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Research Article

Clinical and Demographic Characteristics of Patients with Breast Carcinoma in Nepal: A Single-Centre Cross Sectional Study

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Abstract

Background: Breast cancer is a significant health concern in Nepal, ranking as the second most common cancer among women and the third overall cancer in the country. This study aims to evaluate clinical and demographic characteristics of patients with breast carcinoma on the basis of clinical history and Contrast Enhance Computed Tomography (CECT) report at BP Koirala Memorial Cancer Hospital (BPKMCH), Bharatpur, Nepal.

Methodology: Prospective observational study was performed in Department of Radio diagnosis, Imaging and Nuclear Medicine, BPKMCH. Total 209 diagnosed patients with breast carcinoma underwent to CECT of chest and abdomen and clinical history was obtained simultaneously. The different observational study of CECT chest with abdomen was done with the measurement of mass, lymph node size and different other parameters including distance metastasis. Data was analyzed using IBM SPSS version 20 and Microsoft excel. Pearson's Correlation was used to see the relation between different parameter and significance level was kept at $p < 0.05$.

Results: Majority of the breast cancer patients (77.50%) were within the age range of 36-65 years. In all 209 patients, mean size tumor size was 37 x 31 x 30 with standard deviation (SD) ± 20.124. Most of the breast cancer patients 115 out of 209 had painless lump i.e. 55.02%, following 90 patients had painful lump i.e. 43.06%. Among all patients, 82 patients had right breast carcinoma i.e. 39.23%, 125 patients had left breast i.e. 59.80% and 2 patients had bilateral breast carcinoma i.e. 00.95%. Similarly, 147 patients had lymph node metastasis i.e. 70.33%, 56 patients didn't have lymph node metastasis i.e. 26.80% and only 2 patients had reactive lymph node i.e. negligible. 80 patients were at early stage i.e. 38.27% and 129 patients were at advance stage i.e. 61.73%. Most of the patients 188 didn't have distance metastasis i.e. 89.5% whereas only 21 patients had distance metastasis status i.e. 10.05%.

Conclusion: In our study breast carcinoma was more common within the age range of 35-56 years age. Majority of the breast cancer patients detected at early stage who can be treated as radical treatment. Regular screening of this age group will help to early detection of breast carcinoma.

keywords: Breast Carcinoma; Contrast Enhance Computed Tomography; Distance Metastasis; Lymph Node; Malignant Mass

Introduction

Breast cancer is the foremost diagnosed cancer type in females, all inclusive, and its status as a driving cause of cancer-related death has remained unchanged. It starts within the epithelial cells lining the mammary ducts or lobules and is characterized by uncontrolled cell proliferation with potential nearby invasiveness and distant spread to other organ sites. Breast cancer is most common in women, but it can develop in men as well, as it comprises 1% of all breast cancer cases breast cancer incidence varies significantly by world region, with higher rates in developed countries with higher life expectancy, urbanization, and the embrace of Western lifestyles [1]. In 2020 specifically, the Global Cancer Observatory estimates over 2.3 million new cases of breast cancer and nearly 685,000 deaths worldwide. Nonetheless, progress in screening and treatment has drastically enhanced rates of survival, particularly in high-income countries. Pathophysiology progresses through a series of genomic mutations altering normal cellular homeostasis. These mutations give rise to uncontrolled cell division, avoidance of apoptosis, and potential for invasion and metastases. Assessment of hormone receptor status e.g., Estrogen Receptor (ER) and Progesterone Receptor (PR), and Human Epidermal Growth Factor Receptor 2 (HER2) is important in tumor biology and guided therapy.

Breast cancer is a multifactorial disease and its pathogenesis is fueled by genetic, hormonal, and environmental factors. Known risk factors include 1. Age: the risk increases with age, with the majority of cases occurring in women over 40, 2. Genetic Predisposition: mutations in genes such as BReast CAncer genes 1 (BRCA1) and BReast CAncer genes 2 (BRCA2) are strongly linked to an increased risk, 3. Reproductive History: early menarche, late menopause, null parity, and late age at first childbirth are associated with higher risk and 4. Lifestyle Factors: obesity, alcohol consumption, and physical inactivity have been implicated in breast cancer etiology.

The most common presentation of breast cancer is a painless lump in the breast, often detected during self-examination or screening mammography. Other symptoms include skin changes, nipple discharge, and axillary lymphadenopathy. Advanced cases may present with systemic symptoms such as weight loss, bone pain, or respiratory distress due to metastasis. Breast cancer diagnosis and imaging are critical components in the management of this common malignancy.

Early and accurate diagnosis not only improves survival rates but also ensures the use of appropriate therapeutic interventions. The process integrates clinical evaluation, imaging modalities, and histopathological examination [2]. Contrast Enhance Computed Tomography (CECT) could be a crucial imaging methodology in the management of breast cancer, playing a complementary role alongside mammography, ultrasound, and magnetic resonance imaging (MRI). While not routinely used for the initial diagnosis or screening of breast cancer, CECT is extensively employed for staging, treatment planning, and monitoring metastatic disease. Its ability to provide detailed cross-sectional images of the chest, abdomen, and pelvis makes it indispensable for comprehensive evaluation in advanced breast cancer cases. CECT excels in identifying distant metastases, such as those in the lungs, liver, bones, or brain. It also provides detailed visualization of chest wall involvement, mediastinal structures, and axillary or supraclavicular lymph nodes [3]. This broad anatomical coverage makes CECT a critical tool for staging breast cancer, ensuring accurate classification based on the TNM staging (T-Tumor size, N-Lymph Node involvement, and M-Metastasis) system [4].

In cases where biopsy or surgical interventions are planned, CECT assists in pre-procedural mapping, identifying safe biopsy routes or surgical challenges.

However, CECT and PET/CT are not optimal for delineating primary tumor volume, and PET is less efficient than the sentinel node biopsy to depict small axillary lymph node metastases. In large breast cancer tumor, FDG PET/CT is useful to show extra-axillary lymph nodes. FDG PET/CT is superior to bone scan and CECT in detecting distant metastases, and it results in a change of treatment plan in nearly 15% of patients. [5]. As a portion of a multimodal imaging technique, CT contributes significantly to personalized care in breast cancer. Its ability to integrate with other imaging findings provides clinicians with a holistic view of the disease, facilitating optimal therapeutic decisions [6]. By combining diagnostic precision and anatomical detail, CT remains a cornerstone in the comprehensive assessment of breast cancer, especially in advanced stages. The imaging findings on CECT vary depending on the disease stage and the structures involved [7].

This descriptive study was conducted with the aim of critical need to optimize the diagnostic and staging accuracy in breast cancer management. As we know the breast cancer is a leading cause of morbidity and mortality among women worldwide, and its presentation can vary significantly, from localized disease to advanced stages with distant metastases. CECT imaging plays a pivotal role

in assessing the extent of disease, particularly in advanced cases, by evaluating the primary tumor, regional lymph nodes, and distant metastases in a single imaging session. In a tertiary care setting, where patients often present with more complex or advanced disease, comprehensive imaging becomes indispensable for tailoring appropriate treatment strategies. Furthermore, CECT provides valuable information on associated findings, such as chest wall invasion or mediastinal involvement, which directly impact surgical and therapeutic planning. A single-centered study offers the opportunity to analyze patient demographics, disease patterns, and imaging findings specific to the local population, contributing to improved understanding and management of breast cancer in similar resource-limited settings. By correlating CECT findings with clinical and histopathological data, this study seeks to establish the utility and limitations of CECT imaging, enhancing its role in multidisciplinary cancer care. The aim of this study is to evaluate the demographic and age group distribution of breast carcinoma, to correlate the complaint duration with staging in breast carcinoma and to determine the mass and nodal size on breast carcinoma.

Material and Methodology

This Prospective cross-sectional study was done including 209 female patients diagnosed with breast cancer at BPKM Cancer Hospital Bharatpur, Chitwan Nepal from January 2023 to March 2024. All patients with proven histopathology breast carcinoma that schedule for CECT chest and abdomen were included in this study. Patients who had not histopathological proven breast carcinoma and image having motion and other artifact were excluded from this study. Every relevant piece of information was added to a database of an existing information system. Information from the clinical records and file sheets of the referred patients was used to assess the data. All patients undergoing CECT chest and abdomen examination who met the inclusion criteria had been selected. Detail history was taken including patients age, address, complain duration, ongoing treatment procedures and collect true cut biopsy (Histopathology) or Fine Needle Aspiration Cytology (FNAC) report copy. Then the patients were asked to remove all radiopaque materials from chest after obtaining the written informed consent from each patient. For CECT scanning, the patients were placed supine with feet first on the table, with a suitable size cannula insertion. The legs were extended and arms were raised above the head. The CECT examination was performed in a 128 slice SCENARIA Fujifilm CT scan machine, with 0.625 mm cut with 350 window width and 50 window level with the departmental chest protocol of department of Radio diagnosis, Imaging and Nuclear Medicine.Tumor size, grade, and disease stage were among the variables noted. The TNM classification is a standardized system used to describe the extent of cancer spread in a systematic and consistent manner which is developed by the American Joint Committee on Cancer (AJCC) and the Union for International Cancer Control (UICC) [4].

Image analysis

All the images were analyzed at window width and window level of 350HU and 50 HU respectively. Firstly, different observational study was done like mass localization, its shape, nipple retraction or not, enlarged lympnode, muscle involvement or not, chest wall involvement or not, fatty hilum is lost or not, single lump or multiple, metastasis or not. Then after, measurement was done using software scale on mass size and lymph node size.

Statistical analysis

Mean, standard deviation, minimum and m maximum value, were calculated. Pearson Correlation was applied for the test of statistically significance. Pearson's correlation coefficient was classified as in Table 4. A 95% confidence interval was taken, and p value <0.05 was taken as statistically significant. Statistical analysis was carried out with the help of IBM SPSS version 20 and Microsoft Excel.

Result

A total number of 209 patients were enrolled in the study who underwent routine CECT examinations of chest with biopsy proven Breast Carcinoma. These patients had been classified in to different age groups with ten intervals, among them maximum i.e. 66 (31.57%) patients lie at 46-55 years age group. Similarly, 52(24.88%) patients on 36-45 years, 44 (21.05%) patients on 46-55 years, 26 (12.44%) patients on 25-35 years, 15 (7.17%) patients on 66-75 years and 6 (2.87%) patients on 86-95 years age group.

Study includes the numbers of patients from different province in Nepal. Maximum number of patients were from province five i.e. 62 patients and minimum from province seven i.e. 7 patients. Actually, this number didn't reflect the exact number of breast carcinoma patients in that province. In province no 5, there is no cancer hospital in that province and nearby cancer hospital is BPKMCH. Similarly, province number 7 is very far from BPKMCH and India is very nearby. Some of the provinces like province no 1 and province no 3 have more than three cancer treatment available hospitals. Among all study populations, 115 (55.02%) patients had painless lump, 90 (43.06%) patients had painful lump, 3 patients had bloody discharge and 1 patient had pain on and off.

According to our result, maximum number of Breast carcinoma was found in left side i.e. 125 (59.80%) patients, while 82 (39.23%) patients had right breast involvement and 2 (0.95%) patients had both breast involvement. Similarly, 186 (89%) patients had single lump while 23 (11%) patients had multiple lumps. Study Populations showed nipple retraction among 42 (20%) patients while 169 (80%) patients didn't show nipple retraction. Among all study populations, 91 (43.54%) patients had skin thickening while 118 (56.46%) patients didn't have skin thickening. Study populations showed chest wall involvement among 8 (3.83%) while 201 (96.17%) patients showed no chest wall involvement.

Patients with fatty hilum lost was 80 (38.28%) patients while 129 (61.72%) patients showed no fatty hilum lost. Total 188 (90%) patients showed muscle involvement while 21 (10%) patients showed muscle involvement. Similarly, 147 (70.33%) patients showed lymph node enlargement while 56 (26.79%) patients showed no lymph node enlargement and 6 (2.87%) patients show reactive lymph node.

Among all patients, 40 (19%) showed metastasis while 169 (81%) patients didn't have metastasis. Among Study populations 129 (62%) patients were at advance stage while 80 (38%) patients were at Early stage. Similarly, 21 (10%) patients had distant metastasis while 188 (90%) patients didn't have distant metastasis. All the Clinical and Demographic Characteristics of Patients with breast carcinoma is summarized in table 1.

In our study, different quadrant of breast was involved with breast carcinoma. Upper Outer (UO) quadrant involvement was seen on maximum patients i.e. 68 (32.53%), similarly Lower Outer (LO) quadrant involvement in 48 (23%) patients, Upper Inner (UI) quadrant involvement in 31 (15%) patients, Central quadrant involvement in 21 (10%) patients, Retro-areolar 11 (5%) patients, Outer half 2 (0.95%) patient, Upper half 2 (0.95%) patients, Lower Outer (LO) and central quadrant 2 (0.95%) patients (Figure 1).

Age		
Age Range	25-95 Years	
25-35 Yrs Group	26	12.44%
36-45 Yrs Group	52	24.88%
46-55 Yrs Group	66	31.57%
56-65 Yrs Group	44	21.05%
66-75 Yrs Group	15	07.17%
76-95 Yrs Group	06	02.87%
Geographical Region		
Province 1 (Koshi)	18	08.61%
Province 2 (Madhesh)	55	26.31%
Province 3 (Bagmati)	34	16.26%
Province 4 (Gandaki)	25	11.96%
Province 5 (Lumbini)	62	30.09%
Province 6 (Karnali)	8	03.82%
Province 7 (Sudur Paschim)	7	03.35%
History/Complain of Patients		
Painless Lump	115	55.02%
Painful Lump	90	43.06%
Nipple Discharge	3	01.43%
Pain On/Off	1	00.47%
Involvement site of Breast Carcinoma		
Right Breast	82	39.23%
Left Breast	125	59.80%
Bilateral Breast	2	00.95%
Lump Nature (Single/multiple)		
Single	186	89.00%
Multiple	23	11.00%
Nipple retraction Patients		
Yes	40	19.14%
No	169	80.86%
Status of Skin Thickening		
Yes	91	43.54%
No	118	56.46%
Status of Fatty Hilum		
Lost	80	38.28%
Not Lost	129	61.72%
Status of Chest Wall Involvement		
Yes	8	03.83%
No	201	96.17%
Muscle Involvement Status		
Yes	21	10.05%
No	188	89.95%
Lymph Node Status		
Yes	147	70.33%
No	56	26.80%
Reactive	6	02.87%
Metastasis Status		
Yes	40	19.14%
No	169	80.86%
Staging (Early/Advance)		
Early	80	38.27%
Advance	129	61.73%
Distance Metastasis Status		
Yes	21	10.05%
No	188	89.95%

Table 1: Clinical and Demographic Characteristics.

Among all patients, 48 (23%) patients were at 3B stage, 38 (18%) patients at 2A, 35 (17%) at 3C, 27 (13%) at 2B, 25 (12%) at 3A, 21 (10%) at 4th, 14 (7%) patients at 1A, and 1 (0.47%) patient at 1B (Figure 2).

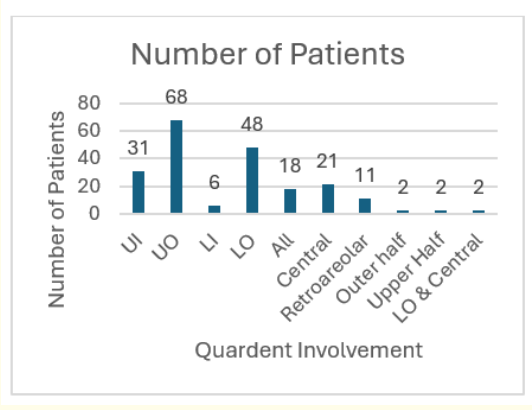

Figure 1: Showing different quadrant involvement in breast carcinoma in our study.

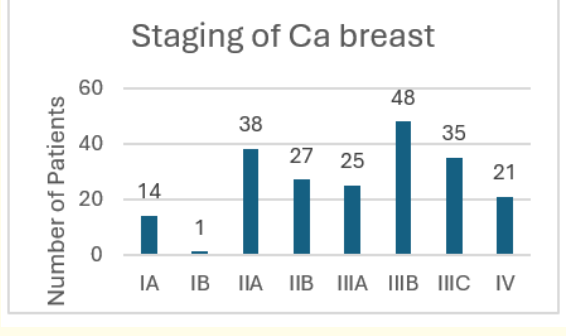

Figure 2: Showing Staging of Breast Carcinoma patients in our study.

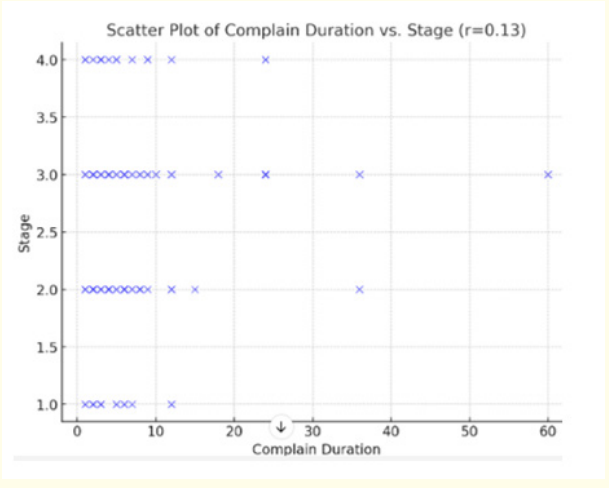

Figure 3: Scatter plotter diagram showing correlation between stage and complain duration.

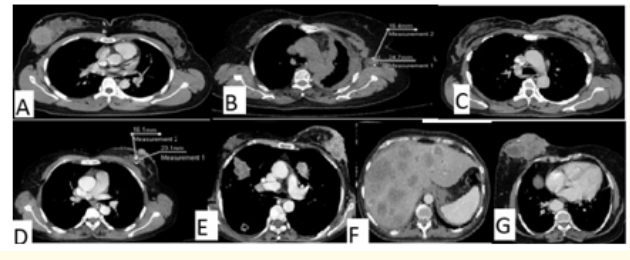

Figure 4: Showing (A) well defined hetero nodule (B) left axillary lymph node with measurement Showing (C) multiple irregulars outlined nodules in left breast, (D) irregular outlined heterogeneous nodule in central quadrant, (E) left breast carcinoma with lung metastasis, (F) Breast Carcinoma with liver metastasis, (G) large heterogeneous irregular outlined mass in upper inner quadrant.

Among all 209 patients, 38 patients showed skin thickening, among them minimum thickness was 4 mm, maximum thickness was 18 mm, mean thickness was 8.45 mm with S.D ± 3.117. Similarly, smallest breast mass was 3x3x2 and largest was 184 x 125 x 120, mean size was 37 x 31 x 30 with S.D ± 20.124. Smallest lymph node size was 9x6 whereas largest was 53x60 with mean value 20x16 with S.D ± 8.754.

Complain duration and staging was correlated with Pearson correlation and found that there is no significant correlation between them with p value ≤ 0.13(Figure 3). Some of our patients with breast carcinoma with different radiological diagnosis are presented in figure 4.

Discussion

In this study maximum number of patients i.e. 66 patients lie at age group 46-55 years which may be due to onset of menopause

and also may be due to awareness during menopausal periods. The result showed very less chance of breast carcinoma finding after 76 years age. This age group is similar to the study conducted by *N A Thakur et al* which showed maximum study subjects were in the age group of 41-50 years [10]. In this research maximum number of patients are included form provision five and then after provision two, and provision three. This may be related with awareness level, easy access and no any other optional Hospital at this provision for cancer treatment. More people i.e. 115 have complain of painless lump so that they may be diagnose at higher stage as our result showed most patient are at 3B stage on TNM classifications which similar to study conducted by *N A Thakur et al* which shows Majority of the cases were in stage III or stage II and is just opposite to research conducted by *Seuligi You et al* which shows majority of cases were in stage I [8,10]. This may be due to the awareness regarding Cancer and also due to tertiary center Hospital so that patients come with referral from other Hospital at delayed stages. In the involvement site, most lump are seen at UOQ i.e. 68 and then after LOQ i.e. 48 which is opposite to result in a study conducted by *A Sedighi et al* that shows 85.7% with retro-areolar mass [11]. Among study populations, 91 patients had skin thickening while 118 patients didn't have skin thickening similarly 186 patients had single lump while 23 patients had multiple lumps**.** Study Populations showed nipple retraction among 42 patients while 169 patients didn't show nipple retraction so we can predict that nipple retraction may not see on breast carcinoma. Study populations showed chest wall involvement among 8 patients while 201 patients showed no chest wall involvement and total 188 patients showed muscle involvement while 21 patients showed muscle involvement, so that we can say that muscle and chest wall involvement is very less common on breast carcinoma. Total 147 patients showed lymph node enlargement while 56 patients showed no lymph node enlargement and 6 patients show reactive lymph node, so it can be predicted that there is high chance of lymph node enlargement on breast carcinoma. And average size of lymph node was 20x16 mm. Similarly average size of breast lump was 37x31x30. Total 21 patients are found at fourth stage of TNM classification; among them 11 patients are with vertebral Mets, 7 with lung Mets and 3 patients with liver Mets. We can't conclude about the most metastasis site due to small number of data available at fourth stage. There is no statistically significant correlation between complain duration and TNM staging with p value ≤0.13. So, from this data we can say there is no significant relation between complain duration and staging. This hospital is tertiary care center and the cause of women living in a rural area, those with lower socio-economic status and those with older age tend to assess health-care late, are the multiple factors for the presentation of breast carcinoma in late stage similar to study done by N A Thakur*., et al.* [10].

Conclusion

In conclusion, breast cancer is a significant health issue in Nepal, and it is important to take steps to address this problem. By increasing awareness, education, and access to early detection and treatment services, it is possible to reduce the incidence and impact of breast cancer on women in Nepal. we concluded that CECT scan can be diagnosed and show different radiological finding like size, nature, lympnode, metastasis, stage, prognosis of for breast carcinoma patients so that treatment can be modified or assessed. CECT can be used in breast cancer care to help determine the extent of the cancer, identify axillary lymph node metastasis, assess response to treatment, and look for local recurrence.

Limitations

This was single center study.

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Declaration of Competing Interest

The authors declare there is no conflict of interest among themselves.

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