression between these intervals emphasizes the need to understand local risk dynamics, such as parity patterns, contraceptive use, and BMI shifts among urban women, which together may shape the epidemiological distinction from other countries.¹³

The significant elevation in breast cancer incidence in the 35–40 age subgroup aligns with regionally reported peaks of aggressive tumor presentation before menopause, and high rates of triple-negative breast cancer subtype in younger Asian women.¹⁴ While data from India and China support comparable findings of rising incidences in this age bracket, studies from Pakistan and

Thailand report a somewhat later peak, which may link to variations in genetic background and sociocultural determinants.¹⁵ Western studies, conversely, indicate delayed peaks predominantly in post-menopausal populations.¹⁶ The increased incidence seen in Bangladeshi women may be explained by localized risk factors such as delayed childbearing, hormonal changes, lower socioeconomic status, and limited access to screening resources.¹⁷

The findings of this study strongly support initiating breast cancer screening at the age of 35 years. Analysis of age-specific incidence revealed that 4.0% of cases occurred among women aged 30–34, while the rate more than doubled to 8.3% in those aged 35–40. This notable increase indicates that the late thirties mark a crucial transition period in which breast cancer risk accelerates in the Bangladeshi female population. Similar age-related patterns have been observed in studies from South and East Asia, where the incidence curve begins rising steeply in women's mid-thirties, reaching its peak in the early fifties.¹⁸ In contrast, European women exhibit a delayed peak incidence between 40 and 50 years of age.¹⁹ The earlier onset in Bangladesh likely reflects distinct genetic, hormonal, and reproductive influences including earlier menarche, delayed childbirth, lower parity, and rapid lifestyle transitions tied to urbanization.

Starting screening from age 35 is therefore both a pragmatic and evidence-based public health strategy.²⁰ International data show that early detection through mammography or clinical breast examination in women aged 35–39 significantly improves survival by enabling diagnosis during more treatable stages of disease.²¹ For resource-limited settings like Bangladesh, focusing community-level screening and educational programs on women beginning at 35 years could substantially reduce the prevalence of late-stage presentation and enhance treatment outcomes. This targeted approach aligns with WHO recommendations emphasizing localized cancer control adapted to epidemiological realities. As the country experiences a growing burden of early-onset disease, recalibrating the screening age from 40 to 35 years would allow earlier risk detection, timely referral, and greater reduction in mortality.

Recommendation

Based on the confirmed age shift and the pragmatic reliance on resource-appropriate detection methods, the following concrete public health recommendations are essential for strengthening the National Cancer Control Program in Bangladesh:

Prioritization of breast cancer screening at the age of 35 years in women

- **Lowering the Effective Screening Age Focus:** While CBE is available starting at age 40, public health resources and messaging must be strategically focused to maximize uptake and compliance among women in the 35 years age band. This window is the most critical period to identify cases before the age of maximum incidence.
- **Enhancing CBE Quality and Access:** Implement increased investment in structured, high-quality training and supervision for senior staff nurses and mid-level health providers responsible for conducting CBE at the Upazila Health Complex (UHC) level.
- **Targeted Mass Media and Community Outreach Campaigns:** Develop and deploy targeted, culturally relevant mass media campaigns. The messaging should specifically address the high risk associated with the 35+ age group, emphasizing the importance of seeking regular CBE and recognizing early warning signs, which is vital given the poor screening awareness currently observed.
- **Community Education:** Strengthen collaborations with community clinics and local non-governmental organizations to actively mobilize women aged 35 years and older. These efforts should aim to overcome socio-cultural and economic barriers to healthcare access, facilitating enrollment into existing UHC-level CBE services.

Conclusion:

Starting breast cancer screening at age 35 is a practical step for Bangladesh and similar countries. Data show a sharp rise in incidence between 30–34 and 35–40 years, with an early peak before menopause. Beginning screening at 35 allows detection while disease is still localized,

improving treatment outcomes and survival. It also aligns with regional trends in Asia, where early-onset cases are more common than in Western populations. For resource-limited settings, targeting women from 35 onward offers the best balance between early diagnosis and public health capacity.

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