


# Understanding diagnostic delays among newly diagnosed breast cancer patients at a tertiary cancer care center in a low-middle-income country like Bangladesh

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## Abstract

Breast cancer poses a significant health challenge for women globally, with survival rates varying widely between and within countries. The correlation between delayed diagnosis and lower survival rates is well-established, emphasizing the importance of addressing barriers to early presentation to improve survival rates in low-middle-income countries like Bangladesh. The objective of the study was to assess how often breast cancer patients present late, pinpoint the underlying reasons for the delay, and examine any potential links between delayed presentation and socio-demographic factors in our context. A prospective cross-sectional study was conducted at Ahsania Mission Cancer and General Hospital from July 2023 to December 2023. The study focused on newly diagnosed breast cancer patients attending the outpatient department. Following the provision of consent, the patient's information was obtained through face-to-face interviews and a review of their medical records. Diagnostic delay was defined as 90 days or more from the onset of symptoms to the initiation of medical treatment (by expert physicians). The collected data was stratified based on various socio-demographic variables, including age, marital status, education status, and socio-economic status. Data analysis and visualization were performed using Microsoft Excel and SPSS V 25. The study involved 242 participants; the majority (126, 52.06%) were aged 41 to 60 and came from a low-income, uneducated social background. Stage II breast cancer was the most common presentation (137, 56.6%). The average duration from diagnosis was 5.18 months, and nearly half of the patients (112, 46.28%) experienced more than 3 months of diagnostic delay. The delay in diagnosis was significantly associated with the patient's socio-economic status and the stage of cancer. The primary cause of delayed diagnosis was a lack of awareness about breast cancer symptoms, particularly the painless nature of breast lumps, which patients either did not notice or did not consider serious enough to seek medical attention, followed by the initial pursuit of alternative treatments. To facilitate earlier breast cancer diagnosis, policies should prioritize community-based education programs and adequate screening procedures, as well as expanded healthcare access.

**Abbreviations:** LMIC = low- and middle-income countries, SES = socio-economic status.

**Keywords:** Bangladesh, breast cancer, diagnostic delay, LMIC

## 1. Introduction

In 2020, breast cancer was the most prevalent form of cancer among women, with an estimated 2.9 million new cases worldwide.<sup>[1]</sup> It is also the most frequent cause of cancer-related

mortality among women in both developed and developing countries.<sup>[2]</sup> One of the primary causes of this lethal characteristic is the delayed diagnosis of the cases. Most breast cancers can be successfully treated during their early stages; however, the mortality rate increases substantially as the stages progress.

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

Ahsania Mission Cancer and General Hospital Ethics Committee [DAM/AMCGH/1900/2023-669], Dhaka, Bangladesh approved the study.

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Compared to detection and treatment initiated within 3 months, a diagnostic delay exceeding 3 months is associated with a markedly worse prognosis.<sup>[3]</sup>

Furthermore, the tumor's rapid progression and earlier metastases in younger women with breast cancer can make delayed detection a particularly perilous situation, resulting in a shorter overall survival rate.<sup>[3]</sup> The behavior and pattern of treatment-seeking can be significantly influenced by factors such as age, education, marital status, and disease presentation, which can significantly affect management.<sup>[1]</sup> Pregnancy, parity, menopause, and contraceptive use are factors related to the risk of getting breast cancer (such as nulliparity, early menarche-late menopause, and the oral contraceptive pill) whereas age, education, marital status, and disease presentation like painless breast lump can influence the behavior and pattern of treatment seeking. In low- and middle-income countries (LMIC), the issue is more pervasive as a result of a lack of adequate facilities and detection programs, among other factors.<sup>[3]</sup>

Breast cancer is also prevalent in Bangladesh, with an incidence rate of 22.5 per 100,000 women and a contribution of 69% to the mortality rate of women due to cancer.<sup>[4]</sup> The early detection of the disease is the primary strategy for breast cancer prevention, as it can prevent significant mortality. The data on the factors associated with delayed presentation is still scarce in Bangladesh. However, this information can be used to develop strategies and policies that address and mitigate these issues.

## 2. Methods

Using purposive sampling, a prospective cross-sectional was conducted at Ahsania Mission Cancer and General Hospital in Dhaka between July 2023 and December 2023. All women newly diagnosed with breast cancer who attended the outpatient department during the study period were enrolled after providing informed consent. Data was collected through structured questionnaires during in-person interviews, and all pertinent medical records, including clinicopathological documents, were thoroughly reviewed and documented. Patients experiencing mental confusion and those who declined to provide consent were excluded from the study. Inclusion criteria included histopathologically diagnosed and staged breast cancer patients who provided consent and were receiving treatment at the institution during the study period. Mammogram and ultrasonography reports, histopathological reports, and tumor, node, metastasis staging based on size, nodal involvement, and metastasis were all gathered from the medical records. Treatment delays were defined as a minimum of 3 months between the onset of symptoms and diagnosis.<sup>[5]</sup> A total of 242 patients were included in the study. Descriptive analysis and bivariate analysis, utilizing the chi-square and Fisher exact tests, were conducted on the collected data using SPSS V 25.0, and visualization was performed using Microsoft Excel. A *P*-value of <.05 was considered statistically significant.

## 3. Results

Table 1 contains the socio-demographic data of the patients. Most patients (126, 52.06%) fell in the age group of 41 to 60. The average age was 45.85 years, with a standard deviation of 11.15. The majority of female patients were either illiterate (56, 23.14%) or had received only primary education (104, 42.97%). Hundred thirty-seven women (57.08%) belonged to the middle socio-economic class, while 97 women (40.41%) belonged to the low socio-economic class. The majority of individuals were married (189, 78.09%). Only 17 women (7.02%) had a known family history of breast cancer, and 2 women (0.82%) reported having experienced benign breast disease in the past.

The pie chart depicts that the most frequently observed stage of breast cancer at presentation was stage II (137, 56.6%), followed by stage III (62, 25.6%), as shown in Figure 1.

A total of 112 (46.28%) patients experienced diagnostic delays (3 months or more from the onset of symptoms to the initiation of medical treatment). Figure 2 illustrates the distribution of delayed diagnosis, with the majority occurring within 12 months of symptom onset (66, 27.3%). The average diagnostic duration was 5.18 months, with a standard deviation 7.10.

Table 2 illustrates the potential factors linked to the delayed diagnosis of breast cancer. Most patients with delayed diagnosis were in stage II (49, 20.20%) and stage III (39, 16.10%). A diagnostic delay was observed in 54 (22.50%) individuals with low socio-economic status (SES). These variables showed statistical significance.

The majority of patients with delayed presentation either neglected or failed to report the painless lump until it grew in size (71, 59.7%). Subsequently, they sought alternative homeopathic treatment until their symptoms worsened or remained unresolved (36, 30.3%).

## 4. Discussion

The objective of the study was to unveil the reasons behind delayed breast cancer diagnosis, which can result in a substantial increase in the mortality rate.

The majority of our patients were 45–60 years of age, which was the most common age group for breast cancer diagnosis in Bangladesh by another study.<sup>[6]</sup> The majority of individuals were from impoverished and illiterate socio-economic backgrounds, which can contribute to delayed presentation.

Nearly half of our study's patients (112, 46.28%) had diagnostic delays. The economic status and the cancer stage at presentation were potential statistically significant associated factors. Most patients with delayed diagnosis were in stage II (49, 20.20%). The onset of breast cancer is insidious, with minimal symptoms that can result in a substantial delay in seeking medical assistance. The symptoms may not be apparent until

**Table 1**  
Socio-demographic characteristics of the patients.

	Frequency	Percentage
Age group (yr)		
21–40	92	38.02
41–60	126	52.06
61–80	24	9.91
Level of education		
Illiterate	56	23.14
Primary	104	42.97
Secondary	48	19.83
Higher secondary	12	4.95
Graduate and above	22	9.09
Economic status		
Low	97	40.41
Middle	137	57.08
High	6	2.50
Marital status		
Unmarried	5	2.06
Married	189	78.09
Widow	39	16.11
Divorce	9	3.71
Family history of cancer		
Yes	17	7.02
No	225	92.97
History of benign breast disease		
Yes	2	0.82
No	240	99.17

the disease advances to an advanced stage, and it causes a visible disruption in daily activities observed in the later phases. This discovery is consistent with the findings of Plotogea et al,<sup>[7]</sup> who discovered that asymptomatic stage I cancer had a substantially longer diagnostic delay than screening-detected stage II or symptomatic stage III or IV cancers. This discovery suggests the necessity of a consistent screening program to facilitate the earlier detection of breast cancer.

Poorer SES was an additional substantial contributing factor in our investigation. A delayed diagnosis was observed in 54 patients (22.50%) with a low SES. In LMIC such as Bangladesh, SES was identified as a significant contributing factor to delayed

breast cancer diagnosis in a recent systemic review. Poorer populations are more susceptible to diagnostic delays and have less access to healthcare and diagnostic and treatment facilities, which results in increased costs and a worse prognosis.<sup>[8]</sup> Multiple studies have demonstrated that individuals with low SES are at a higher risk of developing advanced-stage breast cancer at the time of diagnosis.<sup>[9]</sup>

Our study did not identify these variables as statistically significant, even though some studies have identified age group and marital status as significant associated factors for diagnostic delay in breast cancer.<sup>[10]</sup>

We discovered that the most prevalent reason for delayed diagnosis was individuals' ignorance or a lack of awareness about breast cancer symptoms, particularly the painless nature of breast lumps, which patients either did not notice or did not consider serious enough to seek medical attention (Fig. 3). In multiple studies, the interpretation of symptoms as not severe and worrisome was

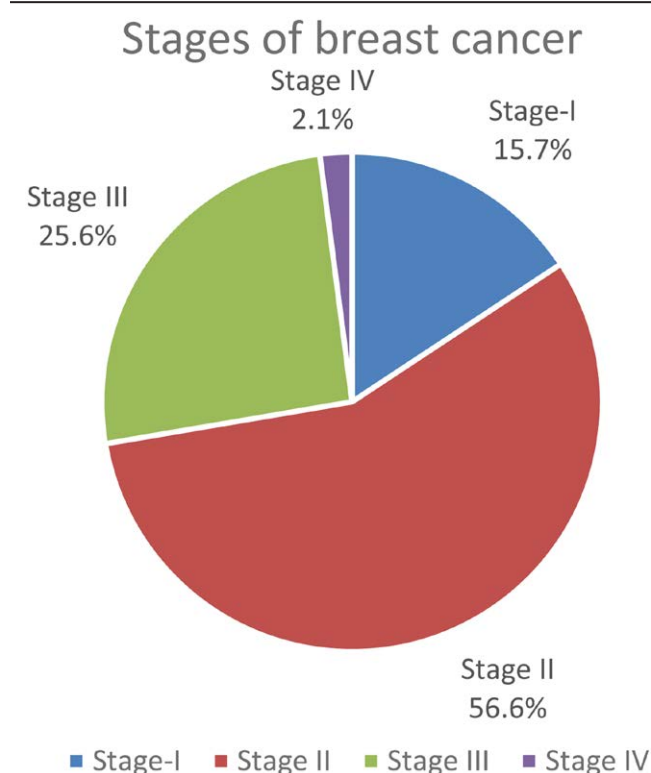


Figure 1. Frequency of breast cancer stages.

Table 2

Factors associated with diagnostic delay of breast cancer.

		Delay		P value
		Present	Absent	
Age group	21–40	43 (17.80%)	49 (20.20%)	NS
	41–60	57 (23.60%)	68 (28.50%)	
	61–80	12 (5.00%)	12 (5.00%)	
Education level	Illiterate	31 (12.80%)	25 (10.30%)	NS
	Primary	51 (21.10%)	53 (21.90%)	
	Secondary	19 (7.90%)	29 (12.00%)	
	Higher secondary	2 (0.80%)	10 (4.10%)	
Marital status	Graduate	9 (3.70%)	13 (5.40%)	NS
	Unmarried	2 (0.80%)	3 (1.20%)	
	Married	83 (34.30%)	106 (43.80%)	
	Widow	19 (7.90%)	20 (8.30%)	
Economic status	Divorced	8 (8.30%)	1 (0.40%)	.04
	Low	54 (22.50%)	43 (17.90%)	
	Middle	57 (23.80%)	80 (33.30%)	
Family history	High	1 (0.40%)	5 (2.10%)	NS
	Yes	8 (3.30%)	9 (3.70%)	
	No	104 (43.0%)	121 (50.0%)	
Stage of breast cancer	Stage I	20 (8.30%)	18 (7.40%)	.001
	Stage II	49 (20.20%)	88 (36.40%)	
	Stage III	39 (16.10%)	23 (9.50%)	
	Stage IV	4 (1.70%)	1 (0.40%)	

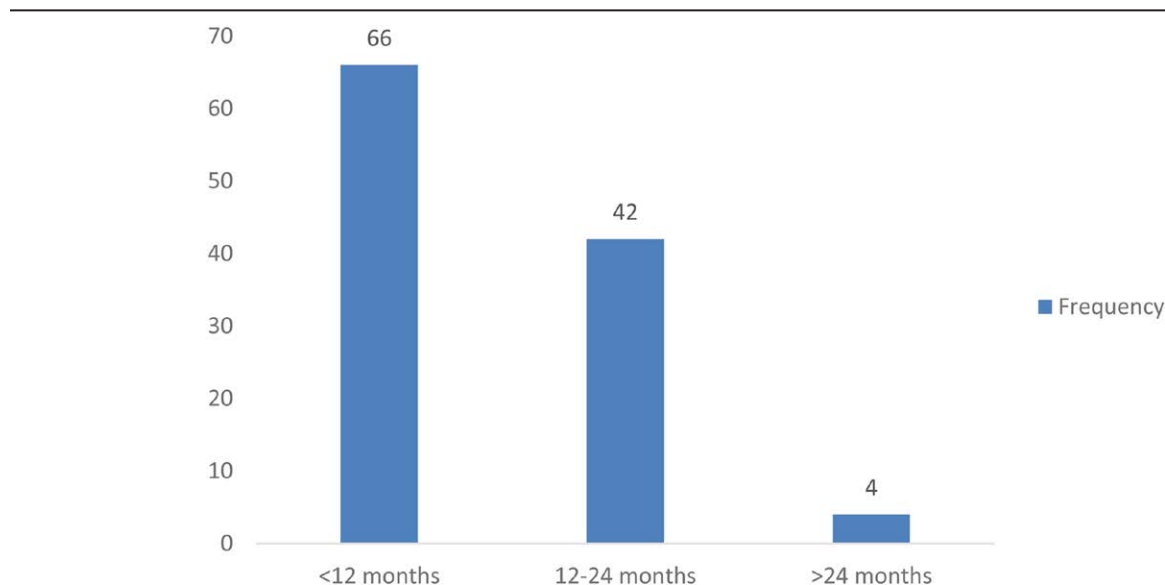
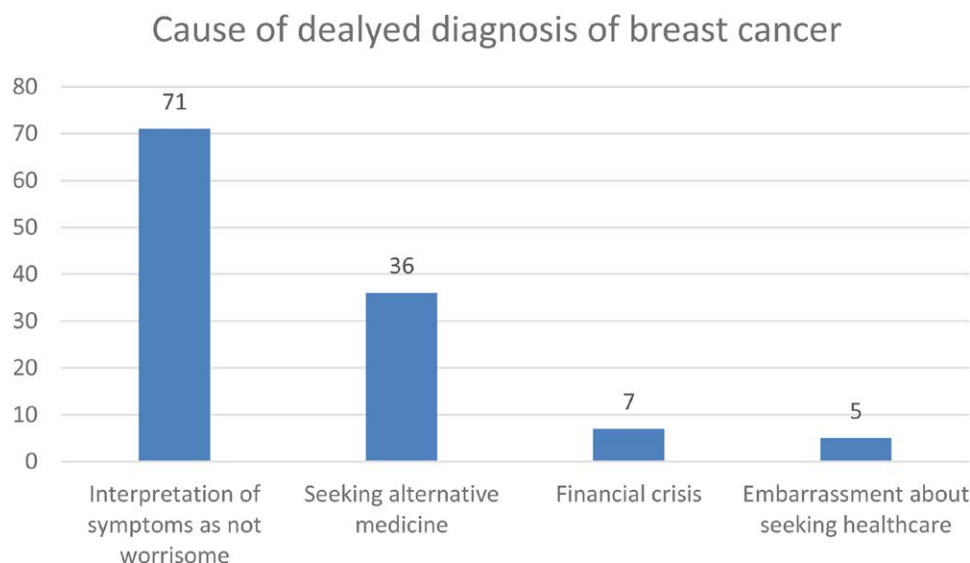


Figure 2. Frequency of diagnostic delay.



**Figure 3.** Cause of delayed diagnosis.

identified as a common cause of breast cancer delay. This is primarily due to ignorance regarding the presenting features of breast cancer.<sup>[11–13]</sup> These results underscore the importance of community awareness regarding the potential presentation and hazards of breast cancer to facilitate earlier detection. An additional significant impediment to earlier detection was pursuing alternative medicine in ayurvedic or homeopathic treatment before consulting a registered physician. Subedi et al<sup>[8]</sup> have observed that this barrier is prevalent in LMIC and is intricately linked to the socio-economic conditions and underlying cultural beliefs. In the context of Bangladesh, Akhtar et al also discovered that the delay in breast cancer diagnosis was significantly influenced by the decision to seek medical aid from a source other than a physician.<sup>[14]</sup> Although advancements in breast cancer research have significantly reduced its mortality rate in recent years, it remains a major global health challenge due to its continually rising incidence.<sup>[15]</sup>

The study's strength is its location in a specialized cancer center that has received patients from all over Bangladesh and has presented a diverse group of patients for this study. The study's cross-sectional nature is one of the limitations. Therefore, the results may not apply to all circumstances. To more thoroughly examine the diagnostic delay in breast cancer, additional longitudinal studies are necessary.

## 5. Conclusion

The morbidity and mortality rates of breast cancer are elevated when the diagnosis is delayed for an extended period. A significant percentage of breast cancer patients in our country are diagnosed late because they lack awareness of the signs and symptoms of the disease, proper management, and where to seek medical attention. It is essential to focus on educating targeted groups by implementing initiatives such as community outreach, targeted advertising, providing resources in local languages, and using social media to reach people from diverse backgrounds. By establishing widespread breast cancer awareness and screening programs at the grassroots level, we can reduce delayed presentations and improve patient outcomes.

## Author contributions

**Conceptualization:** Jannatul Ferdause.

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**Writing – review & editing:** Jannatul Ferdause, Kazi Ridwana Rahatul Aain, Farhana Afrin Ferdausi, A.K.M. Shafiul Kadir, Md Ariful Haque.

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