



A Retrospective study of Cytopathologic Patterns of lymphnode Lesions at a tertiary hospital in Ethiopia, between January 2018 to August 2020.

For partial fulfillment of Post Graduate Program in Pathology.

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ABSTRACT

Background:

Lymph node comprises an important part of defense system in the human body as it traps or filters foreign particles. Lymphadenopathy refers to lymph nodes with abnormal size, number or consistency (1). The cause of lymphadenopathy is varied and may be inflammatory or neoplastic process. There is a wide variation in pattern of disease in different age groups, gender and in various countries. The main aim of FNAC is for rapid diagnosis of lymphadenopathy with simple, accurate procedure and with minimum trauma and low cost. It identifies lymph node enlargements with malignant potential that requires treatment and those benign conditions that can be observed clinically.

Methods and Materials: Retrospective cross-sectional descriptive study was conducted on 771 lymphadenopathies cases in which FNAC was performed in patients referred to pathology laboratory of black lion hospital in the three years period (from January 01, 2018 to August 30, 2020).

Results: Of the 771 lymph node FNAC biopsy specimens received, 409 (53%) were females and 362 (47%) were from males making F: M ratio of 1.13:1. with mean, lowest and highest age limits of 33.6 years, 3 month and 84 years respectively. Most of the patients were in the age range of 21-30 years accounting for 152(19.7%). Localized lymphadenopathy was observed in 638 (82.7%) cases. Cervical lymphadenopathy predominated, comprising 211 (27.4%) cases. Metastatic disease and reactive lymphadenitis were the major causes of lymphadenopathies constituting 256 (33.2%) and 176(22.83%) respectively. Metastatic tumor was commonest in adult females above 30 years and reactive lymphadenitis was the predominant cause of lymph node enlargement in age groups (0-30 years) and rare above the age of 40 years. 166 (21.5%) lymphoma cases were seen out of these 132 (79.5%) of the cases were Non-Hodgkin's lymphoma of these 67.4% occurred in males and 32.6% in females followed by Hodgkin's lymphoma accounting 27(16.3%) and 63% cases were seen in males and 37% cases in females. 7 (4.2%) cases diagnosed as lymphoma only. Other benign lesions identified were; tuberculosis lymphadenitis constituting 83 (10.8%). Suppurative lymphadenitis 10 (1.3%) and other benign diseases 2(0.3%) were seen. Other malignant lesion identified in this study were non-specified malignant tumor, leukemic infiltration, myeloid sarcoma and plasmacytoma accounting 11 (2.5%), 4(0.9%), 2(0.5%) and 1(0.2%) respectively.

Conclusion: In this study the majority of patients with lymphadenopathy had metastatic deposits commonly ductal carcinoma. Reactive lymphadenitis was the second most common pathology Followed by lymphoma.

Keywords: Fine needle aspiration cytology, lymph node, benign lesion, malignant tumors

Acronyms and Abbreviation

BLH-Black Lion Hospital

FMAAU-Faculty of Medicine, Addis Ababa University

FNAC – Fine needle aspiration cytology

GCMS-Gondar College of Medical Science

NHL-Non Hodgkin's lymphoma

HL- Hodgkin's lymphoma

US- Ultrasound

CT –computed tomography scan

1. Introduction

1.1 Background

Lymph nodes comprise an important part of the defense system of the human body. They are clustered in small groups or chains at strategic locations, where they drain the lymphatic vessels of various anatomic regions. Their function includes mechanical filtration of the foreign bodies in the lymph and the recognition and processing of antigens. Peripheral nodes are more numerous in younger than in older persons while they are absent in the new-borns (1, 2). Lymphadenopathy refers to lymph nodes which are abnormal in size, number or consistency and lymphadenitis is the inflammation of lymph node (3). Lymphadenopathy is one of the commonest clinical presentations of patients with varied etiological predispositions and it always causes problems to clinicians.

The cause of lymphadenopathy is varied and the cause may be inflammatory or neoplastic process. Depending on the causative factor lymph node swelling can occur unilaterally or bilaterally, single or multiple, where these lumps can be acute painful swelling or painless and develop slowly in weeks to months (4).

Lymph nodes are common site of metastasis for different cancers and sometimes constitute the first clinical manifestation of the disease. Thus, clinical recognition and urgent diagnosis of palpable lymphadenopathy is of paramount importance specially to differentiate between non neoplastic or neoplastic lesions.

There is a wide variation in pattern of disease in different age groups and various countries. Some variations were seen in different races. In developing countries, tuberculosis is the commonest cause of lymphadenopathy and should be considered in every case of granulomatous lymphadenopathy unless proved otherwise, whereas evaluation of granulomas is a complex problem in developed countries (5).

There are different conditions which present with lymph node enlargement; however the most common cause for enlargement of regional lymph nodes appears secondary to tuberculosis lymphadenitis, malignancies, reactive hyperplasia, pyogenic abscess and other chronic inflammation.

The initial diagnosis of lymphadenopathy is done with a thorough history and physical examination, haematological examination, tuberculin test, radiological examination, and

fine needle aspiration (FNAC), while for the final diagnosis is done by biopsy and tissue culture.

Fine needle aspiration technique, has been used extensively as a diagnostic tool for rapid evaluation of mainly superficial lesions. It is cost effective, relatively less traumatic, and enables the pathologist to provide the clinician with a diagnosis in a very short time in the outpatient department with excellent patient compliance.

Fine needle aspiration cytology of the lymph node is a simple useful screening test to diagnose suspected and unsuspected secondary and primary lymph node malignancy. The management of these various lesions differ; hence it is important to determine the aetiology.

Imaging techniques such as computed tomography (CT) scan and ultrasound (US) are highly accurate for detection of enlarged lymph nodes but are not sensitive in diagnosing the cause of enlargement and therefore tissue diagnosis is a requisite. Image-guided FNAC is a well-established and reliable modality in obtaining rapid and reliable diagnosis in cases with deep-seated lymph nodes [\(6\)](#).

The pattern in adults is different from that of children. Metastatic cancer is documented widely as a major cause of lymphadenopathy in adults and reactive hyperplasia to minor stimuli has been reported as a significant cause of lymphadenopathy in children. [\(7\)](#).

This study determined Cytopathologic Patterns of lymph node Lesions at black lion Hospital, Department of Pathology, Faculty of Medicine, Addis Ababa University between January 01, 2018 and August 30, 2020.

1.2 Statement of the problem

The history of fine-needle aspiration cytology has been documented by a number of investigators. At the beginning of the twentieth century, needle aspiration of lymph nodes was attempted by various investigators to diagnose trypanosomiasis, lymphoblastoma and Hodgkin's disease. During the 1930s, the first large-scale report on needle aspiration biopsy of 65 cases was reported by Martin and Ellis from Memorial Hospital, New York, and then it became popular in the other part of the world (8). Today it remains the mainstay of diagnostic workup and a well-established, first line diagnostic test for preoperative evaluation of lymph node lesion.

In Ethiopia, the practice of cytopathology and fine-needle aspiration began sometime after the establishment of the department of pathology in Addis Ababa University, Faculty of Medicine, Black Lion Hospital, in 1965 (9).

Generally lymph node lesions are best diagnosed with a combination of clinical, radiological, cytological and histopathologic studies and FNAC is performed frequently because it is simple, easy, cost effective, accurate, and minimally invasive and has no serious complication.

Ultrasound-guided techniques allow the detection and aspiration of smaller and deep-seated lymphadenopathies (6). Like other tests, FNAC has its own limitations and diagnostic problems. The limitations include false negative, false positive and suspicious results. Sample adequacy, aspiration techniques and skill of performing physician, the experience of the pathologist interpreting the cytology and the overlapping cytological features between some benign and malignant neoplasms are some of the diagnostic problems.

A study done in Hawassa University Referral Hospital pathology laboratory, on Cytologic patterns of lymph node diseases from September, 2009 to September, 2014 showed, a total of 1067 lymph nodes were aspirated. Cervical lymphadenopathy was the most frequent (48.82%) followed by submandibular (22.77%) lymph nodes. The age group of 11-20 years was the most affected age group while age group above 60 with less frequency. Tuberculosis lymphadenitis was the highest (48.82%), chronic Non-specific lymphadenitis (20.33%), reactive (16.21%), pyogenic abscess (5.99%) and the rest were malignancies (4).

Different types of disorders can affect the lymph nodes and present as lymph node enlargement clinically. According to a study conducted at Jimma teaching Hospital, pathology department, Jimma University, southwest Ethiopia between September 1999 and August 2001, benign lymph node disorder was diagnosed 93.2% of patients and 6.8% are malignant ones. The most common cause of benign enlargement was tuberculous lymphadenitis (66.3%), followed by reactive lymph node hyperplasia (19.2%). Of malignant cases, Non-Hodgkin's lymphoma (2.7%) and metastatic carcinomas (2.2%) were most frequently diagnosed. The cervical region was the most frequent site of involvement [\(10\)](#).

Retrospective study conducted at Gondar university hospital seven years period from January, 2003 to January, 2007 and January, 2010 to January 2011, a total of 3,440 lymph nodes were aspirated and examined using fine needle aspiration cytology. Of these, 2,392 (69.5%) cases were found to have tuberculous lymphadenitis. Male to female ratio of all study subjects were 0.9:1. Females (54.1%) were more affected than males (45.9%). The age group of 15–24Years had the highest prevalence of tuberculous lymphadenitis followed by those of 25–34 years old. The most affected sites were cervical lymph nodes (47.5%) followed by axillary (19.4%) and submandibular (12.9%) lymph node regions [\(8\)](#).

1.3 Significance of the study

Lymph node enlargement are common clinical presentation of patients at Black lion specialized teaching Hospital (BLH) and fine needle aspiration cytology done commonly, however despite the presence of studies showing cytopathologic patterns in other parts of Ethiopia, there is no recent study done to determine the cytopathologic patterns of lymph node lesions in this institution. This study helps to gain knowledge regarding cytopathological pattern of lymph node lesion in a given geographical region, and this study will be used as a reference for other studies in the future.

2. Literature review

Fine needle aspiration cytology of the lymph node has been accepted as a first-line screening test for patients with lymphnode enlargement. In conjunction with immunophenotyping and molecular studies, it has gained acceptance in many centers as an initial diagnostic tool. It is a safe, accurate and cost-effective way for evaluating lymph node enlargements and its utility has increased significantly in recent years [\(3, 7\)](#).

FNAC can be done using palpation or US/CT guidance. US/CT guided FNAC is preferred for intra-abdominal lymphadenopathies and difficult to palpate nodules.

The fine-needle aspiration technique has been found most useful for the differentiation between inflammatory lesions, primary or metastatic tumors, for the selection of a representative node for biopsy, for the diagnosis of recurrent lymphoma, for staging the extent of the disease, for monitoring treatment and to collect material for ancillary testing and now-a days used in the primary diagnosis and sub classification of lymphomas [\(3, 11\)](#).

Image-guided FNACs were performed at Nehru Hospital Post Graduate Institute of Medical Education and Research, Chandigarh from January 1998 to March 2000 showed. The patients age range from 2 months to 86 years, male/ female ratio 138/104. A total of 242 patients were aspirated of which 216 (90%) aspirations were US-guided and 26 (10%) were made under CT guidance. The commonest group of lymph nodes aspirated were retroperitoneal (115) followed by mediastinal (77) and intra-abdominal (41). In 5 cases FNAC was done from both retroperitoneal and intra-abdominal lymph nodes simultaneously and also in 4 other cases where both mediastinal and retroperitoneal lymph nodes were aspirated. The intra-abdominal lymph nodes included mesenteric, portal and peripancreatic groups. All lymph nodes aspirated ranged from 1 to 5 cm in diameter [\(6\)](#).

Fine-needle aspiration of lymph nodes is particularly useful for the documentation of metastatic carcinoma. It is most often useful in cervical lymph nodes but also in other locations, including intra-abdominal and retroperitoneal regions. The cytologic diagnosis of malignant lymphoma can be made in 50%–75% of the cases, the accuracy being greatest in the high-grade lesions. FNAC does not give same architectural details as

histology but it can provide cells from the entire lesion as many passes through the lesion can be made while aspirating (3, 7).

A primary diagnosis of malignant lymphoma based on cytology morphology, however is not adequate and all cases undergoing fine-needle aspiration for possible lymphoma should have an aspirate sample submitted for flow cytometry immunophenotyping, and preferably be accompanied by a core biopsy for architectural evaluation (1).

In developing countries FNA is a valuable tool for the monitoring and staging of metastatic head and neck squamous cell carcinoma and for the diagnosis of inflammatory diseases, especially tuberculosis due to their high incidence (3, 7).

A prospective cohort study conducted over two year's period from October 2014 to September 2016 in Andhra Pradesh, India. Out of the 76 malignant cytological smears studied, 68 (89.47%) were metastatic lesions and 8 (10.53%) were lymphomas. The age group varied from 15 to 82 years. Malignancy was clinically unsuspected in 7 cases. Cervical group of lymph nodes were most commonly involved (47 cases; 47/76) followed by supraclavicular (15 cases; 15/76), axillary, Inguinal lymph node and a study done in Indore, India from June 2011 to May 2013 shows reactive hyperplasia 33.38%, tubercular lymphadenitis 39.77%, granulomatous lymphadenitis 7.1%, lymphoma 5.5%, metastatic carcinoma 40 (8.9%) and others 22 (4.9%) (11, 12).

In another study conducted in a tertiary care teaching hospital in north eastern India ,among 100 adult patients aged above 15 years presenting with accessible peripheral lymphadenopathy showed that, age of patients varied from 15 to 76 years, the commonest being 21-30 years (24%) followed by 15-20 and 31-40 years respectively and distribution of lymph nodes were unilateral in 90 (90%) of cases right sided being commoner than the left sided ones, bilateral in 4 (4%) and generalized in 6 (6%) cases respectively. Cervical nodes accounted for 79 (79%) of cases followed by axillary in 9 (9%), inguinal and generalized nodes in 6 (6%). FNAC was done successfully in 98 (98%) cases whereas in 2 (2%) cases aspirated material was inadequate despite repeated attempts. The diagnosis arrived on the basis of FNAC were tubercular (TB) in 51 (52.04%), metastasis (MET) in 25 (25.51%), non-specific reactive lymphadenitis (NSRL) in 17 (17.34%), Hodgkin's lymphoma (HL) in 2 (2.04%) and Non-Hodgkin's lymphoma (NHL) in 3(3.06%) cases respectively (13).

From studies done in Kathmandu, Nepal KIST Medical College conducted over a period of two years (May 2015 to May 2017) on 206 patients with cervical lymphadenopathy, most cases were observed in the age group of 21-40 years. Malignant lesions are common in older age as elderly patients respond to infection with slight to moderate lymph node enlargement in contrast to children. Most of cervical lymphadenopathy cases were non-neoplastic (91.74 %) whereas (8.26 %) cases were neoplastic. Major cause of lymphadenopathy was related to inflammatory pathology which is common in developing countries. Reactive lymphadenitis was the most common non-neoplastic lesion (112 cases, 54.36%) followed by tuberculous lymphadenitis (74 cases, 35.92%). Regarding age group, it was observed that reactive lymphadenitis was the most common cause of lymphadenopathy in the age group of 0-20 years, whereas tuberculous lymphadenitis was more common in the age group of 21-40 years. Reactive lymphadenitis was predominantly seen in male while tuberculous lymphadenitis was predominant in female. The diagnostic accuracy of FNAC for metastatic carcinoma and reactive lymphadenitis was 100% and 93.75% respectively [\(14\)](#).

Another study done on the same area from June 2006 to May 2008 (2 years) revealed cervical lymph nodes were 66 (50.76%), and axillary lymph nodes were 20 (15.38%). Male to female ratio of the patients was 1: 0.9. FNAC diagnosis accounting: reactive hyperplasia 54(41.55%), tubercular lymphadenitis 36 (28 %), metastatic carcinoma 16 (12.3%), granulomatous lymphadenitis 12 (9.2 %), lymphoma 8 (6%) and suppurative lymphadenitis 4(3%). In metastatic carcinoma to lymph nodes sensitivity and specificity of FNAC were 100% each [\(15\)](#).

The study done on 205 Patients with enlarged peripheral lymph nodes in Kigali University Teaching Hospital, Rwanda, the study shows that, cervical group of Lymph nodes were the most common site of involvement, out of 205 patients received 157 (76.6%) were from cervical group. Reactive lymphoid hyperplasia was the most common pattern accounting for 84 (41.0%) of cases followed by tuberculous lymphadenitis 58 (28.3%). Lymphomas were seen in 25 (12.2%) whereas secondary malignancies (metastasis) to lymph nodes were 13 (6.3%). In 58 cases of tuberculous

lymphadenitis, there was a statistical significant association of tuberculous lymphadenitis with an age group of 15 and 44 years, with 76% of the cases [\(9\)](#).

A study carried out in the department of Pathology, Sher-i-Kashmir Institute of Medical Sciences from January 2009 to December 2011 (3 years). A total of 1902 patients presenting clinically with localised or generalised lymphadenopathy, revealed the cervical lymph node group involved in most of the cases (76%) followed by the axillary region (17.5%). The size of the lymph nodes ranged from 1-2 cm in 1,007 cases (63.8 %) and >2 cm in remaining 572 cases (36.2 %). Metastatic malignancy (38.2%) was the commonest cause of lymphadenopathy followed by reactive lymphoid hyperplasia (36.9%), tuberculosis (9.1%) and lymphomas (8.6%). Squamous cell carcinoma (32.2%) followed by adenocarcinoma (21.9%) were the most frequent metastatic tumors [\(16\)](#).

A retrospective study conducted on 627 cases of lymph node FNA performed at the, Department of Pathology, Escola Paulista de Medicina, during the period from 1997 to 2001 Patient age ranged from 2 mo to 98 yr .348 (56.8%) of the patients were men and 265 (43.2%) were women, at a proportion of 1.3:1. Regarding topography, 86.5% lymph nodes were located in the head and neck region, 9.9% in the trunk, 2.1% in the region of the upper or lower limbs, and 15 (2.4%) had no location specified [\(17\)](#).

A Study conducted on 1000 patients of lymphadenopathy in the Department of Pathology J.N. Medical College, AMU, Aligarh from May 2002 to May 2003, the patients were evaluated into two broad categories of benign and malignant disorders. 864 cases (86.4%) were benign lymphadenopathy, of which 536 cases (53.6%) were of reactive nature and 328 cases (32.8%) were tubercular. The remaining 136 cases (13.6%) were of malignant lymphadenopathy; consisting 45 cases (4.5%) of primary malignancies i.e. lymphomas and 91 (9.1%) cases of metastasis to lymph nodes. The nodal site sampled most frequently was cervical group in 736 cases (73.5%), followed by axillary groups in 106 cases (10.6%)[\(18\)](#).

A cross-sectionalretrospective study was done between January 2011 and December 2014in the pathology laboratory of the Affiliated Hospital of Qingdao University, china, a total of 2682 lymph node were sampled. The male-to-female ratio was 1.23:1 with an age ranges from 8–73 years and cervical lymph nodes were the most frequent anatomic site

for lymphadenopathy 81.5%. The highest age groups affected with lymph node diseases were among the 30–39 and 40–49 year age groups with 642 (30%) and 542 (25.4%) cases. The proportion of tuberculosis lymphadenitis was 186 (8.7%) and the highest rate was observed in the 10–19 year age group with 106 cases, the 20–29 year age group was more affected with pyogenic abscesses and Hodgkin lymphoma, while reactive lymphadenitis was more in the <10 year age group. 53.6% lymph node diseases were malignancies [\(19\)](#).

3. Objective

3.1. General objective

- To determine cytopathologic patterns of lymph node lesions.

3.2 Specific objective

- To determine cytopathologic patterns of lymph node Lesions.
- To see the relationship of different lymph node lesions with site of distribution, age and sex of individuals.
- To compare the result with different studies.

4. Methods

4.1 Study area

Ethiopia is a country located in the Eastern Horn of Africa, has a population of more than 114 million. The Black Lion Hospital in Addis Ababa is the university teaching hospital of the Addis Ababa University and the largest referral hospital in the country. The practice of cytopathology and fine-needle aspiration began sometime after the establishment of the department of pathology in Addis Ababa University, Faculty of Medicine, Black Lion Hospital, in 1965. The department gives haematology, cytopathology, surgical pathology and neonatal autopsy services. All of the pathologist staff and residents rotate to work through the FNAC service. FNA is the only non-surgical method of determining whether a lymph node enlargement is benign or malignant.

4.2 Study Design

The study applied retrospective cross-sectional descriptive method with reviewing all the consecutive Fine needle aspiration cytology reports of lymph nodes performed at Black Lion specializes teaching Hospital from January 01, 2018 to August 30, 2020.

4.3 Target population

All patients who had Fine needle aspiration cytology performed at Black Lion specializes teaching Hospital during the study period.

4.4 Study population

All patients who had Fine needle aspiration cytology performed for lymph node lesion at Black Lion specializes teaching Hospital during the study period.

4.5 Inclusion and exclusion criteria

4.5.1 Inclusion criteria

- All patients primarily presented with lymph node enlargement that underwent Fine needle aspiration cytology (including ultrasound guided).

4.5.2 Exclusion criteria

- Those patients with two or more missing variables.

4.6 Sample size estimation

All patients fulfilling the criteria during the study period was included.

4.7 Sampling procedure

All the hard copy of lymph node Fine needle aspiration cytology reports from January 01, 2018 to August 30, 2020 was reviewed from the archive of pathology department.

4.8 Data collection tools and procedures

The data was collected in August 2018 to September 2020. Demographic data, clinical presentation of the patients, anatomical sites of the lymph nodes and Fine needle aspiration cytology diagnoses were extracted from the hard copy using data extraction sheet.

4.9 Data analysis

The data sheets were coded and data entry, cleaning and analysis was done using the Statistical Package for the Social Sciences (SPSS) version 26 and Microsoft excels 2010.

4.10 Data quality assurance

The data was collected by investigator herself

4.11. Study variables

- Age of the patient
- Gender of the patient
- Lymph node laterality
- Anatomic site of the lymph node
- Cytopathologic diagnosis

4.12. Operational definitions

Lymphadenopathy; any lymph node enlargement accessible for FNAC

Generalized lymphadenopathy; involvement of two or more groups of lymph nodes was considered to generalized.

Benign: reactive hyperplasia, tuberculosis (including suspicious and suggestive reports) , chronic nonspecific inflammation, pyogenic abscess, granulomatous inflammation (including suspicious and suggestive reports)

Malignant; lymphoma, secondary carcinoma, sarcoma, melanoma, leukemic infiltration, myeloid sarcoma and plasmacytoma including suspicious and suggestive reports

4.13. Ethical consideration

The study was approved by the Department of Pathology, College of Health Sciences, Addis Ababa University.

5. Results

From a total of 775 cases reviewed 771 cases were having complete records suitable for the study. The other four were excluded due to incomplete demographic and clinical data. Of the total 771 cases, 409 (53%) were females and 362 (47%) were males making F: M ratio of 1.13:1. with mean, standard deviation, lowest and highest age limits of 33.6 yrs, 19.6, 3 month and 84 years respectively. Most of the patients were in the age range of 21-30 years, accounting for 152(19,7%) cases followed by 137 (17.8%) in the age range of 31-40 years , 108 (14%) cases were in the range of 41-50 years.103 (13.4%) cases were in the group between 51-60.only 53 cases (6.9%) were above the age of 60 years. The ages of 2 (0.3%) cases were not mentioned.

Table: 1 Distribution of lymph node lesion cases with Gender and age group

Gender			
		Frequency	Percent
Valid	Male	362	47.0
	Female	409	53.0
	Total	771	100.0
Age group			
		Frequency	Percent
Valid	10	130	16.9
	11-20	86	11.2
	21-30	152	19.7
	31-40	137	17.8
	41-50	108	14.0
	51-60	103	13.4
	>60	53	6.9
	Total	769	99.7
Missing	System	2	0.3
Total		771	100.0

Table: 2 Distribution of lymph node lesion cases with lymph node laterality and type of FNAC procedure

Lymph node region	Frequency	Percent
Unilateral	523	67.8
Bilateral	87	11.3
Generalized*	133	17.3
mediastinal	3	0.4
intraabdominal	25	3.2
Total	771	100.0

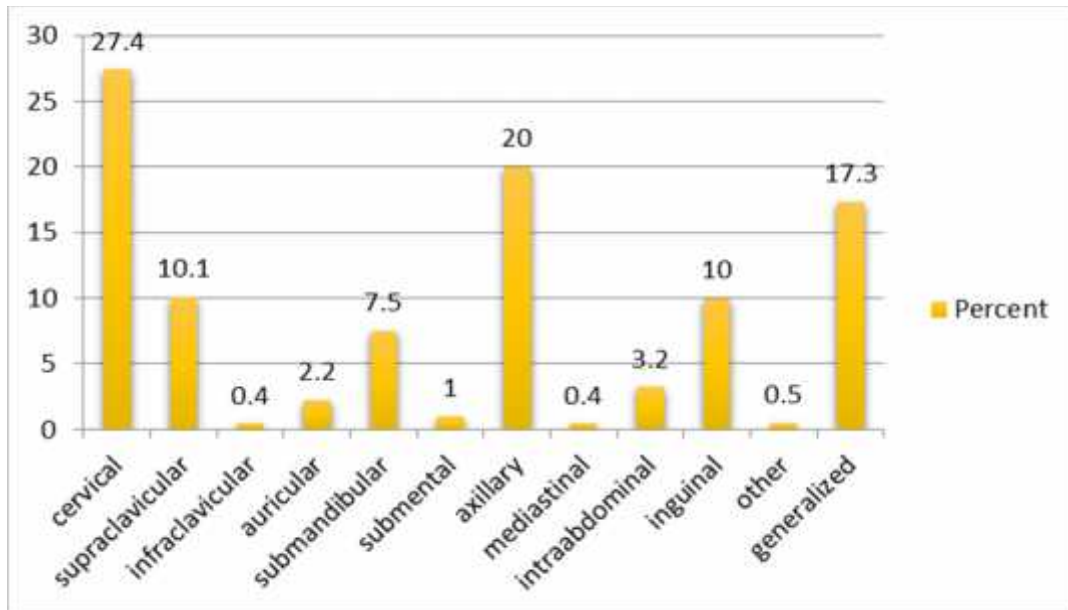
FNAC Procedure		
	Frequency (no)	Percentage
palpation guided	743	96.4%
Image-guided	28	3.6%
total	771	100

***involvement of two or more groups of lymph nodes was considered to be generalized**

With regard to the regional distribution of the lymphadenopathies unilateral 516 (66.9%), bilateral 87(11.3%), generalized 133(17.3%), mediastinal 3 (0.4%) and intraabdominal 25 (3.2%) cases were seen. 743(96.37%) of FNA procedures were palpation guided while the rest 28 (3.63%) were image-guided cases.

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The commonest lymph node group involved was cervical lymph node constituting 211 (27.4%) followed by axillary lymph node 154 (20%), generalized lymphadenopathy was observed in 133 (17.3%) cases, among the remaining cases 78 (10.1%), 77 (10%), 58 (7.5%), 25 (3.2%), 17 (2.2%) and 8 (1.0%) cases were supraclavicular, inguinal, submandibular, intraabdominal, auricular and submental lymph nodes respectively.



Other-epitrochlear, intramammary, femoral

Fig-1, a graph showing distribution of lymph node groups

From all 771 studied cases, 11 (1.4%) were non-diagnostic (inconclusive) results and 26 (3.4) cases were signed out with description, while benign lesions and malignant diagnosis accounted for 294 (38.1%) and 440 (57.1%) of the cases respectively. (**Fig-2**)

From the 11 non-diagnostic (inconclusive) and 26 descriptive cases, 6/28 (21.4%) were among the 28 ultrasound guided cases and the non-diagnostic and descriptive percentage was lower for palpation guided cases 31/743 (4.2%)

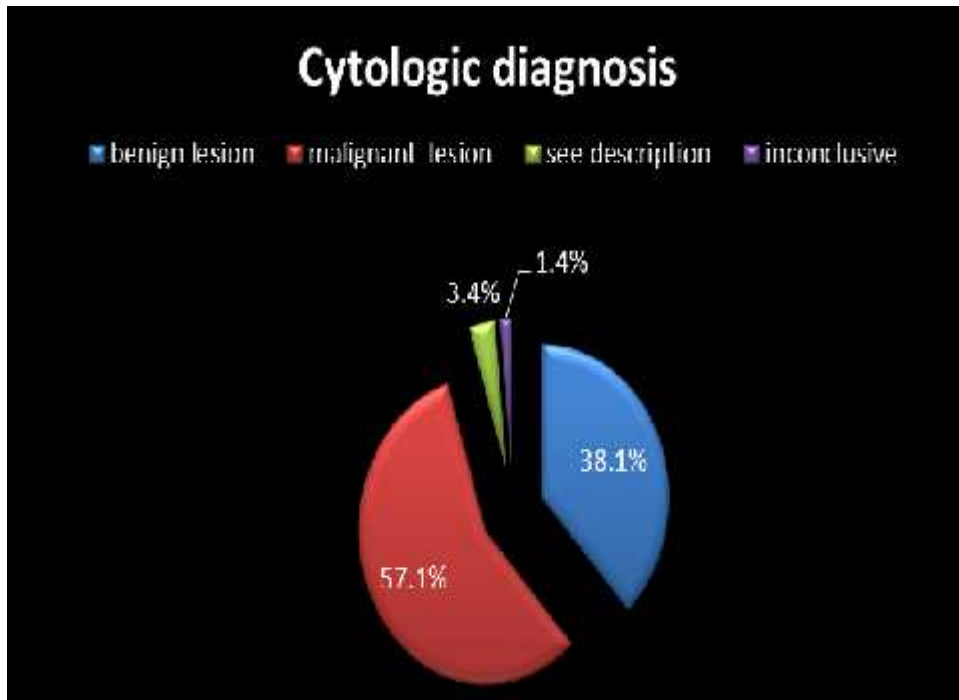


Fig: 2. A graph showing the proportion of the cytopathologic diagnosis

Collectively metastatic tumor 256 (33.2%) was the most common cytological diagnosis followed by reactive lymphadenitis 176 (22.83%), lymphoma 166 (21.53%) and tuberculous lymphadenitis 83 (10.8%). Most benign lesions occurred in cervical lymph nodes followed by axillary lymph nodes. In contrast to this malignant lesions were seen predominantly in axillary lymph nodes and in generalized lymphadenopathies.

Table: 3 Pattern of lymph node lesions

Types of lymphadenitis	Frequency	Percent
metastatic tumors	256	33.2
reactive lymphoid hyperplasia	179	23.2
lymphoma	166	21.5
tuberculous lymphadenitis	83	10.8
granulomatous inflammation	20	2.6
non specified malignant tumor	11	1.4
suppurative lymphadenitis	10	1.3
leukaemia	4	0.5
Rosai-dorfman disease	2	0.3
myeloid sarcoma	2	0.3
plasmacytoma	1	0.1
see description	26	3.4
inconclusive	11	1.4
Total	771	100%

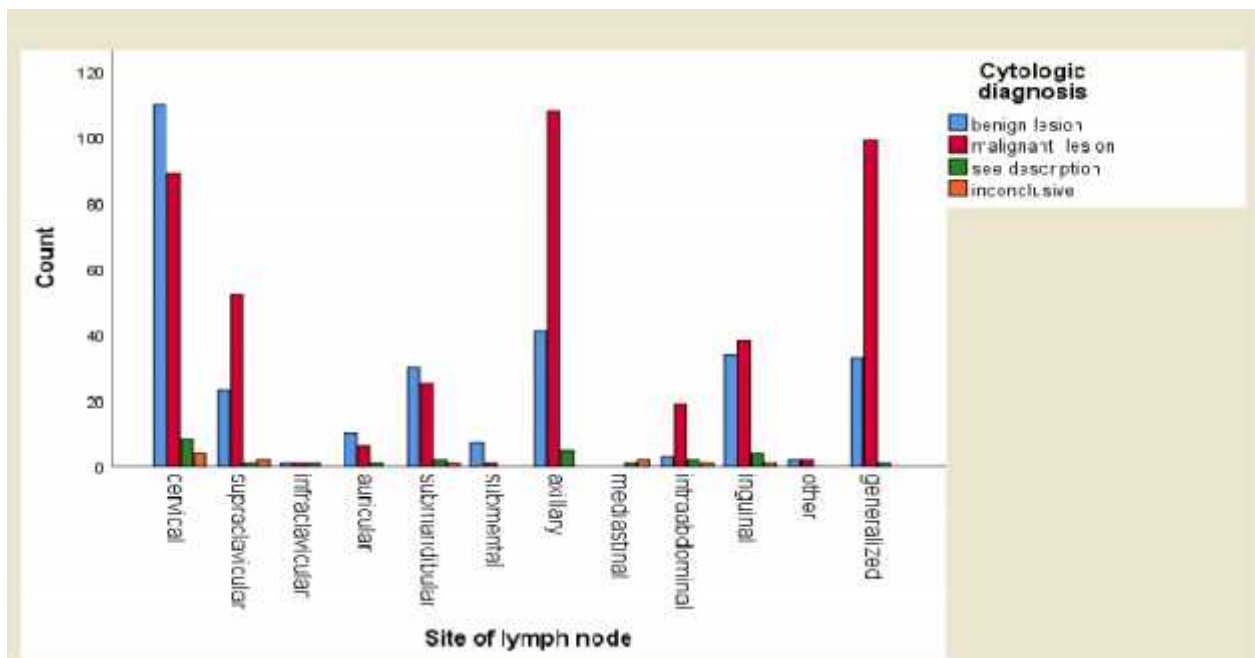


Fig: 3. A graph showing cytopathologic diagnosis in relation to sites of lymph nodes

Among the Benign lesions 294(38.1%), reactive lymphadenitis was the most common diagnosis occurring in 179 (60.9%) of the cases followed by tuberculosis lymphadenitis 83 (28.2%). There were also diagnoses of granulomatous inflammation accounting 20 (6.8%), suppurative lymphadenitis with 10 (3.4%) and Rosai-dorfman disease 2(0.7%).

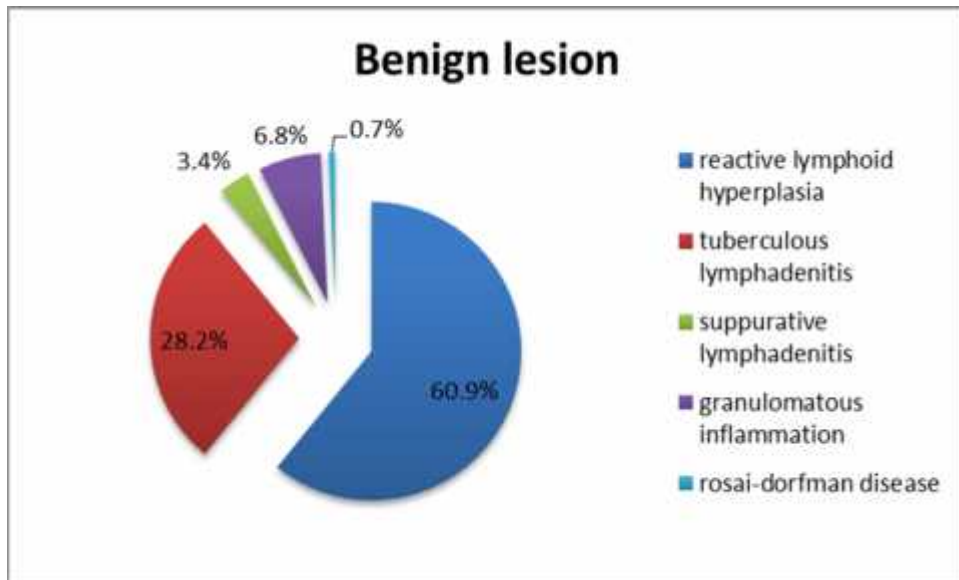


Fig: 4 a graph showing distribution of benign cytopathologic diagnosis

The gender specific cytopathologic benign diagnosis proportion was 141/294 (48%) for males and 153/294 (52%) for females. Reactive lymphadenitis, suppurative lymphadenitis and granulomatous inflammation more occurred in females accounting 93 (52.0%), 7 (70%), 12 (60%) respectively. In contrast tuberculous lymphadenitis predominantly occurred in males.

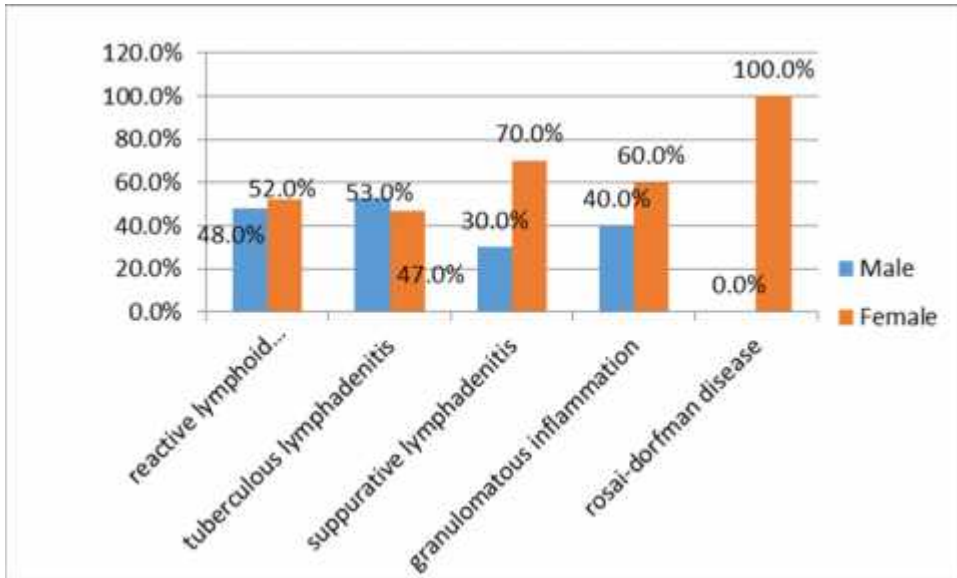


Figure 5 Distribution of benign lesion among gender

Within benign lesion reactive lymphadenities contributed to the majority of cases in the first three age groups (61(34.1%) in 0-10 yrs; 39(21.8%) in 11-20 yrs and 27(15.1%) in 21-30yrs) followed by tuberculosis 13.3% in 0-10 yrs, 31.3% in 11-20 yrs and 15.7% in 31-40 yrs). Suppurative lymphadenitis and granulomatous inflammation account (40% and 25%) in 0-10 yrs, (30% and 25%) in 11-20 yrs, (10% and 15%) in 31-40% respectively.

Most of benign lesions occurred in the cervical lymph node groups 110 (37.40%) followed by axillary lymph node 41(13.9%) and inguinal lymph node 34 (11.60%). Regional lymphadenopathy was observed 261 patients while generalized lymphadenopathy occurred in 33 patients.

Benign lesion							Total
Age group		reactive lymphoid hyperplasia	tuberculous lymphadenitis	suppurative lymphadenitis	granulomatous inflammation	Other benign disease	
	10	61(34.1%)	16(19.3%)	4(40%)	5(25%)	0(0%)	86(29.3%)
	11-20	27(15.1%)	12(14.50%)	0(0%)	2(10%)	1(50%)	42(14.3%)
	21-30	39(21.8%)	26(31.30%)	3(30%)	5(25%)	0(0.0%)	73(24.80%)
	31-40	27(15.1%)	13 15.70%	1(10%)	3 15.00%	0 0.00%	44 15.00%
	41-50	13(7.3%)	7 8.40%	1(10 %)	2(10%)	1 50.00%	24 8.20%
	51-60	11(6.1%)	6 7.20%	1(10%)	1 5.00%	0 0.00%	19 6.50%
	>60	1(0.6%)	3(3.6%)	0	2(10%)	0	6(2%)
	Total	179(100%)	83(100%)	10(100%)	20(100%)	2(100%)	294(100%)
Lymph node laterality	unilateral	131(73.2%)	60(72.3%)	10(100%)	16(80%)	2(100%)	219(74,5%)
	bilateral	32 17.90%	7 8.40%	0 0.00%	0 0.00%	0 0.00%	39 13.30%
	generalized	16 8.90%	13 15.70%	0 0.00%	4 20.00%	0 0.00%	33 11.20%
	Intra-abdominal	0 0.00%	3 3.60%	0 0.00%	0 0.00%	0 0.00%	3 1,00%
	Total	179 100.00%	83 100.00%	10 100.00%	20 100.00%	2 100.00%	294 100.00%
Site of lymph node	cervical	68 38.00%	32 38.60%	2 20.00%	6 30.00%	2 100.00%	110 37.40%
	supraclavicular	7 3.90%	15 18.10%	0 0.00%	1 5.00%	0 0.00%	23 7.80%
	infraclavicular	1 0.60%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	1 0.30%
	auricular	6 3.40%	2 2.40%	1 10.00%	1 5.00%	0 0.00%	10 3.40%
	submandibular	19 10.60%	6 7.20%	2 20.00%	3 15.00%	0 0.00%	30 10.20%
	submental	5 2.80%	1 1.20%	1 10.00%	0 0.00%	0 0.00%	7 2.40%
	axillary	28 15.60%	7 8.40%	3 30.00%	3 15.00%	0 0.00%	41 13.90%
	intraabdominal	0	3(3.60%)	0	0	0	3(1.00%)
	inguinal	27 15.10%	4 4.80%	1 10.00%	2 10.00%	0 0.00%	34 11.60%
	other	2 1.10%	0 0.00%	0 0.00%	0 0.00%	0 0.00%	2 0.70%
	generalized	16(8.9%)	13(15.7%)	0	4(20%)	0	33(11.2%)
	Total	179(100.00%)	83(100.00%)	10(100.00%)	20(100.00%)	2(100.00%)	294(100.00%)

Table 4 Distribution of Cytopathologic diagnoses of benign lesions among different age groups and lymph node anatomic site

Figure-6, Distribution of malignant lymph node lesions

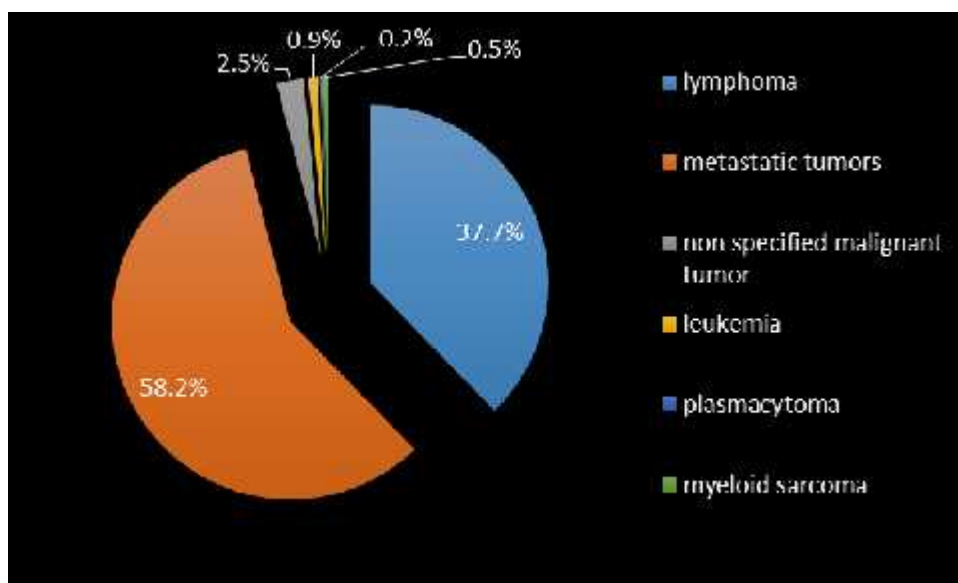


Figure 6 shows the cytopathologic diagnosis of 440 (57.1%) malignant lesions in lymph nodes, metastatic tumors 256 (58.2%) followed by lymphoma 166 (37.7%) and non-specified malignant tumor 11 (2.5%) and the remaining cases were leukemic infiltration, myeloid sarcoma and plasmacytoma accounting 4(0.9%), 2(0.5%) and 1(0.2%) respectively.

Among the metastatic cases carcinoma accounts 242 (94.5 %), sarcoma and melanoma 6 (2.3%) each and the least case was secondary small round cell tumor 2 (0.8%).

Metastatic tumors predominantly occurred in females 175 (68.4%) commonly in the age groups between 21-60 (20.1% in 21-30yrs, 24.4% in 31-40yrs and 18.5% in 41-50yrs) only 9.4% cases seen >60yrs of age and presented with regional lymphadenopathy 233 (91.02%) .

In case of lymphoma males were 110 (66.3%) and 56 (33.70%) were females. M: F ratio 2:1. The mean age is 41.5 and commonly seen in the age groups of 41-60yrs. commonly presents with generalized lymphadenopathies 69 (41.6%). Non specified malignant tumor cases predominantly diagnosed in males 75% and mostly diagnosed in 0-20 age groups 5 (45.5%) ,presented with regional lymphadenopathy 8(72.7%) of cases.

Table 5; Distribution of Cytopathologic diagnoses of malignant lymph nodes lesions among Male & Females, different age groups and lymph node region

cytopathologic diagnosis of malignant lesion								Total
Gender		lymphoma	metastatic tumors	non specified malignant tumor	leukemia	Plasmacytoma	myeloid sarcoma	
Gender	Male	110(66.3%)	81(31.6%)	7(63.6%)	3(75%)	1(100%)	2(100%)	204(46.4%)
	Female	56(33.7%)	175(68.40%)	4(36.4%)	1(25%)	0(0%)	0(0%)	236(53.6%)
	Total	166(100%)	256(100%)	11(100%)	4(100%)	1(100%)	2(100%)	440(100%)
Age group	10	24(14.5%)	10(3.9%)	2(18.2%)	2(50%)	0(0%)	1(50%)	39(8.9%)
	11-20	24(14.5%)	12(4.7%)	3(27.3%)	0(0%)	0(0%)	0(0%)	39(8.9%)
	21-30	19(11.4%)	51(20.1%)	1(9.1%)	1(25%)	0(0%)	0(0%)	72(16.40%)
	31-40	19(11.4%)	62(24.4%)	3(27.3%)	1(25%)	1(100.00%)	1(50%)	87(19.9%)
	41-50	28(16.9%)	47(18.5%)	1(9.1%)	0(0%)	0(0%)	0(0%)	76(17.4%)
	51-60	32(19.3%)	48(18.9%)	1(9.1%)	0(0%)	0(0%)	0(0%)	81(18.5%)
	>60	20(12%)	24(9.4%)	0(0%)	0(0%)	0(0%)	0(0%)	44 (10%)
	Total	166(100%)	254(100%)	11(100%)	4(100%)	1(100%)	2(100%)	438 (100%)
Lymph node region	unilateral	65 (39.2%)	209 (81.70%)	8 (72.7%)	0 (0%)	1 (100%)	0 (0%)	283 (64.3%)
	bilateral	19 (11.4%)	18 (7%)	1 (9.1%)	0 (0%)	0 (0%)	1 (50%)	39 (8.90%)
	generalized	69 (41.60%)	23 (9.00%)	2 (18.20%)	4 (100.00%)	0 (0.00%)	1 (50%)	99 (22.50%)
	intraabominal	13 (7.8%)	6 (2.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	19 (4.30%)
	total	166 (100%)	256 (100%)	11 (100%)	4 (100%)	1 (100%)	2 (100%)	440 (100%)

Out of 166 lymphoma cases 132 (80%) of the cases were non-Hodgkin's lymphoma. Of these 67.4% occurred in males and 32.6% in females followed by Hodgkin's lymphoma 27 (16.4%) and 63% cases were in males and 37% cases in females. 7 (4.2%) cases were diagnosed as lymphoma only.

From non-Hodgkin's lymphoma cases, high grade lymphoma were 80 (60.6%), low grade cases were 49 (37.1%) and none specified non-Hodgkin's lymphoma case were 3 (2.3%) with male predominance in each case 73.8%, 57.10% and 66.70% respectively.

Among 80 cases of high grade NHL 9 cases (11.3%) were lymphoblastic lymphoma, 5 cases (6.3%) were Burkitt's lymphoma , 4 cases (5%) were anaplastic large cell lymphoma and the remaining cases, anaplastic T-cell lymphoma, diffuse large B cell lymphoma constitute 1 case (1.3%) each. The rest 60 cases (75%) diagnosed as High NHL only. **(Fig 9)**

From 49 Low grade NHL cases 40 (81.6%) of cases were small lymphocytic lymphomas and 9 cases were diagnose as Low grade NHL only. **(Table 7)**

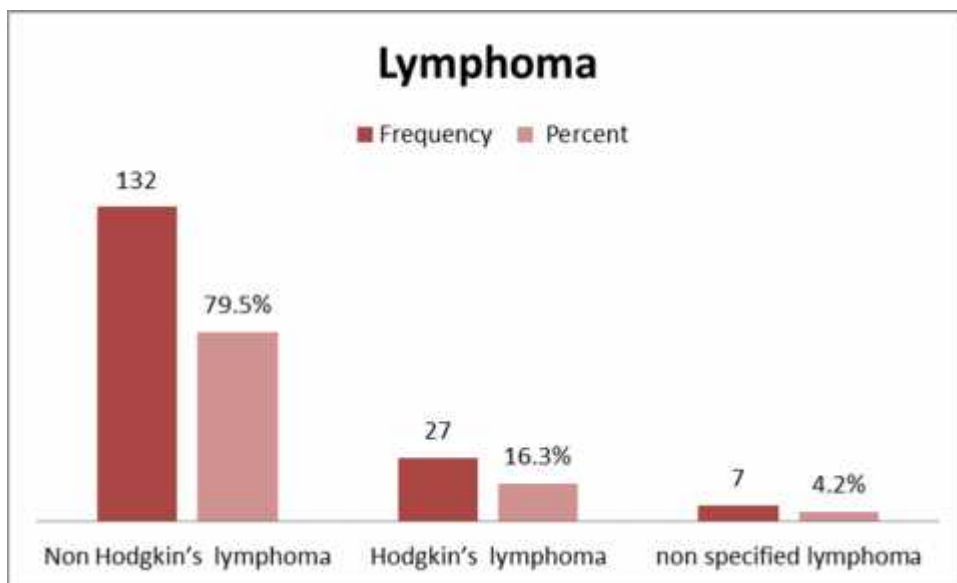
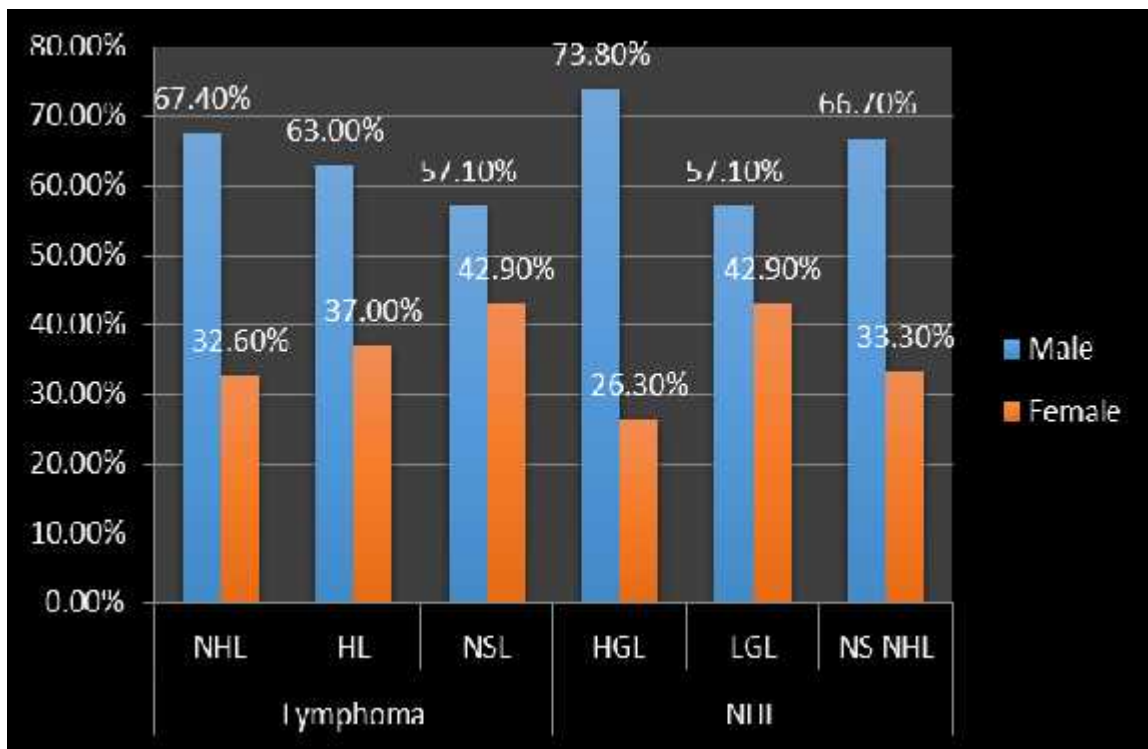


Figure-7, Frequency Distribution of lymphoma category

Table: 6 Frequency distribution of Non-Hodgkin’s lymphoma

NHL		
	Frequency	Percent
High grade lymphoma	80	60.6
Low grade lymphoma	49	37.1
non specified NHL	3	2.3
Total	132	100.0



NHL-Non-hodgkins lymphoma, HL-hodgkins lymphoma, NSL-Non-specified lymphoma, HGL-High grade lymphoma, LGL-Low grade lymphoma, NS NHL-Non specified Non hogikins lymphoma

Figure 8 shows distribution of lymphoma category by gender

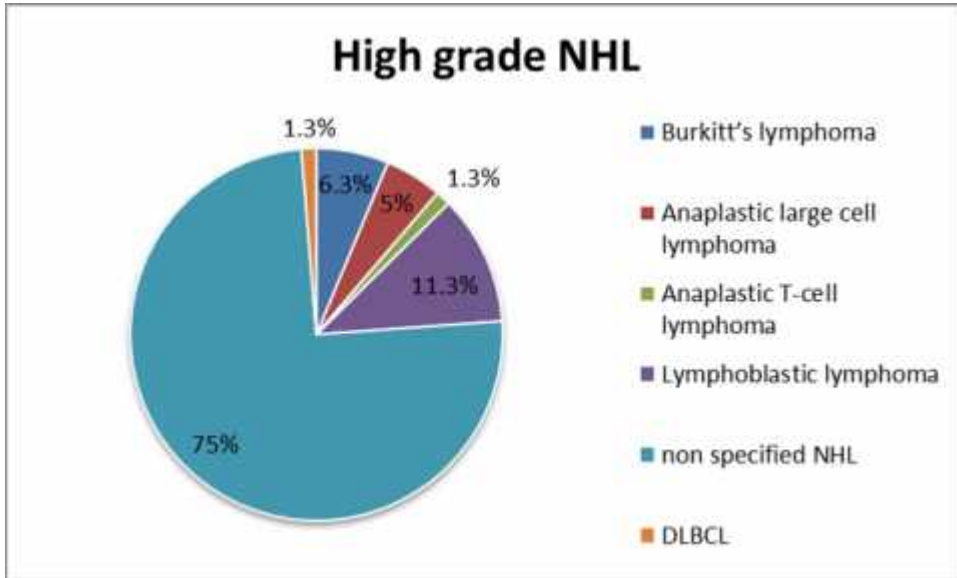


Figure 9 shows frequency of High grade lymphoma

Table 7 shows frequency of Low grade lymphoma

Low grade NHL	Frequency	Valid Percent
Small lymphocytic lymphoma	40	81.6
non specified	9	18.4
Total	49	100

Diagnosis of metastatic deposits was seen in 256 cases, possible types of metastatic deposits are given in (Table: 8). the majority cases were carcinomas 242 (94.5%) followed by equal distribution of sarcoma and melanoma 6 (2.3%) each. The remaining case was secondary small round cell tumor constituting 2 (0.8%).

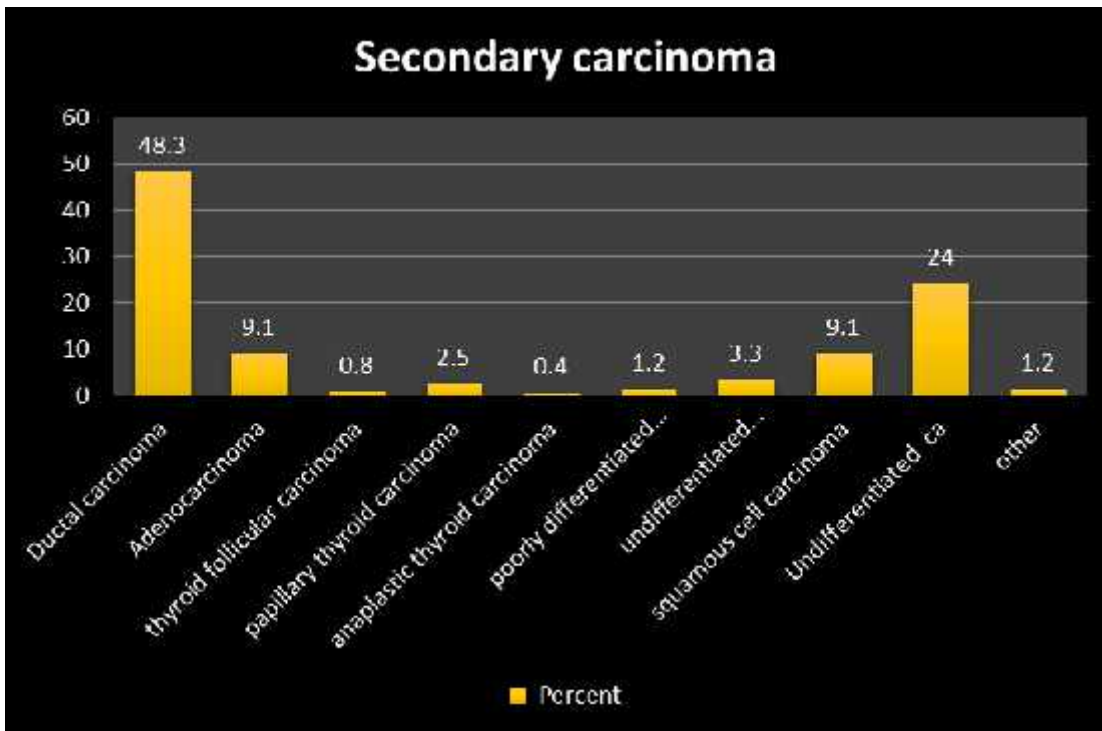
Table 8 shows metastatic deposits in the lymph node

Metastatic tumors		
	Frequency	Percent
Carcinoma	242	94.5
Sarcoma	6	2.3
Melanoma	6	2.3
SRT	2	0.8
Total	256	100

SRT; Small round cell tumor

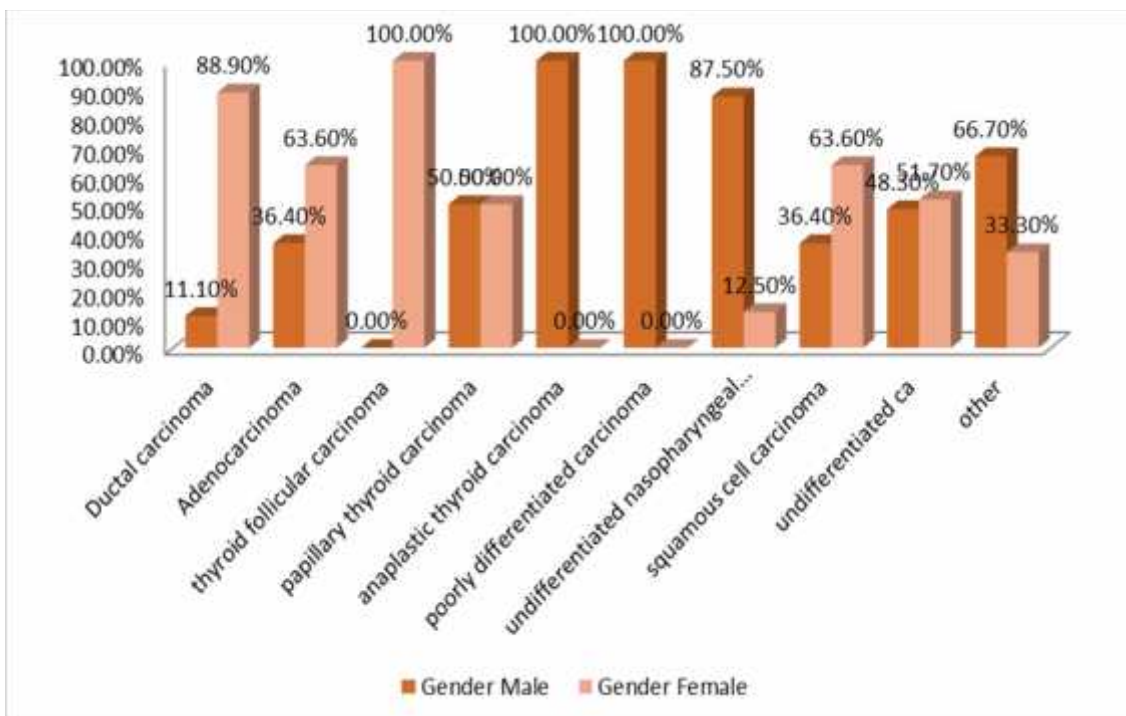
Among Metastatic carcinomas 117 (48.3%) were ductal carcinoma, 58 (24%) were undifferentiated carcinoma, adenocarcinoma and squamous cell carcinoma account 22 (9.1%) each. The remaining cases were undifferentiated nasopharyngeal carcinoma, papillary thyroid carcinoma, poorly differentiated carcinoma and thyroid follicular carcinoma accounting 8 (3.3%), 6(2.5%), 3(1.2%) and 2(0.8%) respectively. There were one case each of metastasis from thyroid which was anaplastic carcinoma in female aged 50 years, medullary carcinoma in male aged 58 years, Hurthle cell carcinoma in male aged 29 years and renal cell carcinoma in female aged 30 years. **(Fig10)**

In metastatic ductal carcinoma 104 (88.9%) of cases seen in females and 13(11.1%) cases in males making F: M ratio of 8:1 and predominantly occurred between the age groups of 31-60yrs (39 cases (33.3%) in the range of 31-40, 24 cases (20.5%) in the range of 41-50 and 19 cases (16.2%) in the range of 51-60yrs. Most **of the cases** 78(66.7%) occurred on the axillary lymph node followed by supraclavicular lymph nodes 21(17.9%) and 10 (8.5%) cases presented with generalized lymphadenopathy. **(Fig: 11, Table: 8, Table: 9)**. Out of 22 cases of secondary squamous cell carcinomas 14 (63.6%) cases occurred in females and 8 (34.4%) in males. Mostly occurred in cervical lymph node groups 10 (45.5%) within 41-50 age groups 6 (28.6%).



Other-medullary thyroid carcinoma, chromophobe renal cell carcinoma, hurthle cell carcinoma

Figure- 10 patterns of secondary carcinoma



Other-medullary thyroid carcinoma, chromophobe renal cell carcinoma, hurthle cell carcinoma

Fig -11, shows distribution of secondary carcinoma in relation to gender

Table 9 shows age group distribution of secondary carcinomas.

Secondary Carcinoma	Age group								Total
	10	11-20	21-30	31-40	41-50	51-60	>60		
Ductal ca	0 0%	1 0.9%	25 21.40%	39 33.30%	24 20.5%	19 16.20%	9 7.70%	117 100%	
Adenocarcinoma	0 0%	1 4.5%	4 18.20%	1 4.50%	6 27.3%	8 36.40%	2 9.10%	22 100%	
thyroid follicular ca	0 0%	0 0.0%	0 0.00%	1 50.00%	0 0%	1 50.00%	0 0.00%	2 100%	
papillary thyroid ca	0 0%	0 0%	2 33.30%	1 16.70%	0 0%	1 16.70%	2 33.30%	6 100%	
anaplastic thyroid ca	0 0%	0 0%	1 100%	0 0.00%	0 0%	0 0.00%	0 0.00%	1 100%	
poorly differentiated ca	0 0%	0 0%	1 33.3%	0 0.00%	0 0%	1 33.30%	1 33.30%	3 100%	
undifferentiated NPC	0 0%	4 50%	2 25.%	0 0.00%	1 12.5%	1 12.50%	0 0.00%	8 100%	
SCC	0 0%	0 0%	4 19%	2 9.50%	6 28.6%	4 19.00%	5 23.80%	21 100%	
undifferentiated ca	3 5.2%	5 8.6%	9 15%	18 31.00%	9 15.5%	10 17.20%	4 6.90%	58 100%	
other	0 0%	0 0%	2 66.7%	0 0.00%	0 0%	1 33.30%	0 0.00%	3 100%	
Total	3 1.20%	11 4.6%	50 20.7%	62 25.70%	46 19.1%	46 19.10%	23 9.50%	241 100%	

Table 10; showing cytopathologic diagnosis of secondary carcinoma in relation to sites of lymph node

Secondary Carcinoma

	DC	AC	TFC	PTC	ATC	PDC	UNPC	SCC	UC	other	Total
Cervical	7(6%)	3(13.6%)	1(50%)	3(50%)	0(0%)	2(66.7%)	5(62.5%)	10(45.5%)	21(36.2%)	1(33.3%)	53(21.9%)
Supraclavicular	21(17.9%)	6(27.3%)	0(0%)	1(16.7%)	0(0%)	0(0%)	0(0%)	1(4.5%)	12(20.7%)	0(0%)	41(16.9%)
Infraclavicular	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1(1.7%)	0(0%)	1(0.4%)
Auricular	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1(12.5%)	2(9.1%)	1(1.7%)	0(0%)	4(1.7%)
Submandibular	0(0%)	0(0%)	1(50%)	1(16.7%)	0(0%)	0(0%)	2(25%)	1(4.5%)	2(3.4%)	0(0%)	7(2.9%)
Submental	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1(4.5%)	0(0%)	0(0%)	1(0.4%)
Axillary	78(66.7%)	3(13.6%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	7(12.1%)	0(0%)	88(36.4%)
Intraabdominal	0(0%)	1(4.5%)	0(0%)	0(0%)	0(0%)	1(33.3%)	0(0%)	0(0%)	2(3.4%)	133.3%	5(2.1%)
Inguinal	1(0.9%)	7(31.8%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	4(18.2%)	7(12.1%)	0(0%)	19(7.9%)
Other	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	1(100%)	0(0%)	0(0%)	1(0.4%)
Generalized	10(8.5%)	2(9.1%)	0(0%)	1(16.7%)	1(100%)	0(0%)	0(0%)	2(9.1%)	5(8.6%)	1(33.3%)	22(9.1%)
Total	117(100%)	22(100%)	2(100%)	6(100%)	1(100%)	3(100%)	8(100%)	22(100%)	58(100%)	3(100%)	242(100%)

DC; Ductal carcinoma, **AC;** Adenocarcinoma, **TFC;** Thyroid follicular carcinoma, Papillary thyroid carcinoma, **ATC;** Anaplastic thyroid carcinoma, **PDC;** Poorly differentiated carcinoma, **UNPC;** Undifferentiated nasopharyngeal carcinoma; **SCC;** Squamous cell carcinoma, **UC;** Undifferentiated carcinoma

6. Discussion

FNAC is a simple procedure with minimum trauma & low cost with no complications therefore it plays an important role in the diagnosis of primary or the secondary malignancies especially in developing nations [\(1-3\)](#) even in cases where malignancy is not suspected clinically & when lymph nodes are undetectable clinically the use of special investigations like USG guided FNAC is useful to detect malignancy [\(6\)](#).

In this study most of the patients with cytopathologic evaluation were in the age range of 21-30 years accounting 152(19.7%) cases with mean and standard deviation of 33.6yrs, 19.6 respectively. This is comparable to with studies conducted in north eastern India the commonest age group being 21-30 years (24%) [\(13\)](#). and similar studies in other parts of India showed maximum number of cases in similar age groups [\(23 -25\)](#).

In the current study more lymphadenopathy occurred in females 409 cases (53%) than males 362 cases (47%) making F: M ratio of 1.13:1 this is analogous to study reported in Gonder, Ethiopia Females (54.1%) were more affected than males (45.9%) [\(8\)](#) Similar results were seen in the South Coastal Region of India [\(27\)](#), in Pakistan [\(28\)](#) in contrast to Andhra Pradesh, India [\(11\)](#) in Nigeria [\(20\)](#) and Gwalior India [\(24\)](#) in which males are more affected than females.

In the present study to localized lymphadenopathies were 638 (82.7%), generalized 133(17.3%), cases were seen which is similar with study done in Hawassa, Ethiopia which is localized lymphadenopathy were 95.6% [\(4\)](#) and in Nigeria Regional lymphadenopathy was observed in 380 (89.0%) [\(20\)](#).

In the present study regarding the age group the first two age groups 0-20 reactive lymphadenitis contributed to the majority of cases followed by tuberculosis which is more common in age groups of 21-40 years. Higher numbers of malignancy were seen in the age group of 31-60 years followed by age groups above 60 years.

This finding was in agreement with studies conducted in Jammu, India [\(2\)](#) and Kathmandu, Nepal. The incidence of reactive lymphadenitis gradually falls 6th decade onwards and the incidence of malignant lesions rises [\(14\)](#)

In the current study the commonest lymph node group involved was cervical lymph node constituting 211 (27.4%) followed by axillary lymph node 154 (20%). Most benign lesions occurred in cervical lymph nodes followed by axillary lymph nodes in contrast to malignant lesions which commonly seen in axillary lymph nodes and in generalized lymphadenopathies. This is similar with study done in Ethiopia, Cervical lymph nodes were the most frequent 521 (48.82%) lymphadenopathy followed by submandibular and axillary lymph nodes accounting 243 (22.77%) and 122 (11.43%) respectively (4) and study conducted in Kigali University Teaching Hospital, Rwanda showed that, cervical group of Lymph nodes were the most common site of involvement, 157 (76.6%) and Reactive lymphoid hyperplasia was the most common pattern accounting for 84 (41.0%) of cases (9). In Kathmandu, Nepal also showed cervical lymphadenopathy cases were non-neoplastic (91.74 %) whereas (8.26 %) cases were neoplastic (14).

The maximum number of aspirations was done from cervical lymph nodes and this may be due to the easy accessibility of cervical nodes for examination and evaluation.

In our study metastatic tumor was the highest cytological diagnosis 256 (33.2%) followed by reactive lymphadenitis 176 (22.83%) and lymphoma 166 (21.53%) predominantly occurred in females 175 (68.4%) commonly in the age groups between 21-60 our case came in agreement with research conducted in *Kashmir Valley: Srinagar, India*, metastatic malignancy was the single most common cause of lymphadenopathy, 38.2% (603 cases) followed by reactive lymphoid hyperplasia 36.9% (583 cases) (16).

And similar results reported in Bhojpuri, Bareilly in which Metastatic carcinomas (93) was most common followed by Reactive lymphadenopathy (82) and granulomatous lymphadenitis (67) (34). And in (Steel et al., 1995) metastatic malignancy was reported, 53.8 % of cases (36) and 80.4% reported in other study done in India (30) and 65.7% cases of lymphadenopathy were found to be suspicious or positive for malignancy from India (Izhar et al., 2007).

Study conducted in Jimma University, southwest Ethiopia also showed predominance of benign lymph node disorder in 93.2% of patients and 6.8% are malignant ones (8).

Our finding did not correlate with most of other similar studies that reported in Ethiopia and developing countries that benign lesions were more frequent diagnosis with high frequency of reactive lymphadenitis and tuberculous lymphadenitis (4,30, 37,38).

The cause of the large percentage of malignant tumor in our study may be attributed to our study was carried out in cancer institute where most referral cases seen.

In present study among the benign lesions, reactive lymphadenitis was the most common Diagnosis occurring in 179 (60.9%) of the cases followed by tuberculosis lymphadenitis 83 (28.2%). There were also diagnoses of suppurative lymphadenitis with 10 cases (3.4%) and rosai-dorfman disease 2 (0.7%). In the first three age groups (0-30yrs) reactive lymphadenities contributed to the majority of cases followed by tuberculosis.

The same findings were made in studies done in Kathmandu, Nepal showed the major cause of lymphadenopathy was related to inflammatory pathology which is common in developing countries. Reactive lymphadenitis was the most common non-neoplastic lesion (112 cases, 54.36%) followed by tuberculous lymphadenitis (74 cases, 35.92%) [\(14\)](#). In *Kashmir Valley*, reactive lymphadenopathy constitute, 59.7% followed by tuberculosis, 14% were responsible for most of the cases of lymphadenopathy in children (<18 years age) [\(16\)](#) and in another study done in Srinagar, Jammu & Kashmir, India showed the most common overall diagnosis was nonspecific reactive hyperplasia constituting 66.9% (447 cases) whereas the second most common benign diagnosis was chronic granulomatous lymphadenitis constituting 10% (71 cases), tuberculous lymphadenitis constituted 6.5% (46 cases) and acute suppurative lymphadenitis constituted 3% (21 cases) and other similar studies showed predominance of reactive lymphadenitis [\(8,30-33\)](#).

In current study malignant tumor constituted 440 (57.1%) of cases, of these metastatic tumor 256 (58.2%) followed by lymphoma 166 (37.7%) and non-specified malignant tumor accounted 11 (2.5%). And the remaining cases were leukemic infiltration, myeloid sarcoma and plasmacytoma accounting 4(0.9%), 2(0.5%) and 1(0.2%) respectively.

Among the metastatic cases, carcinoma accounts 242 (94.5%), sarcoma and melanoma 6 (2.3%) each and the least case was secondary small round cell tumor 2 (0.8%). Metastatic tumors predominantly occurred in females 175 (68.4%) this might be due to high number of metastatic breast cancer. this was comparative with study done in Hawassa Ethiopia, showed high frequency of metastatic tumors in females [\(4\)](#).

Among metastatic carcinomas 117 (48.3%) were ductal carcinoma, 58 (24%) were undifferentiated carcinoma, adenocarcinoma and squamous cell carcinoma account

22(9.1%) each. Our study goes with study done in New York, breast carcinoma metastases were the most frequent case in 12(37.5%) [\(29\)](#). These finding was in contrasting with most of other similar studies which showing, squamous cell carcinoma was the most common entity. In India squamous cell carcinoma constitute (41 cases: 53.95%) followed by carcinoma breast (12 cases: 15.79%) and adenocarcinoma (8 cases: 10.53%) [\(11\)](#). other studies done in India, SCC (96/158; 60%) was the most common carcinoma metastasizing to the lymph nodes. Cervical lymph nodes (140/188; 74%) were the main group of lymph node involved by malignant pathology [\(26\)](#).

In Brazil the most frequent diagnoses of metastases included squamous cell carcinoma (34.9%), adenocarcinoma (16.6%), melanoma (4.2%), and papillary carcinoma (3.3%) [\(17\)](#). Similar results were also seen in other studies [\(30-32\)](#).

In present study lymphoma was the third commonest specific cause of lymphadenopathy constituting 166 (21.53%). 132 (80%) cases were non-Hodgkin's lymphoma of these 67.4% occurred in males and 32.6% in females followed by Hodgkin's lymphoma 27 (16.4%). 63% cases were in males and 37% cases in females. 7 (4.2%) cases were diagnosed as lymphoma only. Research done in Nigeria Lymphoma was the third cause of lymphadenopathy constituting 26.3% cases. Most of these cases (16.2%) were of the non-Hodgkin's lymphoma type. Hodgkin's lymphoma constituted 10.1% cases and showed marked predilection for the cervical group of lymph nodes in young adult males [\(20\)](#)

Other similar research done in Nigeria showed 28.8% non-Hodgkin's lymphoma cases reported by Obafunwa in Jos1 [\(39\)](#) ,and 19.1% reported by Pindiga in Maiduguri [\(40\)](#) . And in brazil showed among lymphomas cases, 60.5% were classified as Hodgkin's disease and 26.3% as non-Hodgkin's lymphoma, whereas 13.2% were regarded as lymphomas only. After studies employed immunophenotyping methods (flow cytometry/ immunocytochemistry), the diagnostic distribution of lymphomas indicates a larger number of non-Hodgkin's cases than Hodgkin's disease [\(17\)](#).

Study done in India, there were 18 cases of malignant lymphoma, 16 cases of non-Hodgkin's lymphoma and 2 cases of Hodgkin's disease [\(41\)](#).

In this study non-Hodgkin's lymphoma is classified as high grade, low grade and non-specified non-Hodgkin's lymphoma based on cytomorphology only which doesn't exist in the WHO classification. But most studies use the WHO classification of lymphomas which is based on a combination of cytomorphology, immunophenotype, genetic

characteristics and clinical findings for lymphoma typing. Due to absence of immunochemistry and flowcytometry in the study area it is difficult to specifically discuss on lymphoma types.

Conclusion

Different patterns lymph node lesions with their distribution among different age groups, gender and anatomic sites were observed

This study revealed a huge burden of metastatic lymph node enlargement in general and ductal carcinoma in particular.

Reactive lymphadenitis was the second most common pathology. Followed by lymphoma accounting (21.53%) of these most cases were non-Hodgkin's lymphoma and classified as high grade & low grade lymphoma.

Tuberculous lymphadenitis constituted 10.8% of the pathologies.

Cervical lymph nodes are the commonest lymph node groups involved with diseases.

Limitation of the study

It was difficult to ascertain the association of different lymph node lesions with the size of lymph node since the size was not mentioned for a large number of cases.

Recommendation

Some of the patient's medical records were incomplete and handled inappropriately so it is crucial to improve the data keeping methods

It is good to document the size of the lymph nodes to be examined by the clinician and the pathologist so that future studies will determine the relation with different lymph nodes lesions

Some of lymphoma cases signed out as lymphoma only. It is better to classify as non-Hodgkin or Hodgkin's which is beneficial for treating physician

There is inconsistency in reporting terminologies which can be improved by having local reporting systems which can avoid confusion among pathologists and treating clinician.

Introduction of immunocytochemistry and flowcytometry are needed for proper classification of lymphomas

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