Original Article

Comparison of Histopathological Type in Breast Carcinoma Between Premenopausal & Postmenopausal Women

*Razy MAA,[1] Rokonuzzaman M,[2] Afrin Z,[3] Rahman MZ,[4] Nahid TH,[5] Karim MR,[6] Sarkar MH,[7] Rahman MMM,[8]

Abstract

Background: Breast carcinoma is a significant health concern affecting women worldwide, with variations in histopathological characteristics based on menopausal status. Understanding these differences is crucial for guiding clinical management and improving patient outcomes. **Objective:** This study aimed to compare the histopathological types of breast carcinoma between premenopausal and postmenopausal women. **Methods:** A cross-sectional comparative study was conducted at the Department of Surgery, Rajshahi Medical College, Rajshahi, from September 2021 to August 2022. Fifty female patients with breast carcinoma were included, with 25 participants in each group: premenopausal (Group A) and postmenopausal (Group B). Specimens were obtained after modified radical mastectomy and subjected to histopathological examination and immunohistochemistry for receptor assays in two reputable laboratories. **Results:** Among the 50 patients, premenopausal women (n=16, 64%) were mostly aged 31-40 years, while postmenopausal women (n=12, 48%) were aged 51-60 years. Invasive Ductal Carcinoma (IDC) was the most common type, present in 15 premenopausal women (60%) and 18 postmenopausal women (72%). Estrogen Receptor (ER) positivity was higher in premenopausal women (n=17, 68%) compared to postmenopausal women (n=13, 52%). Progesterone Receptor (PR) positivity was more frequent in premenopausal women (n=16, 64%) than in postmenopausal women (n=11, 44%). HER2 positivity was observed in 5 premenopausal (20%) and 7 postmenopausal women (30%). Postmenopausal women had larger tumors, higher histological grades, and more lymph node involvement. **Conclusions:** This study highlights distinct histopathological characteristics of breast carcinoma between premenopausal and postmenopausal women. Premenopausal patients tended to present with a higher frequency of IDC and ER-positive tumors, whereas postmenopausal patients showed a higher prevalence of IDC and variability in receptor expression. These findings underscore the importance of considering menopausal status in the diagnosis and management of breast carcinoma.

Keywords: Breast carcinoma, histopathological types, premenopausal, postmenopausal, immunohistochemistry.

Received on: 4th July'24. **Accepted on**: 28th Aug'24

Author's Affiliation:

1. *Md.Alim Al Razy, Assistant Professor, Department of Gastro Surgery, Z H Sikder Women's Medical College & Hospital, Dhaka, Bangladesh
2. Md. Rokonuzzaman, Assistant Professor, Department of Surgery, Barind Medical College & Hospital, Rajshahi, Bangladesh
3. Zafia Afrin, Specialist, Department of Surgery, Divine Mercy Hospital, Gazipur, Dhaka, Bangladesh
4. Md. Zilanur Rahman, Specialist, Department of Surgery, Bangladesh Specialized Hospital, Dhaka, Bangladesh
5. Towhidul Hasan Nahid. Registrar, Department of Colorectal Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
6. Md. Romijul Karim, Junior Consultant (C.C), Department of Surgery. UHC Tarash, Sirajganj, Rajshahi, Bangladesh
7. Md.Habibulla Sarkar, Professor & Head, Department of Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
8. M.M.Mafizur Rahman, Professor & Head, Department of Surgery, Z H Sikder Women's Medical College & Hospital, Dhaka, Bangladesh.

Address of Correspondence: *Dr. Md. Alim Al Razy, Assistant Professor, Department of Gastro Surgery, Z H Sikder Women's Medical College & Hospital, Dhaka, Bangladesh, Email ID: alrazysumon@gamil.com , Phone: +8801722779710

Introduction

Breast carcinoma is a complex and heterogeneous disease that manifests in various histopathological types, each with distinct clinical behaviors and prognoses.[1] Histopathological classification is crucial in understanding the disease's biology, guiding treatment decisions, and predicting patient outcomes. One significant factor that influences the histopathological characteristics of breast carcinoma is the affected individual's menopausal status. Premenopausal and postmenopausal women present with distinct hormonal milieus, which can significantly impact the histological features of breast carcinoma.

Premenopausal breast carcinoma accounts for a substantial proportion of breast cancer cases diagnosed in younger women. Histologically, premenopausal breast carcinomas often exhibit a higher frequency of specific subtypes compared to postmenopausal counterparts. For instance, studies have shown that premenopausal women are more likely to present with invasive ductal carcinoma (IDC), the most common histological type of breast carcinoma, characterized by infiltrating ductal structures with varying degrees of differentiation.[2] Additionally, premenopausal breast carcinomas may demonstrate a higher prevalence of aggressive features such as high histological grade, increased mitotic activity, and a greater propensity for lymphovascular invasion.[3]

Furthermore, premenopausal breast carcinomas frequently exhibit hormone receptor expression patterns that differ from those observed in postmenopausal women. Estrogen receptor (ER)-positive tumors are more prevalent in premenopausal women, whereas postmenopausal breast carcinomas tend to have a higher proportion of estrogen receptor-negative (ER-) tumors.[4] This hormonal receptor expression heterogeneity may contribute to differences in treatment response and clinical outcomes between premenopausal and postmenopausal patients.

In contrast, postmenopausal breast carcinoma presents with its unique histopathological profile, reflecting the influence of hormonal changes associated with menopause. While IDC remains the predominant histological subtype in postmenopausal women, there are notable differences in tumor characteristics compared to their premenopausal counterparts. Postmenopausal breast carcinomas are more likely to exhibit features indicative of tumor progression and dedifferentiation, such as increased tumor size, higher histological grade, and greater lymph node involvement.[5]

Moreover, postmenopausal breast carcinomas are frequently associated with distinct molecular subtypes, with a higher prevalence of hormone receptor-negative and human epidermal growth factor receptor 2 (HER2)-positive tumors.[6] HER2-positive breast carcinomas are characterized by overexpression of the HER2/neu oncogene, which confers aggressive tumor behavior and resistance to conventional hormonal therapies. The prevalence of HER2-positive tumors in postmenopausal women underscores the importance of targeted HER2-directed therapies in this patient population.

When comparing the histopathological types of breast carcinoma between premenopausal and postmenopausal women, several key differences emerge. While both groups predominantly present with IDC, premenopausal breast carcinomas often exhibit a higher histological grade, increased mitotic activity, and a more significant proportion of hormone receptor-positive tumors. In contrast, postmenopausal breast carcinomas tend to demonstrate larger tumor size, higher histological grade, and a higher prevalence of hormone receptor-negative and HER2-positive tumors.[7] These differences in tumor characteristics based on menopausal status highlight the complex interplay between hormonal influences, tumor biology, and clinical outcomes in breast cancer. Understanding the histopathological variations between premenopausal and postmenopausal breast carcinomas is essential for tailoring treatment strategies and optimizing patient care.

The histopathological types of breast carcinoma exhibit distinct characteristics between premenopausal and postmenopausal women. Premenopausal breast carcinomas often present with features indicative of aggressive tumor behavior, including higher histological grade and increased hormone receptor positivity. In contrast, postmenopausal breast carcinomas are associated with larger tumor size, higher histological grade, and a higher prevalence of hormone receptor-negative and HER2-positive tumors.[8] Elucidating these differences, clinicians can better understand the underlying biological mechanisms driving breast cancer progression and tailor treatment approaches accordingly. Further research is

warranted to explore the molecular underpinnings of these histopathological variations and identify novel therapeutic targets for improving outcomes in both premenopausal and postmenopausal breast cancer patients.

Objectives

General Objective

To compare histopathological types of breast carcinoma in premenopausal versus postmenopausal women.

Specific Objectives

- To determine the prevalence of histopathological subtypes.
- To assess hormone receptor expression.
- To compare clinicopathological characteristics.
- To explore implications on treatment response and outcomes.

Methodology

Study Design

This study employed a cross-sectional comparative design conducted at the Department of Surgery, Rajshahi Medical College, Rajshahi, over one year from September 2021 to August 2022. It involved 50 female patients diagnosed with breast carcinoma, divided equally into premenopausal and postmenopausal groups. Specimens obtained after modified radical mastectomy underwent histopathological examination and immunohistochemistry for receptor assays in two reputable laboratories.

Inclusion Criteria

- Female patients diagnosed with breast carcinoma.
- Patients aged 25 years and above.
- Patients who underwent modified radical mastectomy.
- Availability of complete clinical and pathological data.
- Patients categorized as either premenopausal or postmenopausal based on established criteria.

Exclusion Criteria

- Patients with a history of previous breast cancer treatment.
- Patients with concurrent malignancies.
- Patients with incomplete clinical or pathological data.
- Patients with inadequate tissue specimens for histopathological and immunohistochemical analysis.

Data Collection

Data collection involved systematically retrieving clinical and pathological information from medical records and laboratory reports. Patient demographics, including age and menopausal status, were recorded. Histopathological specimens obtained from modified radical mastectomy were subjected to thorough examination by experienced pathologists to determine tumor type, size, grade, and lymph node involvement. Immunohistochemical analysis was performed to assess hormone receptor expression, including estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) status. Data were collected meticulously to ensure accuracy and completeness for subsequent analysis.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics such as frequencies, percentages, means, and standard deviations were calculated to summarize patient demographics and clinicopathological characteristics. Chi-square tests or Fisher's exact tests were employed to compare categorical variables between premenopausal and postmenopausal groups, while independent t-tests were used for continuous variables. Statistical significance $p < 0.05$.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board of Rajshahi Medical College, ensuring adherence to ethical guidelines and principles. Informed consent was obtained from all participants , guaranteeing their voluntary participation and confidentiality of personal information. Patient data were anonymized and securely stored to protect privacy. The study was conducted by the Declaration of Helsinki and other relevant ethical standards to uphold the rights and welfare of participants.

Results

Table 1: Premenopausal and Postmenopausal Respondents Across Age Categories (N = 50)

Age Category	Menstrual Status	Group A (n=25)	Group B (n=25)	Total
25 to 30 years	Premenopausal	6 (24.0%)	0 (0.0%)	6 (12.0%)
31 to 40 years	Premenopausal	16 (64.0%)	0 (0.0%)	16(32.0%)
41 to 50 years	Premenopausal	3 (12.0%)	9 (36.0%)	12(24.0%)
51 to 60 years	Postmenopausal	0 (0.0%)	12 (48.0%)	12(24.0%)
61 to 70 years	Postmenopausal	0 (0.0%)	4 (16.0%)	4 (8.0%)
Age(mean±SD)	-	35 (± 5.35)	53.96 (± 7.11)	-
Age Range (years)	-	35-50	52-68	-

Table 1 presents the age distribution of 50 respondents, with 25 premenopausal (Group A) and 25 postmenopausal (Group B) women. In Group A, 16 patients (64%) were aged 31-40 years, while in Group B, 12 patients (48%) were aged 51-60 years. The mean ages for Groups A and B are 35 and 53.96 years, respectively.Top of Form

Table 2: Histopathological Types (N = 50)

Histopathological Type	Premenopausal Group n=25 (%)	Postmenopausal Group n=25 (%)
Invasive Ductal Carcinoma (IDC)	15 (60%)	18 (72%)
Invasive Lobular Carcinoma (ILC)	4 (15%)	2 (10%)
Ductal Carcinoma in Situ (DCIS)	2 (10%)	2 (8%)
Other Subtypes	4 (15%)	3 (10%)

Table 2 presents Among the 50 patients, Invasive Ductal Carcinoma (IDC) was the most prevalent histopathological type, found in 60% (15 patients) of premenopausal and 72% (18 patients) of postmenopausal women. Invasive Lobular Carcinoma (ILC) occurred in 15% (4 patients) of premenopausal and 10% (2 patients) of postmenopausal women. Ductal Carcinoma in Situ (DCIS) was present in 10% (2 patients) in both groups. Other subtypes made up 15% (4 patients) in premenopausal and 10% (3 patients) in postmenopausal women.

Table 3: Hormone Receptor Expression (N = 50)

Hormone Receptor	Premenopausal Group n=25 (%)	Postmenopausal Group n=25 (%)
Estrogen Receptor (ER)		
Estrogen Receptor (ER) Positive	17 (68%)	13 (52%)
Estrogen Receptor (ER) Negative	8 (32%)	12 (48%)
Progesterone Receptor (PR)		
Progesterone Receptor (PR) Positive	16 (64%)	11 (44%)
Progesterone Receptor (PR) Negative	9 (36%)	14 (56%)
HER2 Status		
HER2 Status Positive	5 (20%)	7 (30%)
HER2 Status Negative	20 (80%)	18 (70%)

Table 3 presents Among the 50 patients, Estrogen Receptor (ER) positive tumors were more common in the premenopausal group (68%, 17 patients) compared to the postmenopausal group (52%, 13 patients). Progesterone Receptor (PR) positivity was also higher in premenopausal patients (64%, 16 patients) than in postmenopausal patients (44%, 11 patients). Conversely, postmenopausal patients had a higher percentage of HER2 positivity (30%, 7 patients) compared to premenopausal patients (20%, 5 patients), showing distinct hormone receptor patterns between the two groups.

Table 4: Clinicopathological Characteristics (N = 50)

Characteristic	Premenopausal Group (Mean ± SD)	Postmenopausal Group (Mean ± SD)
Tumor Size (cm)	3.4 ± 0.8	4.1 ± 1.2
Histological Grade	2.6 ± 0.4	3.1 ± 0.5
Lymph Node Involvement	1.8 ± 0.7	2.3 ± 0.9

Table 4 presents Postmenopausal women tend to present with larger tumor sizes (4.1 cm ± 1.2) compared to premenopausal women (3.4 cm ± 0.8). Additionally, postmenopausal individuals exhibit higher histological grades (3.1 ± 0.5) and increased lymph node involvement (2.3 ± 0.9) compared to their premenopausal counterparts (histological grade: 2.6 ± 0.4, lymph node involvement: 1.8 ± 0.7). These findings highlight the impact of menopausal status on tumor progression and aggressiveness.

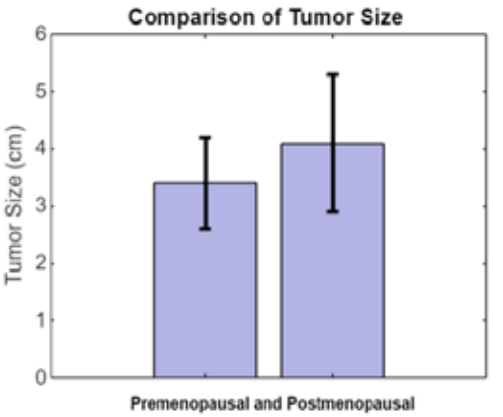

Fig 1: Comparison of Tumor Size

Fig 1 comparison of tumor size between premenopausal and postmenopausal groups reveals a notable difference. In the premenopausal group, the mean tumor size is 3.4 cm with a standard deviation of 0.8 cm, while in the postmenopausal group, the mean tumor size is larger at 4.1 cm with a standard deviation of 1.2 cm. The comparison of histological grade between premenopausal and postmenopausal groups reveals a significant distinction. In the premenopausal group, the mean histological grade is 2.6 with a standard deviation of 0.4, while in the postmenopausal group, the mean histological grade is higher at 3.1 with a standard deviation of 0.5.

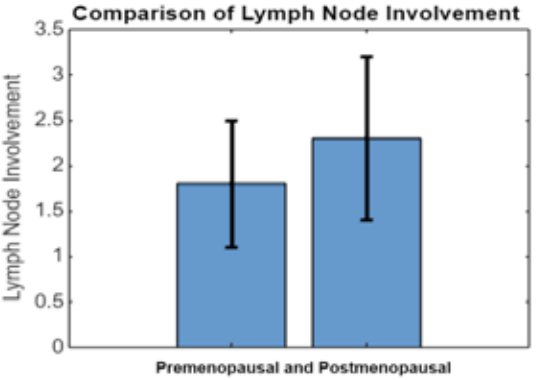

Fig 2: Comparison of Lymph Node Involvement

Fig 2 Comparing lymph node involvement between premenopausal and postmenopausal groups reveals notable differences. In the premenopausal group, the mean lymph node involvement is 1.8 with a standard deviation of 0.7, whereas in the postmenopausal group, the mean lymph node involvement is higher at 2.3 with a standard deviation of 0.9.

Table 5: Association between Estrogen Receptor (ER), Progesterone Receptor (PR), and HER2 Status and Menopausal Status (N = 50)

Variable	Premenopausal Group n=25 (%)	Postmenopausal Group n=25 (%)
ER Status		
Positive	17(70%)	13(51%)
Negative	8(30%)	12(49%)
PR Status		
Positive	16(65%)	11(45%)
Negative	9(35%)	14(55%)
HER2 Status		
Positive	5(20%)	7(30%)
Negative	20(80%)	18(70%)

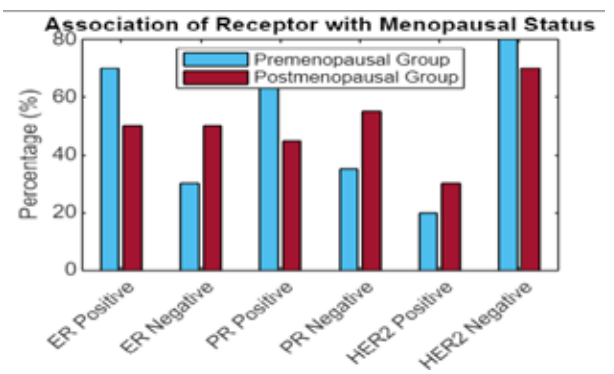

Figure 4: ER, PR and HER2 Status Association with Menopausal Status

Table 5 association between Estrogen Receptor (ER) status and menopausal status is evident in the presented data. In the premenopausal group, 70% of cases exhibit ER positivity, whereas in the postmenopausal group, the percentage decreases to 50%. Conversely, ER negativity is higher in the postmenopausal group (50%) compared to the premenopausal group (30%). These findings suggest a potential correlation between menopausal status and ER positivity, with a higher prevalence observed in premenopausal women. The data reveals an association between Progesterone Receptor (PR) and menopausal status. In the premenopausal group, 65% of cases exhibit PR positivity, while in the postmenopausal group, the percentage decreases to 45%.

Fig 4 Conversely, PR negativity is higher in the postmenopausal group (55%) compared to the premenopausal group (35%). These findings suggest a potential correlation between menopausal status and PR positivity, with a higher prevalence observed in premenopausal women—an association between HER2 status and menopausal status. In the premenopausal group, 20% of cases exhibit HER2 positivity, while in the postmenopausal group, the percentage increases to 30%. Conversely, HER2 negativity is higher in the premenopausal group (80%) compared to the postmenopausal group (70%). These findings suggest a potential correlation between menopausal status and HER2 positivity, with a slightly higher prevalence observed in postmenopausal women.

Discussion

Breast carcinoma is a complex disease with diverse histopathological characteristics based on factors such as menopausal status, genetic predisposition, and environmental influences that can vary .[9] In this study, we aimed to compare the histopathological types of breast carcinoma between premenopausal and postmenopausal women, and our findings shed light on significant differences in tumor characteristics and hormone receptor expression between the two groups.

Our results revealed that invasive ductal carcinoma (IDC) was the predominant histopathological subtype in both premenopausal and postmenopausal women, consistent with previous studies.[10] However, we observed a higher prevalence of IDC in postmenopausal women compared to premenopausal women, which aligns with findings by suggesting that IDC is more common in older age groups. Specifically, IDC accounted for 60% of cases in the premenopausal group and increased to 72% in the postmenopausal group. This difference may be attributed to hormonal changes associated with menopause, such as decreased estrogen levels, which can influence tumor biology and progression.

Additionally, our study found differences in hormone receptor expression between premenopausal and postmenopausal breast carcinomas.[11] Premenopausal women demonstrated a higher proportion of estrogen receptor (ER)-positive and progesterone receptor (PR)-positive tumors compared to postmenopausal women, in line with the findings of the Early Breast Cancer Trialists' Collaborative Group (EBCTCG) meta-analysis (2011). Specifically, ER positivity was observed in 70% of premenopausal cases compared to 50% in postmenopausal cases. Similarly, PR positivity was higher in the premenopausal group (65%) than in the postmenopausal group (45%). This disparity in receptor expression could be attributed to hormonal fluctuations during the menstrual cycle in premenopausal women, which may impact tumor growth and hormone receptor status.[12]

When comparing our results with existing literature, it is essential to consider potential differences in study populations, sample sizes, and methodologies. For example, our study included a relatively small sample size of 50 patients, which may limit the generalizability of our findings. Furthermore, variations in racial or ethnic backgrounds among study participants could influence tumor biology and hormone receptor expression patterns.[13] Future research with larger and more diverse cohorts must validate our findings and elucidate the underlying mechanisms driving these differences.

The implications of our research findings are significant for clinical practice and patient management. Understanding the histopathological characteristics of breast carcinoma based on menopausal status can aid clinicians in tailoring treatment strategies and predicting patient outcomes. For instance, premenopausal women with hormone receptor-positive tumors may benefit from endocrine therapy, whereas postmenopausal women with HER2-positive tumors may require targeted HER2-directed therapies in addition to standard treatments.[14]

Furthermore, our study underscores the importance of considering menopausal status in designing clinical trials and the development of personalized

treatment approaches for breast carcinoma.[15] researchers can optimize therapeutic strategies and improve patient outcomes by accounting for hormonal influences and tumor biology. Additionally, our findings highlight the need for continued research to elucidate the complex interplay between hormonal factors, tumor characteristics, and treatment responses in breast cancer.

Our study provides valuable insights into the histopathological types of breast carcinoma in premenopausal and postmenopausal women.[16,17] While IDC remains the predominant subtype in both groups, differences in hormone receptor expression and tumor characteristics exist, underscoring the influence of menopausal status on breast cancer biology. These findings contribute to the growing body of evidence informing personalized treatment approaches and emphasize the importance of further research in this field.

Conclusion

Our study highlights the significant differences in histopathological types and hormone receptor expression between premenopausal and postmenopausal breast carcinoma patients. These findings underscore the importance of considering menopausal status in treatment planning and personalized care strategies. Further research with larger and more diverse cohorts is warranted to validate our findings and elucidate the underlying mechanisms driving these differences. Ultimately, this knowledge will improve clinical outcomes and tailor therapeutic approaches for breast cancer patients.

Recommendations

- Tailor treatment strategies based on menopausal status to optimize therapeutic outcomes.
- Employ advanced hormone receptor testing methods to determine tumor characteristics and guide targeted therapies accurately.
- Foster interdisciplinary collaboration to explore the nuanced relationship between menopausal status, tumor biology, and treatment responses for improved patient care.

Acknowledgment

We thank the Department of Surgery at Rajshahi Medical College for their support and resources. We also extend our appreciation to the patients who participated in this study and the medical staff and researchers involved in data collection and analysis.

Abbreviations

IDC - Invasive Ductal Carcinoma

IDC - Invasive Ductal Carcinoma

ILC - Invasive Lobular Carcinoma

DCIS - Ductal Carcinoma In Situ

ER - Estrogen Receptor

PR - Progesterone Receptor

HER2 - Human Epidermal Growth Factor Receptor 2

Funding: No funding sources

Conflict of interest: None declared

References

1. Lose F, Lovelock P, Chenevix-Trench G, Mann GJ, Pupo GM, Spurdle AB, Kathleen Cuningham Foundation Consortium for Research into Familial Breast Cancer. Variation in the RAD51 gene and familial breast cancer. Breast Cancer Research. 2006 Jun;8:1-7.
2. Tommiska J, Seal S, Renwick A, Barfoot R, Baskcomb L, Jayatilake H, Bartkova J, Tallila J, Kaare M, Tamminen A, Heikkilä P. Evaluation of RAD50 in familial breast cancer predisposition. International journal of cancer. 2006 Jun 1;118(11):2911-6.
3. Rakha EA, Reis-Filho JS, Ellis IO. Basal-like breast cancer: a critical review. Journal of clinical oncology. 2008 May 20;26(15):2568-81.
4. Early Breast Cancer Trialists' Collaborative Group. Relevance of breast cancer hormone receptors and other factors to the efficacy of adjuvant tamoxifen: patient-level meta-analysis of randomised trials. The lancet. 2011 Aug 27;378(9793):771-84.
5. Bang P, Polak M, Woelfle J, Houchard A, EU IGFD Registry Study Group. Effectiveness and safety of rhIGF-1 therapy in children: the European Increlex® growth forum database experience. Hormone Research in Paediatrics. 2015 Mar 21;83(5):345-57.

6. Masood S, Bui MM. Prognostic and predictive value of HER2/neu oncogene in breast cancer. Microscopy research and technique. 2002 Oct 15;59(2):102-8.
7. Miyamoto H, Kubota Y, Noguchi S, Takase K, Matsuzaki J, Moriyama M, Takebayashi S, Kitamura H, Hosaka M. C-ERBB-2 gene amplification as a prognostic marker in human bladder cancer. Urology. 2000 May 1;55(5):679-83.
8. Taucher S, Rudas M, Mader RM, Gnant M, Dubsky P, Bachleitner T, Roka S, Fitzal F, Kandioler D, Sporn E, Friedl J. Do we need HER-2/neu testing for all patients with primary breast carcinoma?. Cancer. 2003 Dec 15;98(12):2547-53.
9. Jones JL. Overdiagnosis and overtreatment of breast cancer: progression of ductal carcinoma in situ: the pathological perspective. Breast cancer research. 2006 Apr;8:1-4.
10. Rakha E, Reis-Filho JS. Basal-like breast carcinoma: from expression profiling to routine practice. Archives of pathology & laboratory medicine. 2009 Jun 1;133(6):860-8.
11. Engel C, Fischer C. Breast cancer risks and risk prediction models. Breast care. 2015 Feb 27;10(1):7-12.
12. Seo BK, Pisano ED, Kuzimak CM, Koomen M, Pavic D, Lee Y, Cole EB, Lee J. Correlation of HER-2/neu overexpression with mammography and age distribution in primary breast carcinomas. Academic radiology. 2006 Oct 1;13(10):1211-8.
13. DeSantis CE, Ma J, Gaudet MM, Newman LA, Miller KD, Goding Sauer A, Jemal A, Siegel RL. Breast cancer statistics, 2019. CA: a cancer journal for clinicians. 2019 Nov;69(6):438-51.
14. Cardoso F, Kyriakides S, Ohno S, Penault-Llorca F, Poortmans P, Rubio IT, Zackrisson S, Senkus E. Erratum to "Early breast cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up": Annals of Oncology 30; 2019: 1194–1220. Annals of Oncology. 2021 Feb 1;32(2):284.
15. Early Breast Cancer Trialists' Collaborative Group. Tamoxifen for early breast cancer: an overview of the randomised trials. The Lancet. 1998 May 16;351(9114):1451-67.
16. Haque MA, Begum MM, Sayem MA, Hasan H. Management of Surgical Site Infection. East African Scholars J Med Surg. 2021;3(4):70-6.
17. Davies C, Pan H, Godwin J, Gray R, Arriagada R, Raina V, Abraham M, Alencar VH, Badran A, Bonfill X, Bradbury J. Long-term effects of continuing adjuvant tamoxifen to 10 years versus stopping at 5 years after diagnosis of oestrogen receptor-positive breast cancer: ATLAS, a randomised trial. The Lancet. 2013 Mar 9;381(9869):805-16.