Original Research Article

Epidemiology and receptor status distribution in a cohort of carcinoma breast patients presenting in our institution

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International Archives of Integrated Medicine, Vol. 3, Issue 12, December, 2016.

Available online at http://iaimjournal.com/
ISSN: 2394-0026 (P) **ISSN: 2394-0034 (O)**
Received on: 24-11-2016 **Accepted on:** 30-11-2016
Source of support: Nil **Conflict of interest:** None declared.
How to cite this article: K. Muthu Raj MS, S. Mathan Sankar. Epidemiology and receptor status distribution in a cohort of carcinoma breast patients presenting in our institution. IAIM, 2016; 3(12): 75-83.

Abstract

Background: Carcinoma Breast is the most common cancer among females after cervical cancer. An estimated 1 million cases of breast carcinoma have been diagnosed worldwide and it is the leading cause of cancer death among women of age 20-59 years.

Aim: The aim of the study is to understand the epidemiological factors and prevalence of different receptor status in cases of Ca breast from the South Indian Population to Govt. Stanley Medical College.

Materials and methods: The materials for our retrospective study were collected from the medical records department of Govt. Stanley Medical College (GSMC). All cases of Ca breasts who attended GSMC for admission, treatment, investigations of breast cancer from July 2015 to August 2016 were included in the study. All patients were triple assessed and ER, PR, Her2Neu status were assessed by IHC staining. The study population was grouped based on parameters such as age groups, parity, family history of breast cancer, menopausal status, TNM staging, grade and histological type.

Results: In our Study most common age group affected by Ca breast is 41-60 years (57%). 39% of Ca breast cases are premenopausal women. Most common Grade was grade II (41.8%). Most common Histological type was Intra ductal carcinoma about 94.5%. Stage III is common (50.3%). Metastasis was more common in age group > 60years (23%). On comparing stage and grade of tumor 62.8% cases of Stage III were Grade II. Triple Negative cancer is the most common receptor status (25.5%). 57% of triple positive and 57.5% of triple negative cases were in the premenopausal age group. Stage II is the most common presentation in triple positive disease (76.9%). Stage IV is more common in Triple negative patients.

Conclusion: In conclusion, our study shows there is an increasing trend of Ca breast in South Indian population among younger and middle age group with Triple Negative Receptors is being most common associated with poor prognostic factors. Hormone receptor status and grading evaluation is needed for targeted therapy. Therefore treatment strategies to be better tailored to effectively treat the carcinoma breast patients.

Key words

Receptor status, Grading, Premenopausal, Intra ductal Carcinoma, Metastasis.

Introduction

Carcinoma Breast is the most common cancer among females after cervical cancer [1, 2]. An estimated 1 million cases of breast carcinoma have been diagnosed worldwide and it is the leading cause of cancer death among women of age 20-59 years [3]. It accounts for 26% of all newly diagnosed cancer among women and 15% of cancer deaths. It is postulated that 1 in 22 women in India are likely to suffer from Ca breast. The rise is mainly being documented in the metros but it is safe to assume that many cases in rural India go undetected until a late stage. Hence this study was undertaken to better understand the epidemiological factors and prevalence of different receptor status in cases of Ca breast which present from the local population to our Institute.

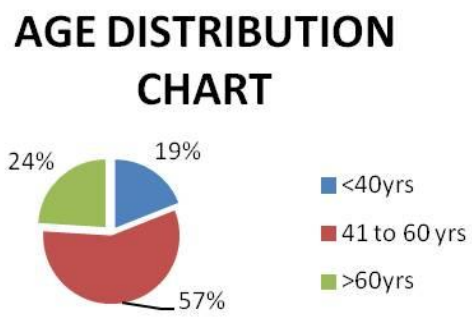
Materials and methods

The materials for our retrospective study were collected from the medical records department of our institute. All cases of Ca breasts who attended our institute for admission, treatment, investigations of breast cancer from July 2015 to August 2016 were included in the study. All patients were triple assessed and ER, PR, Her2Neu status were assessed by IHC staining. TNM staging was assessed based on clinical and radiological studies. The study population was grouped based on parameters such as age groups, parity, family history of breast cancer, menopausal status, TNM staging, grade and histological type.

Results and Discussion

Totally 184 cases of trucut biopsy proven Ca breast has been taken for study from the above mentioned study period. Most common age group affected by Ca breast is 41-60 years is 57% (**Chart - 1**). Mean age is 48 years.

Chart - 1: Age distribution in Ca breast.



Parity more than 3 was 66% where less than 3 were 34%, with Right laterality more common (57%) (**Chart – 2, Chart - 5**) side of breast involved has no clinical significance. In the present study also right breast were marginally more affected than left. Family history breast was seen in 4% (**Chart - 3**).

Chart - 2: Parity status in Ca breast.

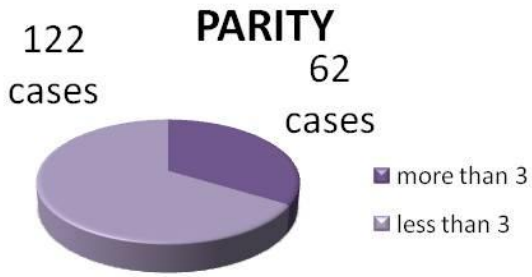


Chart - 3: Number of Ca breast patients with family history.

39% of Ca breast cases seen in the premenopausal women. This shows that Ca breast is having increasing incidence among premenopausal age group (**Chart - 4**). Most common Grade was grade II (41.8%) followed by grade I (29.4%) then Grade III (28.8%) (**Table - 1, Chart - 6**). Most common Histological type was Intra ductal carcinoma about 94.5% (**Table - 2**).

Chart - 4: Relation of Ca breast patients to menstrual status.

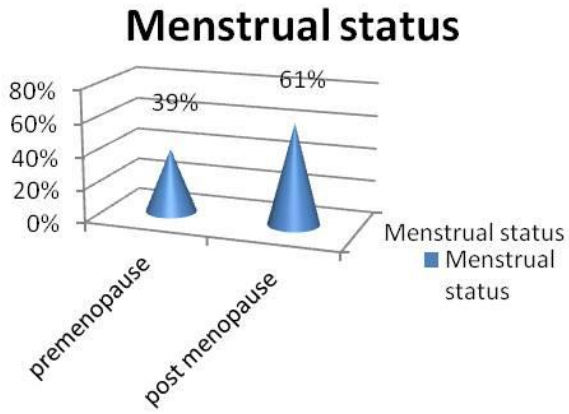


Chart - 5: Laterality in Ca breast.

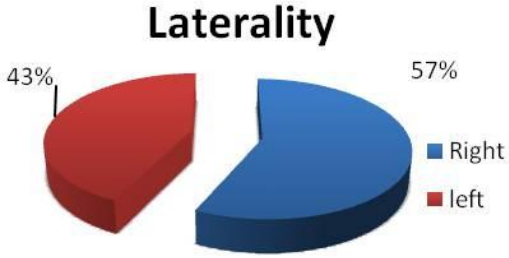


Chart - 6: Grades of tumor of the cases.

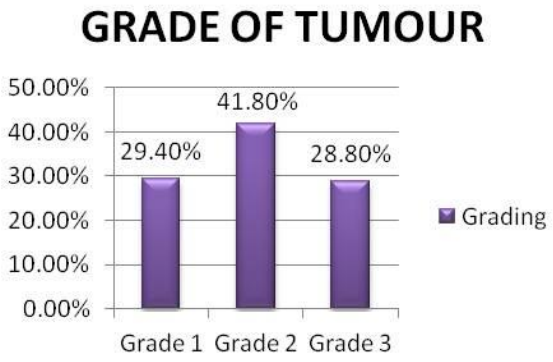


Table – 1: Grades of tumor of the cases.

Grade	Number of patients
Grade I	54
Grade II	77
Grade III	53

Table – 2: Type of histological types of Ca breast in the study group.

Histological type	Number of patients
DCIS	4
IDC	174
Papillary Carcinoma	3
Mucinous Carcinoma	1
Medullary Carcinoma	1
Lobular Carcinoma	1

Staging of breast carcinomas showed higher in stage III accounting to 50.3% followed by stage II (34%) and stage 4 (15.7%) in concordance with other Indian studies [14, 15]. In western countries stage 1 (56.4%) are the majority followed by stage 2 and 3 possibly due to increased awareness and rampant breast cancer screening programs [11, 16]. Stage IIIa was more common in our study group 33.75%, followed by Stage IIb (19.5%), stage IIIb (16.5%), Stage IV (15.5%), Stage IIa (14.5%) (**Table - 3, Chart - 7**).

On comparing age vs stage of tumor, age group <40 years Stage II was more common (51%). In age group 41 to 60 years Stage III was more common 62.8%. In age group more than 60 years

Stage II was more common 43.2%. Metastasis was more common in patients aged group more than 60 years (23%) (**Table - 4**). On comparing age vs grade of tumor, Grade II is common in all age groups (**Table - 5**, **Chart - 8**). On comparing stage and grade of tumor 62.8% cases of Stage III were Grade II, 53.5 % cases of stage IV were Grade III (**Table - 6**, **Chart - 9**).

Table – 3: TNM staging of Ca breast in the study cohort.

Stage	Number of patients
Stage IIa	27
Stage IIb	36
Stage IIIa	62
Stage IIIb	31
Stage IV	28

Chart – 7: TNM staging of Ca breast in the study cohort.

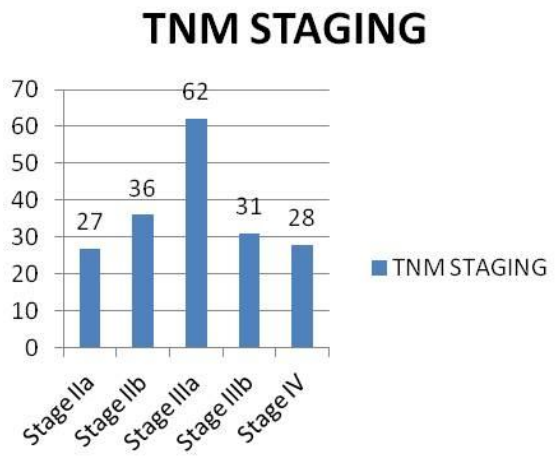


Table – 4: Relation of age of patient to stage of tumor.

Age	Stage II	Stage III	Stage IV
<40	18	12	5
41-60	26	66	13
>60	19	15	10

Table – 5: Relation of age of patient to grade of tumor.

Age	Grade 1	Grade II	Grade III
<40	9	15	11
41-60	33	42	30
>60	12	20	12

Chart - 8: Relation of age of patient to grade of tumor.

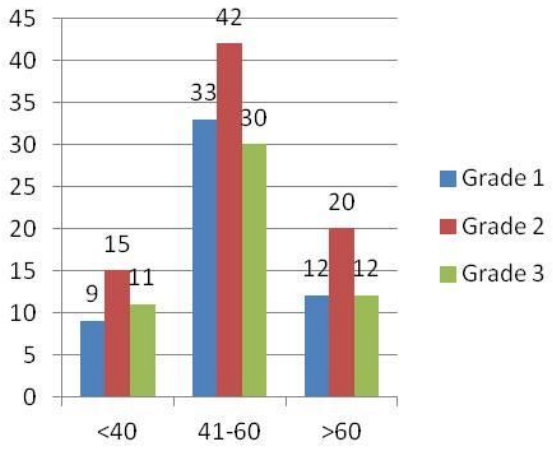
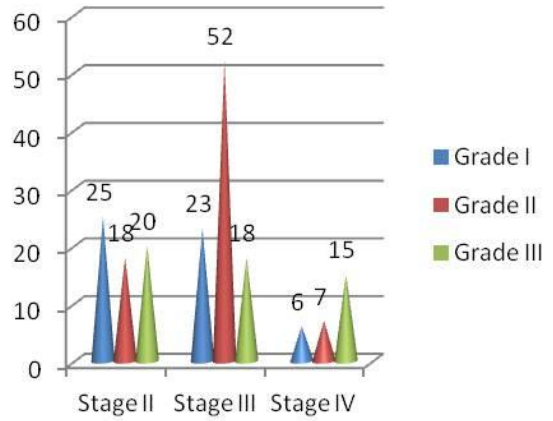


Table – 6: Relation of stage of tumor to grade of tumor.

Stage	Grade I	Grade II	Grade III
Stage II	25	18	20
Stage III	23	52	18
Stage IV	6	7	15

Chart – 9: Relation of stage of tumor to grade of tumor.



Receptor status distribution ER-ve, PR-ve, Her2NEu-ve is the most common receptor status in our institution 25.5% followed by ER-ve, Pr-ve, Her2Neu+ve with 20.5% of patients showing this combination. ER+ve, PR+ve, Her2Neu-ve was expressed by 20% of patients. ER+ve, PR-ve, Her2Neu-ve was shown by 14.5%. ER+ve, PR+ve, Her2Neu2+ve was shown by 14%.

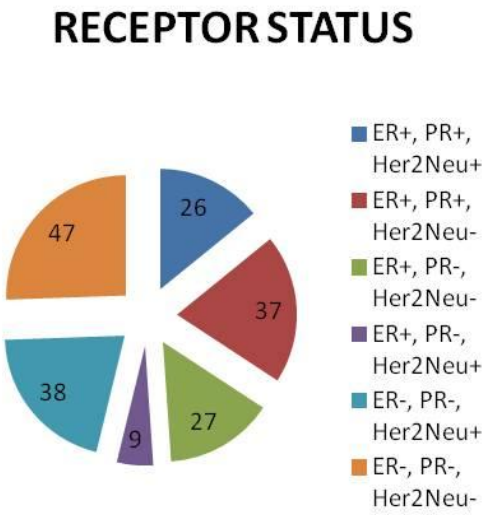
ER+ve, PR-ve, Her2Neu+ve shown by 0.5% (**Table - 7**, **Chart - 10**).

On comparing age vs receptor status 37% of triple negative receptor status was in the age group <40 years, 45% of ER-ve, PR-ve, Her2Neu+ve was in the age group of >60 years, 20% ER+ve, PR+ve, Her2Neu-ve was in 41-60 years (**Table - 8**).

Table – 7: Relation of receptor status distribution of study group.

Receptor Status	Number of patients
ER+, PR+, Her2Neu+	26
ER+, PR+, Her2Neu-	37
ER+, PR-, Her2Neu-	27
ER+, PR-, Her2Neu+	9
ER-, PR-, Her2Neu+	38
ER-, PR-, Her2Neu-	47

Chart – 10: Relation of receptor status distribution of study group.



Literature reveals ER positivity increases with age, that is elderly aged patients express more estrogen receptors [5, 7, 8, 11]. PR positivity does not show any correlation with age [6, 7]. Whereas younger patients have breast carcinomas with triple negative phenotype compared to the elderly [5, 17]. Our study showed similar results.

On comparing receptor status vs menstrual status 57% of triple positive and 57.5% of triple negative cases are in the premenopausal age group. All other receptor status are more common in the postmenopausal age group (**Table - 9**).

On comparing grade vs receptor status 59.5% of triple negative disease showed grade III differentiation. 50% of triple positive ca breast cases showed grade II histology and 48% of ER+ve, PR+ve, Her2Neu-ve showed grade I disease. 45% of ER-ve, PR-ve, Her2Neu+ve showed grade 2 (**Table - 10**).

On comparing receptor status vs histologic subtype among all receptor status, IDC is more common (**Table - 11**). On comparing receptor status vs stage of tumor, Stage II is the most common presentation in triple positive disease (76.9%) and triple negative (47%), stage III is more common in ER+ve, PR+ve, Her2Neu-ve (81%), ER+ve, PR-ve, Her2Neu-ve (66%), ER-ve, PR-ve, Her2Neu+ve (57%), metastasis is more common in triple negative disease (39%) (**Table - 12**).

Comparisons

The traditional prognostic factors for Ca breast include age, tumor grade, histological type, stage and hormone receptor status for estrogen, progesterone receptors and Her2Neu over expression. In the present study, 57% of women were in the age group of 41-60 years, in contrast a study by Pakseresht, et al. [9] had lower age range from 31-40 years (34.5%), whereas Ambroise, et al. [6] (46.4%) Suvarchala, et al. [8] (45.31%), and Rhodes, et al. [10] (36.42%) had higher age range between 51-60 years.

In the present study, majority of breast tumors were grade 2 (41.4%) followed by grade 1 (29.1%) and grade 3 (28.5%) which is in concordance with other studies except for one study by Ghosh, et al. having more of grade 3 (28.5%) [5-8, 11] as per **Table - 13**.

Table – 8: Age relation to receptor status.

Age (Years)	ER+, PR+, Her2Neu+	ER+, PR+, Her2Neu-	ER+, PR-, Her2Neu-	ER+, PR-, Her2Neu+	ER-, PR-, Her2Neu+	ER-, PR-, Her2Neu-
<40	6	9	3	2	3	13
41-60	16	22	19	5	15	27
>60	4	6	5	2	20	7

Table – 9: Relation between menstrual status to receptor status.

Menstrual status	ER+, PR+, Her2Neu+	ER+, PR+, Her2Neu-	ER+, PR-, Her2Neu-	ER+, PR-, Her2Neu+	ER-, PR-, Her2Neu+	ER-, PR-, Her2Neu-
Premenopause	15	17	8	2	4	27
Menopause	11	20	19	7	34	20

Table – 10: Relation between grade and receptor status.

Grade	ER+, PR+, Her2Neu+	ER+, PR+, Her2Neu-	ER+, PR-, Her2Neu-	ER+, PR-, Her2Neu+	ER-, PR-, Her2Neu+	ER-, PR-, Her2Neu-
Grade I	7	18	11	1	14	3
Grade II	13	15	10	6	17	16
Grade III	6	4	6	2	7	28

Table – 11: Relation between histological subtype and receptor status.

Histologic type	ER+, PR+, Her2Neu+	ER+, PR+, Her2Neu-	ER+, PR-, Her2Neu-	ER+, PR-, Her2Neu+	ER-, PR-, Her2Neu+	ER-, PR-, Her2Neu-
DCIS	0	2	0	0	0	2
IDC	25	34	25	9	37	44
Papillary Ca	1	0	2	0	0	0
Mucinous Ca	0	0	0	0	1	0
Medullary Ca	0	0	0	0	0	1
Lobular Ca	0	1	0	0	0	0

Table – 12: Relation between TNM stage and receptor status.

Stage	ER+, PR+, Her2Neu+	ER+, PR+, Her2Neu-	ER+, PR-, Her2Neu-	ER+, PR-, Her2Neu+	ER-, PR-, Her2Neu+	ER-, PR-, Her2Neu-
Stage II	20	5	4	3	9	22
Stage III	4	30	18	5	22	14
Stage IV	2	2	5	1	7	11

Immunohistochemistry revealed 32% ER+/PR+, 14% triple positive 25.5% of triple negatives. These results were in concordance with other Indian studies [4-6, 8]. However western literature showed higher positive receptor status

and lower triple negatives [7, 10, 11, 13] as per **Table – 14**.

Very few studies have compared hormone receptor expression and stage of the breast carcinoma and revealed that patients with ER, PR positive present with early stage breast carcinoma [11, 16]. Her2/neu receptor showed no correlation with the staging [19]. However in the present study shows Stage IV is more common in Triple negative patients as per **Table - 15**.

Table - 13: Comparative Incidence of Frequency of Grade of the tumor.

Grade of The Tumor	Azizun-Nisa, et al., 2008 [7]	Adedayo, et al 2009 [11]	Suvarchala, et al., 2011 [8]	Ambroise, et al., 2011 [6]	Ghosh, et al. 2011 [5]	Present study
1	6.7	21.2	28.12	9.4	0.3	29.1
2	55.3	38.4	42.18	57.3	15.9	41.4
3	38.0	35.9	29.69	33.3	75.4	28.5

Table - 14: Comparative Incidence of Frequency of Hormone Receptor status.

Hormone receptor status	Adedayo, et al. 2009 [11]	Sharif, et al. 2010 [13]	Suvarchala, et al. 2011 [8]	Ambroise, et al. 2011 [6]	Ghosh, et al. 2011 [5]	Present study
ER+/PR+	68.9	62.8	32.8	47	51.2	34
ER+/PR-	-	11.8	14.0	1	0	14.5%
Triple positive	10.2	-	-	-	0	14%
Triple negative	13.4	-	42.19 (ER-/PR-)	25	29.8	25.5

Table - 15: Comparison of Hormone receptor status with Staging of Breast carcinoma.

Study	Stage	Hormone Receptor Status
Adedayo, et al. 2009 [11]	Stage 1	ER+/PR+
Vaidyanathan, et al. 2010 [18]	No correlation	ER/PR/Her2Neu
Rai, et al. 2010 [16]	Stage 1	ER+
Present study 2016	Stage 4	Triple negative

Conclusion

In conclusion our study shows there is an increasing trend of Ca breast in South Indian population among younger and middle age group with Triple Negative Receptors is being the most common type associated with poor prognostic factors like high grading, locally advanced staging and metastasis. Grading correlates with the survival rate and hormonal status for specific hormonal therapy response. Hormone receptor status and Grading evaluation is needed for targeted therapy. Therefore treatment strategies can be better tailored to effectively treat the carcinoma breast patients.

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