

# Retrospective Comparative Analytical Study Of Biological Behaviour Of Breast Cancer Based On Hormonal Status In Premenopausal And Post Menopausal Women

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## Abstract

Breast tissue is cyclically dependent on hormones. Hormone receptor status is important in deciding the choice of treatment for all subgroups of breast cancer and influences the quality of life. The purpose of this study is to compare the biological behaviour of breast cancers based on hormonal receptor status in premenopausal and postmenopausal women as they have significant differences in tumour size, tumour grade, axillary lymph node metastasis, hormone receptor status, human epidermal receptor-2 expression, and treatment modalities. There is also importance of psychological status assessment secondary to cancer diagnosis and treatment, hence careful examination of symptoms and psychosocial needs is mandatory in oncology and palliative care settings. A Retrospective cohort study was carried out in Department of Radiotherapy, Government General Hospital, Guntur for a period of 6 months i.e., 2021 to 2022 after obtaining approval from Institutional Ethics Committee. The hormonal receptor status [ER/PR/HER-2] in breast cancer was assessed based on pathology reports and are categorized into 5 groups i.e., 1) ER/PR/HER2- positive 2) ER/PR/HER2 negative 3) ER/PR-positive /HER2- negative 4) ER/PR-negative/HER2-positive 5) Others. Validated questionnaire (EORTC QLQ-BR23, HADS, SF-36) was used to assess the quality of life in breast cancer patients. 146 patients who met the inclusion criteria were included in the study. The data obtained was tabulated and analysed the quality of life of the patient using t-test ( $P=0.027$ ) and found that there is improvement in both functional status and psychosocial status; the difference is found to be statistically significant which indicates that there is improvement in quality of life of the patient before and after providing the therapy. Based on the results obtained in our study. We strongly conclude that irrespective of the menopausal state and stage at the time of diagnosis, majority of the patients were diagnosed with receptor status ER-PR: +VE, HER2: -VE ( $n=31$ , 21.23%).

## INTRODUCTION

Breast cancer is a disorder in which the cells in the breast get uncontrollably large. The type of breast cancer is determined by which cells in the breast become cancerous and metastasized when it spreads to other regions of the body. It is the most common malignancy among Indian women, with a prevalence of 25.8 per 100,000 women and a fatality rate of 12.7 per 100,000 women. The etiological factors include early menarche, nulliparity, genetic factors (BRACA 1 & 2), Obesity, Hormone replacement therapy, cosmetic implants. The main signs and symptoms include colour & shape change, Dimpling skin, nipple retraction, Painless lump, nipple discharge from the breast. Mammogram, MRI, CT, Breast ultrasound, Positron emission mammography, optical imaging tests, electrical impedance tomography can be used to diagnose breast cancer and can be treated with the help of chemotherapy, radiotherapy, surgery, targeted therapy. Estrogen and progesterone receptors are nuclear hormone receptors that enhance DNA replication and cell division when the relevant hormones bind to them. They are found in some breast tumours. As a result, medicines that inhibit these receptors could be effective in treating malignancies that have them. An oestrogen receptor-positive (ER+) tumour is found in about two-thirds of postmenopausal cancer patients. Premenopausal patients have a reduced rate of ER+ malignancies. Patients with an estrogen-receptor positive tumour, for example, may develop metastatic breast cancer within three years if tumour indicators are

negative, or more than ten years after initial diagnosis and therapy if tumour markers are positive. Human epidermal growth factor receptor 2 (HER2; also known as HER2/neu or ErbB2) is another cellular receptor whose presence is linked to a worse prognosis at any stage of cancer. HER2 receptors are overexpressed in around 20% of breast cancer patients. Blocking these receptors with drugs is typical treatment for these patients.

## MATERIALS AND METHODS

STUDY PLACE: Department of Radiotherapy, Government General Hospital, Guntur.

PERIOD OF STUDY: 6 months

STUDY DESIGN: Retrospective cohort study.

SAMPLE SIZE: 221 Patients who are seeking treatment in the department of radiotherapy and are suffering with early, locally advanced, metastatic and recurrent breast cancer.

### INCLUSION CRITERIA:

Patients who are diagnosed with breast cancer (Primary, metastatic, recurrence) with their ER/PR/HER2 positive or negative reports.

### EXCLUSION CRITERIA:

Male patients, secondary breast cancer diagnosis, deceased patients and patients with no histopathological reports are excluded.

## STUDY PROCEDURE

The study was conducted after obtaining approval from Institutional Ethics Committee and Informed Consent from patients. Patients who satisfy inclusion criteria were included in the study. Collected data was tabulated and interpreted using Graph pad Prism 9.3.1.

### DATA TOOLS USED:

Patient consent form, data collection form, Patient QOL assessment questionnaire (EORTC, SF-36) and Psychosocial assessment questionnaire (Hospital Anxiety and Depression Scale).

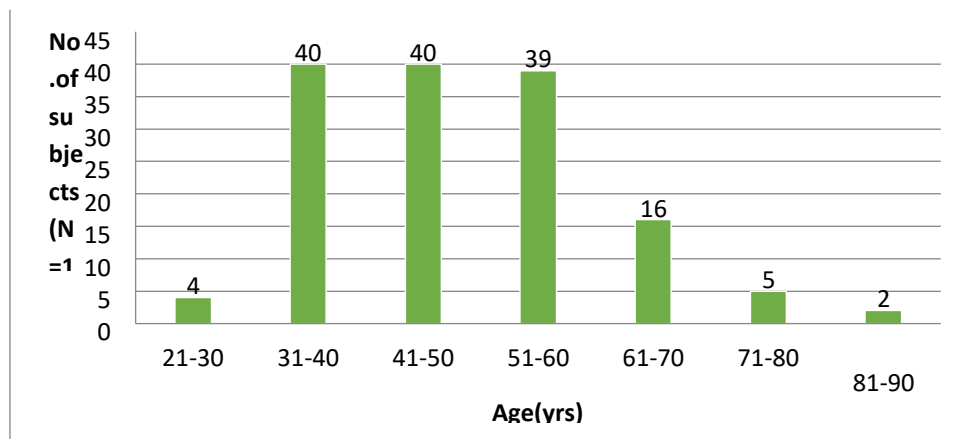
## STATISTICAL ANALYSIS

The data obtained was entered in an advanced Microsoft excel sheet and evaluated. For statistical analysis, Graph pad Prism 9.3.1 was used and t-test was done with 95% confidence interval at alpha value 0.05 and the p-values < 0.05 are considered to be significant.

## RESULTS AND DISCUSSION

### **TABLE 1: AGE VS NO. OF SUBJECTS**

Figure 1 depicts the information regarding distribution of patients within age groups of 18 to >80 years. Majority of patients were found within 31-40 years (27.39%), 41-50 (27.39%) followed by 51-60 (26.71%), 61-70 (10.95%), 71-80 (3.42%), 21-30 (2.73%), 81-90 (1.36%)



**Figure1: AGE Vs NO.OF SUBJECTS**

**TABLE 2: MENOPAUSAL STATUS Vs NO.OF SUBJECTS**

Figure 2 depicts the information regarding distribution of patients within the premenopausal(40%) and postmenopausal group(60%).

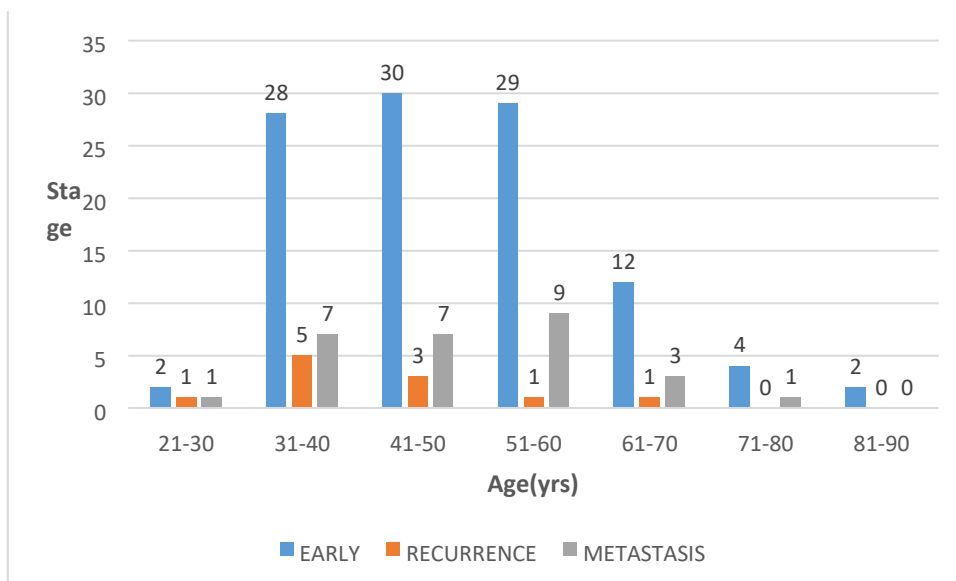


**Figure 6 : MENOPAUSAL STATUS Vs NO.OF SUBJECTS**

**TABLE 3: AGE Vs STAGE**

Figure 3 depicts the information regarding the staging of breast cancer in different age groups of 21 to 90 years. Majority of patients were found within 31-40 years(E-19.17%,R-3.42%,M4.79%),41-50 years(E-20.54%,R-2.05%,M-4.79%) followed by 51-60 years (E-19.86%,R-0.68%,M-6.16%),61-70 years (E-8.21%,R-0.68%,M-2.05%),71-80 years (E-2.73%,R-0%,M0.68%),21-30 years(E-1.36%,R-0.68%,M-0.68%),81-90 years (E-

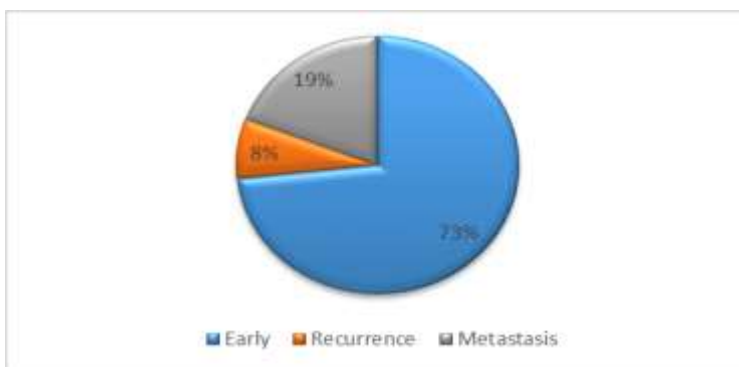
1.36%,R-0%,M0%)



**Figure 3: AGE Vs STAGE**

**TABLE 4: STAGE Vs NO.OF SUBJECTS**

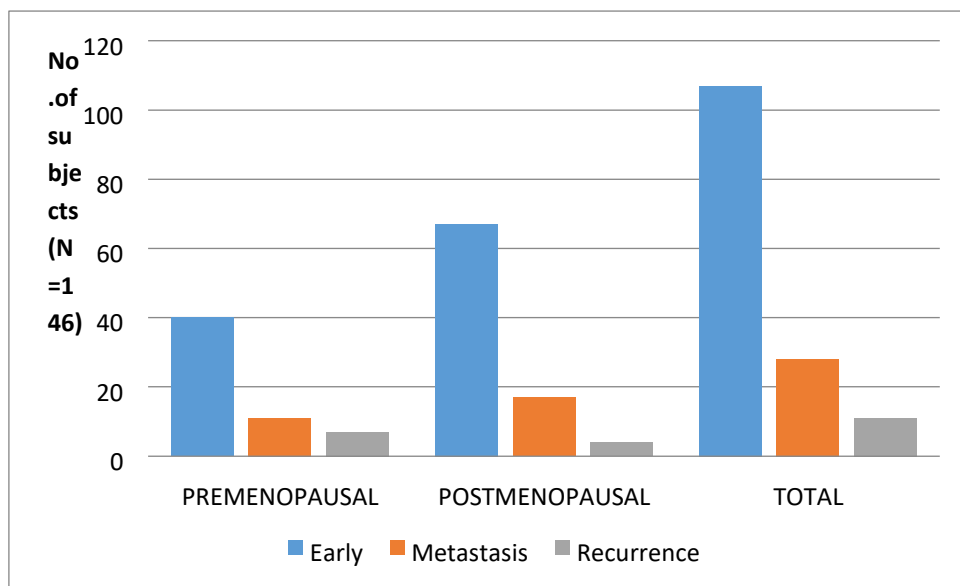
Figure 4 depicts the information regarding the staging of breast cancer and total number of subjects. Majority of the patients were found to be Early (n=107; 73%), followed by Metastasis(n=28; 19%) and Recurrence(n=11; 8%).



**Figure 4 :- STAGE V/S NO.OF SUBJECTS**

**TABLE 5: STAGE Vs MENOPAUSAL STATUS**

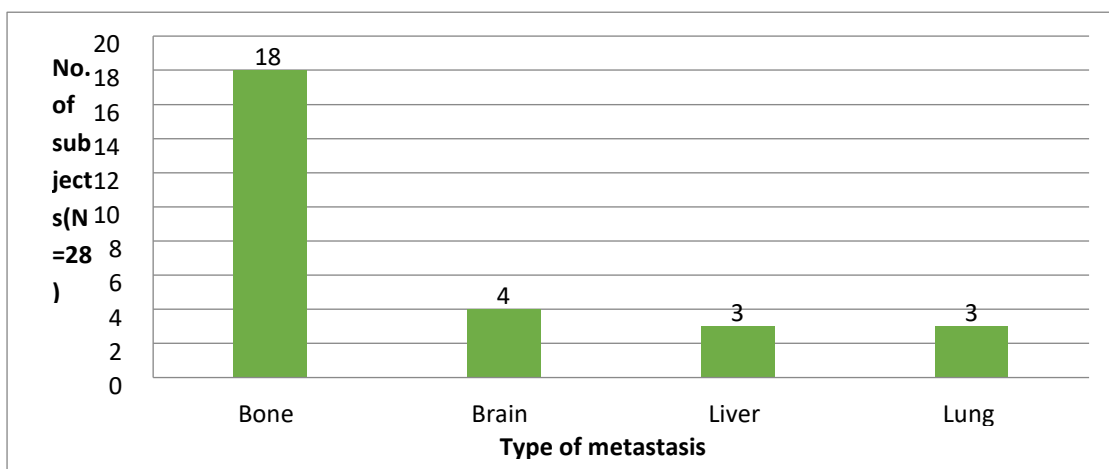
Figure 5 depicts the information regarding the categorising of subjects into stages in premenopausal and postmenopausal women. In premenopausal women: Early(40), Metastasis(11), Recurrence(7) and in postmenopausal women: Early(67), Metastasis(17), Recurrence(4)



**Figure5 : STAGE Vs MENOPAUSAL STATUS**

**TABLE 6: METASTATIC SITE Vs NO.OF SUBJECTS**

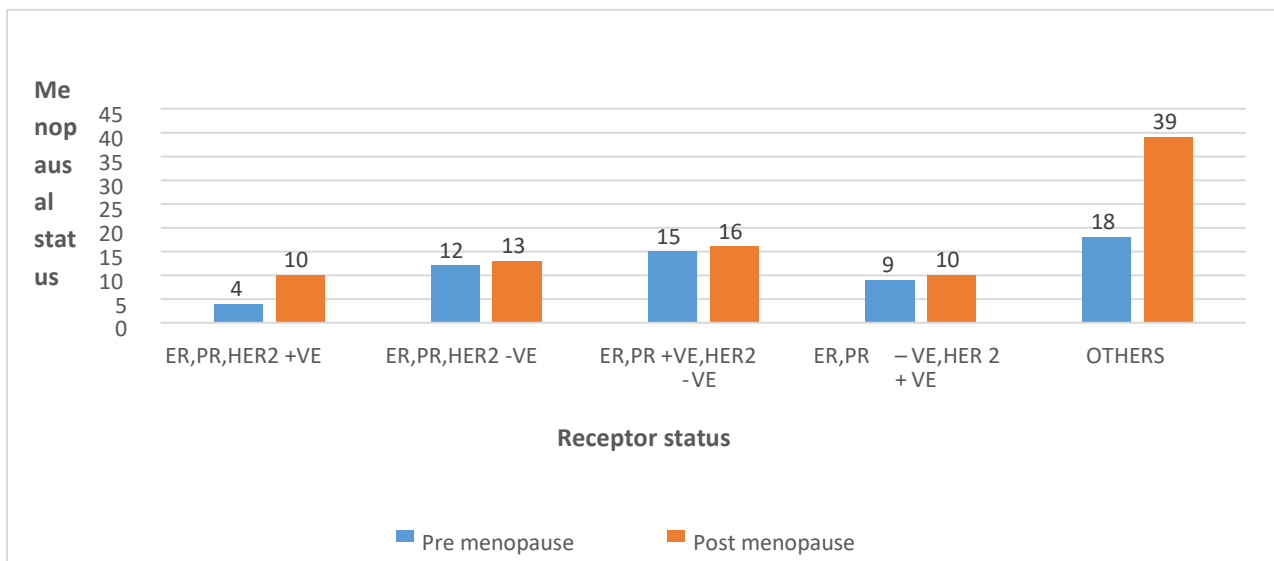
Figure 6 depicts the information regarding the metastatic site which indicates that the most effected sites are bone(n=18;64.28%), followed by brain(n=4;14.28%), liver(n=3;10.71%) and lung(n=3;10.71%)



**Figure 6 : METASTATIC SITE Vs NO.OF SUBJECTS**

**TABLE 7: MENOPAUSE Vs RECEPTOR STATUS**

Figure 7 gives information regarding hormonal receptor status i.e in premenopausal ER,PR,HER2 +VE (2.73%), ER,PR,HER2 -VE (8.21%), ER,PR+VE,HER2 -VE (10.3%) and ER,PR-VE,HER2 +VE (6.2%) and others (12.32%). In postmenopausal; ER,PR,HER2 +VE (6.84%), ER,PR,HER2 -VE (8.90%), ER,PR+VE,HER2 -VE (10.96%), ER,PR-VE, HER2 +VE (6.84%) and others (26.71%).

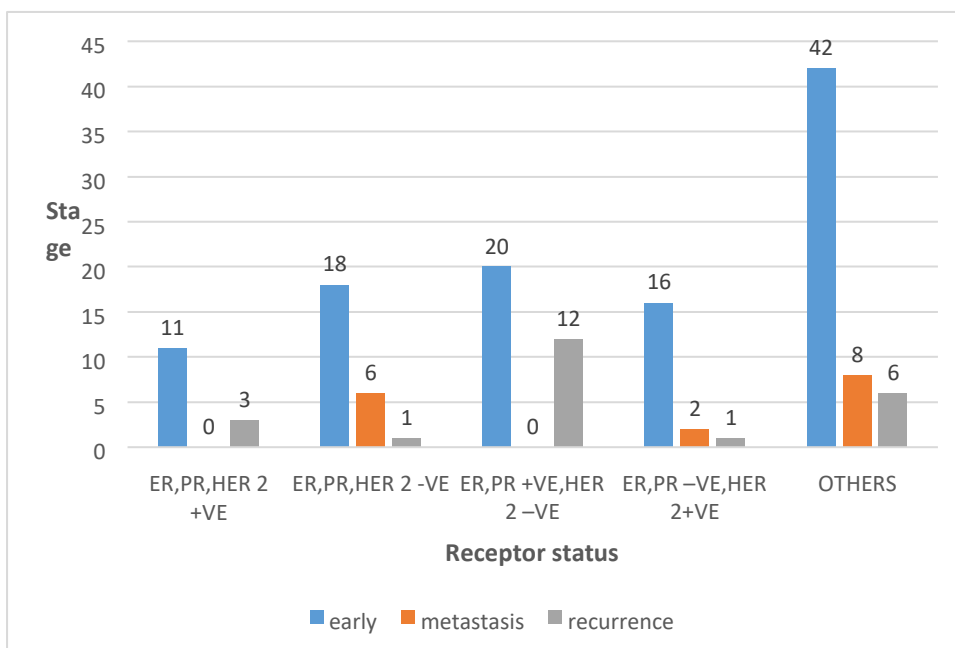


A p value (0.0087\*) was considered to highly significant

**Figure 7: MENOPAUSE Vs RECEPTOR STATUS**

**TABLE 8: STAGE Vs RECEPTOR**

Figure 8 gives information regarding hormonal receptor status in different stages of breast cancer. ER,PR,HER2 +VE (E-7.53%,M-0,R-2.05%), ER,PR,HER2 -VE (E-12.32%,M-4.10%,R-0.68%), ER,PR+VE,HER2 -VE (E-13.7%,M-0,R-8.21%) and ER,PR-VE,HER2 +VE (E-10.95%,M-1.4%,R-0.68%) and others (E-28.76%,M-5.5%,R-4.10%).

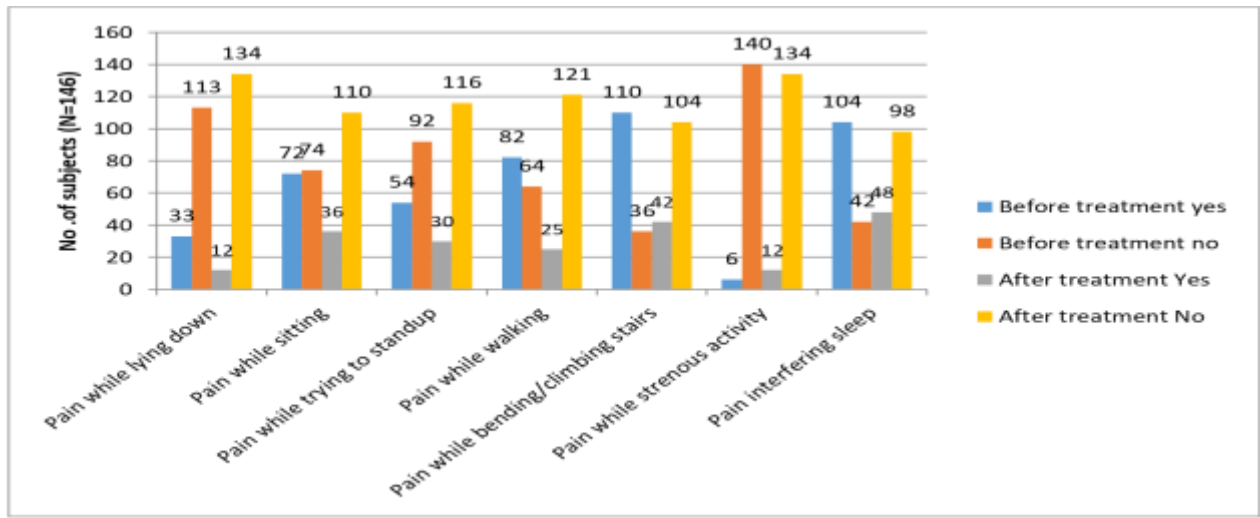


A p value (0.0039\*) was considered to highly significant

**Figure8: STAGE Vs RECEPTOR**

**TABLE 9: FUNCTIONAL INTERFERENCE Vs NUMBER OF SUBJECTS**

Figure 9 depicts most of the patients experiencing pain during bending/climbing (110) followed by pain interfering sleep (104), pain while walking (82), pain while sitting (72), pain with strenuous activity (06), pain when trying to stand up (18), pain while lying down (11) before the treatment. After the treatment by pain interfering sleep (48), pain while walking (25), pain while sitting (36), pain with strenuous activity (12), pain when trying to stand up (30), pain while lying down (12).

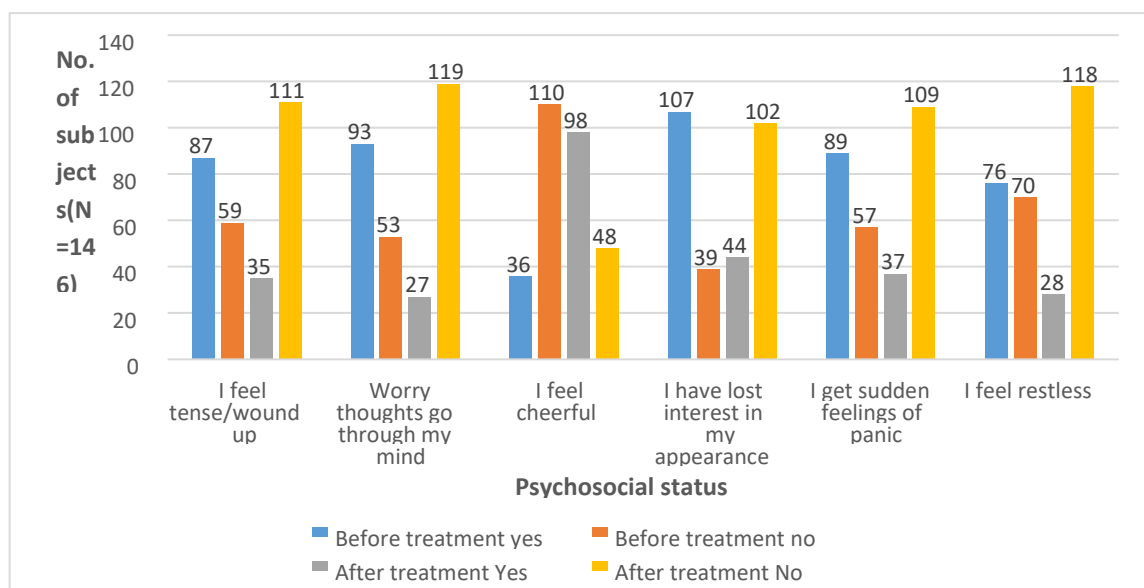


A p value (0.0027\*) was considered to highly significant

**Figure9: FUNCTIONAL INTERFERENCE Vs NUMBER OF SUBJECTS**

**TABLE 10 : PSYCHOSOCIAL STATUS Vs NUMBER OF SUBJECTS**

Figure 10 depicts that most of the subjects have lost interest in my appearance(107),followed by Worry thoughts go through my mind(93), get sudden feelings of panic(89), feel tense/wound up(87), feel restless(76), feel cheerful(36) before the treatment. After the treatment subjects have lost interest in my appearance(44),followed by Worry thoughts go through my mind(27), get sudden feelings of panic(37), feel tense/wound up(35), feel restless(28), feel cheerful(98).

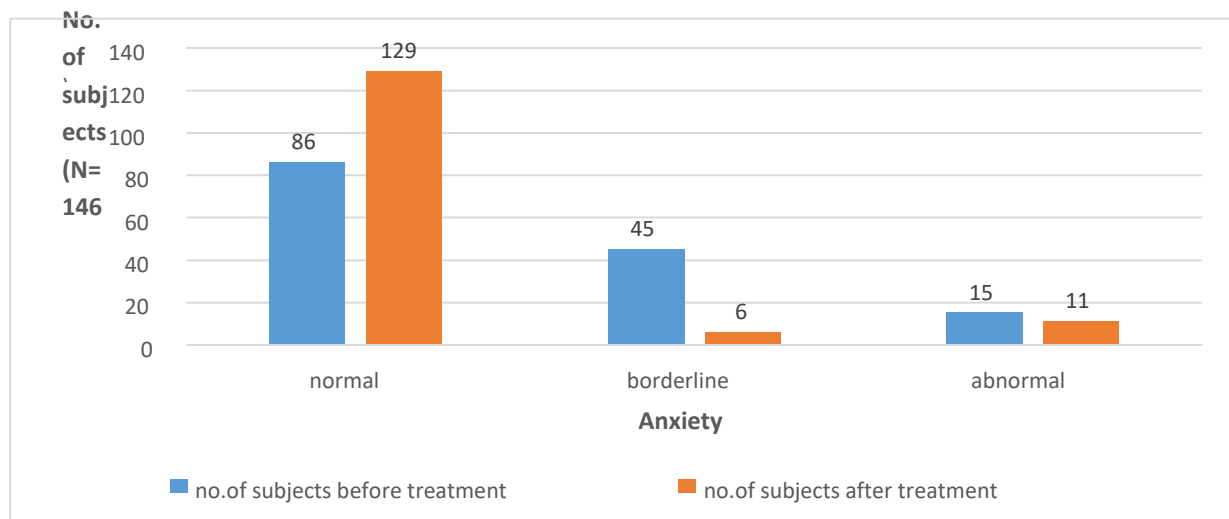


A p value (0.0267\*) was considered to highly significant

**Figure10: PSYCHOSOCIAL STATUS Vs NUMBER OF SUBJECTS**

**TABLE 11: ANXIETY Vs NO.OF SUBJECTS**

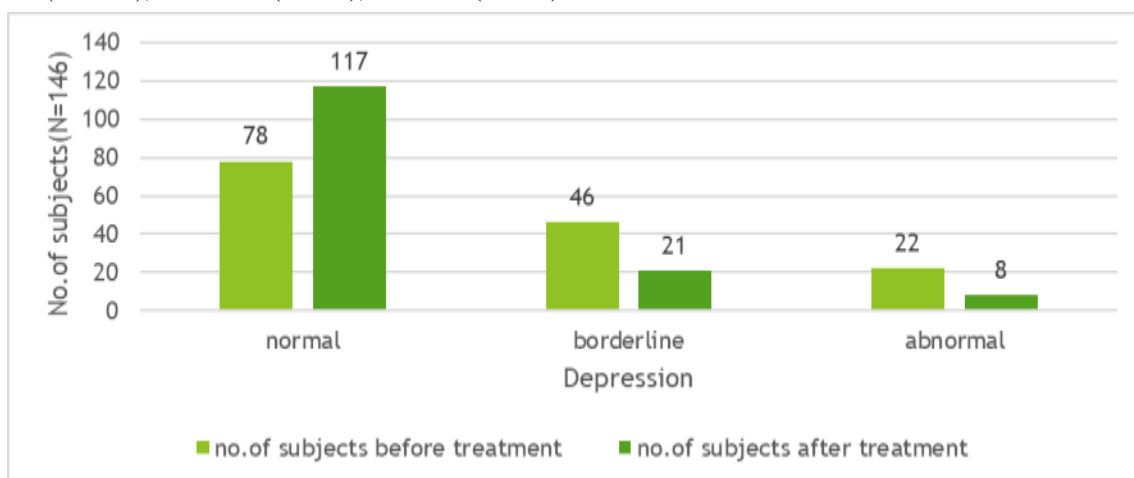
Figure 11 depicts the information regarding distribution of patients with anxiety into different categories. Before the treatment Normal(58.9%), Borderline (30.83%), Abnormal(10.27%). After the treatment Normal(88.34%), Borderline (4.1%), Abnormal(6.7%).



**Figure 11: ANXIETY Vs NO.OF SUBJECTS**

**TABLE 12: DEPRESSION Vs NO.OF SUBJECTS**

Figure 12 depicts the information regarding distribution of patients with anxiety into different categories. Before the treatment Normal(53.42%),Borderline (31.51%),Abnormal(15.07%).After the treatment Normal(80.14%),Borderline (14.4%),Abnormal(5.48%).



**Figure 12 :- DEPRESSION VS NO.OF SUBJECTS**

## CONCLUSION:

Based on the results obtained our study concludes that most of the patients are postmenopausal(n=88) at the time of diagnosis of with majority having receptor status ER,PR +ve,HER2 -ve(n=15, 10.3%) followed by premenopausal(n=58) with majority having receptor status ER,PR +VE,HER2 -VE (n=16,10.96%).Evaluating the stage of breast cancer most of the patients are presented as early breast cancer majorly having receptor status ER,PR +ve,HER2 -ve(n=19 ,13.01%) followed by metastatic breast cancer patients with most having receptor status ER,PR +ve,HER2 -ve(n=12,8.28%) and recurrence with majority having receptor status ER/PR/HER2 +ve(n=3 ,2.05%).

Hence based on the results obtained in our study we strongly conclude that irrespective of the menopausal state and stage at the time of diagnosis , majority of the patients were diagnosed with receptor status ER,PR +VE,HER2 -VE (n=31 , 21.23%) and also found that the patients diagnosed at postmenopausal state were more prone to metastasis and patients diagnosed at premenopausal state were prone to recurrence.

Our study concludes that Pharmaceutical care and psychosocial support and the provided patient information leaflet which was mainly focused on healthy diet plays a vital role in improving adherence to the therapy there by enhancing the quality of life of the patients with early , metastatic, recurrence breast cancer being under followup and/or hormonal therapy after providing with surgery and/or radiation therapy and/or chemotherapy.

## LIMITATIONS:-

Though the target of the “STUDY OF BIOLOGICAL BEHAVIOUR OF BREAST CANCERS BASED ON HORMONAL STATUS IN PREMENOPAUSAL AND POST MENOPAUSAL WOMEN” was to recruit 221 breast cancer patients, only 146 patients were considered due to unavailability of patients during the study period and less time factor. 11 subjects were excluded due to unavailability of hormonal receptor status. This study has to be further extended with more number of patients to derive at a better conclusion.

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