

Histopathologic Patterns of Breast Mass and associated factors in Jimma University Medical Center: A Five-Year Cross-Sectional study



Research paper Submitted to Department of Pathology, Jimma University for Partial Fulfillment of Specialty Diploma in Pathology

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September, 2019

Jimma, Ethiopia

**Histopathologic Patterns of Breast Mass and its associated factors in Jimma
University Medical Center: A Five-Year Cross-Sectional study**

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Abstract

Background: Breast mass is common presenting symptom of breast disease. It has heterogeneous causes that include inflammatory, benign and malignant conditions. Feeling a lump in breast worries both the patient and the clinician because of the risk of breast cancer. Even though there is recent decline in mortality from breast cancer in resource-rich countries but still it causes significant mortality and morbidity in resource limited country.

Objectives: The objective of this study was to determine histopathologic patterns of breast mass and its associated factors in Jimma University Medical Center (JUMC), from 2014 to 2018.

Methods: A five years retrospective cross sectional study was conducted from August first to August 30 2019. Data was extracted from all eligible 301 reports of histologically diagnosed breast masses which were submitted to pathology department, JUMC from 2014 to 2018. Epi data version 3.1 was used for data entry and exported to SPSS version 20 for analysis. Descriptive analysis, Cross tabulation, chi square test and logistic regression were conducted to identify predictors. In the multivariable model, adjusted odds ratios together with their corresponding 95% CI were calculated to assess strength of association and to decide statistical significance at P-value of ≤ 0.05 . Then, the findings presented using text, tables and charts.

Result: In this study, breast cancer was the most common (54.2%) cause of histopathologically diagnosed breast mass with the peak age in 4th and 5th decades. The most common histologic type was ductal carcinoma of no special type (79.3%) followed by lobular carcinoma (7.9%) while the special types accounted for only 12.8% these includes papillary carcinoma (3.7%), Mucinous carcinoma (2.4%), medulary carcinoma (1.8%), metaplastic carcinoma (1.2%). Most of cancer were Grade II (58%) and stage III (80.3%) and lymph node metastasis (81.1%). Age and residency were the two most statistically significant predictors of breast cancer. The most common benign lesion was fibroadenoma (44.6%) followed by fibrocystic change (25.4%).

Conclusion: In the present study, breast cancer had been identified in individuals of younger age and most of the patients presented at stage III and IV. Ductal carcinoma of no special type (79.3%) was the most common histologic type. In male patient also the most common is Ductal carcinoma of no special type. Benign lesion like fibroadenoma and fibrocystic changes causes breast mass commonly in 2nd and 3rd decades

Keywords: Histopathologic Patterns, Breast Mass, Jimma University, Ethiopia

Acknowledgement

I would like to express my deepest respect to Jimma University, department of Pathology, department members, particularly to my advisor Dr Solomon Kebede (MD, assistant professor of pathology), for his advice, invaluable comment and support in conducting this study. I would like to thank also department of epidemiology and my advisor Mr.Dawit Regasa for his great and invaluable advice and comments. I also thank Jimma University for the financial support to conduct this study.

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Acronyms

AOR	Adjusted Odds Ratio
BCA	Breast cancer
CI	Confidence Interval
COR	Crude Odds Ratio
DCIS	ductal carcinoma in situ
FCC	Fibrocystic change
HIC	High income country
IDC	invasive ductal carcinoma
IHC	Immunohistochemistry
LIC	Low income country
JUMC	Jimma University Medical center
LIQ	Lower inner quadrant
LMIC	Middle income country
LOQ	Lower outer quadrant
NST	Ductal carcinoma no special type
SPSS	Statistical Package for the Social Science
TNM stage	Tumor Nodal Metastasis stage
UIQ	Upper inner quadrant
UOQ	Upper outer quadrant
WHO	World Health Organization

1. Introduction

1.1. Background

Human breast is modified sweat gland, covered by skin and subcutaneous tissue and it rests on pectoralis muscle from which it is separated by fascia. Breast pathologies includes both non neoplastic and neoplastic disease conditions having wide range of categories as benign, atypical and malignant lesions(1). More than 95% of breast malignancies are adenocarcinoma that arise from ductal or lobular system early as a carcinoma in situ, but at a time of clinical detection the majority (>70%) will breach the basement membrane and invade to the stroma. Invasive carcinoma can be divided into several clinically important subclasses based on morphological and molecular bases. It has varieties of morphologic types and only one third can be morphologically classified into special histological type. The remaining two third are grouped together ductal or no special type (NST) (2).

There are also different benign breast lesions that causes breast mass. In one study done in Iran most (65%) breast masses were benign and among all samples fibroadenoma was the most prevalent diagnosis accounting for 37.7% followed by fibrocystic lesion (17%) (3).

There are also different non neoplastic breast lesions that cause breast mass. There includes mastitis, duct ectasia, fibrocystic change, Fat necrosis, cystic lesions and different congenital disorders (4).

By far Breast cancer has significant public health and economic burden worldwide, and it is most important cause of mortality and morbidity in patients with breast mass. According to world health organization (WHO), invasive breast cancer is the most common carcinoma in women and commonly it is presented with breast mass. It accounts for 23% of all cancers in women globally and 27% in affluent countries(5).According to 2019 cancer statistics breast cancer is the most common estimated new cancer case, accounting for 30% cancer in women and it is the second most common cause of cancer death (15%) following lung cancer (23%) (6). Currently different studies in Africa also shows high mortality rate of breast cancer(7). This study is also intended to assess different histopathologic patterns of breast mass and associated factors.

1.2. Problem statement

According to 2012 global cancer statistics cancer is the most common cause of death in developed countries and it ranks second most common cause of mortality in developing countries. Over the years, the burden has shifted to less developed countries, which currently account for about 57% of the cases and 65% of cancer deaths worldwide(8). In 2008 also there was high burden estimated to cause about 12.7 million cancer cases and 7.6 million cancer deaths worldwide(8). So, the cancer burden is still increasing in countries of all income levels because of the growth and aging of the population. (9).

In 2018 breast carcinoma was the most common cancer affecting women in countries like united state of America, comprising almost 29% of all cancers occurring in women. In addition to this it was the second most common cause of mortality in women (14%)(10).

Breast cancer is also becoming the important cause of mortality and morbidity in developing countries. In sub-Saharan Africa (SSA) breast cancer ranks second following cervical cancer. But still benign breast lesion occupies majorities of the cases(11).

In systematic review done in 83 different studies done in 17 SSA countries shows high burden of breast cancer. Most of the patients were presented with late stage of the disease. On top of this there are limited modes of therapy which leads to poor survival from the disease in the region. As a result mortality rates due to breast cancers are also high. So late stage at diagnosis, and delays in a woman's journey to a cancer diagnosis, are features known to contribute to poor breast cancer survival rates(12).

Factors such as age, sex, parity, duration of breast feeding, family history of breast cancer and westernized diets are factors which were found to have association with breast cancer(13–15)(16). There is increased risk of breast cancer with age and age of 40 years old shows significant cancer risk. Women with a positive family history of breast cancer had a 2-fold increase in breast cancer (13).

These factors are not well studied in the Ethiopia. Despite the presence of limited studies and data reports in country, there is also a huge burden of breast cancer. It is most prevalent cancer causing 30.2% of cancers among the whole adult population followed by cervical cancer (13.4%)(17).According to one study done in Jimma University on superficial malignant neoplasm also breast cancer was the most frequent malignancy(18). Recognizing this threat, the government has recently launched a national cancer control plan. This plan set ambitious

objective to expand the methods of preventive intervention, launching screening test for early detection, and diagnosis and treatment with provision of chemotherapy, surgery and palliative care (17). Despite this attempt, still the efforts are not able to fill the gap because of the high burden of the disease and inadequate studies in the area. The current study is intended to identify histopathologic patterns and associated factors to reduce the gap.

1.3. Significance of the Study

This study has an immense significance because breast cancer is one of the leading cancers in women in all income level. Moreover patterns and factors that affect different breast disease are not well documented because of scarcity of published data in developing countries like Ethiopia. Despite the high burden of breast mass even the demographic distribution of both benign and malignant breast mass are not well addressed (11).

This study will explore different histopathologic patterns of breast mass and associated factors to overcome the limitation of such studies in this area. In addition it also focuses on the most common presenting symptom of breast disease which is breast mass (19). The diagnosis is made by histopathologic method, which is the gold standard to diagnose Breast mass.

The result of this study also benefit JUMC, regional health bureau and other health institution to create awareness, to set targets of intervention, to monitor and improve treatment quality and outcomes of patients with breast cancer by making early detection. It helps policy makers to design their strategies on prevention, early case detection and treatment of Breast cancer. It also helps practicing pathology by providing a base for confident diagnosis of common histologic patterns of breast mass. More importantly, results of this study can be used as an input for further studies on related topics.

2. Literature Review

2.1. Global burden of breast cancer and other benign mass

The global cancer burden is estimated to have risen to 18.1 million new cases and 9.6 million deaths in 2018. One in 5 men and one in 6 women worldwide develop cancer during their lifetime, and one in 8 men and one in 11 women die from the disease(20).According to estimate done in 2008 also 12 million new cases and 7.6 million death was due to cancer and in future also incidence of cancer worldwide is expected to rise to 26.4 million with 17 million death by 2030. The new cases of cancers are also expected to occur in developing countries. Currently data shows cancer causes more deaths than HIV AIDS, Tuberculosis and malaria together in this area(21).

Specifically among females, cancer is the second leading cause of death worldwide including Americas, Europe, and Western Pacific regions. Among these cancers, breast, colorectal, and lung cancers are the three most frequently diagnosed cancers. And breast cancer is mentioned as the most frequently diagnosed cancer and the one of the leading cause of death among women worldwide, with an estimated 1.7 million cases and 521,900 deaths in 2012(9).

Study done in University Florida College of Medicine shows recently there is decline in mortality from breast cancer in resource-rich countries is attributed to increased public awareness advances in breast imaging and screening, and to the new innovations in breast cancer therapy(22).

Even though there is high public health concern on breast cancer, benign lesions are also frequent. According to study in India out of 95 neoplastic lesions, 46 (48%) cases were diagnosed as benign lesions and 49 (52%) cases as malignant lesions. Fibroadenoma was most common (28%) followed by fibrocystic disease (14%), sclerosing adenosis (8%), intraductal papilloma (5%), apocrine adenoma (3%), benign Phyllodes (1%)(19).

In another retrospective study in Bangladesh on 228 sample of breast tissue sent for histopathology showed majority of the breast lumps were benign either fibroadenoma (39.4%) or fibrocystic disease (18.4%). Benign lesions were common in second to fourth decade and malignancy in fourth and fifth decades(23).

2.2. Burden of breast cancer and other benign mass in Africa

There is a marked discrepancy in cancer survival rate in between developing and developed countries. Currently cancer is an increasingly important public health problem in developing countries, including Africa.(21)

In review made from Medline, pub med and Scopus on cases of sub Saharan Africa shows Africa currently contribute highest age standardized breast cancer mortality rate globally, with the highest incidence rate recorded in SSA (24).

In study done in Ghana breast mass diagnosed as breast cancer is responsible for 28% of all cancers and contributes for 20% of all cancer death in women (26% and 11% both sex) (25).

In retrospective descriptive study done on 346 Tanzanian female patients with benign breast disease, breast lump was the most frequent presentation (67.6%). The majority of patients with benign disease, 255 (73.7%) were younger than 30 years. Fibroadenoma was the most frequent 95 (60%) followed by FCC (19%)(26).

2.3. Burden of breast cancer and other benign mass in Ethiopia

There is limited data about cancer in Ethiopia because there is no population based cancer registry except in Addis Ababa. But it is estimated that the annual incidence of cancer reaches about 60,960 cases and the annual mortality over 44,000(17).

According to study done on primary data on 8539 patients from Addis Ababa population based cancer registry and supplemented by 1,648 cancer cases data on six region, in 2015, there was estimated 21,563 (95% CI, 17,416- 25,660) and 42,722(95% CI, 37,412- 48,040) incident cancer cases were diagnosed in males and females, respectively. This makes a male-to-female ratio of approximately 1:2. Breast cancer was by far the most common and prevalent cancer making 33% of cancer cases followed by cervical cancer (23%). With age there was increment in cancer incidence of breast and ovarian cancer was at 60 to 64 years. Among all breast cancer cases identified in Addis Ababa with staging all are stage III and above(27).

Study done on African cancer registry network (AFCRN) done for 6 months on a total of 5701 residents in Addis Ababa city, shows the most commonly leading cancers among females were cancers of the breast (33%), Cervix uteri (17%) and Ovary (6%), while among males cancers of colorectal (19%), Leukemia (18%) and prostate (11%)(28).

A prospective study of 197 patients who presented to three hospitals in Addis Ababa shows most patients were aged less than 50 years (70.6%) at the time of diagnosis. IDC is the most common (79.2%) breast cancer. Most patients (70%) presented with advanced stage (III and IV) and more than (90%) tumors were more than 2 cm in size. Right breast was involved in 53.8% of patients and the upper outer quadrant was the most common quadrant (78.2%) involved(29).

According to prospective study done on a total of 3,200 cases in southwest Ethiopia Jimma university on superficial malignant neoplasm, breast cancer was the most common superficial malignant neoplasm 79 (29.6%) followed by non Hodgkin's lymphoma accounting for 37(13.9%) of cases. The most common malignant neoplasm in women was also breast carcinomas found in 74 (27.7%)cases, whereas in men non-Hodgkin's lymphomas were found in 29(10.9%) cases (18).

2.4. Clinical features and factors associated with breast mass

A four year retrospective study done on 140 Saudi females showed 110 cases were breast cancer (BCA) with median age of presentation of 46 years. Most of breast cancer cases (68%) were before 40 years and more than 75% in patients aged younger than 50 years. The age of 40 years old shows significant cancer risk. The median age for nonmalignant mass is 42 years and fibrocystic change (FCC) accounting for 33.3% followed by fibroadenoma(13).

Breast cancer diagnosed before age of 40 year was evaluated in descriptive retrospective study among 120 patients in AC Camargo Cancer Center, Brazil. The mean age at diagnosis for primary breast cancer was 30 years. The most common histological type breast cancer was invasive cancer NST (73.8%)(30). Other similar study also shows that breast mass is the most common presenting symptom(79%) followed by pain associated lump which is the second most common presenting symptom(19).

According to cohort study done in united state of America (USA) on 3853 African American women with complete biopsy, fibroadenoma occurred more frequently in biopsy of younger women. Women with fibroadenoma did not have an increased risk of developing breast cancer compared with the general population(31).

Multicenter 10 year's retrospective study done in china on 4,211 breast cancer cases, showed more breast cancer in low socioeconomic status(SES) 25.5% of cases were diagnosed

late(stage III and IV) than those in high(20.4%) and higher(14.%) ($X^2 = 80.79$, $P < 0.001$). Case with low education diagnosed at late stage compared to those with more educated cases(32).

A cross sectional study done in 254 Pakistani female on three year collected biopsy specimen report, the mean average of breast lesion is $25.18 \pm SD 11.73$ years. The most common identified were Benign 191(75.3%), followed by inflammatory 30(11.8%) and malignant lesion 30 (11.8%). The most common presenting symptom was mass and turned out as fibroadenoma in 147(72.8%). All the malignant cases were invasive ductal carcinoma with median age of 45.6 ± 11.63 years. Ten cases (3.8%) encountered in male and all cases were gynecomastia(33).

According to systematic review done on 83 studies done on 26,788 sub-Saharan African (SSA) women from 17 different countries late stage diagnosis were higher in black than non black SSA. The percentage of women with late diagnosis was decreasing over time but still it is higher compared to other area. Three hundred breast cancer patients were recruited, 67.7% with late stage (III/IV) at diagnosis. Multivariate analysis was done to see factors associated and showed lower educational level (OR 2.35; (CI) 1.04, 5.29), not believing in a cure for breast cancer (OR 1.81; 95% CI 1.09, 3.01), and living in a rural area (OR 2.18; 95% CI 1.05, 4.51) had significant association with late stage diagnosis of breast cancer(12).

Females make up 49.5% of the world population; however, they form a larger proportion of the population over 60 years, among whom cancer occurs most frequently, in both HICs and low- and middle-income countries (LMICs) due to differences in life expectancy and leading causes of mortality(7).

According to review made from Medline, pub med and Scopus on cases of SSA certain factors such as westernized diet, urbanization and possibly increasing awareness had been implicated, though their specific contributions were yet to be fully established (24).

In study done in Ghana on breast cancer the average age at diagnosis of breast cancer among African women is around 50 years or younger which is a considerably younger age than seen in Caucasian populations. The proposed reason is likely due in part to the fact that fewer African women live past 65 years of age compared to women in developed countries. African American women also tend to develop cancers at younger age than Caucasian women in united state. African women develop unique breast tumor subtypes which could also be an important contributory factor to the unusual age distribution noted (25).

2.5. Histopathologic patterns of Breast mass

According to a retrospective study done in Wenzhou Medicine University in china on 953 breast cancer patients,73 patients were ductal carcinoma in situ(DCIS)(9.29%),72 patients were ductal carcinoma in situ with micro invasion(DCIS. mi)(9.16%),721 patient were invasive ductal carcinoma(IDC)(83.26%).The incidence of lymph node metastasis in DCIS(6.85%) was lower compare with IDC(38.75%)(34).

A retrospective study was done on 20 cases of male breast cancer in Turkey University hospital. In this study, the median age at presentation was 66.7 ± 10.9 years and the most common presenting symptom was breast mass in 65% (13) cases. Axillary lymph nodes contained metastasis in 6 of the cases. The most common histologic subtype was IDC NST 70% (14) cases and one case mucinous and the remaining 25% was DCIS(16).

In other retrospective study done in Italy on 102 patients with DCIS, only one patient (0.98%) had positive sentinel lymph node indicating sentinel lymph node metastasis is extremely rare in patients with pure DCIS. Of the 102 patients, 20 (19.6%) had palpable, and 82 (80.4%) non-palpable breast tumors (35).

Traditionally breast carcinoma is classified based on morphologic feature. The most common breast carcinoma is invasive ductal carcinoma (IDC) not otherwise specified (NOS). Special types of breast cancer include invasive lobular carcinoma, adenoid cystic carcinoma, apocrine carcinoma, infiltrating ductal carcinoma with osteoclastic giant cells, medullary carcinoma, metaplastic carcinoma, micropapillary carcinoma, mucinous carcinoma, neuroendocrine carcinoma, invasive cribriform carcinoma, tubular carcinoma,secretory carcinoma, lipid-rich carcinoma and glycogen-rich clear cell carcinoma(22).

In Collaborative meta-analyses were undertaken of 194 unconfounded randomized trials done in traditional, clinical and pathologic factors such as age, histologic grade, tumor type, tumor size and hormone receptors have commonly been used to assign patients into risk groups to receive adjuvant hormonal, radiation therapy and/or chemotherapy(22).

According to contemporary cohort done on African American women with benign breast disease,Breast fibroadenomas are not associated with increased breast cancer risk. Breast fibroadenoma occur most frequently in women in their 20s but can occur at any age; it is estimated that 10% of women have breast fibroadenoma(31).

In 5 year study done in Indian on 9086 biopsy breast biopsies were 366 (4%) during this. The incidence of benign neoplasm was 50.4% & for malignant neoplasm was 49.6%. Among all types of specimen received, excision biopsy was most common (48%). Upper outer quadrant was most commonly involved region for breast neoplasm. The most common benign neoplasm was fibroadenoma (87%) and invasive ductal carcinoma NST (88%) was malignant neoplasm(19).

In 10 year retrospective study done in Uganda 1870 patient female made up 97.3%(36:1 ratio). Two third of cases were benign(68%), the remaining were malignant. Fibroadenoma (59.6%) and FCC (17.9%) were the two most frequent among benign cases. Different breast cancer morphologies were identified, Infiltrating ductal carcinoma was the most common which contribute for 55.6% followed by infiltrating lobular carcinoma (10.9%) and papillary carcinoma (0.7%) while medulary carcinoma also identified in 0.7% of cases. The remaining other histopathologic type contributes for less than 0.5%. Cancers overall showed a steady increase in the absolute numbers diagnosed per year over the study period whereas the benign diseases did not show any preferential pattern. Nonetheless still benign lesions are higher than the malignant lesions(11).

2.6. Conceptual framework

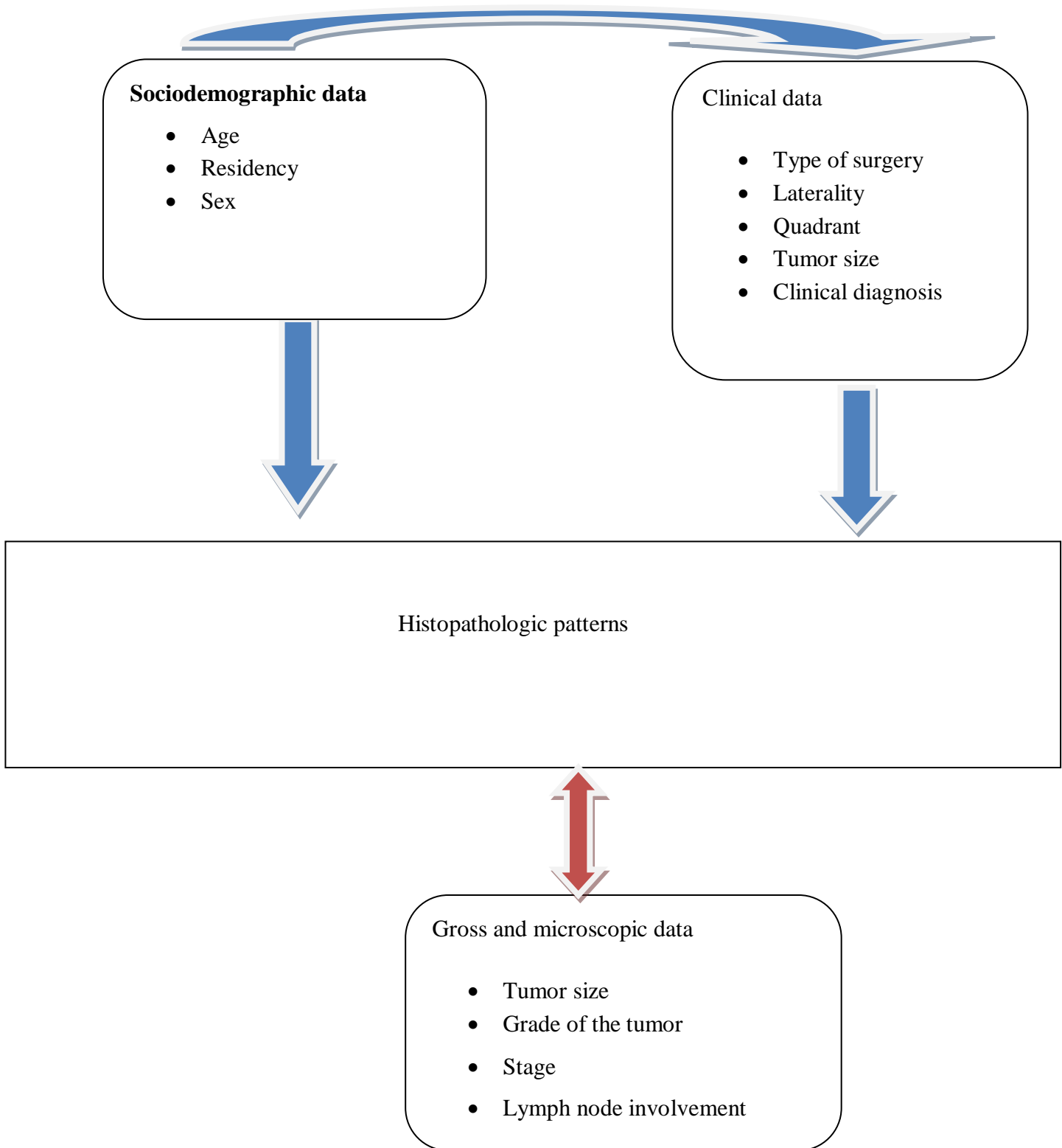


Figure 1: Conceptual framework for histopathologic patterns of breast mass and associated factors (13)(14) (15)(16) (19)

3. Objectives

3.1. General Objective

To determine histopathologic Patterns of patients with Breast Mass and associated factors in Jimma University Medical Center, from 2014 to 2018

Specific objectives

To determine histopathologic patterns of patients with breast mass in Jimma University medical center

To identify the association of breast mass with age, sex and residency

To determine the size and site of breast mass in terms of laterality and quadrant

To assess grade and stage at presentation among confirmed breast cancer cases

4. Methods and materials

4.1. Study area

The study was conducted in Jimma university medical center which is one of the old public hospitals in the country. It was established in 1930 E.C by Italian invaders for the service of their soldier. It is located in Jimma city 352 km southwest of the capital Addis Ababa. It has a latitude and longitude of 7°40'N 36°50'E (36). Currently the hospital is the only teaching and referral hospital in the southwestern part of the country, providing service to 15 million people with 1600 staff members, 32 intensive care units, and 800 beds. It is also the only hospital giving histopathology and cytology services in the southwest region part of the country(37).

Pathology department is one the main department in the center giving services like histopathologic diagnostic service, fine needle aspiration cytology, fluid cytology and other services including hematopathology with annual average patient flow of 1,636 for histopathology and for fine needle aspiration cytology 5,127. The department has five pathologists, 15 practicing pathology resident, two general practitioners, and two technicians and 7 assistant technicians. Currently, it is the only hospital that renders FNAC, surgical biopsy and other pathology services to this part of the country.

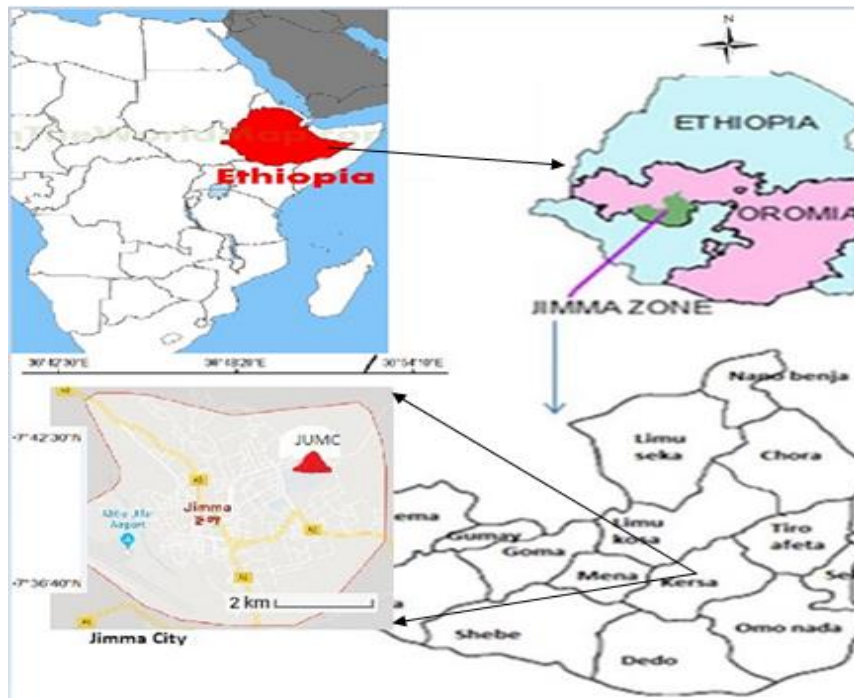


Figure 2 : Map showing the study area, JUMC, Jimma, Jimma zone, Oromia , Ethiopia (38)(39)

4.2. Study design and period

Five years retrospective cross sectional study design was used from histopathologic reports from 2014 to 2018. The study was conducted from August first to August 30, 2019.

4.3. Population

4.3.1. Target population

All patients who were in the catchment area of Jimma university medical center

4.3.2. Source population

All patients who submitted biopsy specimen to pathology department for histopathologic diagnosis from 2014 to 2018

4.3.3. Study population

The selected patients' records from all those who submitted breast tissue biopsy to pathology department from 2014 to 2018

Eligibility criteria

Inclusion Criteria

All patients who submitted Breast tissue specimen 2014 to 2018

Exclusion Criteria

Eighteen cases were excluded by using the following Criteria

Hard copies reports without diagnosis

Report that shows secondary metastasis from extra breast tissue

Reports with non breast proper lesions

Cases of recurrent breast malignancies

4.4. Sample size and Sampling technique /Sampling procedures

Purposively, all breast masses' biopsy records of 319 cases from the year 2014 to 2018 those who fulfill the inclusion criteria were manually selected and then grouped by year after being retrieving the entire hard copies of 7361 histopathology reports from the Department of Pathology archives. Eighteen cases were excluded by exclusion criteria in which there, one was without diagnosis, one was recurrent Breast cancer, three lipoma, three angiosarcoma, four other

sarcomas and 6 other benign lesions. Information important for the study were collected by checklist from 301 hard copies and, then coded and entered into Epi data version 3.1 on password protected computer. Finally data was exported to SPSS version 20 for analysis.

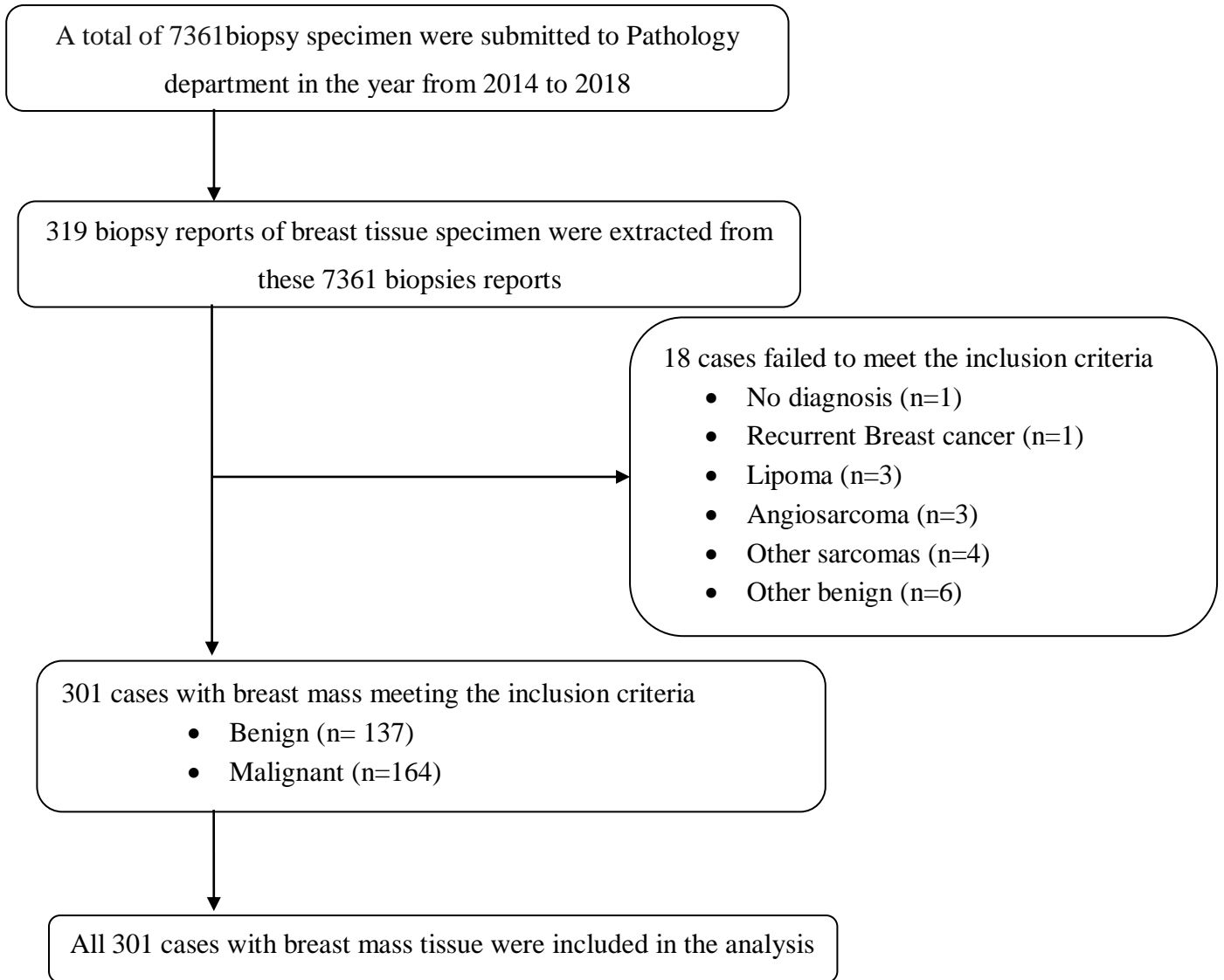


Figure 3 Diagram showing sampling procedure of the selected 301 breast mass biopsy records from the year 2014 to 2018, JUMC

4.5. Variables of the Study

Dependent variable(s)

Histopathologic diagnosis	Grade
Pathologic T stage (tumor size and skin involvement)	Lymph node involvement
Stage	

Independent Variables

Age	Laterality
Sex	Year
Residence	Quadrant

4.6. Data collection procedures (Instrument, personnel)

Structure checklist was adopted through reviewing of literatures and books to include information that fulfill the objective of the study. After adequate training of two final year and first year residents together with two technical assistant collected the Data by using the checklist.

4.7. Operational definitions

Breast mass: patient presented with breast mass which is excised and submitted for Histopathologic diagnosis

Histopathologic pattern: specific type of histopathologic diagnosis made on biopsy specimen

Urban: patient coming from Jimma city

Rural: patient coming outside Jimma city

Tumor size: the largest diameter of the mass

Laterality: Breast mass involving either side of the breast; left, right or both/bilateral breast

Lymph node involvement: breast cancer metastasis to lymph node

Quadrant: quadrant of the breast in which the mass was identified

4.8. Data analysis procedures

Data collected by checklist was coded, edited and interred into Epi Data version 3.1 and the exported to SPSS version 20 for analysis. Descriptive analysis was done for frequency and distribution of independent variables and histopathologic patterns of Breast mass. Cross tabulation, chi square test and logistic regression conducted for identifying predictors of histopathologic patterns. Those variables with a *P*-value <0.25 in binary logistic regression were

recruited for multivariable logistic regressions. In the multivariable model, adjusted odds ratios together with their corresponding 95% CI were calculated to assess strength of association and to decide statistical significance at P-value of ≤ 0.05 . Then, the findings presented using text, tables and charts.

4.9. Data quality management

Checklist was adopted after reviewing different literatures and books. In addition to this, data collectors received adequate training about the study and what to do during data collection. The checklist was pretested on 30 cases (10% of total sample size) of biopsy hard copy reports done in 2005/12 which were not included in the current study. Then the checklist was revised with some modification of the variable and the final revised checklist was used for data collection. After checklist was checked for completeness then data was entered into Epi data on password protected computer. The principal investigator was supervising the data collection daily.

4.10. Ethical consideration

Before Data collection the full protocol of this study was submitted to Jimma university research and ethical committee. Then permission letter to conduct the study was obtained from research and ethical committee of Jimma University. Specific unique identifier was used to collect information rather than using patients' name. Information obtained during the study was kept confidential. The result of the study didn't include patient name and other personal information.

4.11. Dissemination plan

The result of this study will be disseminated and communicated to Jimma University, regional health bureau, Ethiopian Federal Ministry of Health (EFMOH) and other institutions. And the result will be used by policy makers and other concerned bodies.

4.12. Limitation of the study

Only morphologic diagnosis of the cases was used. Hormonal markers, molecular and immunohistochemical (IHC) markers were not used for diagnosis.

Because of the retrospective nature of this study, it was not possible to measure other variables associated to breast cancer like family history, reproductive and was not included

Because of the resource limitation and awareness of the clinicians usually malignant and suspicious cases were evaluated for histopathologic examination

5. Result

Out of 7361 biopsy reports for specimens submitted to JUMC on the last 5 years, a sample of 301 histopathologic reports of breast mass were included in the study.

Sociodemographic profiles

Out of 301 sampled cases majority of them (277 cases) were female while 23(7.6%) were male. One case had no sex record and overall female to male ratio was 12:1 (figure 4). Breast cancer was by more common in female than male in a ratio of 10.5:1. From 277 female cases, 53.8% was breast cancer while 60.9% male cases were breast cancer. This shows the chance of mass to turn out malignant was higher in male than in female but this finding was not statistically significant ($X^2=0.425$, $df=1$, $p=0.514$).

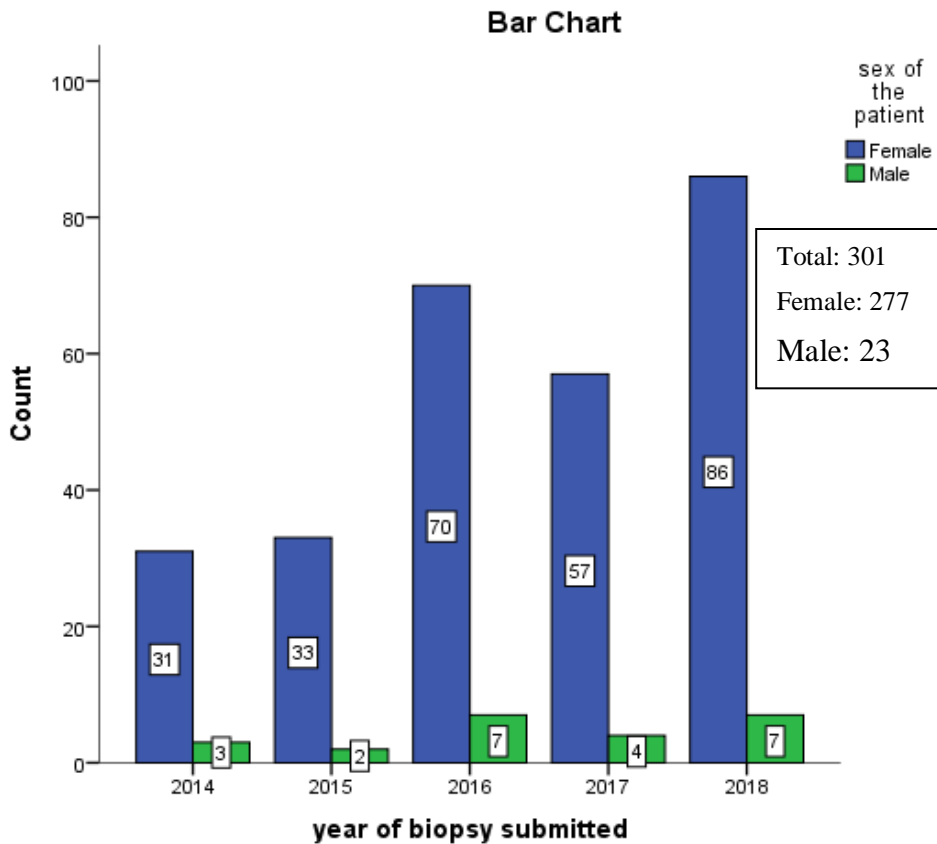


Figure 4: Bar chart showing frequency distribution of sex over the last five years from the year 2014 to 2018, JUMC, N=300

Most of the patients (76.4%) with recorded residency were from rural area (Table 1). More than half (57.7%) of these rural cases were breast cancer while only 38.3% of urban cases were breast cancer. This showed strong association between breast cancer and residency which was statistically significant ($p= 0.009$) (figure 5, table 2). With binary logistic regression there was increment in risk of breast cancer in rural patients compared to urban area ($p =0.01$, $OR=1.543$, $CI 1.174-1.748$).

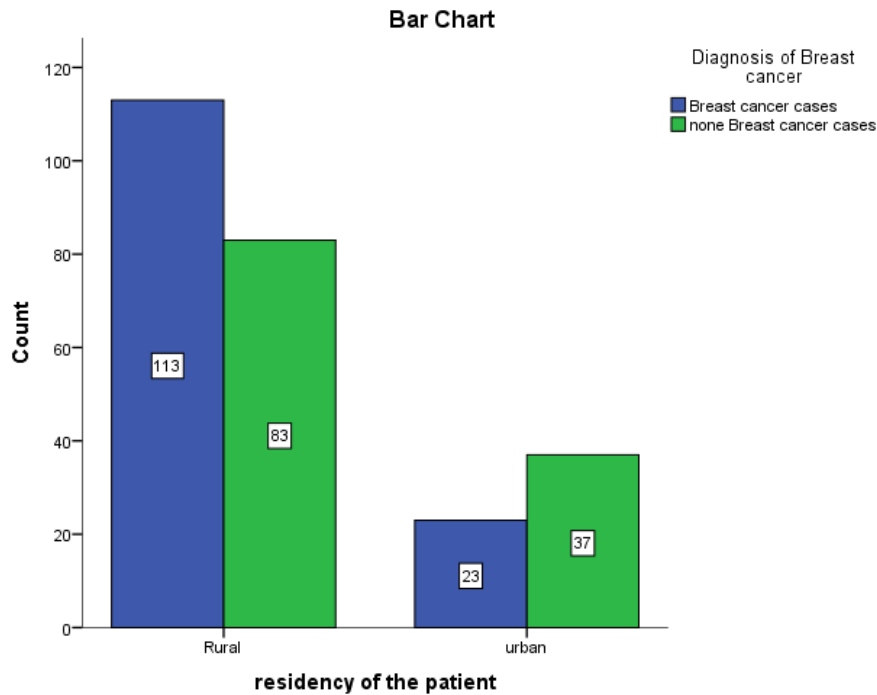


Figure 5: Graph showing distribution of breast cancer among rural and urban in JUMC from 2014 to 2018, N=256

The mean age of the patients with breast mass was 36.81 ± 14.26 years with a minimum age of 11 years and a maximum 100 years (figure 6). Most of breast cancer (83%) occurred after the age of 30 years compared with benign lesion which was only 37% after the age of 30 years. This was statistically significant ($X^2=78.69$, $df =5$ $p<0.001$). The minimum age at which breast cancer diagnosed was 18 years while maximum was 100 years with median age of 40 year while mode was also 40 (27 times) years. As age of patient increases risk of having breast cancer increases and fourth and fifth decade of life was found to associate with the increased risk of having breast cancer. More than half (59.2%) of breast cancer cases was occurred in these two decades ($p<0.01$ $OR=1.901$ $CI 1.742-1.962$, $p<0.01$, $OR=1.956$, $CI 1.867-1.986$) (Table 2).

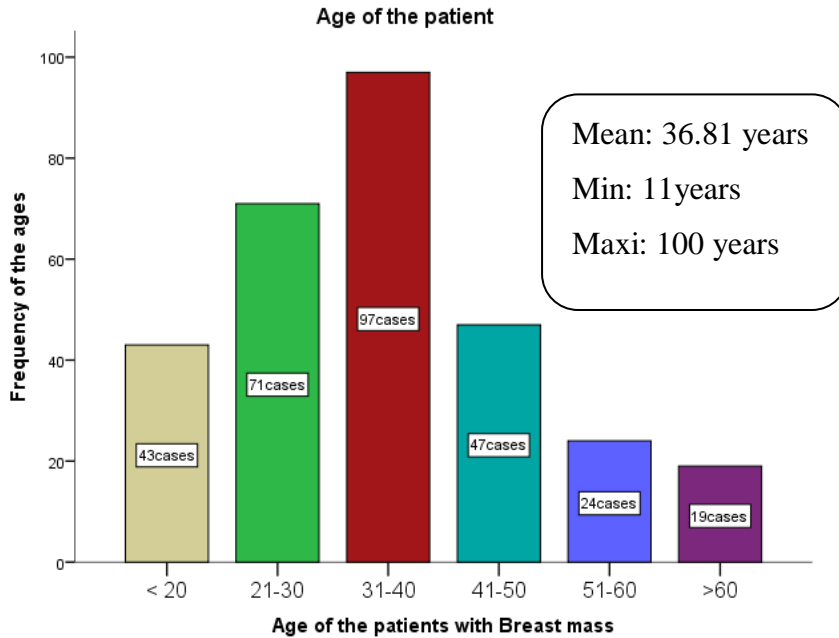


Figure 6: Frequency distribution of Age of patients with breast mass in years from the year 2014 to 2018, JUMC, N=301

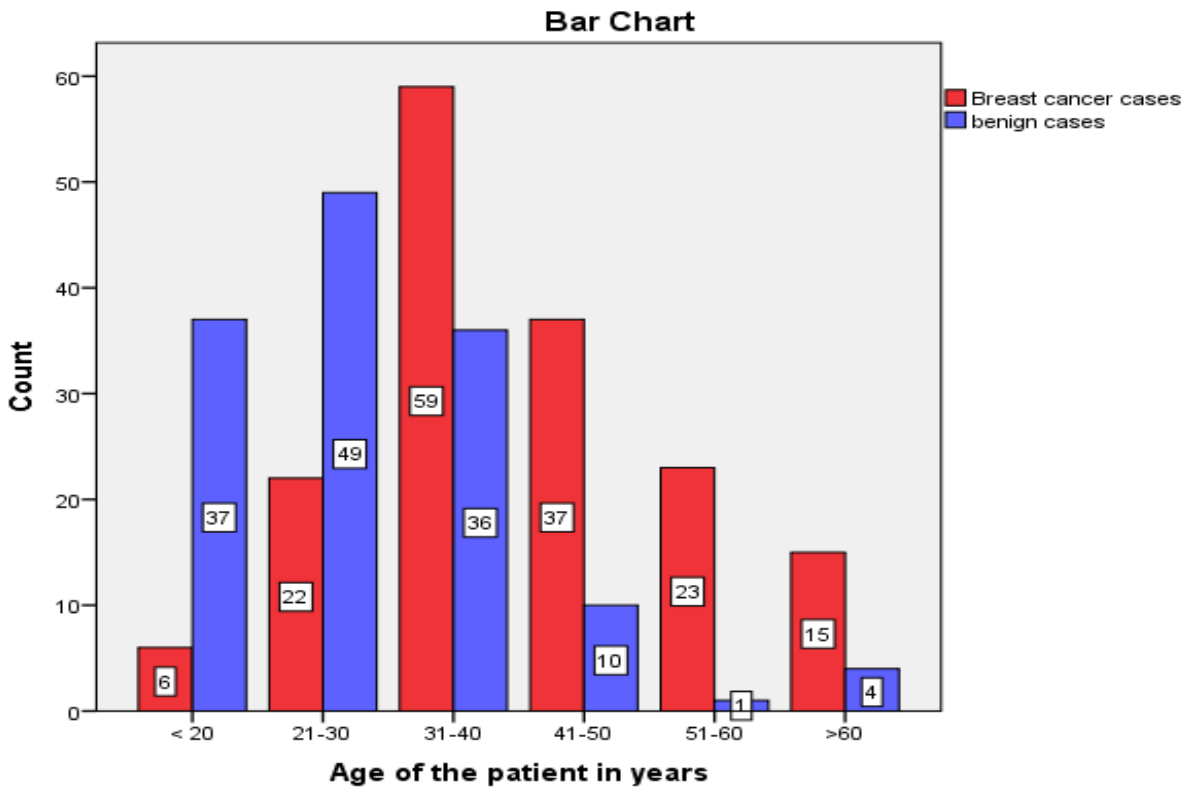


Figure 7 : Shows distribution of breast cancer and benign cases among different age groups on selected breast mass biopsy records from the year 2014 to 2018, JUMC,N=301

5.1. Clinical data of patients with Breast mass

There was almost equal involvement of both Breasts. Right breast was involved in 132(49.4%) cases while 128(48.3%) cases showed involvement of left breast and in the remaining 2.2%, both breast was involved. Similarly from 145 cases of breast cancer with documented laterality, there was almost equal finding of breast cancer in both side, with 51% occurred on the right while 48.5% on left breast and one cases was bilateral. And the association between laterality and breast cancer was statistically not significant($X^2=3.672$, $df=1$, $p= 0.159$).

Mastectomy specimen was submitted in 154(51.2%) cases while for the remaining 147(48.8%) lumpectomy was submitted and in around two thirds of cases (65.5%), UOQ was involved followed by central (13%) while the remaining 21% involved other quadrants like LOQ, UIQ, and LIQ in decreased order (figure 8). Sixty percent of breast mass in UOQ breast and 80% of mass in central quadrant of the breast were malignant. But there was no statistically significant association between quadrant and breast cancer($X^2=5.997$, $df =4$, $p= 0.199$).

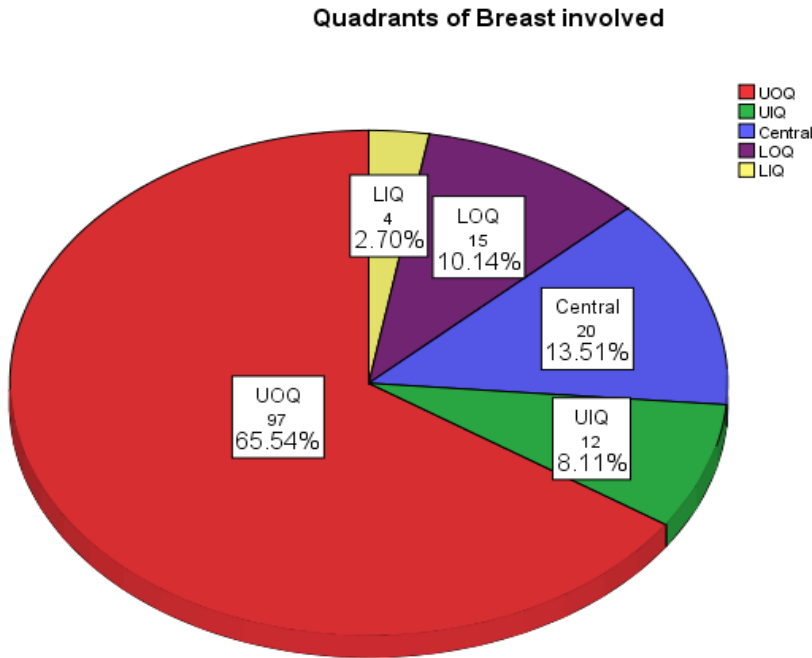


Figure 8: Pie chart showing frequency distribution of breast mass in different quadrants of Breast on selected breast mass biopsy records from the year 2014 to 2018, JUMC,N=148

More than half (56.4%) of breast mass had size larger than 5cm(table 1) and most of the tumor (82.6%) sized less than 2cm were benign and while 70.7% of breast mass with size greater than 5cm was malignant. As size increases chance of having breast cancer increases (figure 9). This was statistically significant ($X^2=45.732$, $df =2$, $p < 0.001$). Binary logistic regression analysis showed size greater than 5cm had increased risk of having breast cancer compared to size less than 2 cm ($p < 0.001$ OR=1.913 CI 1.730-1.912)(table 2). Half (50.1%) of benign cases had size between 2-5cm.

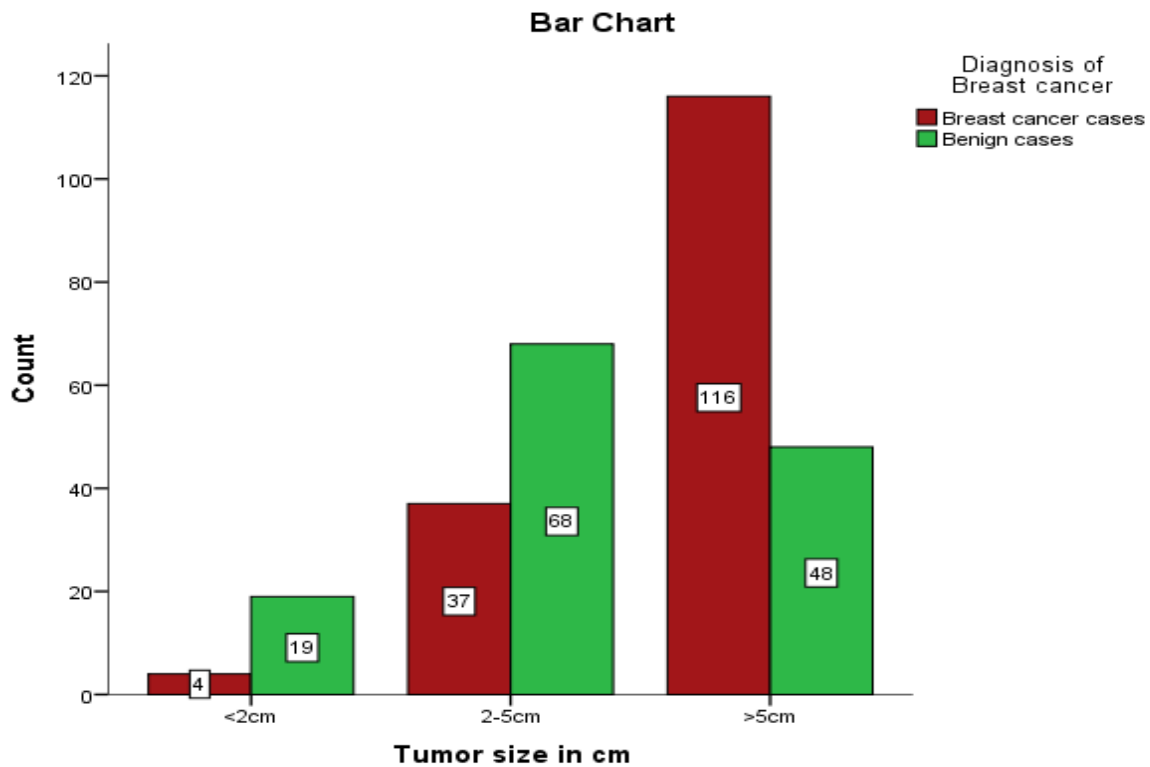


Figure 9 : Breast cancer cases distribution in categorized size breast mass in JUMC from the 2014 to 2018, N=294

The most frequent clinical diagnosis was breast cancer (50.9%) followed by fibroadenoma (21.2%).

5.2. Histopathologic patterns of breast mass

More than half (52.82%) of the specimens were malignant while 40% were benign, 4% inflammatory and the remaining 3% were borderline and precancerous cases (figure 10).

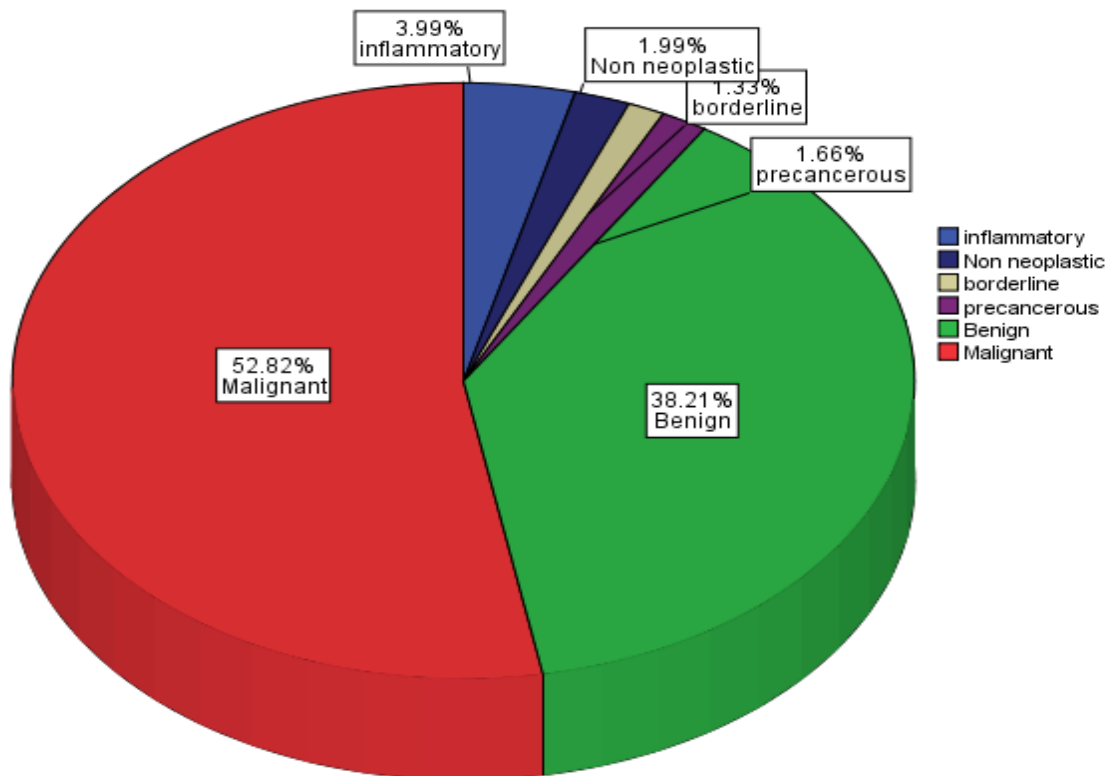


Figure 10: shows distributions of diseases categories that cause breast mass in JUMC from 2014 to 2018, N=301

Ductal carcinoma NST was the most frequent cancer diagnosed during the study accounting for 79.3% followed by lobular carcinoma (7.9%) while the remaining 12.8% are ductal carcinoma with different special feature. These were 7 cases (3.7%) of papillary carcinoma, 4 cases of mucinous carcinoma, 3 cases of medulary carcinoma, 2 metaplastic carcinoma, and 2 other carcinoma. There were two cases of precancerous cases, one DCIS and one LCIS (figure 11). Out of seven cases of Phyllodes tumor, 4 of them were benign, 3 borderlines and no Malignant Phyllodes was identified.

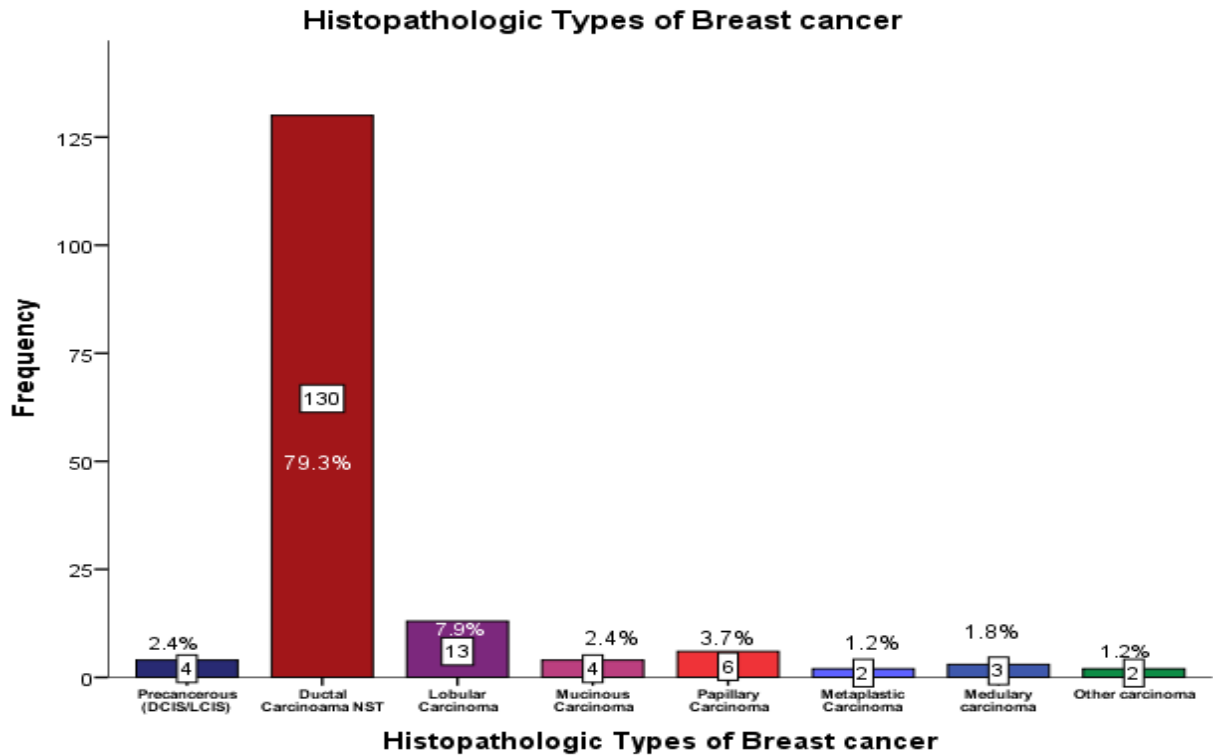


Figure 11: shows different histopathologic types of breast cancer by bar chart in JUMC from 2014 to 2018, N=164

In 2014, from submitted lumpectomy and mastectomy specimens breast cancer was 54.5%, 2015(52.8%), 2016(62.3), 2017(55%) and in 2018(44%). Trend of breast cancer is still increasing and reached peak in 2016.

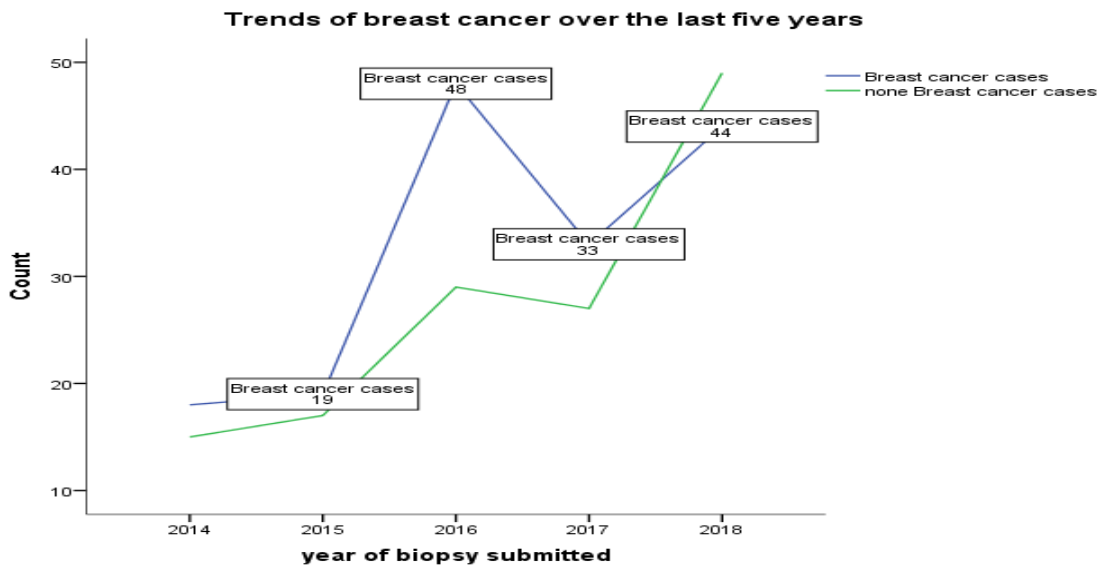


Figure 12: Showing trends of breast cancer over the last five years in JUMC from 2014 to 2018, N=301

Most of breast cancer cases were presented with advanced disease stage and had large tumor size. From malignant cases 73.9% of cases have size greater than 5cm and 27.4% of breast cancer cases have extension to local structure (T4). In 109 cases of breast cancer lymph node was identified (submitted) and lymph node was involved 90 cases (82.5%). All of cancer involving central quadrant of the breast had lymph node involvement. Compared to LOQ, UOQ had three times risk of lymph node involvement ($p=0.189$ OR= 3.094 CI 0.574-16.674). No significant association between histologic type of breast cancer and lymph node involvement ($X^2=2.537$, $df=2$ $p=0.281$). Eighty four percent of breast cancer with size 2-5cm had lymph node metastasis while 82.4% of tumor size >5cm had lymph node metastasis and there was only one cases of breast cancer that was less than 2cm but with positive lymph node. But this is not statistically significant ($X^2=0.237$, $df=2$ $p=0.888$).

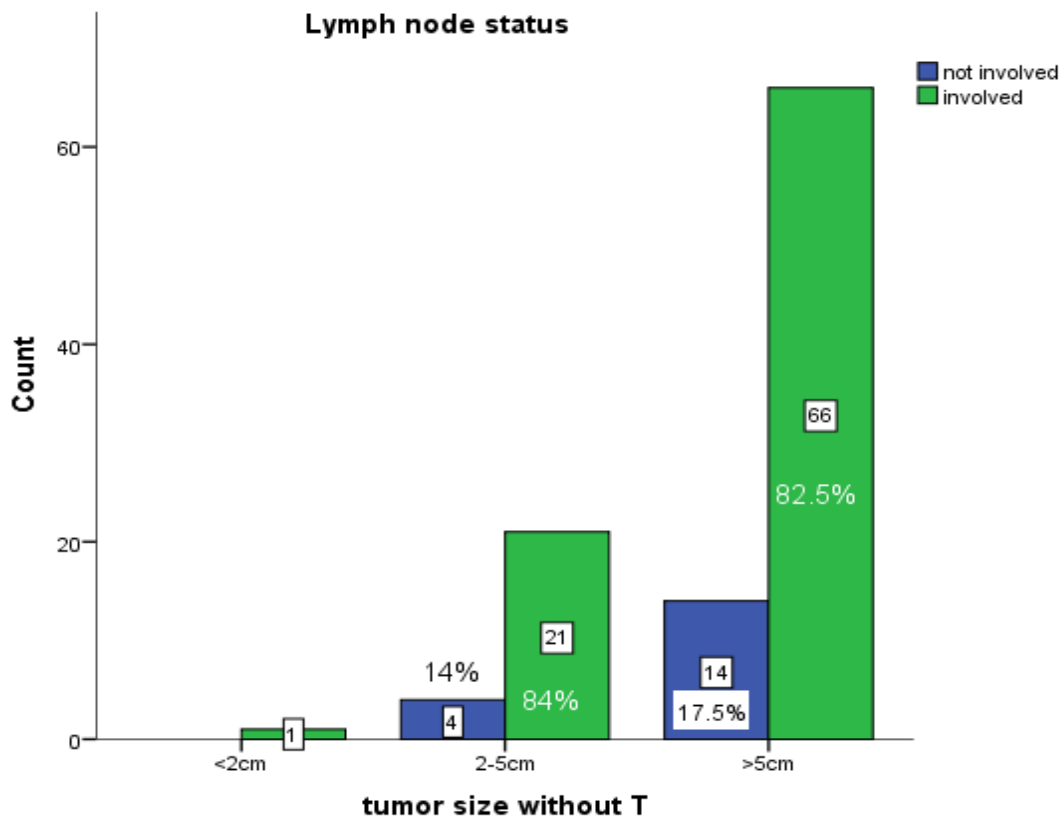


Figure 13 : Lymph node status distribution among different tumor size in JUMC from 2014 to 2018 , N=106

Most of the patients (84.5%) from 71 cases with documented TNM stage had stage III and IV breast cancer. Eighty eight percent of rural patients were presented at late stage while 75% of urban came at late stage but this result was statistically not significant ($X^2=1.087$, $df=1$ $p=0.297$). Half of cancers with tumor size larger than 5cm had late stage (stage III and IV) presentation ($X^2=8.786$, $df=2$ $p=0.012$). Stage of the breast cancer had also no significant association with age and sex.

Sixty nine invasive carcinomas were graded according to the Nottingham modification of Bloom and Richardson grading system and from these cases more than half (58%) was grade II, 29% was Grade III while only 13% was Grade I carcinoma (table 1). All of grade III cancers had lymph node involvement while 50% of grade I tumor had lymph node involvement which was statically significant. ($X^2=7.453$, $df=$, $p< 0.024$). Compared to grade I, grade II breast cancer had 2.7 time chance of lymph node involvement but this was statistically not significant ($p=0.269$ OR=2.750 CI 0.456-16.525).

From the total cases, 137(45.5%) were benign lesions. Fibroadenoma was the most frequent breast mass making almost half 58 cases (48.7%) of benign tumors. The most common age for fibroadenoma was 11-20 years accounting for 43.1% while 40% occur between 21-39 year. Only 17.3% occurred beyond 40 years. Fibrocystic change was second frequent, 27.7% (33 cases) of benign neoplasm. The most common age for fibrocystic disease was 31-40 years with account for 36% and 30% occurred 21-30 years. The remaining other 26 cases(18%) of benign lesions were masses like sclerosing adenosis, fibroadenosis and gynecomastias (Table 1).

Out of 301 cases, only 11 cases(3.7%) was inflammatory cases, -three cases were granulomatous mastitis, 3 cases of breast abscess and the remaining were chronic non specific mastitis. There were also other 26 non neoplastic case mainly including duct ectasia, galactocele and retention cyst.

The most common cause of breast mass in male patient was ductal carcinoma NST(47.8%) followed by Gynecomastia(26.1%) while papillary carcinoma and fibrocystic change contributes for 13% each. In female patient ,ductal carcinoma(43%), fibroadenoma(20.6%), fibrocystic change(10.8) and the remaining are caused by diferrent benign and malignant lesions.

Table 1: Table showing summary of frequency distribution of variables & histopathologic patterns from the year 2014 to 2018, JUMC

sex of the patient			Histopathologic Diagnosis			
	Frequency	Percent %			F	%
Female	277	92.3	Benign	Fibroadenoma	58	19.3
Male	23	7.7		Fibrocystic change	33	11.0
Total	300	100		Sclerosing adenosis	2	0.7
				Inflammatory	11	3.7
Residency Of The Patient				other Benign tumors	26	8.6
Rural	197	76.4	Phyllodes	Benign	4	1.3
Urban	61	23.6		Borderline	3	0.1
Laterality Of The Mass			Precancer	(DCIS/LCIS)	4	1.3
Right	132	49.4		Malignant	Ductal carcinoma NST	130
Left	129	48.3	lobular Carcinoma		13	4.3
both	6	2.2	Mucinous Carcinoma		4	1.3
Type Of Specimen			papillary Carcinoma		6	2.0
lumpectomy	154	51.2	Metaplastic carcinoma		2	0.7
mastectomy	147	48.8	Medulary carcinoma		3	1.0
tumor size without T			Other		2	0.7
<2cm	23	7.8	Lymph node status			
2-5cm	105	35.7	not involved	21	18.9	
>5cm	166	56.5	Involved	90	81.1	
T4(local extension)	43	14.6	Grade of cancer			
Disease category			grade 1	9	13.0	
	Frequency	Percent	grade 2	40	58.0	
Inflammatory	12	4.0	grade 3	20	29.0	
Benign	115	38.2	Stages of cancer			
Borderline	4	1.3	stage 1	1	1.4	
Precancerous	5	1.7	stage 2	10	14.1	
Malignant	159	52.8	stage 3	57	80.3	
Other non neoplastic	6	2.0	stage 4	3	4.2	
Total	301	100.0				

Table 2: Candidate variables for multivariable binary logistic regression analysis to assess factors associated with breast mass among the selected breast mass biopsy records from the year 2014 to 2018, JUMC

	COR	95% C.I.		<i>P-value</i>
		Lower	Upper	
Residency				
Urban	1			0.00
Rural	1.543	1.174	1.748	0.01**
Age in year				
<20	1			0.00
20-30	1.639	1.02	1.867	0.046
31-40	1.901	1.742	1.962	0.00**
41-50	1.956	1.867	1.986	.000**
51-60	1.993	1.938	1.999	.000**
>60	1.957	1.225	1.989	0.00
Size Of The Tumor				
<2cm	1			0.00
2-5cm	1.613	0.778	1.878	0.106
>5cm	1.913	1.73	1.972	.000**

**significant p value

Age ($p < 0.001$), Residence ($p = 0.009$), quadrant ($p = 0.199$), laterality ($p = 0.159$) of breast mass and tumor size ($p < 0.01$) as indicated in the table 2 were tested at P-value less than 0.25 for their association & selected as candidate variables for multivariable analysis. Multivariable logistic regression analysis was performed in backward method though four step on these variables and finally age and residency showed to be the independent predictors of breast cancer which was statistically significant at p value and AOR ($p < 0.001$ OR=1.082, $p = 0.031$ OR=1.654) (Table 3).

Table 3: Factors independently associated with breast mass among the selected breast mass biopsy records from the year 2014 to 2018, JUMC

		AOR	95% CI		Adjusted p-value
			Lower	Upper	
Step 1^a					
Age in years	Age	1.067	1.026	1.107	0.002
residency	Rural	1.524	1.45	1.944	0.192
Quadrant	UOQ				0.517
	UIQ	1.582	1.695	7.944	0.577
	Central	1.62	1.937	2.283	0.29
	LOQ	2.863	0.483	16.961	0.247
	LIQ	1.491	0.086	25.841	0.784
Size of the tumor	>2cm				0.221
	2-5cm	1.391	0.128	15.097	0.786
	>5cm	1.546	0.14	5.006	0.519
laterality	Right	1.233	0.438	3.471	0.692
Step 2a					
Age in years	Age	1.068	1.026	1.107	0.002
residency	Rural	1.516	1.463	1.84	0.198
Quadrant	UOQ				0.511
	UIQ	1.518	0.307	7.515	0.609
	Central	1.645	0.061	2.069	0.249
	LOQ	2.77	0.463	16.592	0.265
	LIQ	1.51	0.085	26.797	0.779
Size of the tumor	>2cm				0.227
	2-5cm	1.265	0.124	12.905	0.843
	>5cm	1.58	0.96	4.416	0.47
Step 3a					
Age in years	Age	1.071	1.031	1.101	0.001
residency	Rural	1.534	1.381	1.859	0.168
Size of the tumor	>2cm				0.285
	2-5cm	1.263	0.141	11.361	0.835
	>5cm	1.535	1.95	4.313	0.5
Step 4a					
Age in years	Age	1.082	1.044	1.118	< 0.001
residency	Rural	1.654	1.013	1.068	0.031

6. Discussion

Causes of breast masses are resulted from heterogeneous group of diseases ranging from inflammatory to malignant conditions. From 301 cases of lumpectomies (51.2%) and mastectomies (48.8%) submitted to JUMC, Around half (52.8%) of breast mass was found to malignant while 40% were benign and 3% inflammatory and the remains are borderline and precancerous cases. This is consistent with study done in Mangalore by Kiran H in which 52% malignant and 48% were benign (19). In other study done in Nigeria on 1,566 breast tumors, 1035 (66.1%) were benign, and 531 (33.9%) were malignant(40). In study done India, Out of the total 129 cases with neoplastic lesions, 76 cases were benign, 51 cases were malignant, and 2 cases were precursor lesions(41). So the finding of our study is different from these two finding and other similar studies (11) (42). This is possibly because of the limited resource and services usually malignant and suspicious cases are usually submitted that could possible lead to selection bias in show predominant malignancy over benign cases.

Fibroadenoma was the most common (48.7%) benign neoplasm with common age in second decades of life followed by fibrocystic changes (27.7%) which was common from 31-40 years. This finding is similar with study done in study done in Bangladesh showing fibroadenoma(39.4%) and fibrocystic change(18.4%)(23).The find is also consistent with other findings(41)(26) (43)(42)(3).

Proportion of breast cancer in breast masses from rural (57.7%) is greater than that of urban (38.3%) and there was statistically strong association between residency and breast cancer. This finding is consistent with systematic review done in SSA show living in rural area was described as significant association(OR 2.18; 95% CI 1.05, 4.51) and living in a rural area had significant association with late stage diagnosis of breast cancer(12).

Out of 301 cases most of them (92%) were female with female to male ratio of 12:1. The finding is similar with study done in Uganda in which 97.1% of breast mass was diagnosed in female patients (11). The most common cause of breast mass in male patient was ductal carcinoma NST(047.8%) followed by Gynecomastia(26.1%).In female patient most commonly diagnosed disease was ductal carcinoma NST (43%), fibroadenoma(20.6%) and FCC. In study done in Uganda, in MakCHS Lab from 572 malignant cases invasive ductal carcinoma (319), lobular carcinoma (59) and from 1232 benign cases, fibroadenoma (751) fibrocystic change

(218) diagnosed in female. In male from malignancy ductal carcinoma was diagnosed in 58% cases and gynecomastia accounts for almost half (46.1%) of benign cases(11). This finding is also consistent with this study.

Involvement of Breast mass in both right (49.4%) and left breast (48.3%) was almost equal. UOQ was the most frequently involved quadrant contributing for two thirds of cases (65.5%), followed by central (13%). In study done in India UOQ was frequently involved followed UIQ. In study done in Addis Ababa on three different hospital in Addis Ababa UOQ was most frequently involved followed by UIQ (29). In this study similar to these and other studies UOQ was frequently involved but unlike other studies central involvement was the second most common and 80% of the central involvement were malignant cases and all of them had lymph node involvement.

Ductal carcinoma NST (79.3%) was the most frequent diagnosis followed lobular carcinoma (7.9%), 7 cases (3.7%) of papillary carcinoma, 4 mucinous carcinoma, 3 medullary carcinoma, 2 Metaplastic carcinoma, and 2 other carcinoma. In study done in Wenzhou Medicine University in china on 953 breast cancer, the most common histologic type was invasive ductal carcinoma (83.26%)(34). In study done in Uganda Infiltrating ductal carcinoma NST (55.6%) was the most common followed by infiltrating lobular carcinoma (10.9%) and papillary carcinoma (0.7%) while medullary carcinoma also identified in 0.7% of cases (11). The finding of this study is also similar to these studies.

More than of the breast cancer (58%) were found to be grade II and 29% was grade III and all of grade III cancers had lymph node involvement while only 50% of grade one tumor had lymph node involvement. Compared to grade I, grade II breast cancer had 2.7 time chance of lymph node involvement but this was statistically not significant. In study done in Indian on 106 cases, Grade II invasive breast carcinoma was the most common (58.49%)(43). In another study done Addis Ababa most frequent grade was grade two (46.2%) while 36.5% were grade three(29). The find was also similar with these two studies. But in contrast to these finding in one study in Nigeria, Grade I(59.5%), Grade II(33.4%) and Grade 3(7.1%) (40).

Most of breast cancer patients with breast mass had large size mass and late stage presentation. Most of them (73.9%) had size greater than 5cm and 27.4% of breast cancer cases have extension to local structure (T4). As size increases, chance of having breast cancer increases. More than two third (70.7%) of tumors larger than 5cm were malignant while most of the tumor

(82.6%) sized less than 2cm were benign. These findings coincide with finding in Addis Ababa only 10.7% of breast cancer had size less than 2cm while the rest 89.3% had size larger than 2 cm. But study done on benign lumps in Tanzania shows size ranging from 0.5-18cm and 6cm was median size(26). Majority of cases of breast cancer (82.5%) with identified lymph nodes were positive for malignancy. In study in Addis Ababa Lymph node involvement was seen in 62.4 % of the cases and the 37.6 % were absent(29). This figure is lower than that of the current study which showed 82.5% involvement. In other study in India, Rajasthan showed from 50 cases of modified radical mastectomy, lymph node metastasis was found in 70% cases (44).

Majority of patients (84.5%) with documented stage, were stage III and IV. Most of patients from rural were with late stage compared to those from urban area. Fifty percent of patients with tumor size larger than 5cm were presented at late stage of breast cancer. Study done in china on 4,211 breast cancer cases, showed more breast cancer were diagnosed late (stage III and IV) in low socioeconomic status (SES) than those in high SES. Case with low education diagnosed at late stage compared to those with more educated cases(32). This finding possibly explains late presentation in this study. Study in Addis Ababa also showed similarly late stage presentation in 70% of cases (29).

This study showed young age diagnosis of breast cancer. Majority of breast cancer (76.5%) occurred before age of 50 years. The median age was 40 and mean was 42.6 ± 13.8 years. There was maximum burden of breast cancer on patients' age in 4th and 5th decade of life which accounts for almost 60% of breast cancer cases and most of the cases were from rural. There was statistically significant association between breast cancer and residency. This finding is consistent with in study done in Ethiopia, Tikur Anbesa Hospital, which showed the peak incidence of breast cancer was 4th and 5th decades but most the case were from urban (Addis Ababa)(45). Systematic review done in SSA, living in a rural area found to be associated with breast cancer (11). In study in Nigeria also breast cancer age ranges from 21-79 years with mean age of 42 years (40). In another study in India, maximum malignant tumors were in 6th decade followed by 7th and 4th decade(41). In similar other study in the same area also Invasive carcinoma NST was most commonly seen in 7th decade(19). This result showed one decade earlier burden of the disease.

Generally breast cancer is by more common in female than male in a ratio of 10.5:1. In both sex ductal carcinoma NST was the most common. There was no much difference in chance of being

a cancer once a patient had a breast mass. In this study 53.8% of female patient with breast mass were diagnosed with breast cancer and similar 60.9% male with breast mass had breast cancer showing little increment in male compared to female. A study in Uganda showed that breast cancer is more common in female with female to male ratio of breast cancer of 48:1(11). In a study done in Addis Ababa, there was higher ratio male to female ratio was 1:15 (45). Compared to this studies number of breast cancer in male is increased in the current study. In study done in Turkey on Male breast cancer median age at presentation was 66.7 ± 10.9 years (16). Breast cancer occurred up to 16 years later in males than in females. In study in Nigeria Out malignant cases 93.4% were females and 6.6% were males with a female to male: ratio of 14.2:1 (40).

Nearly half (51%) of breast cancer was in right breast and 48.5% was on left breast while one was bilateral. Study in Tanzania showed right breast cancer in 53.8%, left 42.8% and 3.4% was bilateral (26). This findings are similar to this study but in shiraz most of the breast masses were detected in the left breast (57.3%) (3).

7. Conclusion

Trend of breast cancer is increasing over the last five years and it remains the most common cause of breast mass accounting for more than half (52.8%) histopathologic diagnosis. The peak age was in 4th and 5th decades with the median age of 40 years. Breast cancer in this area occurred at younger age which is one decade earlier. Among different variable affecting breast cancer age and residency show the two most powerful independent predictors breast cancer. Majority of patients (84.5%) with breast cancer were stage III and IV. More than of the breast cancer (58%) were found to be grade II and 29% was grade III and all of grade III cancers had lymph node involvement. Majority of cases of breast cancer (82.5%) with identified lymph nodes were positive for malignancy. Higher grade cancer associated with high chance of lymph metastasis. No significant association between histologic type of breast cancer and lymph node involvement. The most common histopathologic type of breast cancer is ductal carcinoma NST (79.3%) followed by lobular carcinoma (7.9%). The remaining 12.8% was ductal carcinoma with special type. These were papillary carcinoma (3.7%), Mucinous carcinoma (2.4%), metaplastic carcinoma (1.2%) and medulary carcinoma (1.8) and other carcinoma (1.2%).

The most common benign lesion is fibroadenoma (44.6%) and followed by fibrocystic change (25.4%). Inflammatory lesion also caused 8.5% of breast mass. Breast mass in male is most frequently caused by invasive ductal carcinoma (48.8%) followed by gynecomastia (26.1%).

8. Recommendation

There was raising burden of breast cancer and most patients were presented at late stage. Considering these, there is a need of public awareness campaign about importance of breast self examination on regular manner for early detection of breast cancer. In addition to this educating the community to improve the health seeking behavior is also recommended.

There is also great need of launching regular mammography screening with collaboration with pathologic diagnostic modalities.

It is also advised that, histologic assessment for all excised breast lumps should be routinely done to evaluate the entire histopathologic pattern.

Further studies are needed particularly by incorporating molecular and hormonal marker together with more Sociodemographic data that could affect breast cancer.

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Annex 1

Data collection tool (check list) to study Histopathologic pattern of Breast mass and its associated factors

No.	
Part I	Sociodemographic information
	Biopsy No.
	Year of submission
	1. 2014
	2. 2015
	3. 2016
	4. 2017
	5. 2018
	Age
	1. <20
	2. 21-30
	3. 31-40
	4. 41-50
	5. 51-60
	6. >60
	Sex
	1. Female
	2. Male
	3. Not document
	Residency
	1. Rural
	2. Urban
	3. Address not documented
Part II	Clinical information
	Laterality
	1. Right
	2. Left
	3. Both
	4. Not document
	Clinical diagnosis
	1. Fibroadenoma
	2. Fibrocystic change
	3. Inflammatory lesion
	4. Breast cancer
	5. Other
	6. Not document
Part III	Gross and microscopic information
	Type of specimen
	1. Lumpectomy
	2. Mastectomy
	3. Not mentioned
	Quadrant of the mass/lesion
	1. UOQ
	2. UIQ
	3. Central
	4. LOQ
	5. LIQ
	6. Not mentioned

Size of the tumor/mass	<ol style="list-style-type: none"> 1. <2cm 2. 2-5cm 3. >5cm
Histopathologic diagnosis	<ol style="list-style-type: none"> a. Benign <ol style="list-style-type: none"> 1. Fibroadenoma 2. Fibrocystic change 3. Sclerosing adenosis 4. Inflammatory(mastitis) 5. Other benign tumors b. Borderline/Precancerous Conditions <ol style="list-style-type: none"> 6. Phyllodes 7. Precancerous(DCIS/LCIS) c. Malignancy <ol style="list-style-type: none"> 8. Ductal carcinoma NST 9. Lobular Carcinoma 10. Mucinous Carcinoma 11. Papillary carcinoma 12. Metaplastic carcinoma 13. Medulary Carcinoma 14. Other malignant lesions
Grade for cancer lesion	<ol style="list-style-type: none"> 1. Grade I(well differentiated) 2. Grade II(moderately differentiated) 3. Grade III(poorly differentiated) 4. Not mentioned
Lymph node involvement	<ol style="list-style-type: none"> 1. Not involved 2. Involved 3. Not assessed

Annex: Approval

ASSURANCE OF PRINCIPAL INVESTIGATOR

The undersigned agrees to accept responsibility for the scientific ethical and technical conduct of the research project and for provision of required progress reports as per terms and conditions of the Faculty of Medical sciences in effect at the time of grant is forwarded as the result of this application.

Name of the investigator: _____

Date _____ Signature _____

APPROVAL OF THE FIRST ADVISOR:

Name of the first advisor: _____

Date _____ Signature _____

APPROVAL OF THE SECOND ADVISOR:

Name of the second advisor: _____

Date _____ Signature _____