A Clinico-Epidemiological Profile To Estimate The Burden Of Breast Cancer In Andaman And Nicobar IslandsOver Past Three Years :A Hospital-Based Retrospective Observational Study

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Abstract
Background: The purpose of this study is to estimate the burden of breast cancer and to study the clinico-epidemilogical profile of breast cancer in Andaman and Nicobar Islands.
Materials and Methods:Our study included all hospital admissions due to breast cancer over a period of three years 2020-21, 2021-22 and 2022-23. The total study participants were 94 out of which 6 of them expired over the past 3 years. Triple assessment was used to evaluate a case of breast lump. Ultrasonography of breast and mammography were used to assess the radiological evidence of breast cancer. All the subjects of study population underwent Fine needle aspiration cytology and Tru-cut biopsy from the lump in the breast. To assess the severity of breast cancer in the study population, the Tumor (T) stage of tumor at the time of presentation, evaluated clinically, was used.
Results: 98.94% of patients in the study population were females. 66% of the patients reside in rural areas.The upper outer quadrant of both breasts were the most frequently involved quadrant. Around 50% of the study population had locally advanced breast cancer and metastatic breast cancer.
There is a comparative increase in triple negative hormone receptor status. Modified radical mastectomy is the most preferred surgery (in 88.3% of cases) with adjuvant chemotherapy with or without neo-adjuvant chemotherapy. Metastatic spread was observed in 8.5% of cases which is higher when compared to the data of American Cancer Society.
Conclusion: Middle-aged women belonging to the age group of 40-60 years are the most commonly affected. The T(tumour) stage of the tumor can be used to assess the stage of malignancy and thereby can be used to estimate the outcome of the disease. In our islands, breast cancer at the time of presentation is more commonly a locally advanced breast cancer or a metastatic disease. Lack of awareness, social stigma, ignorance have a big role behind the dismal prognosis of carcinoma breast in the islands.
Keywords :Carcinoma breast, Morbidity and mortality of breast cancer, Burden of breast cancer.

I. Introduction

Breast cancer is the second leading cause of cancer-related deaths, second to lung cancer, with approximately 40,920 deaths caused by breast cancer annually across the world.[1,6] Breast cancer is also a global health issue, with more than 20 lakh cases of breast cancer diagnosed worldwide each year. The overall incidence of breast cancer was increasing until the last century because of increase in average lifespan , lifestyle changes that increase the risk of breast cancer, and improved survival rates for other diseases.[1]

Survival rates in women with breast cancer have steadily improved over the last decades. The decreased mortality from breast cancer is thought to be the result of earlier detection via mammographic screening, a decrease in incidence of breast cancer, and improvements in therapy. The survival rate of stage 1 breast cancer is 98.7%. The current treatment of breast cancer is based on pathology , staging , and more recent insights into breast cancer biology. There is an increased emphasis on defining disease biology and status in individual patients, with the subsequent tailoring of therapies.[1,3]

Cancer of cervix, lung and breast are the most common cancers for which screening programmes are available in India. Though its implementation and effectiveness in different states across our country is still a

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point of debate. There is enough evidence that screening for breast cancer has a favorable effect on mortality from breast cancer. The basic techniques for early detection of breast cancer are: a) Breast self examination (BSE) by the patient, b) palpation by a physician, c) thermography, d) mammography. All women should be encouraged to perform breast self-examination. Breast cancers are more frequently found by women themselves than by a physician during a routine examination. Although the effectiveness of BSE has not been adequately quantified, it is a useful adjuvant to early case detection. In many countries, BSE will probably be the only feasible approach to wide population coverage for a long time to come. Palpation is unreliable for large fatty breasts. Thermography has the advantage that the patient is not exposed to radiation. Unfortunately, it is not a sensitive tool. Mammography is most sensitive and specific in detecting small tumours that are sometimes missed on palpation. The use of mammography has three potential drawbacks: 1) exposure to radiation. This may amount to a dose of 500 milliroentgen compared to 30-40 milliroentgen dose received in chest x-ray. Therefore, there has been a concern about exposure to radiation from repeated mammographies and the risk of breast cancer developing as a result. 2) Mammography requires technical equipment of a high standard and radiologists with very considerable experience- these two factors limit its more wide spread use for mass screening purpose , and 3) biopsy from a suspicious lesion may end up in a false-positive in as many as 5-10 cases for each case of cancer detected. Although recent evidence points to the superiority of mammography over clinical examination in terms of sensitivity and specificity, medical option is against mammography on the very young. Women under 35 years of age should not have x-rays unless they are symptomatic or a family history of early onset breast cancer.[2]

II.   Materials andMethods

Data was collected from Medical Records Library of Gobind Ballabh Pant Hospital, Port blair of Andaman and Nicobar Islands, the database of all hospital discharges in the islands. This database is maintained by the Andaman Nicobar Institute of Medical Sciences.Our study is a retrospective observational study. It's a cross-sectional study design.We have used ICD code 10-CM as C50.919 for malignant neoplasm of unspecified site of unspecified female breast; D05.12 for ductal carcinoma in situ; C50.921 for male breast cancer.Our study included all hospital admissions due to breast cancer over a period of three years 2020-21, 2021-22 and 2022-23. The total study participants were 94 out of which 6 of them expired over the past 3 years.

Triple assessment was used to evaluate a case of breast lump presenting to the surgical out patient department of G.B. Pant hospital comprising of history taking, clinical assessment followed by radiological evaluation. Ultrasonography of breast and mammography were used to assess the radiological evidence of breast cancer. Subsequently, all the 94 subjects of study population underwent Fine needle aspiration cytology and Tru-cut biopsy from the lump in the breast. Based on satisfactory histopathological data, diagnosis of carcinoma of breast was made.

To assess the severity of breast cancer in the study population, the Tumor(T) stage of tumor at the time of presentation, evaluated clinically, was used. According to TNM staging,[1,3,7]

T1: Tumor < 2 cm in greatest dimension

T2: Tumor > 2 cm but < 5 cm in greatest dimension

T3: Tumor > 5 cm in greatest dimension

T4 : Tumor of any size but with direct extension to chest wall and / or to the skin.

T4 (a) : extension to the chest wall, not including only pectoralis muscle adherence or invasion.

T4 (b) : ulceration and /or ipsilateral satellite nodules and/ or edema of the skin.

T4 (c) : Both T4 (a) and T4 (b)

T4 (d) : Inflammatory carcinoma.

M1 : denotes distant detectable metastasis as determined by classic clinical and radiographic and/or histologically proven.

Based upon the above collected data, study population was grouped under 3 major blocks[1,3,7]:

Early breast cancer (EBC): T1,T2

Locally advanced breast cancer (LABC) : T3, T4

Metastatic breast cancer (METASTATIC): M1

Aims:

1. To study the clinico-epidemilogical profile of breast cancer in Andaman and Nicobar Islands.

2. To estimate the burden of breast cancer on the population of the islands.

Objectives:

1.To study the predominant age group of study population presenting with breast cancer.

2.To evaluate the association of incidence of breast cancer with demography of the study population, that is, to infer whether breast cancer has a higher incidence among the urban or rural folk.

3.To observe the most frequently involved site for breast cancer in the study population.

4. To evaluate the most common Tumor (T) stage of breast cancer at the time of presentation of a case .

5.To assess the prevalent hormone receptor status among the study population.

6.To evaluate the most commonly practised management for breast cancer patients in the islands.

7. To assess the eventual outcome of treatment endowed to the study population.

III. Results

In our study population, 31.91% of patients belonged to age group 41-50 years, followed by 28.72 % of patients in the age group 51-60 years, implying that approximately 60% of total study population were in the age group of 40-60 years.

AGE (IN YEARS)	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
20-30	5	5.32%
31-40	12	12.76%
41-50	30	31.91%
51-60	27	28.72%
61-70	12	12.76%
71-80	6	6.38%
>80	2	2.13%
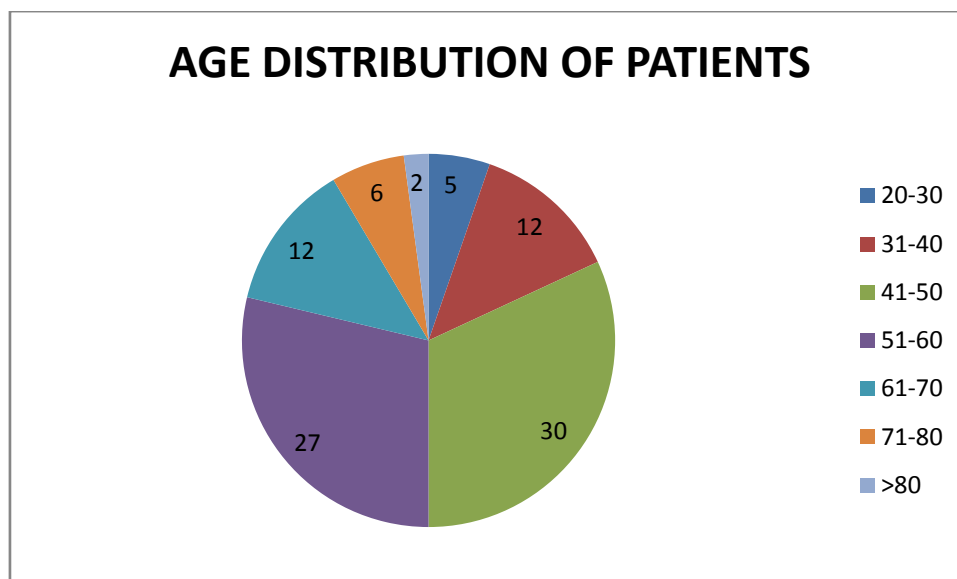
98.94% of patients in the study population were females, and there was 1case of male breast cancer out of sample size of 94.

GENDER	NUMBER OF PATIENTS	PERCENTAGE
FEMALES	93	98.94%
MALES	1	1.06%

Nearly 66% of the patients reside in rural areas, in remote islands and only 34% live in urban city of PortBlair.

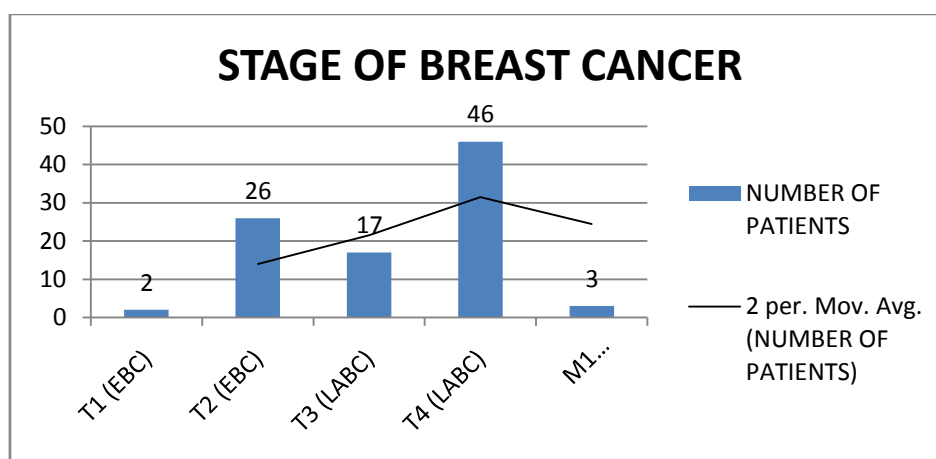| DEMOGRAPHY	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
URBAN	32	34.04%
RURAL	62	65.96%

The left breast was the most frequently involved. The upper outer quadrant of both breasts were the most frequently involved quadrant. The upper outer quadrant of left breast alone accounted to 34 % of the site involved in our study.
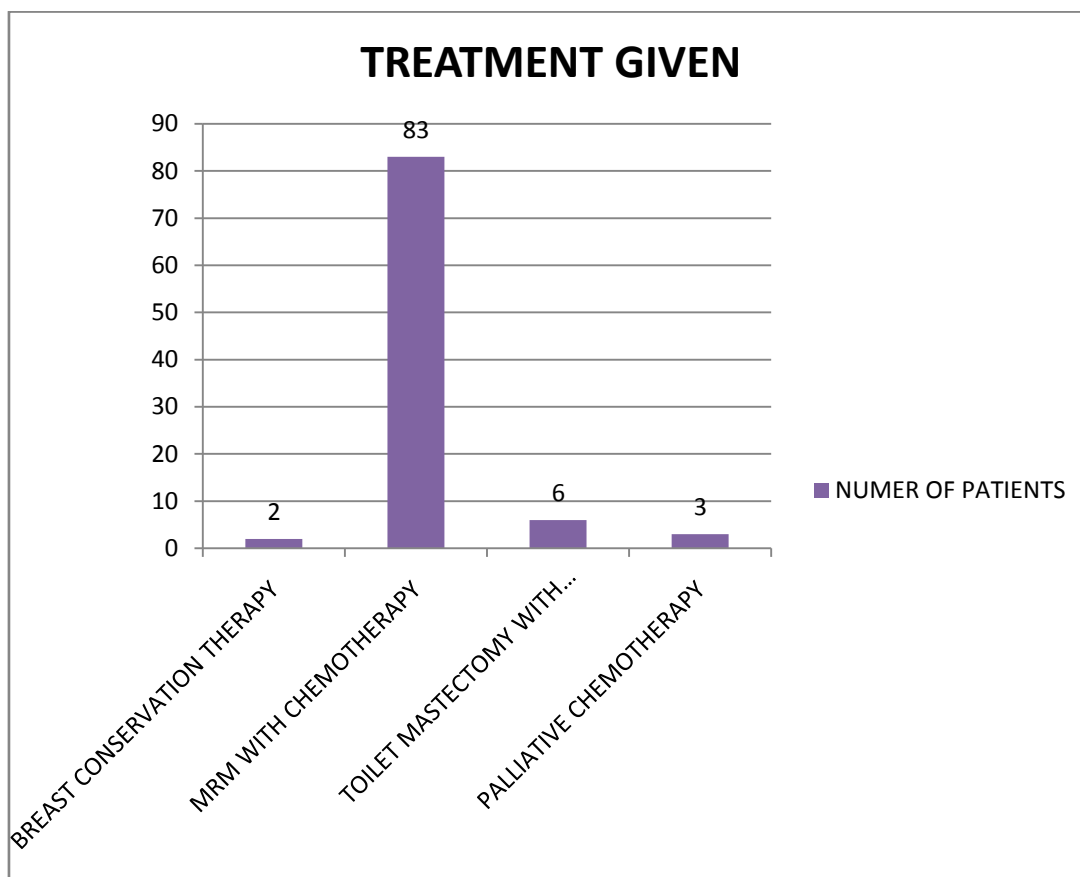
QUADRANT	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
LEFT UPPER OUTER	32	34.04%
LEFT UPPER INNER	4	4.25%
LEFT LOWER OUTER	16	17.02%
LEFTLOWER INNER	1	1.06%
RIGHT UPPER OUTER	24	25.53%
RIGHT UPPER INNER	5	5.32%
RIGHT LOWER OUTER	10	10.64%
RIGHT LOWER INNER	2	2.13%
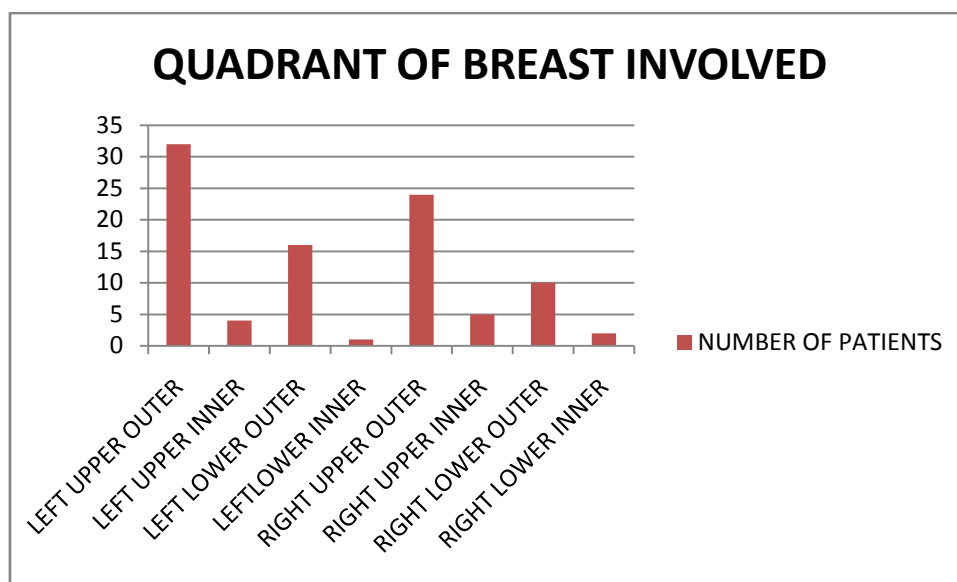
46 patients out of 94, that is around 49%, had a clinically T4 disease and 3 of them had M1 disease. From this we could draw a conclusion that around 50% of the study population had locally advanced breast cancer and metastatic breast cancer.
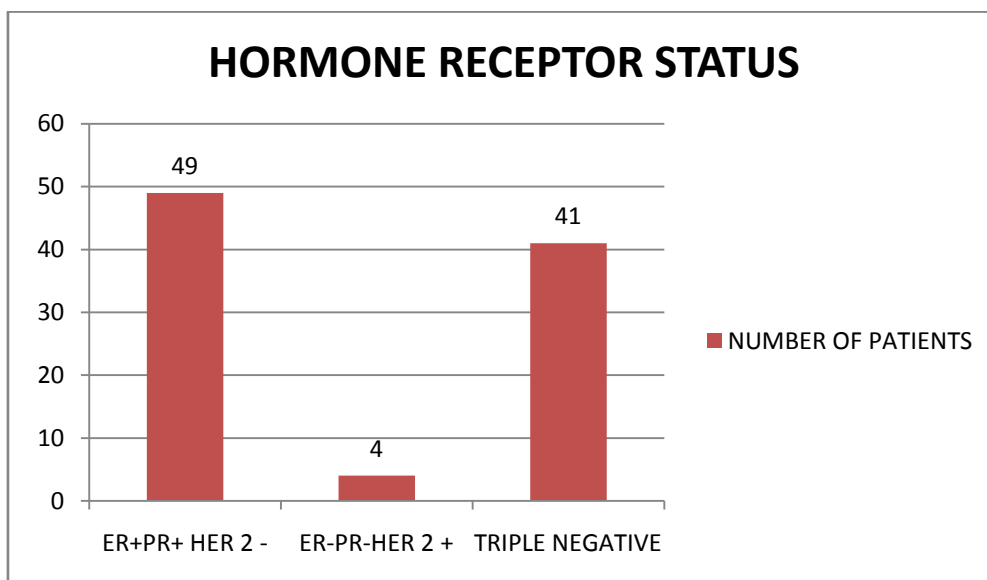
STAGE	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
T1 (EBC)	2	2.13%
T2 (EBC)	26	27.66%
T3 (LABC)	17	18.08%
T4 (LABC)	46	48.94%
M1 (METASTATIC)	3	3.19%

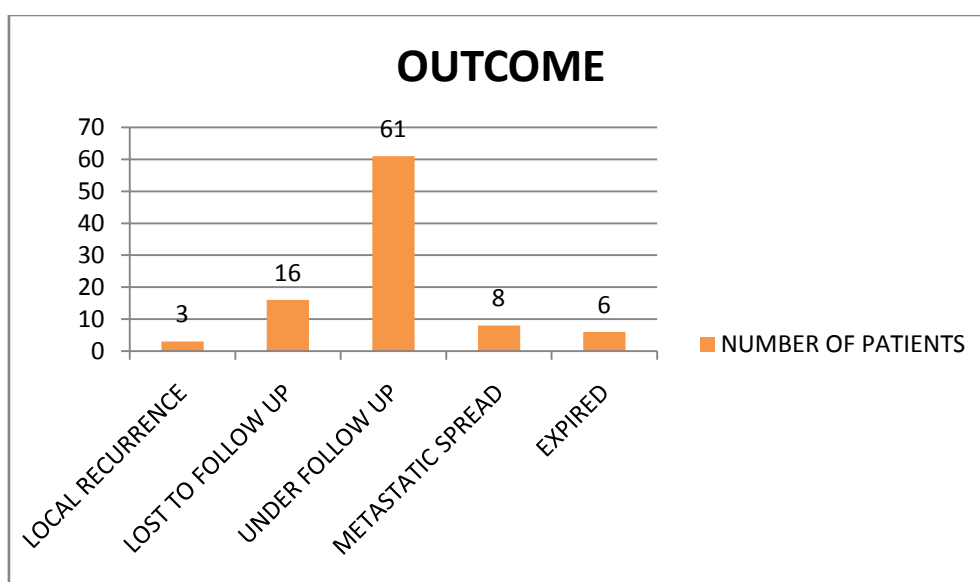| TREATMENT	NUMER OF PATIENTS	PERCENTAGE OF PATIENTS
BREAST CONSERVATION THERAPY	2	2.13%
MRM WITH CHEMOTHERAPY	83	88.30%
TOILET MASTECTOMY WITH CHEMOTHERAPY	6	6.38%
PALLIATIVE CHEMOTHERAPY	3	3.19%

Modified radical mastectomy is the most preferred surgery (in 88.3% of cases) with adjuvant chemotherapy with or without neo-adjuvant chemotherapy. In some cases, where there was skin involvement in the form of ulcers or nodules, also in some cases which were infected with maggots, only toilet mastectomy was performed as emergency procedure. Breast conservation therapy was rarely considered and is the least preferred option. Palliative chemotherapy was given to the patients with metastasis. Most common sites of metastasis were lung, liver, lumbar vertebrae and lymphnodes. Hormonal therapy was added based on the hormone receptor status of different cases.

HORMONE RECEPTOR STATUS

HORMONE RECEPTOR STATUS	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
ER+PR+ HER 2 -	49	52.13%
ER-PR-HER 2 +	4	4.26%
TRIPLE NEGATIVE	41	43.61%

Most of the breast cancer patients are positive for estrogen and progesterone receptors (52.13%).

But, when compared to the data of American Cancer Society, Breast cancer facts and figures, there is a comparative increase in triple negative hormone receptor status of breast cancer patients in the islands which signifies the poor prognosis of breast cancer here as the disease is advanced at the time of presentation with a dismal outcome.

OUTCOME

OUTCOME	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
LOCAL RECURRENCE	3	3.19%
LOST TO FOLLOW UP	16	17.02%
UNDER FOLLOW UP	61	64.90%
METASTATIC SPREAD	8	8.51%
EXPIRED	6	6.38%

Though most of breast cancer patients are under follow up, yet patients lost to follow up amounts to a significant value of 17.02%. Metastatic spread was observed in 8.5% of cases which is higher when compared to the data of American Cancer Society.

IV.   Discussion

Breast cancer stage is determined clinically by physical examination and imaging studies before treatment, and breast cancer stage is determined pathologically by pathologic examination of the primary tumor and regional lymph nodes after definitive surgical treatment. Staging is performed to group patients into risk categories that define prognosis and guide treatment recommendations for patients with a similar prognosis.

Metastasis to ipsilateral axillary nodes predicts outcome after surgical treatment more powerfully than tumor size. Before the incorporation of systematic therapies in the management of breast cancer, when treatment was with surgery alone, the survival rate decreased almost linearly with increasing nodal involvement. The latest staging system has a place to record other variables, including tumor grade, estrogen receptor (ER), progesterone receptor (PR) and HER-2 status, circulating tumor cells, disseminated tumor cells (in bone marrow), multigene recurrence score, and response to chemotherapy.

Age is probably the most important risk factor for breast cancer.[1,4,5] The age-adjusted incidence of breast cancer continues to increase with advancing age of the female population. Breast cancer is rare in women younger than 20 years and constitutes less than 2% of the total cases. According to the data of American Cancer Society, Breast cancer facts and figures, the incidence increases to 1 in 225 from ages 30-39 years, 1 in 69 from ages 40-49 years, 1 in 44 from ages 50-59 years, 1in 29 from ages 60 to 69 and 1 in 8 by 80 years.[1,4,5] Through our study too, we infer similar results. 31.91% of patients belong to age group 41-50 years, followed by 28.72 % of patients in the age group 51-60 years, implying that approximately 60% of total study population were in the age group of 40-60 years. Hence, the incidence of carcinoma breast in younger population is comparatively low when compared to females of age group 40-60 years. Though a rarity, yet a word of caution in dealing breast lumps in younger population about breast cancer is often warranted.

Though most breast cancers occur in women, it does occur in men, however, incidence in men is less than 1%.[1,4,5] In this study also, there was only one case of male breast cancer out of the sample size of 94 implying the rarity of breast cancer in male gender.

Meanwhile, 50% of the study population had locally advanced breast cancer and metastatic breast cancer. Modifiable risk factors like lack of breast feeding , obesity, alcohol consumption, tobacco smoking, use of hormonal replacement therapy, decreased physical activity and night shift work,[1,4,5] though, are usually attributed to urban lifestyle in this part of our country, yet in our study, 66% of patients belong to rural population. Also, higher incidence of locally advanced and metastatic breast cancer points towards delay in presentation and diagnosis, at a health care center,signifying the importance of easy access to a health care facility, which is difficult in rural areas. It also points towards the need of screening programmes in rural areas of the islands to decrease the latent period and help in early diagnosis.

In Andaman and Nicobar Islands, there is non-availability of linear accelerator or any device to administer radiation. As here,there is no dedicated radiotherapy department, treatment modalities which need adjunct radiotherapy are hence least preferred. So breast conservation surgery, lumpectomy,quadrantectomy are the least performed surgery. Henceforth, Modified radical mastectomy is the most commonly performed surgery and chemotherapy is either added as neo-adjuvant or adjuvant chemotherapy. Hormonal therapy was added based on the hormone receptor status of different cases.

Figure 1. Carcinoma left breast T4 (b) skin involvement, ulcers, nodules, peau d orange

Figure 2. Carcinoma left breast T4 (c)

Higher proportion of triple negative cases points towards more advanced nature of disease at the time of presentation. This is also one of the reason behind such dismal outcome of breast cancer treatment in the islands. Triple negative breast cancer do not respond to hormonal therapy and have very less drugs available for chemotherapy combinations.

Figure 3. Carcinoma left breast T4 (c) infected ulcer with maggots

The outcome of treatment of breast cancer in the islands is dismal. Significant proportion of patients belong to rural folk. There is still a social stigma attached to breast cancer which is responsible for ignorance among the study population. This is the reason behind the increase in latent period and delayed presentation. Most of the breast cancers are advanced disease at the time of presentation itself. Another reason is the difficult access to the primary health care facility in the far off rural islands. There is non-availabiltyof a dedicated oncology department for radiotherapy and chemotherapy because of which there is higher incidence of local reccurrence and metastatic spread.

Limitations of our study:
1. The family history, inheritance of genetic mutations such as BRCA could not be studied because of non-availability of advanced resources for genetic testing and gene mapping.
2. The nodal status of the axilla was not taken into consideration during assessment of the stage of the tumor.Though,nodal status of axilla is the most important prognostic factor [1,4,5], it was not included in the assessment because it made the staging of cancer complicated and tedious. And, it also had no effect or bias on the selection of treatment modality.
3. There is ignorance and lack of awareness about the breast cancer and its potential morbidities which is the reason behind flaws in history regarding duration and onset of the disease, familial inheritance, recurrence, default in treatment and delayed access to health care.
4. A significant proportion of the study population was lost to follow up during the study period, because of which the exact count of patients who succumbed to the illness is not available. Soits an under-estimate of case fatality rate and mortality due to breast cancer.
5. There is a preference bias in the study as modified radical mastectomy is more commonly preferred over breast conservation surgery (BCS) as BCS requires adjunct radiotherapy. Radiotherapy needs linear accelerator which is not available in the islands.

V.   Conclusion

Despite the limitations in our study, we could draw some valid and very important conclusions from it. These results cannot be extrapolated to a different set of population as the results are depending upon the demography and socio-economic background of the study population. Middle-aged women belonging to the age group of 40-60 years are the most commonly affected. The T stage of the tumor can be used to assess the stage of malignancy and thereby can be used to estimate the outcome of the disease. In our islands, breast cancer at the time of presentation is more commonly a locally advanced breast cancer or a metastatic disease. Lack of awareness, social stigma, ignorance have a big role behind the dismal prognosis of carcinoma breast in the islands. There is an utmost need of a dedicated oncological mutidiscipilinary team in this tertiary care center to manage radiotherapy and chemotherapy based treatment modalities in the management of breast cancer. There is a rise in trend of triple negative breast cancer indicating the need to stress on study of molecular basis and hormonal receptor behavior to understand the evolution of breast cancer over the years. There is a need of health-care programme to screen the population at risk. The programme should also stress on educating women

about the modifiable and non- modifiable risk factors of breast cancer. Self-examination of breasts should be taught to all women. All these efforts will ensure early presentation and thereby will improve the survival rate of breast cancer patient.

Conflict of interests: There is no conflict of interests

Ethics committee approval: Approval was obtained from the institutional ethics committee.

Sources of funding: There is no source of funding.

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