

# Cytopathological Pattern of Lymphadenopathy in North Kordofan, Sudan

Rabaah ALadawya Mohammed Salih Elbasher Gadkream<sup>1\*</sup>, Balgis Elhag Ibrahim Tager<sup>2</sup>, Ahmed AbdallaAgabEldour<sup>3,4</sup>, Hussain Gadelkarim Ahmed<sup>5,6</sup>

<sup>1</sup>Department of Histopathology and Cytology, Faculty of Medical Laboratory Sciences, University of Kordofan, El-Obeid, NK, Sudan

<sup>2</sup>Department of Histopathology and Cytology, Faculty of Medical Laboratory Sciences, University of West Kordofan, El-Nuhud, WK, Sudan

<sup>3</sup>Department of Pathology Faculty Medicine, University of Kordofan, El-Obeid, NK, Sudan

<sup>4</sup>El-Obeid Histopathology Center, NK, Sudan

<sup>5</sup>Prof Medical Research Consultancy Center, El-Obeid, NK, Sudan

<sup>6</sup>Department of Histopathology and Cytology, FMLS, University of Khartoum, Sudan

DOI: <https://doi.org/10.36348/sjbr.2024.v09i06.004>

Received: 08.07.2024 | Accepted: 15.08.2024 | Published: 20.08.2024

\*Corresponding author: Rabaah ALadawya Mohammed Salih Elbasher Gadkream

Department of Histopathology and Cytology, Faculty of Medical Laboratory Sciences, University of Kordofan, El-Obeid, NK, Sudan

## Abstract

**Background:** Lymphadenopathy is a frequently encountered and clinically relevant condition that can have several causes, including curable infections or cancerous growths. This study was done to analyze the different cytopathological patterns observed in the fine-needle aspiration cytology (FNAC) of patients with lymphadenopathy. **Methodology:** In this retrospective study, we present the findings of a comprehensive analysis on fine-needle aspiration cytology (FNAC) of 70 cases with lymphadenopathy in North Kordofan State. Our aim was to investigate the frequency and underlying causes of lymph node enlargement across different age groups, as well as analyze the diverse cytopathological patterns associated with lymphadenopathies. **Results:** The study population comprised 43 males and 27 females, ranging in age from 6 to 78 years, with a mean age of 50.6 years. Among the 70 cases, 40 were determined to be benign. Out of these, 31 were diagnosed as tuberculosis and 9 were classified as benign lymph node aspirates, which included reactive hyperplasia and vascular lesions. The remaining 30 cases were reported as malignant. Out of these, 12 were identified as metastatic carcinoma, 10 as non-Hodgkin lymphoma, 4 as metastatic breast cancer, and 4 as large-cell anaplastic lymphoma. **Conclusion:** Benign tumors are the predominant components of lymphadenopathy. FNAC is a valuable method for examining lymphadenopathy.

**Keywords:** Fine Needle Aspiration Cytology, Lymphadenopathy, Tuberculosis, Metastasis, North Kordofan.

**Copyright © 2024 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

Lymph nodes are distributed throughout the body's blood vessels and function as filters to prevent the spread of infection and cancer. The human body contains around 800 lymph nodes distributed across the neck, axilla, thorax, abdomen, and groin [1]. Lymphadenopathy refers to an abnormality in the size and texture of lymph nodes. The presence of lymphadenopathy can be attributed to a wide range of conditions, including viral infections, autoimmune disorders, and cancer, which can complicate the process of diagnosis [2]. Lymphadenopathy is increasingly prevalent among patients seeking medical care worldwide. Lymph nodes play a crucial role in the body's immune system, making it essential to comprehend the

global and regional epidemiology for improved diagnosis, treatment, and prevention strategies across different regions [3]. Lymphadenopathy is classified as either localized, meaning it is checked for causes connected to the specific place where the lymphatic drainage is impaired, or generalized, which means it affects two or more locations and indicates a systemic condition. Advanced age, male gender, Caucasian ethnicity, supraclavicular location, and the presence of systemic symptoms such as fever, night sweats, and unexplained weight loss are all factors that increase the chance of developing cancer [4]. Lymphadenopathy can be caused by regional variation, infectious agents like bacteria, viruses, and parasites, as well as noninfectious factors such as autoimmune diseases, cancer, and

specific drugs. These variables increase the likelihood of developing lymphadenopathy. Fine-needle aspiration cytology is the optimal approach for identifying lymph node disease because of its safety, reliability, speed, cost-effectiveness, efficacy, and simplicity. Additionally, it minimizes the necessity for a surgical biopsy. Therefore, it is quite beneficial in the diagnosis of lymphadenitis, lymphoma, and metastatic cancer [5]. Lymph node aspiration is a highly valuable procedure for the diagnosis of lymphadenitis, lymphomas, and metastatic malignancies. Fine-needle aspiration cytology (FNAC) is a secure, dependable, expeditious, and cost-effective technique for identifying a lesion and determining the examination's pattern [5]. Despite the high occurrence of lymphadenopathy in North Kordofan, Sudan, no prior investigations have been carried out to ascertain its cause. The objective of this study is to elucidate the underlying causes of lymph node enlargement in people.

## MATERIALS AND METHODS

This study was conducted to retrospectively assess the cytological characteristics of lymphadenopathy (lymphadenopathy (FNAC findings in the North Kordofan state. This study comprised a cohort of 67 patients presenting with lymphadenopathy who were referred to the El-Obeid the El-Obeid Histopathology Center between January and June 2024. All data pertaining to patients' vital identity information, clinical data, and cytological data were obtained.

## Ethical Consent

The authorization to use patients' data was received from the chief of the pathology department at El-Obeid Histopathology Center, NK, Sudan.

**Ethical Approval:** The ethical committee at the Prof. Medical Research Consultancy Center approved the study protocol.

## Statistical Analysis

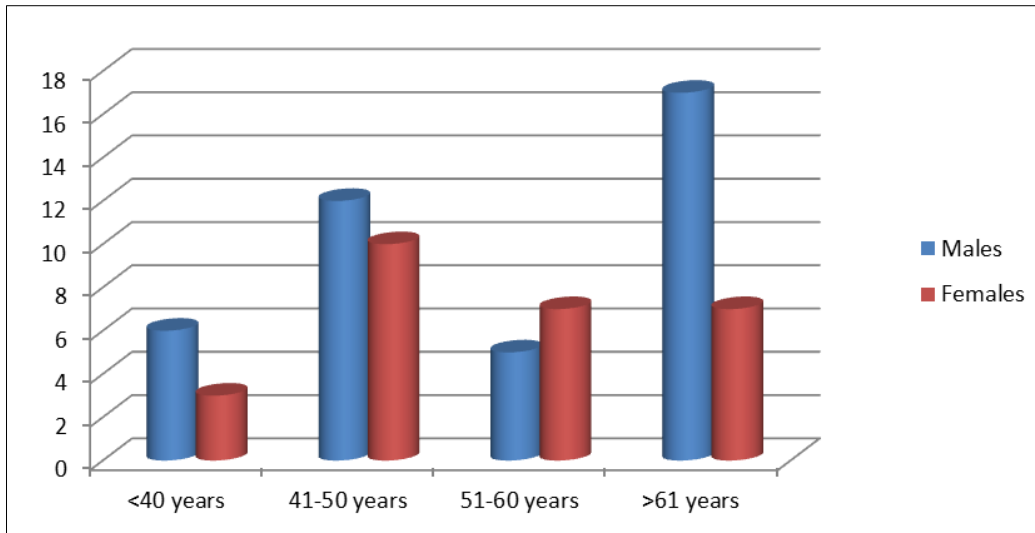
All collected data were organized in a spreadsheet and then entered into computer software (SPSS) for analysis. The analysis comprised frequency calculations and cross-tabulations.

## RESULTS

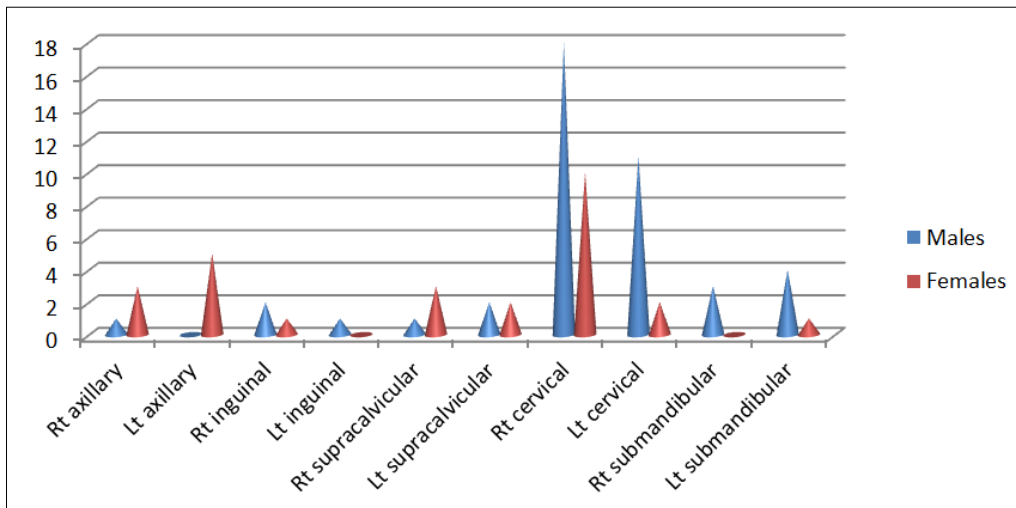
This study examined 70 lymphadenopathy patients, with 40 (59.7%) males and 27 (40.3%) females, ranging in age from 6 to 78 years, with a mean age of 50.6 years. The majority of males are over the age of 61, followed by 41–50 years, <40 years, and 51–60 years, accounting for 42%, 30%, 15%, and 13%, respectively. While the age distribution for females was 41–50 years (37%), 51–60 years and >61 years are similar (26%), and under 40 years (11%). The majority of lymphadenopathy patients were over the age of 61, followed by those aged 41 to 50, who accounted for 38.8% and 32.8% of the total of 67 patients, respectively. The majority of patients appear with right cervical (39%) and left cervical (18%) lymph nodes, followed by axillary, submandibular, supracalvicular, and inguinal lymph nodes (13%), (12%), and (6%), respectively, as shown in Table 1, Figure 1, Figure 2.

**Table 1: Distribution of patients by sex, age, and lymph node site**

Variables	Males	Females	Total
<b>Age group</b>			
<40 years	6	3	9
41- 50	12	10	22
51-60	5	7	12
>61	17	7	24
Total	40	27	67
<b>Lymph node site</b>			
Rt axillary	1	3	4
Lt axillary	0	5	5
Rt inguinal	2	1	3
Lt inguinal	1	0	1
Rt supracalvicular	1	3	4
Lt supracalvicular	2	2	4
Rt cervical	18	10	28
Lt cervical	11	2	13
Rt submandibular	3	0	3
Lt submandibular	4	1	5
Total	43	27	70



**Figure 1: Description of patients by sex and Age group.**



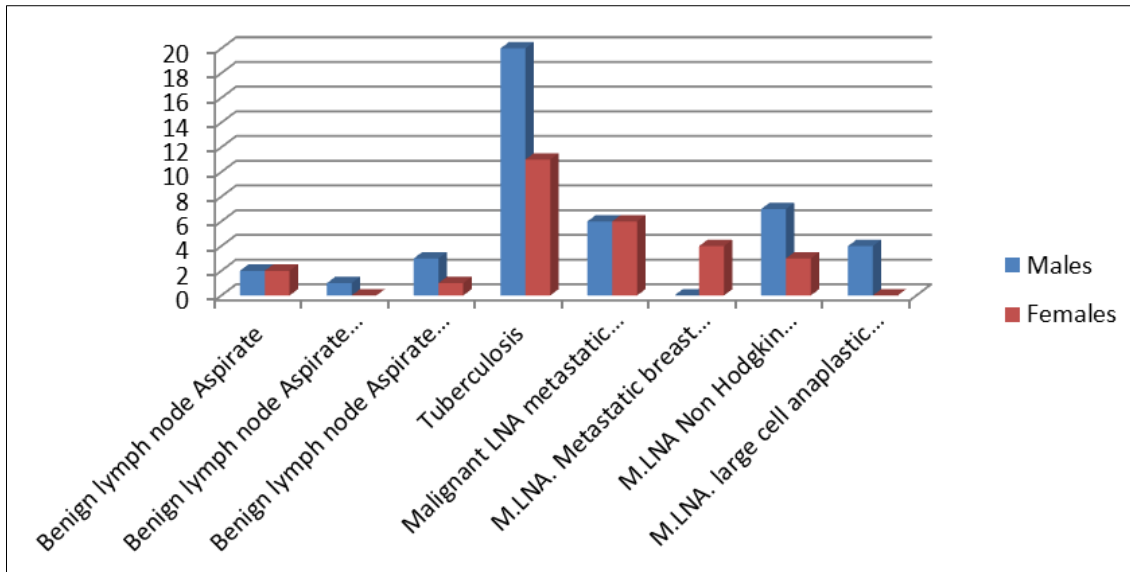
**Figure 2: Description of patients by sex and Lymph node site.**

Table 2 and Figure 3 illustrate the gender distribution of study patients and findings. Tuberculosis had a larger frequency in males (20/31, 64%) than females (11/31, 35.4%). Malignant LNA metastatic adenocarcinoma was equally prevalent in males and females (12/70, 17%). Table 2 and Figure 3 show that

M.LNA non-Hodgkin lymphoma, benign lymph node aspirate, benign lymph node aspirate/reactive hyperplasia, M.LNA. Metastatic breast cancer, and M.LNA. Large cell anaplastic lymphoma had a similar distribution (4/70, 6% for each), with Benign lymph node aspirate/vascular lesion accounting for 1/70 (1.4%).

**Table 2: Distribution of patients by sex and results interpretation**

Variable	Males	Females	Total
Benign lymph node Aspirate	2	2	4
Benign lymph node Aspirate /vascular lesion	1	0	1
Benign lymph node Aspirate /reactive hyperplasia	3	1	4
Tuberculosis	20	11	31
Malignant LNA metastatic adenocarcinoma	6	6	12
M.LNA. Metastatic breast cancer	0	4	4
M.LNA Non Hodgkin lymphoma	7	3	10
M.LNA. large cell anaplastic lymphoma	4	0	4
Total	43	24	70



**Figure 3: Patient description by sex and interpretation of results.**

## DISCUSSION

Lymphadenopathy can be associated with a wide range of conditions, from relatively minor medical problems to life-threatening diseases such as cancer. The detection of enlarged nodes necessitates a correct diagnosis and a thorough investigation. Fine needle aspiration cytology (FNAC) is a precise, minimally invasive, and cost-effective biopsy technique for enlarged lymph nodes [7], and might be considered the first-line approach to such palpable lymph nodes. In the current investigation, the majority of the patients (40) were males and 27 were females. Similar findings were found in the study by Hirachand *et al.*, [7], (males 68 and females 62, with a male-to--to-female ratio of 1:0.9). Tariq *et al.*, (8) conducted a study with 16 males and 34 females, with a male-to--to-female ratio of 1:2.11:2.1. The pattern of lymphadenopathy in the current study varied from benign lymphnode aspirates such as such as reactive hyperplasia and TB lymphadenitis to malignant aspirates like metastatic adenocarcinoma, metastatic breast cancer, non-Hodgkin lymphomas, and large--cell anaplastic lymphoma. As in the study by Malhotra AS *et al.*, [8], the cytological characteristics were found to be benign in 202 cases (86.32%) and malignant in 32 cases (13.68%). Overall, tubercular lymphadenitis (103 cases, 44.02%) was the leading cause of lymphadenopathy. The next most common causes were reactive lymphadenitis (98 cases, 42.64%), metastatic lesions (22 cases, 9.40%), and malignant lymphoma (11 cases, 4.70%). (8) In our investigation, cervical lymph nodes were the most involved location, location, at 44.9%. Similar results were reported in the study of Hirachand *et al.*, (10a). (10), where cervical lymph nodes were enlarged in 66 (50.76%), and in the study of Guru *et al.*, [12], where cervical lymph nodes were enlarged in 230 (78.76%).

In the current study, the most common case was tuberculosis 31 (36.8%), followed by metastatic adenocarcinoma (19.7%). Tuberculosis is more common

in males (20/31, 64%) than in females (11/31, 35.4%). Malignant metastatic adenocarcinoma is equally common in males and females (12/70, 17%). Non-Hodgkin lymphoma accounted for 10/70 (14%), while Benign lymph node aspirate, Benign lymph node aspirate/reactive hyperplasia, M.LNA. metastatic breast cancer, and M.LNA. large M.LNA. large cell anaplastic lymphoma each had a similar distribution of 4/70 (6%) and Benign lymph node aspirate/vascular lesion 1/70 (1.4%).

This analysis is in line with the study done by Ali Ageeb (2012). Generalized lymphadenopathy was discovered in 25 patients (7.7%). The majority of patients (69.4%) had enlarged cervical lymph nodes. The most common cause of lymphadenopathy was tuberculosis (39.5%), followed by metastatic illnesses (24.7%). Non-Hodgkin's and Hodgkin's lymphoma account for 16.6% of the cases. Metastatic tumors typically appear beyond the age of 50 (92.6%). In a comparable study by Dr. Deepika Pandey *et al.*, tuberculosis was the most common cause in 41 cases (48.8%), followed by reactive lymphadenitis in 31 cases (36.9%), metastatic tumor in 3 cases (3.6%), suppurative lymphadenitis in 7 cases (8.3%), and lymphoma in 2 cases (2.4%) (2.4%). Patients between the ages of 20 and 40 had the highest incidence (52.4%) [13]. The high incidence of tuberculosis in this study could be attributed to the fact that tuberculosis is endemic, and the most prevalent tuberculous lymphadenitis is associated with cervical lymph node involvement. The study also found that people over the age of 61 have a higher risk of malignancies, particularly metastasis.

## CONCLUSION

Benign tumors are the most common elements found in lymphadenopathy. FNAC is a highly effective method for evaluating lymphadenopathy.

### Acknowledgement

We express our gratitude to Prof. Ahmed Agab Eldour for generously granting us permission to utilize the data from his lab records for the purpose of conducting this study. We would like to express our gratitude to the individuals at the Prof. Medical Research Consultancy Center for their invaluable guidance in helping us establish this work.

### REFERENCES

1. Bujoreanu, I., & Gupta, V. (2024). Anatomy, Lymph Nodes. 2023 Jul 25. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing.
2. Ali, M., Elhatw, A., Hegazy, M., Albeyoumi, H., Sakr, N., Deyab, A. M., ... & Alfshawy, M. (2022). The evaluation of lymphadenopathy in a resource-limited setting. *Cureus*, 14(10).
3. Malhotra, A. S., Lahori, M., Nigam, A., & Khajuria, A. (2017). Profile of lymphadenopathy: An institutional based cytomorphological study. *International Journal of Applied and Basic Medical Research*, 7(2), 100-103.
4. Gaddey, H. L., & Riegel, A. M. (2016). Unexplained lymphadenopathy: evaluation and differential diagnosis. *American family physician*, 94(11), 896-903.
5. Wilkinson, A. R., Mahore, S. D., & Maimoon, S. A. (2012). FNAC in the diagnosis of lymph node malignancies: A simple and sensitive tool. *Indian Journal of Medical and Paediatric Oncology*, 33(01), 21-24.
6. Nga, M. E. (2023). Pitfalls in lymph node fine needle aspiration cytology. *Acta Cytol*, 10, 000535906.
7. Hirachand, S., Lakhey, M., Akhter, J., & Thapa, B. (2009). Evaluation of fine needle aspiration cytology of lymph nodes in Kathmandu Medical College, Teaching hospital. *Kathmandu university Medical journal*, 7(2), 139-142.
8. Ahmad, T., Naeem, M., Ahmad, S., Samad, A., & Nasir, A. (2008). Fine needle aspiration cytology (FNAC) and neck swellings in the surgical outpatient. *J Ayub Med Coll Abbottabad*, 20(3), 30-2.
9. [https://www.researchgate.net/publication/314813235\\_Assessment\\_of\\_Adult\\_Peripheral\\_Lymphadenopathy\\_in\\_Red\\_Sea\\_State\\_Sudan](https://www.researchgate.net/publication/314813235_Assessment_of_Adult_Peripheral_Lymphadenopathy_in_Red_Sea_State_Sudan)
10. Kumarguru, B. N., Kulkarni, M. H., & Kamakeri, N. S. (2009). FNAC of peripheral lymph nodes in HIV positive patients. *Sci Med*, 1(2), 4-12.
11. Deepika, P., Saroj, K. S., & Mandhan, R. K. (2020). *IOSR Journal of Dental and Medical Sciences*, 19(3), 1-4.