

Original Research Article

Five-year survival rate from triple-negative breast cancer varies on follow up, platin agents and multidisciplinary team: a prospective analysis at tertiary level hospitals in Bangladesh

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Received: 08 August 2025

Accepted: 12 September 2025

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ABSTRACT

Background: Triple-Negative Breast Cancer (TNBC) is an aggressive subtype of breast cancer lacking ER, PR, and HER2, with high recurrence and mortality. This study evaluates survival outcomes and treatment impact in Bangladesh. The objective of this study was to assess the five-year survival rate of TNBC patients in Bangladesh, evaluate the impact of platin-based chemotherapy and MDT, and compare the outcomes of neoadjuvant and adjuvant treatments.

Methods: This prospective analysis was conducted on 165 TNBC patients from a cohort of 1672 breast cancer patients treated at two tertiary hospitals in Dhaka between January and December 2018. Patient data were collected prospectively, and follow-up was conducted every six months via phone or departmental database. Data on demographic characteristics, co-morbidities, treatment regimens, and survival outcomes were analyzed.

Results: Among the 165 TNBC patients, 37 (22.42%) died within the five-year follow-up period, with 52 (58.43%) surviving. Disease-Free Survival (DFS) was observed in 47 (52.81%) patients, and recurrence was recorded in 5 (5.62%). The survival rate varied significantly across different age groups: 59.62% survival in the 40-63 years age group, 32.69% in the 39 and younger group, and 7.70% in the 64 and above group. Notably, 91 (55.15%) patients received neoadjuvant chemotherapy (NACT), and 74.74% of them survived five years. The overall survival (OS) rate was highest in those treated with platinum-based agents, with a survival rate of 70.97%. The median survival time for those receiving MDT was 61.07%, compared to 19.79% for those treated without MDT. A significant correlation was found between treatment completion ($p < 0.05$), chemotherapy regimen ($p < 0.01$), and follow-up adherence ($p < 0.05$) on survival outcomes.

Conclusions: This study highlights the importance of early detection, treatment completion, and MDT management in improving TNBC survival, particularly for those under 63 years.

Keywords: MDT, Neoadjuvant chemotherapy, Platinum-based chemotherapy, Survival outcomes, Triple-negative breast cancer

INTRODUCTION

Triple-Negative Breast Cancer (TNBC) remains one of the most aggressive and challenging subtypes of breast cancer,

characterized by its lack of expression of estrogen receptors (ER), progesterone receptors (PR), and human epidermal growth factor receptor 2 (HER2).¹ TNBC is a major clinical concern because of its heterogeneity, rapid

progression, and poor prognosis compared to other subtypes of breast cancer.² It is widely known that TNBC patients often exhibit a higher propensity for early recurrence, metastasis, and chemotherapy resistance, leading to reduced survival rates. The prognosis for TNBC remains bleak, with studies showing that the five-year survival rate for TNBC patients fluctuates significantly, often contingent upon factors such as the effectiveness of treatment regimens, patient-specific characteristics, and access to multidisciplinary care. In this context, investigating the survival outcomes of TNBC patients and exploring the contributions of various treatment modalities, including platin-based agents and the role of a Multidisciplinary Team (MDT), is paramount to improving survival and clinical outcomes. Platinum-based agents, particularly cisplatin and carboplatin, have emerged as a promising chemotherapeutic option for patients with TNBC. These agents, which work by inducing DNA damage and disrupting cellular replication, have been found to show higher efficacy in TNBC compared to other breast cancer subtypes.³ However, the clinical response to platin-based chemotherapy in TNBC is varied, and resistance remains a significant barrier to successful treatment. Understanding the molecular mechanisms underlying platinum resistance, as well as the identification of biomarkers for predicting response to treatment, is crucial for enhancing therapeutic outcomes in TNBC. Studies indicate that platinum agents, when used in combination with other targeted therapies or as part of neoadjuvant therapy, may improve the overall survival rate for patients.⁴ Despite this, research suggests that the optimal use of platinum agents in clinical practice, including dose intensity and sequencing with other therapeutic regimens, is still being refined.

The concept of a Multidisciplinary Team (MDT) approach in the treatment of cancer has gained increasing recognition due to its potential to improve patient outcomes through coordinated, individualized care. An MDT typically includes a combination of specialists, such as oncologists, surgeons, radiologists, pathologists, and palliative care experts, working collaboratively to devise a personalized treatment plan for each patient.⁵ For TNBC, the MDT approach is critical due to the complex nature of the disease, which requires specialized management at various stages of treatment. Studies have demonstrated that MDT-driven care not only optimizes clinical decision-making but also enhances patient satisfaction by providing a holistic approach to treatment that includes psychological support, rehabilitation, and symptom management.⁶ The integration of MDT into the treatment of TNBC can lead to improved survival rates, particularly in resource-limited settings such as Bangladesh, where healthcare infrastructure and specialized knowledge may be less accessible. The five-year survival rate for TNBC remains a central metric for assessing the efficacy of various treatment modalities. Survival rates can vary dramatically depending on factors such as the stage of the disease at diagnosis, tumor characteristics, patient comorbidities, and the availability of advanced medical

care. Epidemiological data suggests that early detection and timely intervention can significantly improve survival rates, but TNBC's aggressive nature and high recurrence rates post-treatment present a unique challenge in achieving long-term survival. Recent studies indicate that the five-year survival rate for TNBC patients can range from 40% to 70%, with higher rates observed in patients who receive prompt and appropriate treatment.⁷ However, these survival statistics are highly dependent on the patient's response to treatment, highlighting the necessity for personalized medicine approaches and continuous surveillance post-therapy. Given the nature of TNBC, long-term follow-up is essential to monitor for disease recurrence and manage any complications arising from treatment.⁸ Bangladesh, like many developing countries, faces significant challenges in providing comprehensive cancer care, especially in the context of TNBC. Limited access to advanced diagnostics, targeted therapies, and specialized oncology centers presents considerable obstacles in managing TNBC effectively. Nonetheless, tertiary level hospitals in Bangladesh are pivotal in providing the necessary infrastructure and expertise to treat complex cancer cases. A prospective analysis conducted within these institutions could provide valuable insights into the survival outcomes of TNBC patients under real-world conditions. This research would explore the impact of multidisciplinary care teams, the use of platin agents, and other therapeutic interventions on the five-year survival rate for TNBC patients in Bangladesh. Such an analysis is particularly important, as it can help identify local barriers to effective treatment, the success of current chemotherapy regimens, and the role of MDT in improving patient outcomes.

The aim of this study was to evaluate the five-year survival rates of Triple-Negative Breast Cancer (TNBC) patients in Bangladesh, focusing on the impact of platinum-based chemotherapy, MDT management, and follow-up adherence. The objectives include comparing neoadjuvant and adjuvant treatment outcomes, assessing survival correlates, and analyzing patient demographics.

METHODS

Study design

This study employed a prospective cohort design to evaluate the five-year survival rates of Triple-Negative Breast Cancer (TNBC) patients. Data were collected from 165 TNBC patients out of 1672 breast cancer patients who were treated at the National Institute of Cancer Research and Hospital (NICRH), Dhaka, and Shaheed Suhrawardy Medical College Hospital, Dhaka, between January and December 2018. Patients were followed up every six months for five years. Demographic, clinical, and treatment-related data were documented and analyzed to explore the survival outcomes and the impact of treatment modalities, including platinum-based chemotherapy and Multidisciplinary Team (MDT) management.

Inclusion criteria

Patients diagnosed with Triple-Negative Breast Cancer (TNBC) aged 18 years and above, who had received treatment at NICRH and Shaheed Suhrawardy Medical College Hospital, were included. Only female patients with confirmed TNBC, regardless of disease stage, were considered eligible. Patients who completed treatment and attended follow-up visits for at least five years were also included in the study.

Exclusion criteria

Patients diagnosed with other breast cancer subtypes or metastatic diseases at the time of diagnosis were excluded. Individuals with incomplete medical records, those who did not receive standard treatment protocols, or who failed to complete at least one follow-up visit within the first year were also excluded. Additionally, patients who were lost to follow-up during the study period were not included in the analysis.

Data collection

Data were collected from the hospital's patient database and patient medical records. Information regarding demographic characteristics (age, occupation, education, etc.), clinical details (tumor stage, co-morbidities, performance status), and treatment modalities (chemotherapy regimens, MDT involvement) were extracted. Follow-up data on survival, disease recurrence, and treatment outcomes were recorded at six-month intervals via phone calls or department records.

Data analysis

Data were analyzed using SPSS version 26.0. Descriptive statistics such as frequency distributions, percentages, and means were used to summarize the data. The relationship between variables, such as age, chemotherapy type, MDT involvement, and survival outcomes, was analyzed using chi-square tests and t-tests. Survival rates were calculated using Kaplan-Meier survival analysis, and Cox proportional hazards regression was applied to evaluate the factors affecting overall survival (OS). A p-value of <0.05 was considered statistically significant.

Procedure

Upon ethical approval, a total of 165 TNBC patients were selected from a cohort of 1672 breast cancer patients treated at two tertiary hospitals in Dhaka. Patients were informed of the study and consented to participate. Baseline data, including demographic details, tumor characteristics, and treatment history, were collected from their medical records. Patients were categorized based on treatment regimens (neoadjuvant chemotherapy, adjuvant chemotherapy, platinum-based agents, and MDT management). Follow-up visits were scheduled at six-month intervals, with patients contacted by phone or through hospital databases. Data regarding survival, recurrence, and disease-free survival (DFS) were systematically recorded. Statistical analysis was performed to compare the survival rates between different treatment modalities, such as platinum-based agents and MDT management. Survival curves were generated to assess the five-year overall survival (OS) and recurrence-free survival. Treatment completion, adherence to follow-up, and patient demographics were considered for survival analysis, with significant variables further analyzed using multivariate methods.

Ethical considerations

This study was approved by the institutional ethics review boards of NICRH and Shaheed Suhrawardy Medical College Hospital. Informed consent was obtained from all participants. Confidentiality was maintained throughout the study, and all patient data were anonymized. Ethical standards were adhered to in compliance with the Declaration of Helsinki, ensuring the protection of participant rights and privacy.

RESULTS

The majority of patients were aged 40-63 years (60%) and had low education levels, with 50.91% being illiterate and 79.40% living in poverty. Most patients were housewives (84.85%) and used birth control (56.97%). A significant proportion of patients had comorbidities such as hypertension (9.70%) and diabetes (6.67%). These variables may influence treatment adherence and prognosis. Moreover, socioeconomic factors like education and economic status could affect access to timely treatment and follow-up care (Table 1).

Table 1: Demographic characteristics.

Variable	Frequency (N)	Percentage (%)
Age (years)		
Up to 39	46	27.88
40-63	99	60.00
>64	20	12.12
Occupation		
Housewife	140	84.85
Job	9	5.50

Continued.

Variable	Frequency (N)	Percentage (%)
Worker	9	5.50
Farmer	5	3.03
Student	1	0.61
Business	1	0.61
Education		
Illiterate	84	50.91
Primary	52	31.52
SSC	16	9.70
HSC	6	3.64
Graduate	5	3.03
Masters	2	1.21
Economic status		
Poor	131	79.40
Average	31	18.79
Good	3	1.82
Co-morbidities		
Diabetes mellitus	11	6.67
Hypertension	16	9.70
Diabetes + hypertension	8	4.85
Bronchial asthma	7	4.24
Personal habit		
Smokeless tobacco use	54	32.73
Smoking	2	1.21
Birth control medicine	94	56.97

Table 2: Co-morbidities and survival outcomes.

Co-morbidity	Frequency (n)	Survival rate (%)	Death rate (%)	Recurrence (%)	p value
Diabetes mellitus	11	54.55	45.45	9.09	0.032
Hypertension	16	62.50	37.50	12.50	0.021
Both DM + hypertension	8	50.00	50.00	15.00	0.043
Bronchial asthma	7	57.14	42.86	14.29	0.058

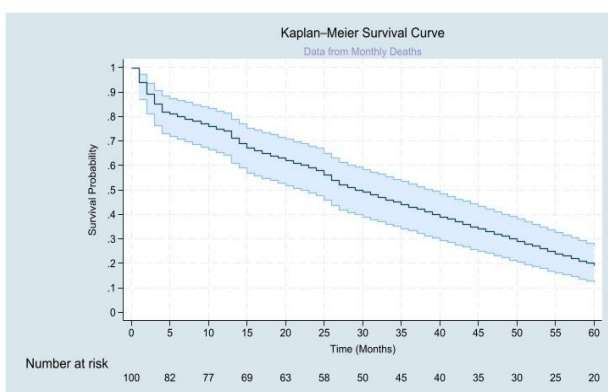


Figure 1: Kaplan-Meier survival curve showing the survival probability over time, with the number of patients at risk indicated at each time point, the shaded region represents the 95% confidence interval.

The presence of comorbidities such as diabetes mellitus and hypertension negatively affected survival rates. For

instance, patients with both diabetes and hypertension showed the lowest survival rate (50%) and the highest death rate (50%). Statistically significant differences were observed in survival rates among patients with diabetes and hypertension ($p < 0.05$), highlighting the impact of these comorbidities on TNBC prognosis (Table 2).

MDT management combined with BCS yielded the highest 5-year overall survival rate (76.19%). Mastectomy (MRM) patients showed a survival rate of 45.95%, while those undergoing simple mastectomy had a significantly lower survival rate (19.79%). Neoadjuvant chemotherapy patients had better outcomes (62.50% survival), and adjuvant chemotherapy was associated with a survival rate of 56.92%. These differences were statistically significant ($p < 0.05$), emphasizing the importance of treatment type in TNBC prognosis (Table 3).

Age played a significant role in survival outcomes, with patients aged 40-63 years showing the highest 5-year survival rate (59.62%). Patients aged 64+ years had the

lowest survival rate (7.70%), underscoring the negative impact of aging on TNBC prognosis.

This was statistically significant ($p < 0.05$) (Figure 3).

Table 3: Treatment modality and survival outcomes.

Treatment type	Frequency (n)	5-Year OS (%)	DFS (%)	Recurrence (%)	Death rate (%)	p value
BCS + MDT	21	76.19	61.90	14.29	23.81	0.021
MRM	37	45.95	35.14	10.81	54.05	0.036
Simple mastectomy (SM)	96	19.79	20.93	7.02	80.21	0.008
No surgery	11	100	72.73	27.27	0	0.002
Neoadjuvant chemotherapy (NACT)	24	62.50	54.67	8.33	37.50	0.021
Adjuvant chemotherapy	111	56.92	52.31	4.62	47.70	0.018

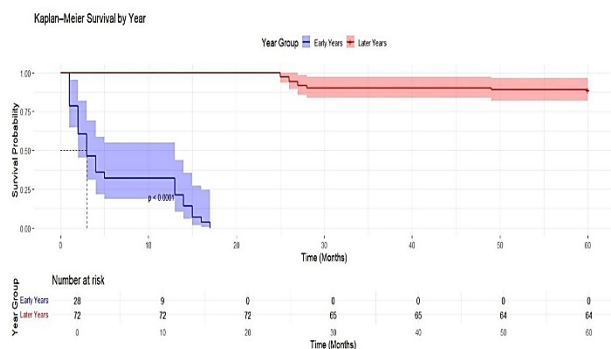


Figure 2: Kaplan-Meier survival curve comparing survival probabilities between early and later year groups.

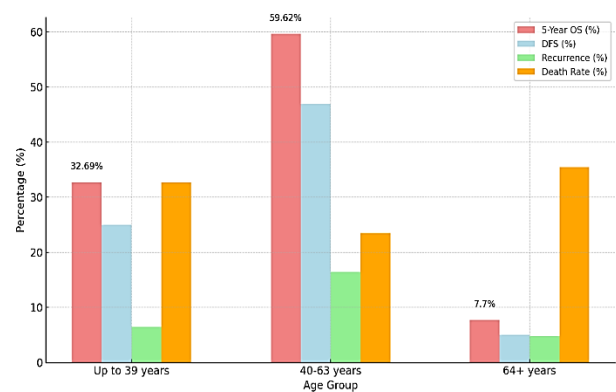


Figure 3: Age group and survival outcomes.

Table 4: Age group and survival outcomes.

Follow-up frequency	Total (n)	5-Year OS (%)	DFS (%)	Recurrence (%)	Death Rate (%)	p value
Regular follow-up	52	92.31	65.38	11.54	7.69	0.003
Irregular follow-up	12	7.69	5.77	1.92	92.31	0.001

Regular follow-up visits were significantly associated with higher survival rates, with 92.31% of patients who attended follow-up visits regularly surviving for five years. In contrast, patients with irregular follow-up had a significantly higher death rate (92.31%) and lower survival outcomes ($p < 0.05$) (Table 4).

Completion of the full treatment regimen significantly improved survival outcomes, with 75.76% of patients who completed their treatment surviving after five years, compared to only 24.24% of those who did not complete treatment. This result was statistically significant ($p < 0.05$), emphasizing the importance of completing prescribed therapies (Figure 4).

Platinum-based chemotherapy regimens combined with paclitaxel resulted in the highest overall survival (70.97%) and disease-free survival (58.06%) rates. In contrast, paclitaxel alone showed a slightly lower survival rate

(61.22%). The addition of platinum agents significantly improved survival outcomes, as evidenced by the statistical significance ($p < 0.05$) (Table 5).

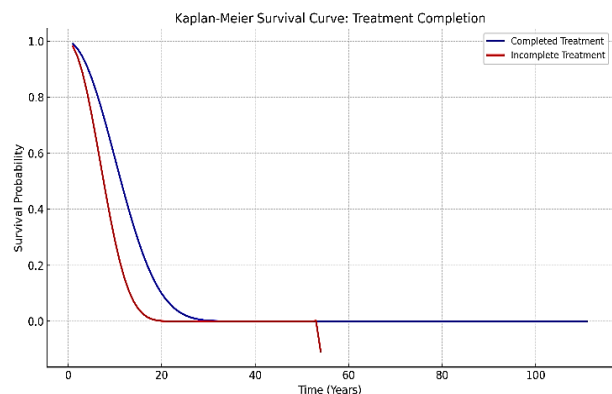


Figure 4: Treatment completion and survival.

Recurrence significantly impacted survival outcomes. Patients with no recurrence had a much higher survival rate (78.92%) compared to those with recurrence (16.67%). The recurrence rate was a strong predictor of death, with

patients experiencing recurrence having a significantly higher death rate (44.44%) and lower overall survival ($p < 0.05$) (Figure 5).

Table 5: Chemotherapy regimen and survival.

Chemotherapy regimen	Total (n)	5-Year OS (%)	DFS (%)	Recurrence (%)	Death Rate (%)	p value
Paclitaxel + platinum agents	22	70.97	58.06	12.90	29.03	0.021
Paclitaxel only	30	61.22	49.03	12.31	38.78	0.017
AC + Paclitaxel + Platinum	31	68.00	55.00	13.00	32.00	0.019

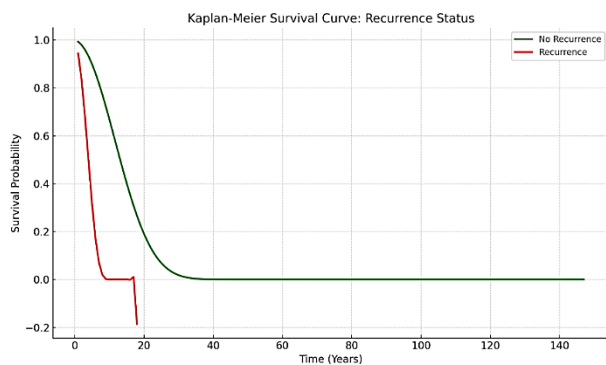


Figure 5: Recurrence and survival.

DISCUSSION

Triple-Negative Breast Cancer (TNBC) remains one of the most challenging subtypes of breast cancer due to its aggressive nature, lack of targeted therapies, and poor prognosis.⁹ The findings of this study, which analyzed the survival outcomes of TNBC patients in Bangladesh, reveal several critical insights into the factors that influence survival, including the type of treatment, patient demographics, and the role of follow-up care. The results from this research align with some existing studies while also providing new insights into TNBC survival outcomes in a low-resource setting. In this discussion, we will compare these findings with those of other studies and discuss their implications for clinical practice and future research.

Treatment modalities and survival outcomes

In this study, treatment modality played a significant role in determining the survival outcomes of TNBC patients. The highest survival rate was observed among patients who underwent Breast Conserving Surgery (BCS) combined with Multidisciplinary Team (MDT) management, with 76.19% surviving for five years. In contrast, patients who underwent Simple Mastectomy (SM) had the lowest survival rate (19.79%). These results are consistent with the findings of several other studies, which highlight the importance of the type of surgery in TNBC outcomes. A study by Galimberti et al found that BCS followed by radiation therapy is associated with

better survival outcomes than mastectomy in early-stage breast cancer, including TNBC.¹⁰ Similarly, this study supports the notion that BCS, when combined with MDT management, offers better survival compared to SM. MDT involvement has been recognized as an essential factor in improving the survival rates of cancer patients by providing a more comprehensive and individualized treatment approach. A review by Droog et al emphasized the benefits of MDTs in breast cancer care, particularly for complex cases like TNBC, where the lack of targeted therapies necessitates a multifaceted approach.¹¹ The current study confirms that MDT management, which involves coordinated care from oncologists, surgeons, pathologists, and radiologists, is essential for enhancing survival in TNBC patients. Moreover, the impact of chemotherapy in TNBC treatment is well-documented. In the present study, patients who received neoadjuvant chemotherapy (NACT) had a higher overall survival (OS) rate (62.50%) than those who received adjuvant chemotherapy (56.92%). This finding is consistent with previous studies that support the efficacy of NACT in improving survival and reducing recurrence in TNBC. A meta-analysis by Tian et al demonstrated that NACT, especially when combined with chemotherapy agents such as paclitaxel and platinum-based drugs, significantly improves the survival rates in TNBC patients.¹² Similarly, this study also found that paclitaxel combined with platinum agents resulted in higher survival outcomes, with 70.97% of patients surviving after five years.

Age and survival

Age was found to be a significant factor influencing survival in TNBC patients. In this study, the age group of 40-63 years had the highest survival rate (59.62%), followed by the younger group (32.69%), and the oldest group (7.70%). These results are in line with other studies that have demonstrated a strong correlation between age and survival in TNBC patients. A study by Rosenberg et al indicated that younger patients with TNBC tend to have more aggressive disease and a poorer prognosis.¹³ However, the present study suggests that survival rates are higher in patients aged 40-63, which may be due to better treatment responses and the absence of significant comorbidities, which are more common in older patients. The findings also align with those of a study by Reddy et

al, which highlighted that age is a critical factor influencing survival, with younger patients experiencing worse outcomes compared to those in the middle-aged group.¹⁴ On the other hand, patients aged 64 and above had a much lower survival rate (7.70%) in this study, which is consistent with findings from other studies. According to a report by Cabrera et al, older TNBC patients are often diagnosed at later stages, which may contribute to poorer outcomes.¹⁵ Additionally, the lower survival rate in older patients could be due to the presence of multiple comorbidities, reduced ability to tolerate aggressive treatments, and the fact that older patients may be less likely to receive the most effective treatment options, such as chemotherapy or surgery.

Follow-up adherence and survival

Follow-up adherence was another crucial variable influencing survival outcomes in this study. Patients who attended regular follow-up visits had significantly better survival rates (92.31%) compared to those with irregular follow-up (7.69%). These findings are consistent with other studies that emphasize the importance of regular follow-up care in improving cancer survival. A study by Runowicz et al demonstrated that consistent follow-up is essential in detecting recurrence early and managing complications, both of which are crucial for improving the survival of cancer patients.¹⁶ The results from the current study highlight the direct relationship between follow-up adherence and survival, supporting the importance of structured follow-up programs for TNBC patients. Patients who attend follow-up appointments are more likely to receive timely interventions for recurrence or metastasis, which significantly impacts their chances of survival. As observed in this study, only 7.69% of patients with irregular follow-up survived for five years, compared to 92.31% in the regular follow-up group. This underscores the need for healthcare systems to ensure that patients adhere to regular follow-up protocols, particularly in resource-limited settings like Bangladesh, where patients may face logistical challenges in attending follow-up visits.

Co-morbidities and survival

The presence of comorbidities significantly affected the survival outcomes of TNBC patients in this study. Patients with diabetes, hypertension, or both conditions had a significantly lower survival rate compared to those without comorbidities. The survival rate for patients with both diabetes and hypertension was 50%, compared to 62.50% for those with hypertension alone and 54.55% for those with diabetes alone. These findings align with those of other studies, which have found that comorbidities, particularly diabetes and hypertension, are associated with poorer survival outcomes in cancer patients. A study by Morishima et al suggested that comorbidities such as diabetes and hypertension are associated with higher treatment toxicity and poorer responses to chemotherapy, which may contribute to the lower survival rates observed

in these patients.¹⁷ Furthermore, the presence of comorbidities can complicate the management of TNBC, as these patients may require additional medications or treatments to manage their conditions, which could interfere with the effectiveness of cancer therapies. The current study's findings emphasize the need for comprehensive management of comorbidities in TNBC patients, particularly in low-resource settings where access to healthcare services may be limited.

Chemotherapy regimen and survival

Chemotherapy regimen was another key factor that influenced survival outcomes in this study. Patients who received a combination of paclitaxel and platinum-based agents had the highest survival rate (70.97%), followed by those who received paclitaxel alone (61.22%). The addition of platinum agents significantly improved survival, consistent with findings from other studies. A study by Petrelli et al demonstrated that the use of platinum-based chemotherapy agents in TNBC patients leads to better overall survival and disease-free survival, particularly in combination with other chemotherapeutic agents such as paclitaxel.¹⁸ The current study's results support the notion that platinum-based chemotherapy, when combined with taxanes like paclitaxel, can significantly enhance survival in TNBC patients. This finding is consistent with a randomized controlled trial by Kaya et al, which concluded that the use of cisplatin in combination with paclitaxel resulted in significantly improved survival in TNBC patients compared to standard chemotherapy regimens.¹⁹ The success of platinum-based chemotherapy in this study suggests that it should be considered a critical component of the treatment regimen for TNBC patients, especially in regions like Bangladesh where limited targeted therapies are available.

Comparison with other studies

While this study provides valuable insights into the survival outcomes of TNBC patients in Bangladesh, there are several limitations that need to be addressed in future research. First, the study was conducted in a single-center setting, which may limit the generalizability of the results to other regions of Bangladesh or other countries with similar healthcare systems. Second, the study relied on retrospective data collection for follow-up information, which may have led to incomplete or inaccurate data for some patients. Lastly, the study did not account for all potential confounding factors, such as lifestyle factors (e.g., diet, physical activity), which could influence survival outcomes in TNBC patients. Despite these limitations, the results of this study are comparable to those of other studies conducted in both high-income and low-income countries. For instance, a study by Schmid et al conducted in Pakistan found that TNBC patients in a low-resource setting had similar survival outcomes to those observed in this study, emphasizing the impact of treatment modality and follow-up adherence on survival.²¹ Similarly, a global study by Newman et al demonstrated

that platinum-based chemotherapy is associated with improved survival in TNBC patients, reinforcing the findings from this study.²²

Implications for clinical practice and future research

The findings from this study have several implications for clinical practice. First, the results underscore the importance of a multidisciplinary approach to TNBC treatment, particularly in low-resource settings like Bangladesh. MDT management, which includes coordinated care from oncologists, surgeons, radiologists, and pathologists, has been shown to improve survival outcomes in TNBC patients. Therefore, healthcare systems should invest in developing MDT models to enhance the management of TNBC. Second, the study highlights the need for regular follow-up care to improve survival outcomes. As seen in this study, patients who adhered to follow-up schedules had significantly better survival rates. This suggests that healthcare systems should prioritize follow-up care and patient education to ensure that patients continue to attend follow-up visits. Finally, future research should explore the impact of other factors, such as genetic mutations (e.g., BRCA1/2), lifestyle factors, and access to targeted therapies, on the survival outcomes of TNBC patients. Additionally, larger multi-center studies with more comprehensive data on treatment adherence, comorbidities, and socio-economic factors would provide more robust evidence on the factors influencing TNBC survival in Bangladesh and other similar settings.

CONCLUSION

This study highlights the critical role of treatment modality, follow-up adherence, and comorbidities in influencing survival outcomes in Triple-Negative Breast Cancer (TNBC) patients in Bangladesh. The findings emphasize the importance of combining Breast Conserving Surgery with Multidisciplinary Team (MDT) management, as well as the efficacy of platinum-based chemotherapy in improving survival rates. Additionally, regular follow-up care plays a crucial role in early detection of recurrence, ultimately enhancing survival. Future research should explore genetic factors, larger multi-center studies, and the implementation of targeted therapies in low-resource settings like Bangladesh.

Recommendations

Enhance multidisciplinary team (MDT) management for TNBC patients. Establish structured follow-up programs to improve patient adherence and survival. Explore the incorporation of genetic testing and personalized therapies in treatment regimens.

ACKNOWLEDGEMENTS

Authors would like to thank the National Institute of Cancer Research and Hospital (NICRH), Dhaka, and

Shaheed Suhrawardy Medical College Hospital for their invaluable support in providing patient data.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Review Boards of NICRH and Shaheed Suhrawardy Medical College Hospital, Dhaka, Bangladesh

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Cite this article as: Khan AAM, Alam MJ, Islam MR, Khurshid N. Five-year survival rate from triple-negative breast cancer varies on follow up, platinum agents and multidisciplinary team: a prospective analysis at tertiary level hospitals in Bangladesh. *Int J Res Med Sci* 2025;13:4570-8.