

# Characteristics and Outcomes of Breast Cancer- Retrospective Analysis from a Tertiary Center in India.

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## Abstract

**Background:** Breast cancer is the most common cancer among women in India and globally and the leading cause of cancer mortality among females. In India, the locally advanced breast cancer (LABC) constitutes 50 to 60% of the patients with Luminal A and Luminal B subtype, 16.7% HER2neu positive and 29.8% triple negative. **Subjects and Methods:** Breast cancer treated in the Department of Medical Oncology, RGGGH, Chennai from January 2014 to December 2016 were included in the study. Six hundred and twelve early and LABC patients were analyzed. **Results:** Among 612 patients, 315 (42.8%) were had early breast cancer and 297 (40.4%) were had locally advanced breast cancer. Among them 30.7% luminal subtype, 11.4% triple positive, 13.7% HER2 positive, 25.6% triple negative and 17.5% had unknown status. The overall mean DFS and OS in early breast cancer was 57months and 58 months respectively and locally advanced breast cancer was 51months and 52.5 months respectively. **Discussion:** Prevalence of TNBC in India is considerably higher compared with Western populations with Indian trial having 51.2% HR positive tumors, HER2 positive tumors in 16.7% and TNBC in 29.8%. In our study, 30.7% Luminal subtype, 11.4% triple positive, 13.7% HER2 positive, 25.6% triple negative and 17.5% had unknown status. The overall mean DFS and OS in early breast cancer was 57months and 58 months respectively and locally advanced breast cancer was 51months and 52.5 months respectively. **Conclusion:** In our study we found that most of our patients present with advanced disease and TNBC and HER2 positive disease compared to western countries. In our study we found the survival of our patients was comparable with our Indian survival data, but less than western patients.

**Keywords:** Breast Cancer, Baseline Characters, Molecular Subtypes.

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## Introduction

In 2018, 2.1 million women globally were diagnosed to have breast cancer and this is the most common cancer among women in India and globally. It is also the leading cause of cancer mortality among females. Genetic predisposition accounts for 5-10% of breast cancer. In India the incidence of breast cancer is in rising trends due to changes in reproductive risk factors, dietary habits and lifestyle changes.<sup>[1]</sup>

A study from north India in women has reported a strong association of risk factors like breast-feeding, location (urban/rural) and increased BMI with breast cancer.<sup>[2]</sup> Increased breastfeeding and physical activity were protective for both ER+ and ER- breast cancer.<sup>[3]</sup> Lifetime duration of breastfeeding was inversely associated with breast cancer risk among premenopausal women.<sup>[4]</sup> Living in rural areas decreases the risk for breast carcinoma as compared to urban counterparts mainly due their adherence to rural lifestyle.<sup>[5]</sup>

According to globacon 2018, the higher incidence of breast

cancer occurs in Australia/ New Zealand (94.2/ 100,000) and lowest in South Central Asia (25.9/100,000). In India age standardized ratio is 24.7/100,000.<sup>[6]</sup>

The peak incidence of breast cancer occurs between 60-64 years in western countries but in Indian women it is between 45-49years.<sup>7</sup> Early stage breast cancer (>60%) is common in the western population with 72.7% Luminal A sub type, 12.2% TNBC , 15-25% HER2 positive and 12% unknown status.<sup>[8,9]</sup>

How lader et al reported best survival pattern among women with HR+/HER2- subtype (survival rate of 92.5% at 4 years), followed by HR+/HER2+ (90.3%), HR-/HER2+ (82.7%), and finally worst survival for triple-negative subtype (77.0%).<sup>[10]</sup>

In India, the locally advanced breast cancer (LABC) constitutes 50 to 70% of the patients presenting for treatment which includes 6-25% having distant metastases with 51.2% Luminal A and Luminal B subtype, 16.7% HER2neu positive disease and 29.8% triple negative.<sup>[11,12]</sup> The 5 year disease free survival (DFS) rate of 70% and overall survival rate of 78% is seen for early breast cancer.<sup>[13]</sup>

**Subjects and Methods**

Cases of early and locally advanced breast cancer which were treated in the Department of Medical Oncology, from January 2014 to December 2016 were included in the study. Six hundred and twelve patients were eligible for analysis. Retrospective review all available medical records to obtain information of patient characteristics, clinical presentation, TNM stage, pathology and receptor details, treatments, recurrence, survival and follow-up was done. Last follow up was till March 2019.

**Statistical methods**

The data was analysed with IBM.SPSS statistics software version 20.0. To describe about the data descriptive statistics, frequency analysis and percentage analysis was used for categorical variables and Kaplan meier survival curve used for comparing groups.

**Results**

Among 736 breast cancer individuals 612 with early and locally advanced breast cancer individuals were analyzed [Figure1]. Three hundred and fifteen (42.8%) had early breast cancer and 297 (40.4%) had locally advanced breast cancer [Figure1].

The peak incidence occurred between 41-50 years of age(ranges between 24-84 years) [Figure2] with 42% in premenopausal and 58% in postmenopausal status.

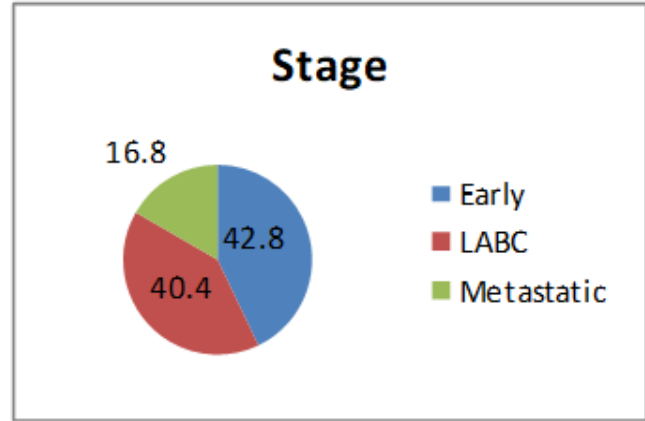


Figure 1: Stage distribution.

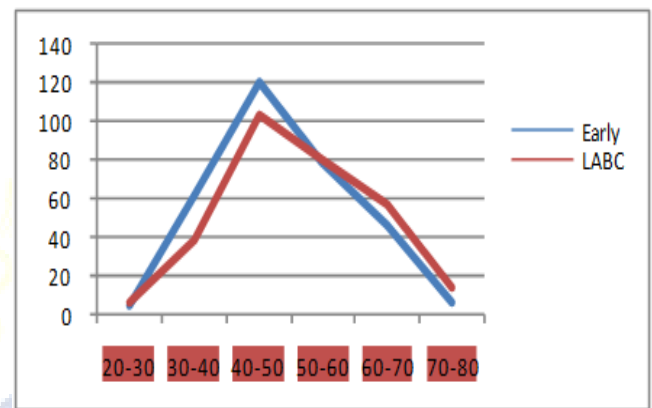


Figure 2: Age distribution.

Table 1: Hormonal receptor status.

S.No	Stage	HR +ve	Triple +ve	HER2 +ve	TNBC	Unknown status
1.	Early	33.3%	9.5%	12.4%	33%	11.4%
2.	LABC	28%	13.5%	15.2%	17.8%	23.9%
3.	Total	30.7%	11.4%	13.7%	25.6%	17.5%

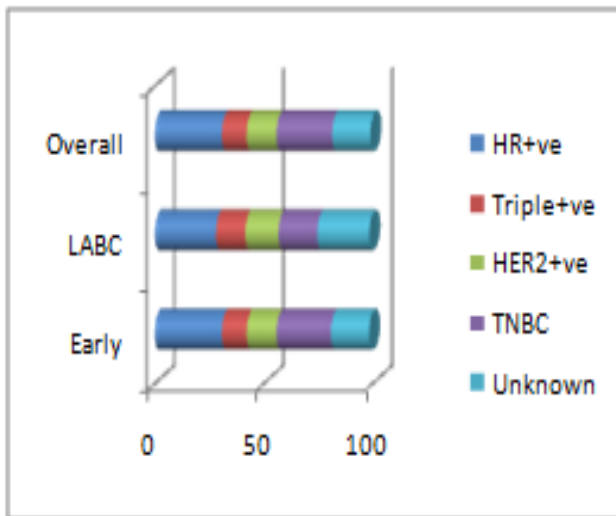


Figure 3: Hormonal receptor status

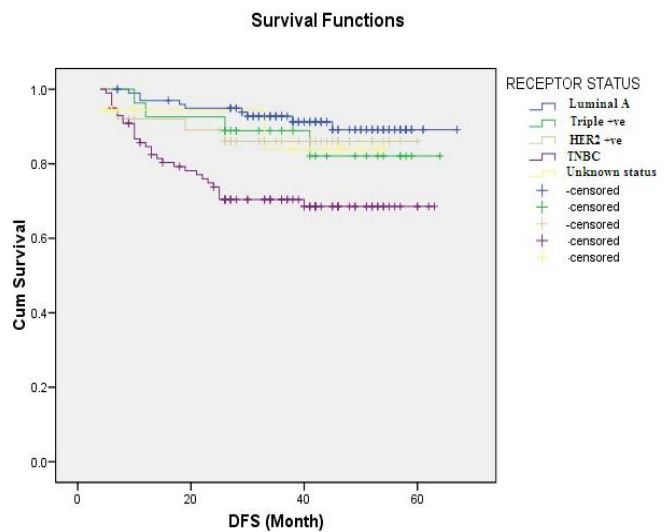


Figure 4. DFS in Early breast cancer

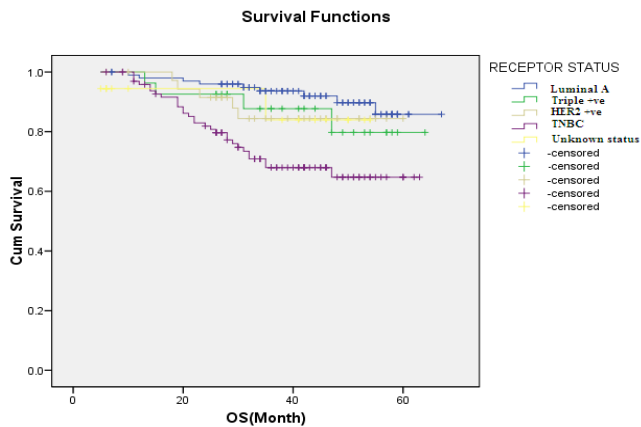


Figure 5: OS in Early breast cancer

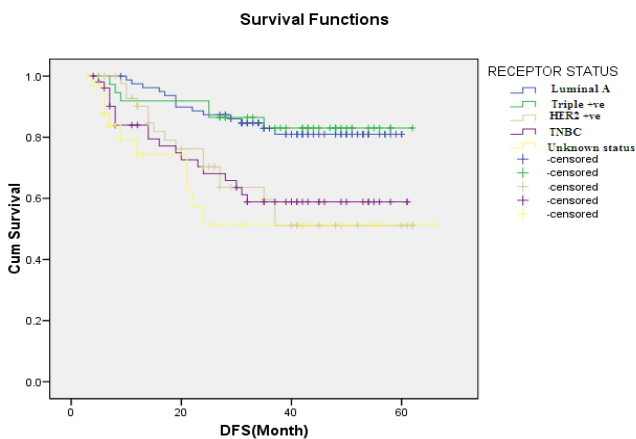


Figure 6: DFS in LABC

All the patients received standard therapy with combination of surgery, chemotherapy and radiotherapy followed by hormonal therapy (eligible patients). Thirteen percentage of women defaulted treatment with highest being in LABC (15.2%) followed by early breast cancer (9.8%).

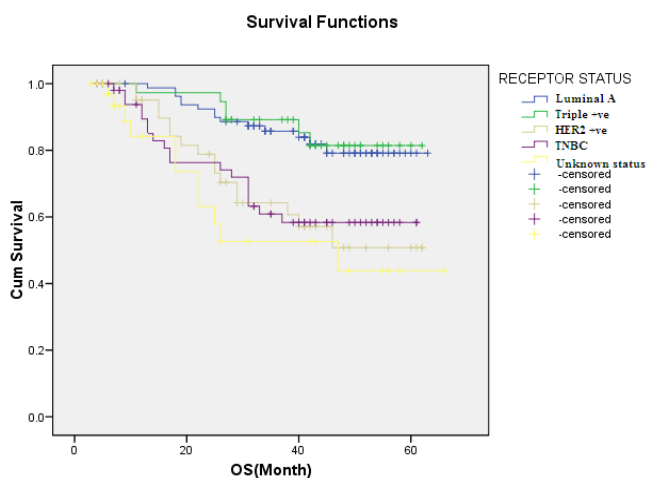


Figure 7: OS in LABC

At the median follow up of 45 months (28-64 months), 48 (15.2%) patients in early breast cancer and 65 (21.9%)

patients in LABC died. The overall mean DFS and OS in early breast cancer was 57 months and 58 months respectively and in locally advanced breast cancer was 51 months and 52.5 months respectively. In early breast cancer luminal A had DFS and OS of 86% and 90% compared to TNBC with 70% and 60% respectively and patients with LABC luminal A had DFS and OS of 82% and 80% compared to TNBC with 60% and 58% respectively as shown in [Figure 4-7].

## Discussion

The aim of this retrospective analysis was to study the baseline characteristics and outcomes of early and locally advanced breast cancer patients who were treated from January 2014 to December 2016 at a tertiary care center in India.

The incidence of breast cancer is increasing rapidly in Asian countries and being the most frequently diagnosed cancer and the leading cause of cancer death in women.<sup>[14]</sup>

According to Globocan 2018, breast cancer is the most common cancer which constitutes 24.2% among all cancers and most common cause of mortality (15%) among females. The breast cancer is the most frequently diagnosed cancer in the vast majority of the countries (154 of 185) and is also the leading cause of cancer death in over 100 countries and in India breast cancer in females constitutes 27.7% among all cancers (overall 14%) with mortality of 12.1%.<sup>[6,15]</sup>

Leong et al reported the incidence of early breast cancer in western countries ranging from 60% to 70% and the remaining being advanced breast cancers.<sup>[16]</sup>

Women with breast cancer in India are detected clinically in contrast to western countries where most breast cancers are detected by screening. Up to two-thirds of patients present with local invasion with one-third being with skin and/or chest wall involvement (T4a-c) and 6–25% present with metastases.<sup>[11]</sup>

In this study 40.4% had early breast cancer, 42.8% had LABC and 16.8% had metastatic disease at presentation. Ten year age distribution peaks between 41-50 years in early and advanced breast cancer (LABC) with 42% were being premenopausal. The median age of patients (49 years) is approximately a decade younger than the West.<sup>[17]</sup> This is likely to be due to the different age distribution of the Indian population, where only 7% of the population is above the age of 60 years.<sup>[18]</sup>

The proportion of tumors with various patterns of receptor expression is reported in the Western literature.<sup>[19,20]</sup> Nadia et al reported US incidence of breast cancer subtypes as Luminal A 72.7%, Luminal B 10.3%, and TNBC 12.2%, HER2 positive 15-25% and 12% unknown status. (8) Saber Fallahpour et al reported as luminal A subtype was the most commonly diagnosed, accounting for 59.0% of all cases, with a rate of 103.3 per 100 000, followed by triple-negative (15.1 per 100 000), luminal B (13.5 per 100 000) and HER2-enriched (7.0 per 100 000) with survival differed significantly between each molecular subtype, with patients with the luminal A subtype experiencing the longest

survival, followed by those with the luminal B and HER2-enriched subtypes. The poorest survival was observed among patients with the triple-negative subtype.<sup>[21]</sup>

Mustapha Abubakar reported, 34% were luminal A-like, 33% were luminal B-like, 13% were HER2-enriched, and 20% were triple-negative, respectively with overall, all-cause mortality and recurrence differed significantly by tumor subtype. In general, women with luminal A-like tumors had better survival outcomes than those with the other subtypes.<sup>[22]</sup>

A tertiary care centre in south India has recently reported a high percentage of triple negativity (25%) in their breast cancer patients (compared to the West) and a similar percentage of patients (27%) with HER2 positivity.<sup>[23]</sup>

Prevalence of TNBC in India is considerably higher compared with that seen in Western populations as suggested by various meta-analysis studies. Trial from India showed 51.2% HR positive tumours, HER2 positive tumours in 16.7% and TNBC in 29.8%.<sup>[12]</sup>

In this study, 30.7% patients had luminal subtype, 11.4% had triple positive, 13.7% had HER2 positive, 25.6% had triple negative and 17.5% had unknown status. The overall receptor expression pattern of patients in this study suggests a lower fraction of endocrine receptor-positive, higher fraction of triple negative and similar fraction of HER2-positive disease compared to the Western data.

As reported by TMH India, this study also found a lower proportion of Indian breast cancer patients have hormone receptor positive and a higher fraction have triple negative phenotype compared to Western populations. These differences could, at least partly, be explained by the lower average age of our patients.

In this study significant proportion of patients (31%) had co-morbid illness and were able to tolerate planned treatment similar to a patient without co-morbid illness. Thirteen percentages of women defaulted treatment with highest being in LABC (15.2%) followed by early breast cancer (9.8%). This reflects the lower socioeconomic status being the reason for treatment discontinuation.

Retrospective analysis of Southwest Oncology Studies reported 10 year DFS was 71% for African American patients and 78% for white patients; for OS, the 10-year estimates were 86% and 76%, respectively.<sup>[24]</sup>

In this study with a median follow up of 45 months (28-64 months), 48 (15.2%) patients in early breast cancer and 65 (21.9%) patients in LABC died. The overall mean DFS and OS in early breast cancer was 57 months and 58 months respectively and locally advanced breast cancer was 51 months and 52.5 months respectively. In early breast cancer with luminal A had 3 year DFS and OS of 86% and 90% compared to TNBC with 70% and 60% respectively and patients with LABC with luminal A had 3 year DFS and OS of 82% and 80% compared to TNBC with 60% and 58% respectively which is comparable to Indian survival data.

The SEER data from National Cancer Institute showed 5 year survival as close to 100%, 93%, 72% and 22% in stage 0 or I, II, III and stage IV respectively. A trial from Tata Memorial Hospital (TMH) in patients with early breast

cancer treated with multimodal treatment revealed 5 year disease free survival (DFS) rate of 70% and overall survival rate of 78%.<sup>[17]</sup>

Reina Haque et al reported, Women with luminal A tumors had the longest survival, although women with HER2-enriched and luminal B tumors had much shorter survival times. Women with basal-like tumors had intermediate survival times, with deaths occurring earlier than women with luminal A tumors. Survival declined precipitously during the first 3 to 4 years of follow-up for both HER2 subtypes (HER2-enriched and luminal B), followed by a slowing in the decline over subsequent years of follow-up. The basal-like subtype showed a similar early decline over the first 2 to 2.5 years with a more gradual decline to about 13 years of followup. Interestingly, the curve for luminal A continues to decline steadily after 10 years of follow-up suggesting that the risk of late mortality persists in this group.<sup>[25]</sup>

## Conclusion

Breast cancer is the most common cancer and the leading cause of cancer mortality among females. In this study, most of the patients presented a decade earlier and more advanced staged disease with higher percentage of TNBC and HER2 positive disease compared to western countries. Higher rate of defaulters for treatment especially in advanced stage could due poor socioeconomic support. The survival of patients was comparable with other Indian literature, but less than that of western data.

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