

DEMOGRAPHIC, CLINICO-PATHOLOGICAL PROFILE, AND IMMUNOHISTOCHEMISTRY STUDY IN FEMALE BREAST CANCER IN EASTERN INDIA: A HOSPITAL-BASED RETROSPECTIVE STUDY

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ABSTRACT

Objectives: Female breast cancer is the most common cancer in Worldwide. In India, locally advanced female breast cancer is more common (57%) and survival rate of female breast cancer is very poor because early age of disease onset, diagnosed in late stage, delayed initiation, and inadequate proper treatment. Few studies have been published in journals regarding clinico-pathological profile of breast cancer in India. However, there are limited data available in literature on demographic, clinico-pathological profile, and immunohistochemistry (IHC) study in female breast cancer in Eastern India.

Methods: Newly diagnosed, histopathology proved female breast cancer patients registered from January 2018 to June 2022 at department of radiotherapy was included in this study. This study was retrospective and primary data were collected from medical records of patients about their demographic, clinico-pathological, and IHC profile.

Results: The median age at diagnosis was 48 years. Incidence of female breast cancer was more in the age group of 41–50 years (39.5%) and most of the patients were in premenopausal group (59.2%). Locally advanced disease, Stage III (50.7%) was more followed by Stage II (32.2%). Most common histopathology type was invasive ductal carcinoma not otherwise specified (90.8%) and Grade II (50%). Triple negative breast tumor was more common IHC type (32.9%).

Conclusions: In our study, locally advanced breast cancer was more common in premenopausal patients in urban area. Awareness regarding breast cancer among general population, early diagnosis and adequate proper treatment can reduce mortality of breast cancer.

Keywords: Breast cancer, Demography, Clinico-pathological profile, Immunohistochemistry.

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INTRODUCTION

According to GLOBOCAN 2020, female breast cancer is the most common cancer in worldwide and there are 2.3 million new cases which represent 11.7% of all cancer cases followed by lung cancer (11.4%) and colorectal cancer (10.0%). Worldwide, breast cancer is the fifth most common cause of cancer death and there are 685,000 deaths in 2020 [1].

In India, age adjusted incidence rate of breast cancer is 25.8/100,000 which is low compared to United Kingdom (95/100,000) but mortality rate is almost similar with United Kingdom [2]. In India, the incidence of breast cancer is low compared to developed countries, but the total number of cases and the net mortality is high due to large population, inadequate screening programs, and lack of education and awareness [3].

According to GLOBOCAN 2020, risk factors for breast cancer are early age at menarche, late menopause, nulliparous, advanced age at first birth, less breastfeeding, postmenopausal hormone therapy, and oral contraceptives pill. Alcohol intake, obesity, and less physical activity are also risk factors of breast cancer [1]. In developed countries, incidence of breast cancer is high due to longstanding higher prevalence of reproductive and hormonal risk factors and there is increased detection through mammographic screening [1]. Previously in India, carcinoma cervix was most common cancer in women but at present the incidence of breast cancer is high compare to carcinoma cervix and is leading cause of cancer death in woman, although carcinoma cervix remains most common cancer in rural

Indian woman [4]. In Western countries, peak age of female breast cancer is between 60 and 64 years of age but in Indian woman it is between 45 and 49 years of age [5]. In western countries, early stage of breast cancer is more common and incidence range is 60–70% [6]. In India, locally advanced female breast cancer is more common (57%) and among them 10.3% patients have distant metastases [7]. In our country, survival rate of female breast cancer is very poor because early age of disease onset, diagnosed in late stage, delayed initiation, and inadequate proper treatment [8]. Few studies have been published in journals regarding clinico-pathological profile of breast cancer in India. However, there are limited data available in literature on demographic, clinico-pathological profile, and immunohistochemistry (IHC) study in Female Breast Cancer in Eastern India. Aims of this study were documentation and enriching data in the literature on demographic, clinico-pathological profile, and IHC study in Female Breast Cancer from Eastern India.

METHODS

This is a retrospective study, so Ethical Committee approval was exempted and patient consent was not required.

Study area

This study was conducted at the Department of Radiotherapy, College of Medicine and SagoreDutta Hospital, Kolkata, West Bengal, India.

Study population

This study was retrospective and primary data were collected from medical records file of patient at department of radiotherapy.

Inclusion criteria

Newly diagnosed, histopathology proved female breast cancer patients registered from January 2018 to June 2022 at Department of Radiotherapy was included in this study.

Exclusion criteria

Female breast cancer with any other type of cancer was excluded from this study.

Study design

This was single institution and retrospective study.

We collected data from medical records file of patients about their demographic profile, clinico-pathological characteristics, IHC-Estrogen/progesterone receptors (ER/PR), and HER2/neu status. The staging of breast cancer was done according to American Joint Committee on Cancer TNM staging system (8th Edition). Patients received neo-adjuvant/adjuvant chemotherapy, surgery, external beam radiotherapy, hormone therapy, trastuzumab according to their stage, histopathological profile, and ER/PR and HER2/neu status. Post-radiotherapy pulmonary toxicity was assessed by spirometry study at the Department of Physiology, Calcutta National Medical College, Kolkata. Routine blood test, tru cut biopsy for histopathology and IHC, Chest X-ray PA view, ECG, Echocardiography, ultrasonography (USG) of bilateral breast and axilla, USG of whole abdomen, and CECT scan of thorax, whole abdomen, whole body bone scan, and PET CT scan (if needed) were done before initiation of treatment.

RESULTS

In total 152 patients of histopathology proved female breast cancer who were registered from January 2018 to June 2022 at the department of radiotherapy were included in this study. The socio-demographic characteristics of patients with breast cancer are shown in Table 1. The median age of our patients at diagnosis was 48 years (range 30–80 years). The majority of the patients 39.5% were in the age group of 41–50 years, 23.7% of the patients were in the age group of 51–60 years, 22.3% of the patients were in the age group of 30–40 years, 12.5% of the patients were in the age group of 61–70 years, and 2% of the patients were in the age group of 71–80 years. In this study, the majority of patients 67.1% were living in urban area and 32.9% of the patients were living in rural area. About 85.5% of the patients were Hindu, 13.2% of the patients were Muslim, and 1.3% of patients were Christian. The median age of menarche was 11 years. The majority of the patients 98.7% were married and 1.3% patients were unmarried. Most of the patients were housewives (84.2%) and over 90% of patients had poor economic condition. The literacy rate in this study population was 70%. About 98% of the patients were multiparous and 2% patients were nulliparous. About 59.2% patients were in Pre-menopausal group and 40.8% of patients were in postmenopausal group. About 2.6% of patients had positive family history of breast cancer of 1st and 2nd degree relatives. About 34.9% of patients used oral contraceptive pills. About 8.6% of patients were tobacco chewers, 5.2% patients used nasal snuff (powder tobacco), and 6.6% patients were smokers.

The clinico-pathological profile and stage of the disease are shown in Table 2. The incidence of left breast carcinoma (53.3%) was more compare to the right breast (46%) and bilateral breast carcinoma was 0.7%. The most common clinical presentation at diagnosis was lump in the breast (100%), followed by axillary swelling 54.6%, pain in breast 35.5%, and discharge from nipple 12.5%. The most common histopathological type was invasive ductal carcinoma, not otherwise specified (NOS) 90.8%, other types were invasive ductal carcinoma with ductal carcinoma in situ (DCIS) (2%), medullary carcinoma 2.6%, mucinous carcinoma 1.3%, tubular carcinoma 1.3%, metaplastic carcinoma 1.3%, and invasive lobular carcinoma 0.7%. The most common grade of carcinoma was Grade II (50%), followed by Grade III (27.6%), Grade I (22.4 %).

The majority of the patients had Stage III (50.7%), followed by Stage II (32.2%), Stage I (11.8%), and Stage IV (5.3%).

Table 1: Socio-demographic characteristics of patients with breast cancer

Patients characteristics	No. of patients (%) (n=152)
Age group (years)	
30–40	34 (22.3)
41–50	60 (39.5)
51–60	36 (23.7)
61–70	19 (12.5)
71–80	3 (2)
Median age (Years)	48
Religion	
Hindu	130 (85.5)
Muslim	20 (13.2)
Christian	2 (1.3)
Marital Status	
Married	150 (98.7)
Unmarried	2 (1.3)
Parity	
Nulliparous	3 (2)
Multiparous	147 (98)
Age at menarche (years)	
Median	11 years (Range 10–15 years)
Menopausal status	
Premenopause	90 (59.2)
Postmenopause	62 (40.8)
Occupation	
House wife	128 (84.2)
Employee	24 (15.8)
No. patients taken oral contraceptive pill	53 (34.9)
Positive family history of breast cancer	4 (2.6)
Residential Area	
Urban area	102 (67.1)
Rural area	50 (32.9)
Addiction	
Tobacco chewer	13 (8.6)
Nasal Snuff (powder tobacco)	8 (5.2)
Smoking	10 (6.6)
Alcohol	Nil

IHC status of the patients in this study is shown in Table 3. 21 (13.7%) patients had ER+, PR+, HER2/neu + (Triple Positive). 50 (32%) patients had ER-, PR-, HER2/neu-(Triple Negative). Patients with ER+, PR+, HER2/neu-were 23.7%, ER+, PR-, HER2/neu - were 5.3%, ER-, PR+, HER2/neu - were 5.3%. About 19.1% patients had ER-, PR-, and HER2/neu+tumor.

DISCUSSION

In Western countries, peak age of female breast cancer is between 60 and 64 years of age but in Indian woman it is between 45 and 49 years of age [5]. Chopra *et al.* observed the peak age of female breast cancer in India was 40–50 years [9]. In this study, the median age of our patients at diagnosis was 48 years (range 30–80 years) and the majority of the patients 39.5% were in the age group of 41–50 years, 23.7% of the patients were in the age group of 51–60 years, 22.3% of the patients were in the age group of 30–40 years, 12.5% of the patients were in the age group of 61–70 years, and 2% of the patients were in the age group of 71–80 years.

McPherson *et al.* reported that most of the patients with breast cancer in Western countries were in postmenopausal age group [10]. In this study, most of patients (59.2%) were in premenopausal group and 40.8% of patients were in postmenopausal group. The majority of the patients (98.7%) were married and 98% of the patients were multiparous in the present study and similar result was seen in other literature [11].

According to GLOBOCAN 2020, risk factors for breast cancer are early age at menarche, late menopause, nulliparous, advanced age at first

Table 2: Stage and clinico-pathological profile

	No. of patients (%)
TNM staging	
I	18 (11.8)
II	49 (32.2)
III	77 (50.7)
IV	8 (5.3)
Clinical Profile at diagnosis	
Lump in Breast	152 (100)
Site of Disease	
Right Breast	70 (46)
Left Breast	81 (53.3)
Bilateral Breast	1 (0.7)
Pain	54 (35.5)
Discharge from Nipple	19 (12.5)
Axillary Swelling	83 (54.6)
Histopathological type	
Invasive ductal carcinoma (NOS)	138 (90.8)
Invasive ductal carcinoma with DCIS	3 (2)
Medullary carcinoma	4 (2.6)
Mucinous carcinoma	2 (1.3)
Tubular carcinoma	2 (1.3)
Metaplastic carcinoma	2 (1.3)
Invasive lobular carcinoma	1 (0.7)
Grade	
I	34 (22.4)
II	76 (50)
III	42 (27.6)

Table 3: Immunohistochemistry status

ER+/PR+/HER2neu + (Triple Positive)	21 (13.7%)
ER-/PR-/HER2neu - (Triple Negative)	50 (32.9%)
ER +/PR +/HER2 neu-	36 (23.7%)
ER+/PR-/HER2neu-	8 (5.3%)
ER-/PR+/HER2neu-	8 (5.3%)
ER-/PR-/HER2neu+	29 (19.1%)

birth, postmenopausal hormone therapy, and oral contraceptives pills which cause prolonged exposure to unopposed ER. Alcohol intake, obesity, and less physical activity are lifestyle risk factors for breast cancer [1]. There is increased conversion of androgen to ER in adipose tissues of obese patients. In the present study, the median age of menarche was 11 years, 84.2% patients were housewife (low physical activity), 34.9% patients took oral contraceptive pill, tobacco chewer were 8.6%, and smoker were 6.6%. Tobacco in the form of chewing and smoking is risk factor of cancer.

Bera *et al.* observed that the clinical features at presentation were 100% breast lump, 33.2% axillary swelling due to lymphadenopathy, 8% pain in breast, 0.3% nipple discharge, 48% tumor in the right breast, and 52% tumor in the left breast [12]. In this study, clinical profile of study population at diagnosis was left breast tumor 53.3%, right breast tumor 46%, bilateral breast tumor 0.7%, pain in breast 35.5%, discharge from nipple 12.5%, and axillary swelling 54.6%.

Mistry *et al.* reported that invasive ductal carcinoma (NOS) was 85.2%, which was the most common type, DCIS was 1.1%, and mucinous carcinoma was 1.1% [13]. Bera *et al.* shown in their study that invasive ductal carcinoma (NOS) was 99.5%, medullary carcinoma was 0.45%, DCIS was 0.05%, Grade II tumor was 45%, Grade III was 29%, and Grade I was 26% [12]. Samanta *et al.* reported that invasive ductal carcinoma (NOS) was 96.5%, invasive ductal carcinoma and invasive lobular carcinoma were 1.5%, medullary carcinoma was 0.5%, invasive lobular carcinoma was 0.3% and 41.2% patient had Grade-III tumor, 54.3% had Grade-II tumor, and 4.5% had Grade-I tumor [14]. In the present study, the most common histopathological type was invasive ductal carcinoma, NOS 90.8%, invasive ductal carcinoma with DCIS (2%), medullary carcinoma 2.6%, mucinous carcinoma 1.3%, tubular carcinoma 1.3%, metaplastic carcinoma 1.3%, invasive lobular

carcinoma 0.7% and the most common grade of carcinoma was Grade II (50%), followed by Grade III (27.6%) and Grade I (22.4%).

Singh *et al.* observed in their study that Stage III was the most common (66.2%), followed by Stage II (32.4%) and Stage I (1.4%) [15]. Bera *et al.* observed Stage II was the most common 45%, followed by Stage III (30%), Stage I (15%), Stage IV (10%) [12]. In the present study, the majority of the patients had Stage III (50.7%) disease, followed by Stage II (32.2%), Stage I (11.8%), and Stage IV (5.3%). In developing countries, most of the breast cancer patients present in advanced stage due to absence of knowledge and awareness regarding breast cancer, shortage of funding, lack of infrastructure, and less preference in public health schemes, lack of breast cancer screening [16].

Singh *et al.* observed in their study that 50% patients had both ER and PR positive, 37.8% patients had both ER, PR negative, 58.1% had only ER+, 52.7% only PR+, and 28.5% Her2+. Triple positive tumors were in 14.9% and 29.7% of cases were triple negative tumor [15]. Samanta *et al.* reported that the incidence of triple negative breast cancer was 47.9%, 15.2% was ER/PR negative HER-2 neu positive, 21.5% was ER/PR positive HER-2 neu negative, and ER/PR positive HER-2 neu positive was 9.1% [14]. In our study, majority of the patients had ER-/PR-/HER2neu- (Triple Negative) 32%, followed by ER+/PR+/Her2neu-23.7%, ER-/PR-/Her2+19.1%, triple positive ER+/PR+/Her2neu+13.7%, ER+/PR-/Her2neu-5.3%, and ER-/PR+/Her2neu-5.3%. The incidence of ER+ (70–80%) and PR+ (60–70%) is higher in western population compare to Indian population and Her2neu positive 28–46.3% [15]. In India, the prevalence of triple negative tumor (31%) is more compare to Western country [15]. Kakarala *et al.* reported higher incidence of ER-/PR-breast cancer in Pakistan and Indian population and also observed survival rate of patients with triple negative (ER, PR, and Her2Neu negative) breast cancer was low compared to other subtypes due to aggressive biology of disease, resistant to cytotoxic drugs [17].

However, sample size of our study was small and data of last 4 years 6 months only were analyzed. This study was single institutional, retrospective study and results may not represent general population.

CONCLUSION

In this study, incidence of female breast cancer was more in the age group of 41–50 years and most of the patients were in premenopausal group. Incidence of disease was more in urban area and patients had poor socioeconomic status. Locally advance disease, Stage III was more followed by Stage II. Most common histopathology type was invasive ductal carcinoma (NOS) and Grade II. Increased awareness regarding breast cancer among general population, early diagnosis by screening procedure and early initiation and adequate proper treatment can reduce mortality of breast cancer in our country.

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AUTHOR'S CONTRIBUTION

All authors contributed equally to this article including data collection, writing, and reviewing the manuscript.

CONFLICT OF INTEREST

All authors declare no conflict of interest for the publication of this article.

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