

Clinicopathological Profile and Receptor Status in Recurrent Breast Carcinoma

MAA MAMUN^a, TERK KORON^b, MAA MAMUN^c, MM HOQ^d, DIPU^e, AFMS ISLAM^f

Abstract

Background: Breast carcinoma is one of the most common malignancies worldwide, with approximately one million new cases diagnosed annually. Estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor-2 (HER2) play a crucial role in determining prognosis and guiding treatment strategies.

Objective: To assess the demographics, site and TNM staging and the ER, PR, and HER-2 reactivity patterns in recurrent breast carcinoma.

Methods: This cross-sectional study was conducted in the Department of Surgical Oncology, National Institute of Cancer Research & Hospital, Dhaka, from March 2022 to February 2023. Ninety histologically confirmed recurrent breast carcinoma patients who underwent either breast-conserving surgery or mastectomy with axillary dissection were included. ER, PR, and HER-2 receptor statuses were assessed by immunohistochemistry. Data were analyzed using SPSS version 26, with significance set at $p < 0.05$.

Results: The mean age of patients was 46.7 ± 11.4 years; 53.3% were above 45 years. Among 44 triple-negative cases, 65.9% were below 45 years, while 90% of triple-positive cases were above 45 years ($p = 0.01$). Most patients completed

chemotherapy (93.3%) and radiotherapy (75.6%); however, incomplete chemotherapy and radiotherapy were significantly associated with recurrence within 12 months ($p = 0.01$ for both). Younger age and larger tumour size (T3) were significantly associated with recurrence ($p = 0.01$ for both), whereas tumour grade, nodal status, and distant metastasis showed no significant association. Most patients were multiparous (88.9%). Local recurrence occurred in 54.4% of cases, regional in 32.2%, and distant in 13.3%. ER positivity was found in 51.1%, PR positivity in 41.1%, and HER-2 negativity in 88.9%. Triple-negative breast cancer (TNBC) accounted for 48.9% of cases.

Conclusion: TNBC was found more in younger age and a higher number of cases. Incomplete radiotherapy or chemotherapy contributed to recurrence within 12 months. Tumour size is a prognostic factor, warranting aggressive adjuvant therapy to improve outcomes in TNBC patients.

Keywords: Recurrent breast cancer, Triple-negative breast cancer (TNBC), Hormone receptor status, HER2 receptor, Immunohistochemistry (IHC)

(J Bangladesh Coll Phys Surg 2026; 44: 182-188)

DOI: <https://doi.org/10.3329/jbcps.v44i3.91561>

Introduction

Though currently there is a lack of epidemiological data regarding breast cancer, globally, breast cancer is the most common malignancy and the leading cause of cancer-related death in women. In 2020, 2.3 million women were diagnosed with breast cancer, and 685,000 died from the disease, making it the most prevalent cancer worldwide.^{1,2} The disease burden, measured by disability-adjusted life

years (DALYs), exceeds that of any other cancer among women. Breast cancer occurs universally, with increasing incidence in later life, and in developing countries, late presentation, absence of screening, and high morbidity and mortality are common.³

Breast cancer exhibits heterogeneous molecular, pathological, and clinical profiles influencing prognosis and therapy. Estrogen receptor (ER), progesterone

- Dr. Md Abdulla Al Mamun, National Institute of Cancer Research & Hospital, Dhaka, Bangladesh
- Dr. Tahmid-E-Rabbani Khairul Koron, Medical Officer, Department of Surgery, Kuwait-Bangladesh Friendship Government Hospital, Dhaka, Bangladesh
- Dr. Md. Abdullah-Al-Mamun, Registrar, Burn & plastic surgery Department, National Institute of Cancer Research & Hospital, Dhaka, Bangladesh
- Dr. Mohammad Muzammel Hoq, Assistant Professor of Surgery, President Abdul Hamid Medical College & Hospital, Karimganj, Kishorganj, Bangladesh
- Dr. Dipu, Assistant Professor, Department of Surgery, Shaheed Monsur Ali Medical College Hospital, Bangladesh
- Dr. Abul Fazal Muhammad Shariful Islam, Classified Surgical Specialist, Department: Surgery, Combined Military Hospital, Bhatiary-Chattogram, Bangladesh

Address of Correspondence: Dr. Md. Abdulla AL Mamun, Resident Surgeon (surgery) National Institute of Cancer Research & Hospital, Dhaka, Bangladesh. Mobile: 01711267053, E-mail: drmamunmamun25@gmail.com

Received: 26 November, 2025

Accepted: 15 March 2026

receptor (PR), and HER2/neu are key biomarkers with independent prognostic and therapeutic significance.^{4–6} ER is expressed in 80–90% and PR in 70–80% of cases, while HER-2/neu overexpression occurs in 15–20%, correlating with tumour aggressiveness and poor prognosis.^{5,7,8} HER-2 positivity and hormone receptor negativity indicate an aggressive disease pattern.⁹ Receptor status may change between primary and recurrent tumours, impacting treatment strategy and prognosis.^{10–13} Studies from Bangladesh and neighbouring regions highlight variations in receptor expression and its association with clinicopathological parameters and recurrence risk, underscoring the significance of biomarker evaluation for individualized breast cancer management.^{14–20} This study aimed to identify the demographics, recurrence sites and TNM staging and the ER, PR, and HER2 reactivity patterns in recurrent breast carcinoma.

Materials & Methods

This cross-sectional study was conducted in the Department of Surgical Oncology, National Institute of Cancer Research & Hospital, Dhaka, from March 2022 to February 2023. A non-probability consecutive sampling technique was used here. Patients who were histologically proven diagnosed case of recurrent breast carcinoma who had undergone wide local excision, quadrantectomy or mastectomy with axillary dissection for surgical management at NICRH were the study population.

Recurrence of breast cancer: recurrent breast cancer is cancer that has reappeared after the initial treatment.¹⁵

Inclusion criteria included: a patient who was histologically proven diagnosed case of recurrent breast carcinoma, & the patient with ER, PR and HER2 reports. Exclusion criteria were: a. Cases of breast carcinoma other than Invasive ductal carcinoma b. Patient without ER, PR & HER 2 reports c. Patients did not want to be included in the study.

Informed written consent was taken from each of the patients. The consent form clearly describes the purpose and method of the study. After enrollment of the relevant data from history, physical examination and investigation was recorded in a pre-designed case record form, which was filled-up. A total of 90 patients were selected consecutively for this study.

Detailed information on Age, Parities, Type of recurrence, Size of recurrence, Site of recurrence, metastasis, if any, History of NACT, History of adjuvant CT, RT received, size of primary tumour, primary breast

involved, primary quadrant involved, Estrogen receptor, Progesterone receptor and HER2 status, histological type, and lymph node status was obtained in each case according to protocol. A complete history was taken either from the patient or the accompanying attendants. A thorough physical examination was done. Relevant investigations and operation notes were collected. Ethical considerations were strictly followed, with voluntary participation, written informed consent, privacy during interviews, and assurance of confidentiality. Quality control was ensured through pre-testing of the questionnaire, random checking of 10% of completed forms, and double-checking of all variables before final analysis.

Ethical clearance was obtained from the National Institute of Cancer Research & Hospital Ethical Review Committee.

Data analysis

Data were collected by use of an interview schedule and from relevant investigations. Collected data was classified, edited, coded and entered into the computer for statistical analysis by using SPSS 26. All categorical data are expressed in frequencies and percentages. Data were verified by the Chi-square test (categorical variable). Statistical significance was considered as $p < 0.05$

Results

The participants ranged in age from 27 to 65 years. The mean age was 46.7 ± 11.4 years. A total of 53.3% of patients were older than 45 years, while 40% were between 30 and 45 years of age. The study also found that the majority of patients were multiparous, comprising 80 individuals (88.9%), while 7 patients (7.8%) were primiparous and 3 (3.3%) were nulliparous. Additionally, 14 patients (15.6%) reported a positive family history of breast cancer. In terms of recurrence patterns, most patients experienced local recurrence (54.4%), followed by regional recurrence (32.2%) and distant recurrence (13.3%) (Table I).

Among patients with recurrence, 93.3% had completed chemotherapy. Radiotherapy was received by 75.6% of patients; however, 24.4% did not complete the recommended course (Table II).

Table III indicates that 44 patients (48.9%) had triple-negative breast cancer (TNBC), followed by 34 cases (37.8%) with ER-positive, PR-positive, HER-2-negative profiles, 10 cases (11.1%) with triple-positive disease, and 2 cases (2.2%) with ER-positive, PR-negative, HER-2-negative profiles.

Analysis of recurrence characteristics (Table 4) revealed that local recurrence was most common (74%; $p = 0.01$). Poorly differentiated tumours accounted for 33% of cases ($p = 0.35$). Regarding TNM staging, tumour size T3 was most frequent (40%; $p = 0.01$). N2 nodal involvement was observed in 37% ($p = 0.57$), while M0 status predominated (90%; $p = 0.01$). Based on Table 4, the significant finding is that the recurrence site differed significantly according to age ($p = 0.01$), with local recurrence being the most common across all age groups, particularly among patients aged >45 years (35

cases). Tumour size was also significantly associated with the recurrence site ($p = 0.01$), with T3 tumours accounting for the highest proportion of local recurrence (27 cases).

In patients with triple-negative status (Table 5), the younger age group (<45 years) was predominant (65.9%; $p = 0.01$). Poor differentiation occurred in 53% ($p = 0.25$). Tumour size T2 was most common (48%; $p = 0.01$). N2 nodal involvement was identified in 44% ($p = 0.077$), and M0 status in 82% ($p = 0.15$) among recurrent breast cancer patients.

Table-I

Distribution of the patients according to different traits (n=90)

Traits	Number of patients	Percentage (%)
Age (years)		
< 30	6	6.7
30-45	36	40.0
> 45	48	53.3
Total	90	100.0
Mean±SDRange	46.7±11.4(27-65)	
Family history		
Yes	14	15.6
No	76	84.4
Total	90	100
Type of recurrence		
Local recurrence	49	54.4
Regional recurrence	29	32.2
Distant recurrence	12	13.3
Total	90	100.0

SD= standard deviation

Table-II

Distribution of the patients by history of received CT and RT and recurrence in carcinoma breast (n=90)

Therapy received			Recurrence within 12 months		p-value*
			Yes	No	
CT	Complete	84(93%)	38(42%)	46(51%)	0.01
	Incomplete	06(7%)	05(5%)	01(1%)	
RT	Complete	68(76%)	18(20%)	50(56%)	0.01
	Incomplete	22(24%)	19(21%)	03(2.9%)	

CT=chemotherapy, RT=radiotherapy, *Chi-square test

Table III

Distribution of the study patients by ER, PR and Her2 status (n=90)

Receptor status	Number of patients	Percentage (%)
ER+, PR+, Her2+	10	11.1
ER-, PR-, Her2-	44	48.9
ER+, PR+, Her2-	34	37.8
ER+, PR-, Her2-	2	2.2
Total	90	100.0

Table-IV*The Relation between recurrent site with age, grade, stage (TNM) of recurrent breast cancer (n=90)*

Characteristics		Recurrent site			p-value*
		Local	Locoregional	Distant	
Age	<30	10	04	01	.01
	30-45	22	05	02	
	>45	35	08	03	
Grade	Well-differentiated	09	05	01	.35
	Moderate differentiated	30	06	03	
	Poorly differentiated	20	04	03	
	Undifferentiated	06	02	01	
Stage(TNM)	T	T1	07	03	.01
		T2	21	03	
		T3	27	06	
		T4	11	04	
	N	N0	06	04	.57
		N1	19	05	
		N2	24	06	
		N3	09	06	
	M	M0	47	27	.13
		M1	05	03	

*Chi-square test

Table V*The Relation between triple negative status with age, grade, stage (TNM) of recurrent breast cancer (n=90)*

Characteristics		Triple Negative		p-value*
		Yes	No	
Age	<30	15	11	.01
	30-45	25	23	
	>45	04	12	
Grade	Well-differentiated	10	08	.25
	Moderate differentiated	11	10	
	Poorly differentiated	19	21	
	Undifferentiated	04	07	
Stage (TNM)	T	T1	08	.01
		T2	17	
		T3	15	
		T4	04	
	N	N0	12	.77
		N1	10	
		N2	16	
		N3	06	
	M	M0	30	.15
		M1	14	

*Chi-square test

Discussion

Breast cancer is the most common malignancy among women worldwide and exhibits considerable biological heterogeneity, largely determined by the expression of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor-2 (HER2). These biomarkers have important prognostic and therapeutic implications and are essential for guiding individualized treatment.¹⁻⁶

The present study found that recurrent breast cancer occurred predominantly in women aged >45 years; however, triple-negative breast cancer (TNBC) was significantly more common among younger patients (<45 years). This observation is consistent with the findings of Iqbal et al., who reported a higher recurrence rate among younger women with TNBC, particularly within the first two years after diagnosis.²² Similarly, Kumar et al. demonstrated that TNBC was more prevalent in younger patients and was associated with more aggressive clinicopathological characteristics and poorer survival outcomes.²³ These findings support the established aggressive biological behavior of TNBC.

Multiparity was the predominant reproductive characteristic in the present study, while only a small proportion of patients had a positive family history of breast cancer. Comparable observations were reported by Kumar et al., who also found a high proportion of multiparous women and relatively few patients with a first-degree family history of breast cancer.²³ This suggests that, despite recognized genetic susceptibility, most recurrent breast cancers occur in women without a documented family history.

Local recurrence was the most frequent pattern of relapse, followed by regional and distant recurrence. Similar findings were reported by Ninan and James, who observed that local recurrence constituted the majority of recurrent breast cancer cases.²⁴ The predominance of locoregional recurrence may reflect residual microscopic disease and emphasizes the importance of optimal local treatment and vigilant postoperative surveillance.

Nearly half of the recurrent cases in the present study were TNBC, while hormone receptor-positive/HER2-negative tumors represented the second most common subtype. This finding is consistent with studies by Iqbal et al.²² and Kumar et al.,²³ both of whom reported TNBC

as the predominant molecular subtype among patients with recurrent disease. The higher recurrence observed in TNBC is likely attributable to its aggressive tumor biology, lack of effective endocrine or HER2-targeted therapies, and greater propensity for early relapse.

A significant association was observed between recurrence pattern and patient age as well as primary tumor size, whereas tumor grade, nodal status, and distant metastasis were not significantly associated. Larger tumor size has consistently been identified as an adverse prognostic factor in breast cancer and has been associated with increased recurrence risk in previous studies.^{8,21} The greater burden of disease and higher likelihood of occult micrometastases in larger tumors may explain this relationship.

The present study also demonstrated that incomplete chemotherapy and radiotherapy were associated with earlier recurrence. This observation is biologically plausible, as inadequate locoregional and systemic treatment may permit persistence of residual tumor cells. Hathila et al. similarly reported significantly higher recurrence among patients who were ER/PR-negative and HER2-positive, emphasizing the importance of completing appropriate adjuvant therapy to reduce recurrence risk. Although treatment adherence was not the primary focus of previous studies, the current findings reinforce the critical role of completing multimodal therapy in improving long-term outcomes.

Overall, the findings of this study are consistent with the existing literature demonstrating that TNBC is characterized by younger age at presentation, aggressive clinicopathological features, and a higher risk of early recurrence.²²⁻²⁴ These results underscore the importance of risk-adapted surveillance, timely completion of adjuvant therapy, and individualized treatment strategies to improve outcomes in patients with recurrent breast cancer.

Limitations

The study has its limitations. We investigated the biomarkers in only those patients who were treated in a single hospital. Inevitably, the current study has some limitations of being a retrospective study, including a relatively small number of patients and the existence of tumour heterogeneity has led to concerns that core biopsies may not represent the whole tumour tissue as they are often restricted to the superficial aspects of the tumour.

Conclusion

Triple-negative breast cancer (TNBC) was the most common molecular subtype among patients with recurrent breast cancer and was significantly associated with younger age and larger tumor size at recurrence. Most recurrences were locoregional, and incomplete chemotherapy and radiotherapy were associated with earlier recurrence. These findings highlight the aggressive nature of TNBC and emphasize the importance of optimal multimodal treatment and close surveillance, particularly in younger patients, to reduce the risk of recurrence. Further prospective, multicenter studies are warranted to validate these findings and improve individualized treatment strategies.

Acknowledgement:

The authors would like to acknowledge all respected respondents and teachers, Professor (Dr.) Laila Shirin, for her valuable time and participation in this research work. The authors would also like to acknowledge the hospital authority for permitting us to conduct the study.

Funding Source:

Self

Conflict of Interest:

There was no conflict of interest.

References

- World Health Organization. Breast cancer [Internet]. Geneva: World Health Organization; 2025 [cited 2025 Mar 28]. Available from: <https://www.who.int/news-room/events/detail/2025/10/01/default-calendar/breast-cancer-awareness-month-2025>
- McGuire S. World Cancer Report 2014. Geneva, Switzerland: World Health Organization, International Agency for Research on Cancer, WHO Press; 2015. Adv Nutr. 2016;7(2):418-419.
- Abdalla FBE, Markus R, Buhmeida A, Border A, Syrjanen K, Collan YRJ. Estrogen receptor, progesterone receptor, and nuclear size features in female breast cancer in Libya: correlation with clinical features and survival. *Anticancer Res.* 2012;32:3485-94.
- Smith RA. Expert Group: IARC Handbooks of Cancer Prevention. Vol. 7: Breast Cancer Screening. Lyon, France: International Agency for Research on Cancer; 2002. *Breast Cancer Res.* 2003;5(4):216.
- Ali EM, Ahmed AR, Ali AM. Correlation of breast cancer subtypes based on ER, PR and HER2 expression with axillary lymph node status. *Cancer Oncol Res.* 2014;2(4):51-57.
- Azam M, Qureshi A, Mansoor S. Comparison of estrogen receptors, progesterone receptors and HER-2/neu expression between primary and metastatic breast carcinoma. *J Pak Med Assoc.* 2009;59(11):736.
- Thompson AM, Moulder-Thompson SL, Evans A, Dewar JA. Disorders of the breast. In: Cuschieri A, Hanna GB, editors. *Essential Surgical Practice: Higher Surgical Training in General Surgery.* 5th ed. Boca Raton: CRC Press; 2015. p.386.
- Huang HJ, Neven P, Drijckoning M, Paridaens R, Wildiers H, Van Limbergen E, et al. Association between tumour characteristics and HER-2/neu by immunohistochemistry in 1362 women with primary operable breast cancer. *J Clin Pathol.* 2005;58(6):611-16.
- Sofi GN, Sofi JN, Nadeem R, Shiekh RY, Khan FA, Sofi AA, et al. Estrogen receptor and progesterone receptor status in breast cancer in relation to age, histological grade, size of lesion and lymph node involvement. *Asian Pac J Cancer Prev.* 2012;13(10):5047-52.
- Gupta D, Gupta V, Marwah N, Gill M, Gupta S, Gupta G, et al. Correlation of hormone receptor expression with histologic parameters in benign and malignant breast tumors. *Iran J Pathol.* 2015;10(1):23.
- Payandeh M, Sadeghi M, Sadeghi E, Koohian AK. Comparison of IHC, FISH, ER and PR in breast cancer in Western Iran. *Am J Cancer Prev.* 2014;2(2):37-41.
- Santinelli A, Pisa E, Stramazzotti D, Fabris G. HER-2 status discrepancy between primary breast cancer and metastatic sites: impact on target therapy. *Int J Cancer.* 2008;122(5):999-1004.
- Thompson AM, Jordan LB, Quinlan P, Anderson E, Skene A, Dewar JA, et al. Prospective comparison of switches in biomarker status between primary and recurrent breast cancer: the Breast Recurrence in Tissues Study (BRITS). *Breast Cancer Res.* 2010;12(6):R92.
- Lower EE, Glass E, Blau R, Harman S. HER-2/neu expression in primary and metastatic breast cancer. *Breast Cancer Res Treat.* 2009;113(2):301-6.
- Hoefnagel LD, van der Groep P, van de Vijver MJ, Boers JE, Wesseling P, Wesseling J, et al. Discordance in ERα, PR and HER2 receptor status across different distant breast cancer metastases within the same patient. *Ann Oncol.* 2013;24(12):3017-23.
- Gaffar T, Baqui MN, Yasmin S, Rozhana S, Ferdous NE. Status of ER, PR, HER-2 and E-cadherin expression in 86 female breast cancer patients from Bangladesh. *SBV J Basic Clin Appl Health Sci.* 2019;2(2):61-64.
- Boukhris S, Zawati I, Manai M, Jaidane O, Goucha A, Kammoun S, et al. Hormone receptors and human epidermal growth factor receptor 2 expression change in primary and recurrent breast cancer. *Eur J Surg Oncol.* 2020;46(2).

18. Sherchan RK, Ghimire P, Lamsal A. Study of estrogen receptor, progesterone receptor, and HER-2/neu status in breast carcinoma. *Asian J Med Sci.* 2022;13(5):108-112.
19. Nafissi N. Breast cancer survival analysis based on immunohistochemistry subtypes (ER/PR/HER2): a retrospective cohort study. *Arch Iran Med.* 2016;19(10):680.
20. Chatterjee S, Mukherjee MM, Nath NC, Samanta S, Saha AK. An observational study on the incidence of HER-2/neu receptor over-expression and comparison of clinical presentation between HER-2/neu positive and HER-2/neu negative breast cancer. *Int Surg J.* 2017;4(2):506-13.
21. Iqbal AK, Akhter N, Ahmed HS, Russell M, Yahia AM, Rahman MM, et al. ER, PR & HER2 receptor status in recurrent breast cancer: its relation to age & time of recurrence. *J Surg Sci.* 2018;22(1):16-20.
22. Kumar K, Akhtar M, Rangwala M. Breast cancer: correlation of receptor status with clinical presentation, stage of disease, histopathological grade and short-term outcome. *Int Surg J.* 2019;6(4):1323-26.
23. Ninan PJ, James M. ER & PR status, tumour recurrence in breast carcinoma patients: a prospective cohort study. *Galore Int J Health Sci Res.* 2020;5(1):140-6.
24. Naeem M, Nasir A, Aman Z, Ahmad T, Samad A. Frequency of HER-2/neu receptor positivity and its association with other features of breast cancer. *J Ayub Med Coll Abbottabad.* 2008;20(3):23-26.
25. Hathila RN, Patel D, Shah P, et al. Assessment of estrogen receptor, progesterone receptor and HER-2/neu receptor status and its therapeutic significance in relation to recurrence of breast cancer. *Int J Med Sci Public Health.* 2018;10(1):55-60.