

Cytomorphological Evaluation of Enlarged Peripheral Lymph Nodes: A descriptive observational study from a Tertiary care centre, Latur

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Abstract

Background: FNAC is an easy, immediate, and reliable diagnostic tool that can be used to evaluate enlarged peripheral lymph nodes. This paper evaluates the cytomorphological spectrum of lymphadenopathy over 2 years. **Methods:** In the current study, 143 FNAC samples from patients with peripheral lymphadenopathy were examined between June 2023 and June 2025. The smears were studied on cellularity, background, inflammatory cells, granuloma, necrosis, atypical cells, and malignant cells. **Material and Methods:** This descriptive observational study was conducted in the Department of Pathology at MIMSR Medical College, Latur, Maharashtra, from June 2023 to June 2025. A total of 143 fine needle aspiration cytology (FNAC) cases of enlarged peripheral lymph nodes were included in the study. FNAC was performed using standard techniques, and the smears were stained with Hematoxylin and Eosin (H&E) and May–Grünwald–Giemsa (MGG) stains. The cytological features were interpreted and categorized into appropriate diagnostic groups. Data were collected using a structured pro forma, entered into Microsoft Excel, and analysed using SPSS version 24.0 (IBM, USA). **Results:** Reactive lymphadenitis (42.6%) was the most common diagnosis, followed by granulomatous lymphadenitis (19.6%), necrotizing lymphadenitis (12.6%), suppurative lymphadenitis (11.9%), metastatic deposits (5.6%), lymphoma (3.5%), and tuberculosis (2.8%). **Conclusion:** FNAC still has a strong role as a first-line diagnostic method in the assessment of lymphadenopathy, providing rapid distinction between reactive, infectious, and neoplastic aetiologies.

Keywords: Cytomorphology, Enlarged, Peripheral, Lymph Nodes.

Received: 20 January 2026

Revised: 07 February 2026

Accepted: 25 February 2026

Published: 07 March 2026

INTRODUCTION

Peripheral lymphadenopathy is a frequent clinical presentation encountered across all ages in routine clinical practice. It can be etiologically attributed to a broad spectrum of causes, including reactive hyperplasia, infectious disease, granulomatous disease, autoimmune disease, and malignant neoplasm. The diagnosis is general, and a proper definition of the underlying condition is paramount for effective management and preventing unnecessary treatment.^[1]

Fine-needle aspiration cytology (FNAC) has emerged as an invaluable diagnostic tool for evaluating enlarged peripheral lymph nodes. It is minimally invasive, rapid, cost-effective, and well-suited for outpatient use. FNAC provides essential information regarding the cellular composition of lymph nodes, enabling differentiation between reactive, inflammatory, granulomatous, and neoplastic processes. Numerous studies have demonstrated its diagnostic accuracy, with high sensitivity and specificity for detecting malignancy, infectious lesions, and tuberculous lymphadenitis.^[1,2]

The burden of granulomatous diseases such as tuberculosis and sarcoidosis remains high in many developing regions, making FNAC particularly useful for early diagnosis.^[3] Reactive lymphadenitis continues to be the most frequently reported diagnosis in many cytological series, reflecting the prevalence of benign and self-limiting causes of lymph node enlargement.^[4] Moreover, FNAC plays a key role in the early

detection of lymphomas and metastatic malignancies, assisting clinicians in triaging patients for further histopathological evaluation or imaging.^[5,6]

Given its diagnostic utility, FNAC remains the first-line investigative modality for peripheral lymphadenopathy. This study aims to comprehensively evaluate the cytomorphological patterns observed in FNAC samples of enlarged peripheral lymph nodes over two years.

MATERIALS AND METHODS

Study design: Descriptive observational study.

Study setting: Department of Pathology, MIMSR Medical College, Latur, Maharashtra.

Study period: June 2023 to June 2025.

Sample size: 143 FNACs of enlarged peripheral lymph nodes. FNAC was performed using standard techniques. Smears were

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DOI:

10.21276/amit.2026.v13.i1.408

How to cite this article: Pawale PP, Chege PB, Sonawane SB. Cytomorphological Evaluation of Enlarged Peripheral Lymph Nodes: A descriptive observational study from a Tertiary care centre, Latur. *Acta Med Int.* 2026;13(1):631-640.

stained with haematoxylin eosin and May Grünwald Giemsa stains. Cytological features were interpreted and categorised into diagnostic groups.

Statistical analysis and methods: Data was collected using a structured pro forma. Data was thus entered into an MS Excel sheet and analysed using SPSS 24.0 (IBM USA). Qualitative data was presented as percentages and proportions. Quantitative data was expressed in terms of Mean and Standard deviation. An association between two qualitative variables was seen by using the chi-square/Fisher’s exact test.

A p-value of <0.05 was considered statistically significant, whereas a p-value <0.001 was considered highly significant.

RESULTS

A total of 143 patients undergoing FNAC for enlarged peripheral lymph nodes were included in the analysis. The 21–30-year age group accounted for the largest proportion of cases (37, 25.9%), indicating that lymphadenopathy was most frequently observed in young adults. This was followed by the 11–20-year group with 33 cases (23.1%), and the 31–40-year group with 27 cases (18.9%). Children aged 0–10 years accounted for 22 cases (15.4%), while middle-aged adults (41–50 years) formed 16 cases (11.2%). Elderly individuals aged 50 and above contributed the smallest proportion, with 8 cases (5.5%).

In terms of sex distribution, males (80 cases, 55.9%) outnumbered females (63 cases, 44.1%), giving a male-to-female ratio of approximately 1.27:1. Across all age groups, males showed a consistently higher frequency of lymphadenopathy, with the highest male predominance noted in the 21–30 years and 11–20 years categories.

Overall, the data indicate that lymphadenopathy is most prevalent among young adults, with a slight male preponderance in the study population.

Background: FNAC is an easy, immediate, and reliable diagnostic tool that can be used to evaluate enlarged peripheral lymph nodes. This paper evaluates the cytomorphological spectrum of lymphadenopathy over 2 years. **Methods:** In the current study, 143 FNAC samples from patients with peripheral lymphadenopathy were

examined between June 2023 and June 2025. The smears were studied on cellularity, background, inflammatory cells, granuloma, necrosis, atypical cells, and malignant cells. **Material and Methods:** This descriptive observational study was conducted in the Department of Pathology at MIMSR Medical College, Latur, Maharashtra, from June 2023 to June 2025. A total of 143 fine needle aspiration cytology (FNAC) cases of enlarged peripheral lymph nodes were included in the study. FNAC was performed using standard techniques, and the smears were stained with Hematoxylin and Eosin (H&E) and May–Grünwald–Giemsa (MGG) stains. The cytological features were interpreted and categorized into appropriate diagnostic groups. Data were collected using a structured pro forma, entered into Microsoft Excel, and analysed using SPSS version 24.0 (IBM, USA). **Results:** Reactive lymphadenitis (42.6%) was the most common diagnosis, followed by granulomatous lymphadenitis (19.6%), necrotizing lymphadenitis (12.6%), suppurative lymphadenitis (11.9%), metastatic deposits (5.6%), lymphoma (3.5%), and tuberculosis (2.8%). **Conclusion:** FNAC still has a strong role as a first-line diagnostic method in the assessment of lymphadenopathy, providing rapid distinction between reactive, infectious, and neoplastic aetiologies. **Keywords:** Cytomorphology, Enlarged, Peripheral, Lymph Nodes

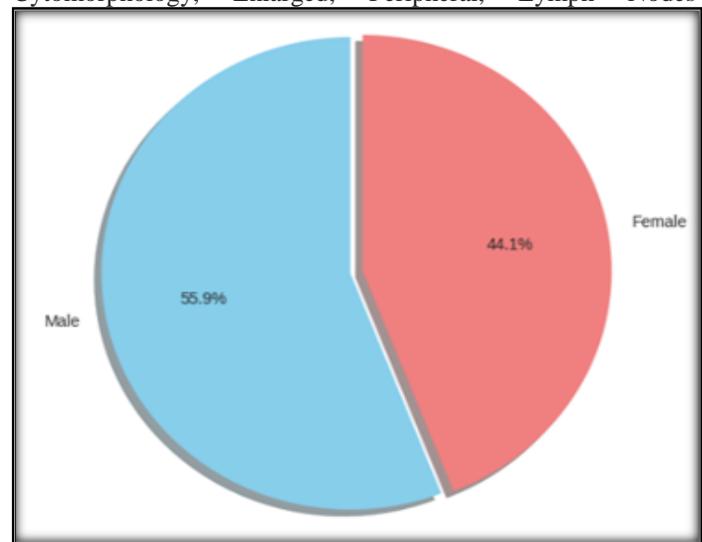


Figure 1: Pie diagram showing distribution according to gender

Table 1: Distribution according to age and gender

Age Group (years)	Male (n)	Female (n)	Total (n)	Percentage (%)
0–10	12	10	22	15.4
11–20	18	15	33	23.1
21–30	20	17	37	25.9
31–40	15	12	27	18.9
41–50	10	6	16	11.2
>50	5	3	8	5.5
Total	80	63	143	100

Table 2: Spectrum of Cytological Diagnosis in Present Study

Cytological Diagnosis	No. of Cases	Percentage
Reactive lymphadenitis	61	42.7
Granulomatous lymphadenitis	28	19.6
Suppurative lymphadenitis	17	11.9
Necrotizing lymphadenitis	18	12.6
Tuberculosis	4	2.8

Lymphoma	5	3.5
Metastatic malignancy	8	5.6
Total	143	100.0

FNAC samples of the enlarged peripheral lymph nodes were assessed (143). The most common diagnosis was reactive lymphadenitis, accounting for 61 cases (42.6 percent), indicating that benign reactive alterations remain the primary cause of lymphadenopathy in the investigative group.

The second category with the highest number was granulomatous lymphadenopathy, with 28 cases (19.6%), indicating a high volume of chronic inflammatory diseases (especially those related to granuloma formation, as reported in tuberculosis and sarcoidosis).

Necrotising lymphadenitis and suppurative lymphadenitis accounted for 18 cases (12.6%) and 17 cases (11.9%), respectively. These results indicate that acute and chronic infectious aetiologies make a significant contribution to lymph node enlargement.

The diagnosis of Tuberculosis lymphadenopathy was made in 4 cases (2.8%), although it was a small but significant subgroup, particularly in the areas where tuberculosis is still prevalent.

Among neoplastic causes, lymphoma was found in 5 cases (3.5%), whereas only 8 cases had metastatic malignancy, accounting for 13 malignant cases (9%). This highlights the importance of FNAC in the identification of primary and secondary lymph node malignancies.

In general, the cytological spectrum indicates the predominance of benign and inflammatory processes as the basis of lymph node pathology, and the number of malignant lesions is not minimal; they need further examination and treatment.

Table 3: Spectrum of Cytological Diagnosis according to age in Present Study

Cytological Diagnosis	Total Cases	0–10	11–20	21–30	31–40	41–50	>50
Reactive lymphadenitis	61	9	14	16	12	6	4
Granulomatous lymphadenitis	28	4	6	7	5	3	2
Suppurative lymphadenitis	17	3	4	4	3	2	1
Necrotizing lymphadenitis	18	3	4	5	3	2	1
Tuberculosis	4	1	1	1	1	0	0
Lymphoma	5	0	1	1	1	1	1
Metastatic malignancy	8	0	1	1	2	2	1
Total	143	22	33	37	27	14	10

This table presents the distribution of 143 cytologically diagnosed lymph node lesions across different age groups. The diagnoses include reactive, inflammatory, infectious, and neoplastic conditions. Reactive lymphadenitis was the most common diagnosis (61 cases, 42.7%), showing a wide age distribution with the highest occurrence in the 21–30 years age group. Granulomatous lymphadenitis accounted for 28 cases (19.6%), predominantly affecting individuals aged 21–30 years and 11–20 years. Suppurative lymphadenitis (17 cases, 11.9%) and necrotising lymphadenitis (18 cases, 12.6%) also showed higher frequencies in the younger age groups (0–40 years), especially in the 21–30 years group. Tuberculosis accounted for 4 cases (2.8%), showing an even distribution across the 0–40 years age range. Lymphoma was seen in 5 cases (3.5%), with cases distributed from 11 years upward, including one case in >50 years, indicating its presence across a broader age spectrum. Metastatic malignancy comprised 8 cases (5.6%), showing increasing frequency in the older age groups, especially >30 years, with the highest numbers in the 31–50 years range and beyond.

Age-wise Trends observed are: The 21–30 years age group had the highest overall burden (37 cases, 25.9%), contributed mainly by reactive and granulomatous lesions. The 11–20 years (33 cases) and 0–10 years (22 cases) groups predominantly showed reactive and inflammatory pathologies. The >50 years age group (10 cases) showed a notable increase in neoplastic lesions, including lymphoma and metastatic malignancy, reflecting age-related risk

patterns. The 41–50 years group (14 cases) showed an intermediate distribution with more neoplastic and necrotising lesions.

DISCUSSION

In the present study, the highest number of cases was observed in the 21–30-year age group (25.9%), followed by the 11–20-year group (23.1%). This pattern is consistent with several published studies reporting that lymphadenopathy is most prevalent among adolescents and young adults. (Table 1)

Similar age trends were also reported by Pandey et al⁷ reported that the second and third decades constituted the majority of lymphadenopathy cases, attributing this to higher exposure to infectious and reactive conditions in younger individuals. Gupta et al³ also observed a peak incidence in the 21–30-year age group, supporting the finding that early adulthood is the commonest age for lymph node enlargement. Siddiqui et al⁸ found the highest prevalence in the 11–30-year age bracket, aligning closely with the distribution seen in the current study.

In the present analysis, males accounted for 55.9% of all cases, resulting in a male-to-female ratio of 1.27:1, indicating a slight male preponderance. This is comparable to trends in other FNAC-based studies: Rao et al⁹ reported a male predominance of 1.3:1, similar to the current findings. Kumar et al.¹⁰ reported a male-to-female ratio of 1.4:1, also highlighting a higher incidence in males. Khan et al¹¹ found males comprising 57% of cases, which closely matches the male proportion in the present study. Overall, the distribution of lymphadenopathy across age groups and genders in this study aligns with regional and

international cytology studies, reinforcing the demographic patterns typically associated with peripheral lymph node enlargement.

In the present study, consisting of 143 cases of lymph node cytology, reactive lymphadenitis was the most common diagnosis, accounting for 42.7% of cases. This was followed by granulomatous lymphadenitis (19.6%), necrotising lymphadenitis (12.6%), and suppurative lymphadenitis (11.9%), indicating that non-neoplastic inflammatory lesions formed the majority of findings. Tuberculous lymphadenitis constituted 2.8% of cases. Among neoplastic conditions, lymphoma was seen in 3.5%, while metastatic malignancy accounted for 5.6%, representing a smaller but clinically considerable proportion of cases (Table 2).

Dr. Amita S. Patel et al in their study reported that fine needle aspiration cytology (FNAC) of 250 lymph node swellings showed tubercular lymphadenitis in 50.8%, followed by reactive lymphoid lesions in 20.8%, metastatic and acute suppurative lesions (8.8% each), granulomatous lymphadenitis 8.4%, chronic nonspecific lymphadenitis 1.2%, necrotising lymphadenitis 0.8%, and lymphoma 0.4%.

Dr. Patil Rashmi K. et al. 13 observed in their large retrospective series of 1478 lymph-node FNACs that the most frequent diagnosis was tuberculous lymphadenitis (40.06%), followed by reactive lymphadenopathy (37.2%), metastatic lymphadenopathy (16.4%), and primary neoplastic lesions (\approx 2.0%). In a study by Gayen P. et al., 14 reported that, among 50 cases of lymphadenopathy, reactive hyperplasia comprised 46% and granulomatous lymphadenitis 18%. In a study conducted at a tertiary centre in Hyderabad, reactive lymph node hyperplasia was the most common finding (49.8%), followed by granulomatous lymphadenitis (37.15%) among 253 FNACs. 15

CONCLUSION

This study reinforces the significance of FNAC as a rapid, minimally invasive, and reliable diagnostic modality in evaluating enlarged peripheral lymph nodes.

- Reactive and granulomatous lesions were the most common causes of lymphadenopathy.
- Infectious and necrotising lesions formed a considerable proportion of cases.
- FNAC was effective in identifying malignant lesions requiring further evaluation.

Overall, FNAC serves as an invaluable first line diagnostic tool for assessing lymphadenopathy.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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