JIMMA UNIVERSITY INSTITUTE OF HEALTH DEPARTMENT OF PATHOLOGY

Patterns Of Palpable Breast Lesions Diagnosed On Fine Needle Aspiration Cytology In Jimma University Medical Center.

Research Report Submitted to Department of Pathology, Jimma University For Partial Fulfillment Of Post Graduate Diploma In Human Anatomic Pathology .

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Summary

Breast cancer is the most common cancer in women worldwide, with nearly 1.7 million new cases diagnosed in 2012 (second most common cancer overall). This represents about 12% of all new cancer cases and 25% of all cancers in women.

The objective of this study focus on determining the cytomorphologic patterns of palpable breast leasions in Jima University, Medical Center. A retrospective descriptive cross sectional study was employed on breast FNAC medical records. `Budget was secured from the Jima University research sector. Data was collected using prepared tool. Analysis were made using SPSS.

Acknowledgement

Acronyms and Abbreviations

FNAC--------------------------Fine Needle Aspiration

SPSS--------------------------Statistical Package for the Social Science.

WHO------------------------ World Health Organization

1. Statement of the Problem

Breast tissue responds markedly to hormonal and other influences throughout life, and, as a result, it may display a wide range of 'normal' appearances: the immature and largely resting breast before puberty; the developed breast of reproductive life, which exhibits changes depending on the time of the menstrual cycle; the actively secreting breast of lactation; and the involuted postmenopausal breast **(1).** Breast is a glandular organ influenced by hormones in females with various structures giving rise to different types of lesion and lumps **(2).**

Breast disease constitutes a substantial percentage of human body organ disease, especially among females.The spectrum of breast lesions ranges from mild physiological conditions up to advanced invasive cancer **(3).** In both developed and developing countries, breast lumps comprise a considerable amount of surgical cases in women. Differentiating benign lumps from malignant preoperatively for definite treatment is necessary **(4).**

Cancer is a group of diseases characterized by the uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death. According to a project that study a global burden of cancers (GLOBOCAN 2012), an estimated 14.1 million new cancer cases and 8.2 million cancer-related deaths occurred in 2012, compared with respectively 12.7 million and 7.6 million in 2008.
Breast cancer is the most common cancer in women worldwide, with nearly 1.7 million new cases diagnosed in 2012 (second most common cancer overall). This represents about 12% of all new cancer cases and 25% of all cancers in women. In low and middle income countries (LMCs), the infrastructure and resources for routine screening mammography are often unavailable. In such lower resource settings, breast cancers are commonly diagnosed at late stages, and women may receive inadequate treatment, pain relief, or palliative care. Because breast cancer is often diagnosed in late stages in women in LMCs, mortality rates are often much higher compared with rates in developed countries.

The risk of death from breast cancer in those diagnosed with the disease remained constant for many years, but since 1994 has gradually declined from 30% to about 20% **(5).** Epidemiologists have documented many risk factors for the development of breast cancer. Exposure to exogenous hormones as oral contraceptives, hormone replacement therapyand dietary fat intake result in an increase risk of breast cancer. Despite recognition of all these risk factors, about 70% of females who develop breast cancer do not have identifiable risk factors. However, the most significant risk factors for breast cancer are gender (being a woman) and age (with most cases developing in women after menopause **(6).** In countries around the world, preventable risk factors for breast cancer such as physical inactivity and excessive alcohol consumption as well as cultural factors are important to consider. In some African countries, for example, there may be a belief that breast cancer is caused by social misbehavior such as oral or nipple contact, or woman wearing dirty clothing or putting money inside her bra. Also, there is a belief that once a woman is diagnosed with breast cancer, she may be

divorced by her husband and possibly rejected by the community, or that following a breast cancer diagnosis her breast will be cut off and she will die. As a result of misconceptions and unfounded beliefs, women may tend to hide their breast cancer symptoms at the early stages when treatment is most likely to be effective. The above reasons and others like changing in life styles and lack of clinical advances to combat the disease, especially in developing countries, lead the trend of the disease to increase from year to year **(7).**

2. Literature Review

Breast cancer is the most common malignant neoplasm affecting women worldwide. Fine needle aspiration (FNA) cytology has become widely accepted as a reliable diagnostic tool for diagnosis of breast masses. It is a simple and safe method which yields high diagnostic performances. However, in some cases a definitive diagnosis cannot be made by FNA alone, either due to the inherent limitations of cytology itself or the inability to obtain adequate material for diagnosis.

Patients who presented with palpable lumps in breast in which the cytomorphological features were studied showed that the age of the patients ranged from 10 to 85 years with majority of malignant cases in the 41–50 year age group. In majority of the cases, mass was located in the left breast in the upper outer quadrant and least in the lower inner quadrant. FNAC results were divided into inflammatory, benign, fibroepithelial lesions, atypical/indeterminate/probably benign, suspicious of malignancy, malignant, and unsatisfactory categories. The study also revealed that in 95 cases, the aspirates were adequate for diagnosis, and 5 cases were inadequate for interpretation where no diagnosis was made. The sensitivity and specificity of FNAC in this study was 86.67% and 93.33% respectively **(8).**

A three (3) years retrospective and prospective study conducted in the department Of Pathology, Mahatma Gandhi Memorial Medical College and MYH Hospital, Indore, Madhya Pradesh, India uncovered thatthe majority [98% ($N = 980$)] of patients were female subjects and rest [2% ($N = 20$)] male subjects. With reference to the age, maximum [66.6% ($N = 666$)] patients were between second and third decades and rest [33.4% ($N = 334$)] in fourth and fifth decades. Benign breast lesions contributed to majority of the cases [57.3% ($N = 573$)], malignant breast lesions to 26.8% ($N = 268$) of the cases, and the inflammatory lesions to 15.9% ($N = 159$) of the cases. Of the 268 (26.8%) malignant breast lesions, 38% ($N = 102$) of cases were aged between 41 and 50 years, 33% ($N = 88$) of cases 51–60 years, and 29% ($N = 78$) of cases 31–40 years. In malignant breast lumps, majority are duct carcinoma NOS ($N = 229$), while in benign breast disease, fibroadenoma are found to be the commonest one. Cytology grading of malignant lesion showed maximum cases with grade II, followed by grades I and III **(4).**

In the retrospective study of breast lesions during 9 years period on 243 cases in Bhairahwa, Nepalwithfine needle aspiration cytology and Pap staining; the carcinoma cases were found in 18 in the range of 40-72 with 54 years as the average age of

presentation. The gynaecomastia were diagnosed in 6 male cases with average age of 37 in the range of 15-65 years. No case of malignancy was seen among males **(2).**

The study conducted in *Turkey from 2007 to 2010 which compared fine needle aspiration cytology(FNAC) with core Biopsyon123 women who have suspicious palpable breast masses* showed thatFNAC was an operator-dependent procedure and reporting of breast cytological results is more demanding than histological analysis, and requires more experiences. Cellular samples limit identifying the grade or invasiveness of the tumor. It was well known that FNAC had high sensitivity and specificity for mass lesions; however, in terms of low grade malignancies and papillary lesions, diagnosis using FNAC might be difficult **(9).**

*A retrospective 3 years study of 190 patients with breast masses was done to evaluate Accuracy of Fine Needle Aspiration Cytology in the Anatomical Pathology Department of Thailand.*The FNA cytological diagnosis was unsatisfactory due to inadequate specimens in eight cases (4.2%). The diagnoses in the remaining 182 cases were: benign lesions in 98 (53.9%); suspicious for malignancy in 31 (17.0%); and malignant in 53 (29.1%). From the subsequent histopathologic diagnoses, 6/98 cases of benign cytology turned out to be malignant lesions (false negatives); 22/31 cases of suspicious cytology were truly malignant while the other nine were benign; and only 1/53 with malignant cytology was benign (false positive), the lesion being a fibroadenoma. The overall accuracy, sensitivity, specificity, positive predictive value, and negative predictive value were 91.2% (95% confidence interval [CI], 87.6%-94.8%), 92.5% (95% CI, 88.7%-96.3%), 90.2% (95% CI, 85.9%-94.5%), 88.1% (95% CI, 83.4%-92.8%) and 93.9% (95% CI, 90.4%-97.4%), respectively **(10).**

A study was conducted to see the role of fine needle aspiration cytology (FNAC) in palpable breast lumps on four hundred and twenty five (425) patients and was compared with histological diagnosis to see the accuracy of fine needle aspiration cytology for neoplastic lesions in the *Department of Pathology King EdwardMedical University,Lahore in four years from June 2006 to June 2010.*There were 271/425 benign, 120/425 malignant, and 32/425 suspicious smears. Inadequate samples were repeated twice or thrice, and the degree of success was improved with consecutive repeating approaches. The frequency of inadequacy declined from 86 to 18, and 2 for first, second and third attempts, respectively. The number of repeats increased the diagnostic accuracy of aspirates which is statistically significant ($P = .000$). Invasive ductal carcinoma was the most commonly reported lesion with maximum incidence in the 4th, 5th, and 6th decades followed by invasive lobular carcinoma and other malignant lesions. The sensitivity, specificity, accuracy, negative predictive value, and the positive predictive value of FNAC was 98%, 100%, 98%, 100%, and 97%, respectively **(11).**

A four years retrospective study carried out from December 2011 to January 2016 on 553 patients who presented with palpable breast lump. The majority of the patients were female and majority of lumps were benign. Fibroadenoma was the most common lesion accounting for 32.18 % of all lesions and most commonly occurring in age group

between 21 -30 years. Fibrocystic disease was second common benign lesion accounting for 30.56% also commonly accounting in the age group 21- 30 years. Carcinoma breast was seen in 5.42 % ofcases (30/553) occurring most commonly in the female patients above 30 years of age. Most common age group for gynaecomastia in male breast was 11 – 20 years **(12).**

A cross sectional retrospective study conducted in Department of Pathology during September 2016 to February 2017. A total of 82 cases were included in the study; out of which, 80 (97.5%) cases were females and 2 (2.5%) cases were males. Most common presenting complaint was lump in the breast 74 (90%) cases followed by breast pain in 8 (10%) cases. Age of the patients ranged from 16 - 40 years. Mean age of presentation was 27.21 years. Youngest patient was 16 years old and the oldest was 40 years old. Maximum numbers of patients were in 21-30 years age groups, followed by 31-40 years age group. Most of the cases had single breast lump, 8 cases had multiple breast lumps. Fibroadenoma was the most common diagnosis with 62 (75.60%) cases, followed by fibrocystic change constituting 15 (18.29%) cases. Two male patients included in the study had subareoloar mass and a diagnosis of gynecomastia was rendered in both cases. The oldest case in this study aged 40 years, presented with 10cm mass, which was diagnosed as benign phyllodes tumor. A diagnosis of breast abscess was given in 2 (2.43%) cases **(13).**

Medical records of 390 patients presenting to breast or general surgery clinics in Kenyatta National Hospital, Nairobi, Kenya, between January 2010 and March 2014 were evaluated retrospectively. Of the 390 diagnosed breast lesions, 89.7 % (n = 350) occurred in females, while 10.3 % (n = 40) occurred in males, giving rise to a female-to-male ratio of 8.8:1. Neoplastic breast lesions (n = 296) comprised 75.9 %, while non-neoplastic breast lesions (n = 94) comprised 24.1 % of all diagnosed breast lesions. The neoplastic lesions were classified as 72.3 % (n = 214) benign and 27.7 % (n = 82) malignant, resulting in a benign-to-malignant ratio of 2.6:1. Fibroadenoma (n = 136) and gynecomastia (n = 33) were the most frequently diagnosed breast lesions for women and men, respectively **(14).**

A retrospective study done in TikurAnbessa Specialize Hospital (TASH) from October 2014 to April 2015on new cases of breast cancer registered annually at the cancer registry revealed that the peak age of incidence was the 4th and 5th decade. Most of the cases were found in Addis Ababa, where the hospital is situated. An increase in trend of breast cancer case was observed in the hospital. Non-declining incidence of breast cancer in this study indicates; the awareness of people to be diagnosed is improved and more cancerous patients are there in the country, and inadequate or ineffective control measure to stem its morbidity due to diversion of the health care system's attention to HIV/AIDS and malaria **(7).**

A prospective cross-sectional cytopathological *study was conducted within the Jimma Teaching Hospital, Pathology Department, JimmaUniversity during the years between September 1998 and August 2002*in South western Ethiopia on 3200 cases *of* Superficial Malignant Neoplasms. *The result showed that the most frequent superficial*

*cytodiagnosis was breast carcinoma, 79 (29.6%) cases; followed by non-Hodgkin's lymphomas, 37(13.9%) cases; and soft tissue sarcomas, 26 (9.7%) cases. The most common malignant neoplasm in women was breast carcinomas found in 74 (27.7%) cases, whereas in men non-Hodgkin's lymphomas were found in 29(10.9%) cases **(15).***

3. Rationale of the study

Breast cancer is the most frequently diagnosed life threatening cancer in women and the leading cause of cancer death among women all over the world. Early breast carcinomas are asymptomatic, and most of them are discovered during breast screening programs. Larger tumors may present as a painless breast mass. Pain is not usually a symptom of breast cancers. However, most breast masses are benign, and the main concern of women with breast masses is the probability of breast cancer. Evaluation of the breast masses begins with pertinent clinical history. This is followed by a clinical examination, imaging studies, and biopsy if necessary.

Cytological or pathological diagnosis is usually needed to ensure that a breast mass is malignant or benign. Cytology has roles to play in the evaluation of breast lesions **(9).** Cytology can explore breast lesions in three distinct ways, Fine Needle aspiration cytology (FNAC), scraping of skin (SS), and smearing of nipple discharge (ND). FNAC of breast lumps is an important part of triple assessment (the other two are clinical examination and mammography) of palpable breast lumps. It is an accurate, rapid, easy to perform, cost-effective and reproducible diagnostic tool **(16).**

Therefore, the essence of this study is to illustrate the trends of palpable breast lesions among women and men visiting our center.This is an original study since breast FNAC magnitude in this part of the country is uknown. It also acts as a base line study in this subject matter.

4. Objective

4.1. General objective:

To determine the cytomorphologic patterns of palpable breast lesions on fine needle aspiration(FNA) cytology.

4.2. Specific objectives:

To describe the relationship of age and breast lesion.
To determine the relationship of sex and breast lesion.
To determine the relationship of residency and breast lesion.
To determine localization of breast lesions in terms of laterality and quadrant.

5. Materials and Methods

5.1. Study Area:

Jimma University Medical Center is found in southwest Ethiopia, 352 km from the capital. It serves a total population of around 15 million over a catchment area of 17,500 km^2. It has clinical services in different departments such as internal medicine, surgery, gynecology and obstetrics, and pediatrics. Here is also a pathology department with fine needle aspiration cytology and biopsy services with anual average patient flow of 5,127 and 1,636 respectively. Currently, it is the only hospital that renders FNAC and surgical biopsy services to this part of the country.

5.2. Study Design and Period:

A retrospective cross-sectional study design was applied for patients coming to JUMC pathology department services with a palpable breast masses between september 2014 and august 2017.

5.3. Source Population

All patients with mass lesions for whom cytodiagnosis were made between september 2014 and august 2017.

5.4. Study subject:

All patients with palpable breast lesions subjected to FNAC at JUMC from september 2014 to august 2017.

5.4.1. Inclusion criteria:

All FNAC reports on palpable breast lesions having
- Age and Sex
- Residency

5.4.2. Exclusion criteria:

FNAC cases of non breast proper lesions.
FNAC cases of breast with secondary cancer.
FNAC cases of breast with recurrent breast cancer.
FNAC cases of breast with image guided.
FNAC cases of breast with non diagnostic/unsatisfactory report.
FNAC cases not including diagnoses

5.5. Sampling

Non probability sampling was used to include cases fulfilling the inclusion and exclusion criteria.

5.6. Sampling procedure

Samples taken from suspected breast masses were aspirated with sterile syringes and spread on to clean slides, air dried and stained with wright's stain. Cases containing pertinent history, general and local physical examination were retrieved and recorded

from pathology department data archive.The completeness of the data was checked. Cases were grouped on four diagnostic categories:Positive for Malignancy, Suspicious for Malignancy, Benign Neoplastic and Benign Non Neoplastic.

5.7. Data collection and quality control

Checklist was prepared that contained the study variables. The data was collected by the cytopathology technical staffs after ten days training on how to locate, retrieve, categorize and record the data. The principal investigator supervised the data collection daily.

5.8. Variables

5.8.1. Independent variables

- Socio demographic characterstics(Age, Sex and Residency)
- Laterality of the mass
- Quadrant of the mass

5.8.2. Dependent variables

- Diagnosis

5.9. Data processing and Analysis

The data was entered cleared and grouped by use of SPSS version 20 software package for statistical analysis.

Descriptive statistics were carried out for frequency distributions. Tabulations were computed to assess the presence and degree of association between dependent and independent variables and compare results between types of diagnosis.

5.10. Ethical consideration

Before the study begins ethical clearance was obtained from the research and ethical committee of JUMC, Jimma University.

5.11. Communication of the results

The results of this study will be disseminated or communicated to the Jimma University, the Regional Health Bureau, local institutions and other concerned bodies. And publication on an appropriate journal will also be done.

6. Result

There were 735 cases with breast masses identified during the study period.

Age and Sex Distribution

The age range and median of 735 patients included in this study were 0.04-80 years and 30 years respectively. Among all cases, 664(92.3%) were female and71(9.7%) were male patients. F:M(9.5:1). The most common lesions in female were benign neoplastic and in male were non-neoplastic groups.The most affected age group by malignancy was 31-40 years. There was no significant association between increasing age (P value was 0.999) and sex (P value was 0.325) as to rate of malignancy[Table 1 and Figure1].
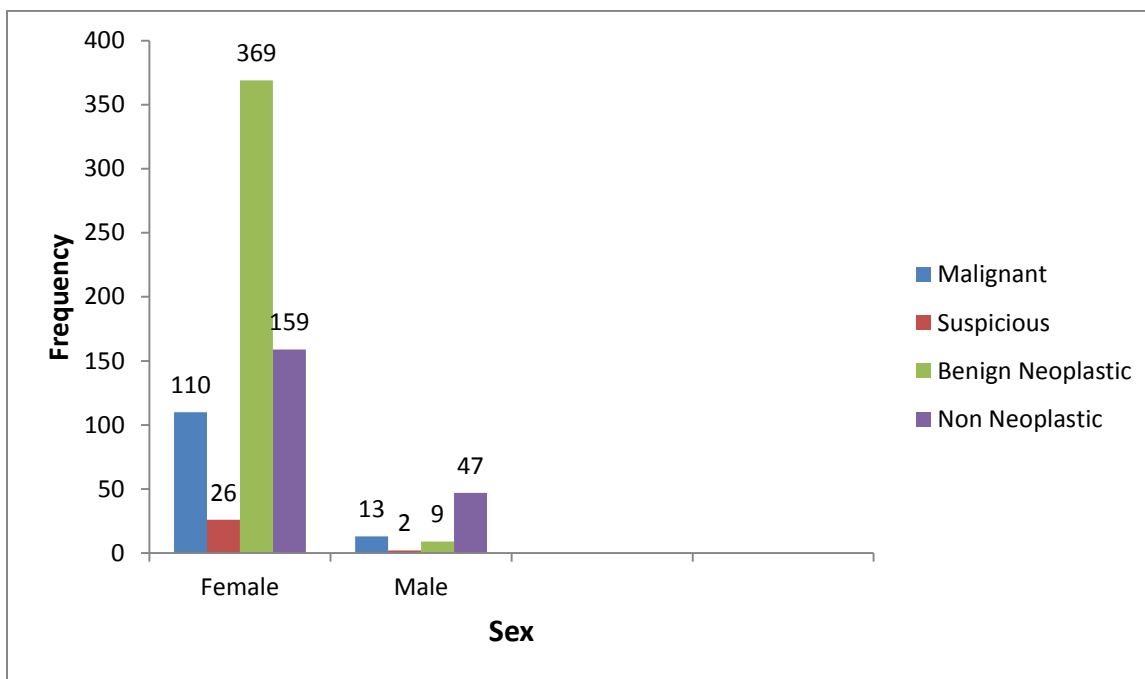
Figure 1: Lesions Distribusion by Sex

Table 1:Lesions Distribution by Age Group

Age Groups	Lesions				Total
	Malignancy	**Suspicious**	**Benign Neoplastic**	**Non Neoplastic**	
<=20	3	2	112	27	144
21-30	25	7	**171**	**91**	294
31-40	**42**	**9**	71	47	169
41-50	33	4	19	16	72
51-60	14	3	4	17	38
>=61	6	3	1	8	18
Total	123	28	378	206	735

Residence

The collected data over the three years showed 523(71.2%) patients from rural and 212(28.8%) patients from urban areas. The most and least common lesions in urban and rural were similarly shared, that were benign neoplastic cases and suspicious cases respectively. As to relationship of malignancy and area of residency no strong association was seen (P value was 0.211).

Laterality Distribution of Breast Lesions

In 323(43.9%) cases, the lesions were located in the right breast and in 362(49.3%) cases these were located in the left breast. In 50(6.8%) cases, bilateral lesions were observed. Left breast was more commonly affected by all breast lesions than right breast.There was one suspicious case which affected both breasts while malignancy was not seen to affect both breasts. No significant association was seen between rate of malignancy and laterality (P value was 0.945).
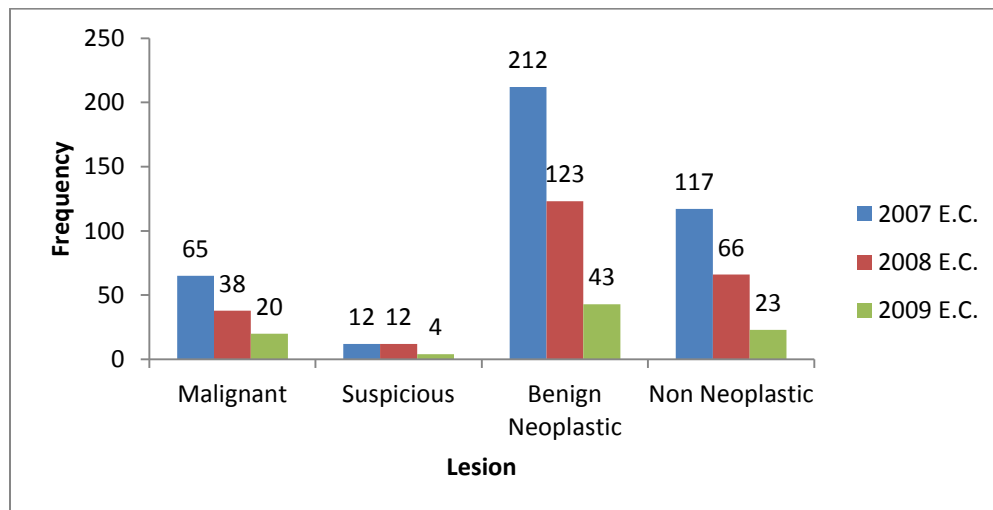

Figure 2: Distribution of Lesions by Year

Quadrant Distribution of Breast Lesions

Among 735 cases 553 cases were correctly labeled for quadrants, and the mass was located in the upper outer quadrant in 206(37.3%) cases, in the central region in 262(47.4%) cases, in the upper inner quadrant in 45(8.1%) cases, in the lower outer quadrant in 18(3.3%) cases and in the lower inner quadrant in 22(3.9%) cases.There was no significant association seen between rate of malignancy and quadrant distribution (p value was 0.286).

The cytological diagnoses included malignancy 123(16.7%), suspicious 28(3.8%), benign neoplastic 378(51.4%), and non-neoplastic 206(28%)cases [Figure 3]. Among benign neoplastic lesions [Table2], the two maximum cases were fibroadenoma 152(40.2%) and fibrocystic changes 117(31.0%). Female aged 11-20 were most affected by fibroadenoma and fibrocystic changes affected mostly those from 21 to 30 years of ages.
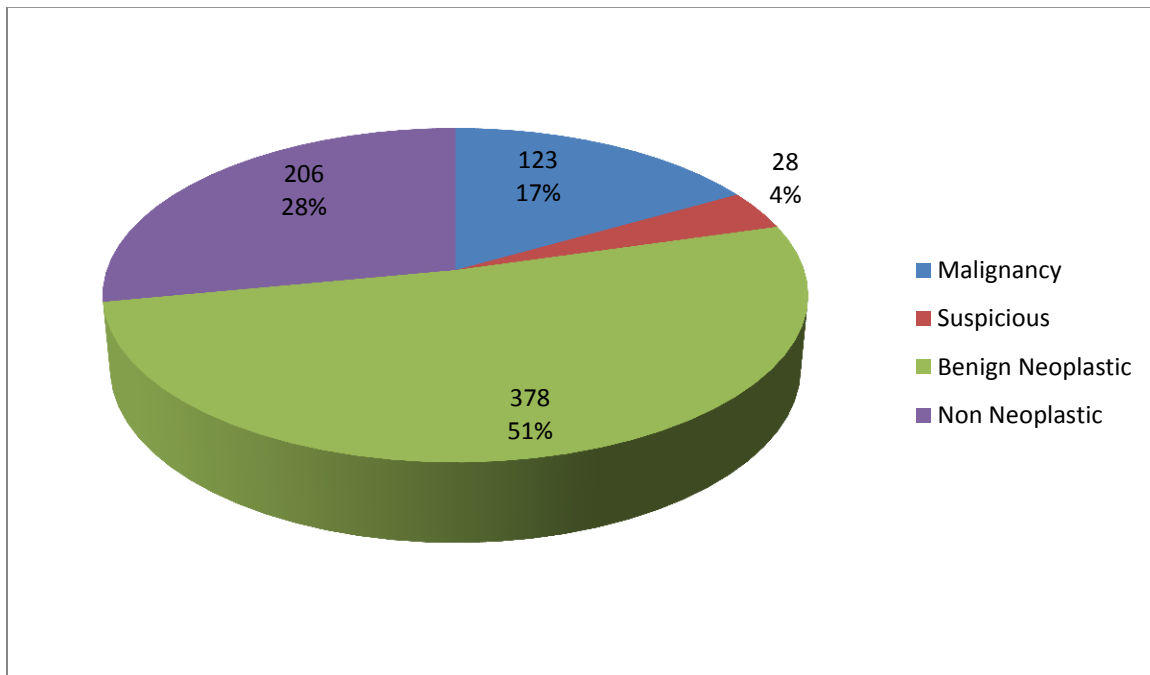

Figure 3: Over all Lesion Distribution

Table 2: Benign Neoplastic Lesions

Benign Neoplastic Group	Frequency	Percent
Fibroadenoma	152	40.2
FCC	117	31.0
Benign Phyloides Tumor	9	2.4
Lactating Adenoma	8	2.1
Lipomatous Lesion	13	3.4
Proliferative Lesions, NOS	66	17.5
Ductal Hyperplasia	11	2.9
Oncocytoma	1	0.3
Papilloma	1	0.3
Total	378	100.0

Table 3: Non Neoplastic Lesions

Non Neoplastic Group	Frequency	Percent
Acute Mastitis	17	8.3
Chronic Mastitis	52	25.2
Abscess	38	18.4
Cyst	37	18.0
Gynecomastia	41	19.9
Duct Ectasia	8	3.9
Fat Necrosis	3	1.5
TB	6	2.9
Lactational Change	2	1.0
Fibroepithelial Polyp	1	0.5
Intramammary Lymphadenitis	1	0.5
Total	206	100.0

Among non-neoplastic lesions [Table 3], the top maximum cases were that of chronic mastitis 52(25.2%) and Gynecomastia 41(19.9%). Abscess and cyst were found in 38(18.4%) and 37(18.0%) cases respectively. Acute mastitis was found in 17(8.3%) cases. 8(3.9%) cases were that of duct ectasia and 6(2.9%) cases were that of tuberculosis. Fat necrosis were seen in 3(1.5%) and lactational change seen in 2(1.0%). Fibroepithelial polyp and intramammary lymphadenitis shared equal frequency (one case each). Gynecomastia was the most common disease that affected male and chronic mastitis the female. All cases of tuberculosis, fat necrosis and intramammary

lymphadenitis were seen in female. A single case of fibroepithelial polyp was found in male.

From a total of 123 malignant cases, 90(73.2%) cases were having lymph nodes. And from malignant cases with lymph nodes 83(92.2%) cases were positive for malignant cells and 7(7.8%) were negative for malignant cells.

7. Discussion

Breast cancer is the most common cancer in women worldwide, with nearly 1.7 million new cases diagnosed in 2012 (second most common cancer overall). This represents about 12% of all new cancer cases and 25% of all cancers in women. In lower resource settings, breast cancers are commonly diagnosed at late stages, and women may receive inadequate treatment, pain relief, or palliative care. Because breast cancer is often diagnosed in late stages in women in LMCs, mortality rates are often much higher compared with rates in developed countries **(5).**

7.1. Malignant Lesions (123 Cases)

Of 735 breast lesions malignancy was seen in 123 cases from which 90 cases were accompanied by lymph node enlargements and majority of them (83 cases) were positive for malignant cells. Lymph node assessment is important in breast lesion evaluation for correct management. Cases were observed more on the left and central region of the breast. This study also showed majority of patients were from rural, female was affected more frequently than male, and the patients were concentrated in 31 to 40 year age group. This finding is in accordance with the study done in developing country **(3).**

7.2. Suspicious Lesions (28 Cases)

The diagnosis of suspicious is rendered when in an atypical cytologic smear there is no strong evidence of malignancy. In this study there was a record of 28 suspicious cases over the three years of study period. This finding was supported by the study done in Thailand (31/190)**(10).**

7.3. Benign Neoplastic Groups (378 Cases)

Nine disease entities were identified under benign neoplastic group. The three most common lesions were Fibroadenoma 40.2% cases, Fibrocystic Changes 31.0% case and Proliferative lesions, NOS 17.5% cases. Female was more affected than male. Similar conclusions were made from the studies done in India, Pakistan and Eastern Nepal **(8,11,12).**

7.4. Non Neoplastic Group (206 Cases)

The left breast was affected more frequently than the right one. Majority of cases were aggregated in the central region of the breast. The three top diseases in this category were chronic mastitis 52(25.2%) cases, Gynecomastia 41(19.9%) cases and Abscess 38(18.4%) cases. Similar finding was seen in Indian study **(4,8).**

8. Conclusion

The findings in this study are new when seen against the works done in other parts of the world. The difference might come from the approach the disease categorizations were made, the sample size, the methodology (most have histopathology correlations) and the criteria set to define the disease types.

This study supports the usefulness of cytomorphological diagnostic techniques in the workout of breast lesions, shows the predominance of benign breast lesions in the young and the occurrence of malignancy in any age groups, and time and cost effectiveness of cytodiagnosis in further planning for management.

9. Recommendations

a. Future studies are needed to explore the benefit of combining regular self-breast examination with FNAC in order to increase the early detection and management of breast lesions.
b. Prospective study that compares Cytodiagnosis with Histopathology diagnosis.

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Annex 1

Data collection tool (Checklist) to study the cytomorphological patterns of breast diseases.

1. **Retrieving breast FNAC cases by year**

Table 4: FNAC cases by year

Year	Total
2007 E.C.(September 2014 to August 2015)	
2008 E.C.(September 2015 to August 2016)	
2009 E.C.(September 2016 to August 2017)	
Total	

2. **Cases containing at least the following parameters.**
   i. Age and sex
   ii. Mass as a chief complaint
   iii. Diagnosis

Table 5: Minimum parameters

Year	M	F	Total
2007 E.C.			
2008 E.C.			
2009 E.C.			
Total			

3. **Categorizing the cases by diagnosis**

Table 6: Cases by diagnosis

Year	Malignancy	Suspicious	Benign Neoplastic	Benign Non Neoplastic	Total
2007 E.C.					
2008 E.C.					
2009 E.C.					
Total					

4. Specific benign neoplastic diagnosis by year

Table 7: Benign Neoplastic categories by year

Year	Dx1	Dx2	Dx3……	Total
2007 E.C.				
2008 E.C.				
2009 E.C.				
Total				

5. Specific benign non neoplastic diagnosis by year

Table 8: Benign Non Neoplastic categories by year

Year	Dx1	Dx2	Dx3……	Total
2007 E.C.				
2008 E.C.				
2009 E.C.				
Total				

6. Cases with lymph nodes if any

Table 9: LN status by year

Year	Positive	Negative	Total
2007 E.C.			
2008 E.C.			
2009 E.C.			
Total			

7. Categorizing cases by laterality and quadrant.

Table 10: Localizing breast lesion

Year	Right breast	Left breast	Both breast	Quadrant		Total
2007 E.C.				UOQ		
				Central		
				UIQ		
				LOQ		
				LIQ		
2008 E.C.				UOQ		
				Central		
				UIQ		
				LOQ		
				LIQ		
2009 E.C.				UOQ		
				Central		
				UIQ		
				LOQ		
				LIQ		
Total						