
Description Of Cytological Characteristics of TB Lymphadenitis Patients at Madani General Hospital Medan in 2022-2024

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Abstract

Tuberculous lymphadenitis (TBL) is a prevalent extrapulmonary manifestation of tuberculosis, characterized by chronic, painless enlargement of lymph nodes caused by Mycobacterium tuberculosis infection. This study aimed to analyze the cytological characteristics of TBL patients at Madani General Hospital Medan from 2022 to 2024. A descriptive retrospective design was employed, utilizing secondary data from medical records of patients whose lymph node cytology was confirmed by fine needle aspiration biopsy (FNAB). The study population comprised all TBL cases documented in the hospital during the period, with a sample of 34 FNAB-confirmed patients. Data on demographics, lymph node sites, and cytological findings were collected and analyzed descriptively. Results showed that the predominant age group was 12–23 years (41.2%), with females representing 61.8% of cases. Cervical lymph nodes were the most frequently affected site (73.6%). Cytological features consistent with tuberculosis, including epithelioid cells and Langhans-type giant cells, were observed in all samples. The study concluded that TBL mainly affects young females with cervical lymphadenopathy and that FNAB is an effective, minimally invasive diagnostic tool. Increased case detection over the years highlights the need for ongoing surveillance and targeted health interventions.

Keywords: Cytology, Diagnostic Methods, Fine Needle Aspiration Biopsy, Tuberculous Lymphadenitis, Tuberculosis

INTRODUCTION

Tuberculous lymphadenitis (TBL) is a common form of extrapulmonary tuberculosis characterized by chronic, painless enlargement of lymph nodes primarily caused by Mycobacterium tuberculosis infection (Shodikin et al., 2021). This condition presents a significant clinical challenge because its symptoms often resemble other bacterial infections or malignancies, complicating timely and accurate diagnosis (World Health Organization [WHO], 2025; Khanna & Kumar, 2023). Indonesia is ranked second globally in tuberculosis burden, underscoring the critical need for enhanced diagnostic capacity to enable earlier detection and treatment interventions (Shodikin et al., 2021; WHO, 2025). Early identification of TBL is crucial as untreated infections can lead to serious complications and continued transmission within communities.

Diagnosis of tuberculous lymphadenitis frequently relies on fine needle aspiration biopsy (FNAB), which facilitates cytological examination by detecting characteristic features such as epithelioid cells, Langhans giant cells, and caseous necrosis (Suryadi et al., 2020). FNAB is valued for its minimally invasive nature, rapid turnaround, and accessibility in resource-limited settings, making it a preferred method for confirming TBL among suspected patients (Deveci et al., 2016; Atnafu et al., 2023). Despite its utility, diagnostic challenges persist due to overlapping clinical presentations and the need for complementary laboratory tests to improve sensitivity and specificity (Khanna & Kumar, 2023; Atnafu et al., 2023). The epidemiological pattern of TBL, particularly the predilection for cervical lymph nodes as

the primary site of infection, further accentuates the importance of FNAB cytology in endemic areas like Medan, Indonesia.

The present study aims to analyze the cytological characteristics of patients diagnosed with tuberculous lymphadenitis at Madani General Hospital Medan between 2022 and 2024. This retrospective descriptive investigation intends to clarify the demographic patterns, lymph node involvement, and cytological findings that delineate TBL in this population. The urgency of the research lies in the growing incidence of tuberculosis in Indonesia and the necessity to optimize diagnostic protocols for extrapulmonary forms of the disease, thus enhancing early detection and healthcare delivery (WHO, 2025; Suryadi et al., 2020). This study contributes to existing literature by providing updated regional data on the epidemiology and cytology of TBL, supporting improved clinical decision-making and public health strategies in high-burden settings

RESEARCH METHODS

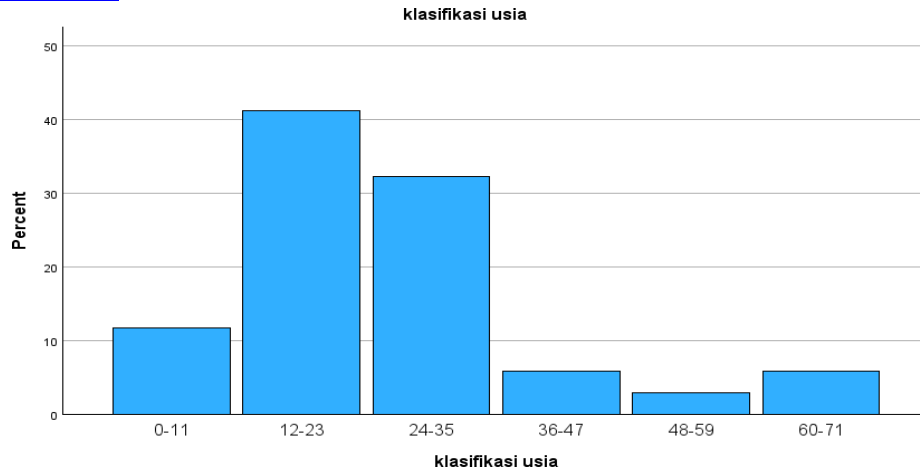
This study utilized a descriptive retrospective design, employing secondary data sourced from patients' medical records at Madani General Hospital Medan during the 2022–2024 period. The research location was chosen based on data availability, specifically patients diagnosed with tuberculosis confirmed through FNAB cytology reports in the hospital's Anatomic Pathology Laboratory (Creswell, 2021). Data extraction focused on demographic information (age, gender), lymph node enlargement sites, year of examination, and cytological diagnoses. The population included all patients who underwent cytological examination for tuberculosis lymphadenitis at the facility in the study timeframe. The sample comprised 34 patients with FNAB-confirmed tuberculous lymphadenitis. Data analysis was performed descriptively to identify patient and disease characteristics (Sugiyono, 2023). Standardized procedures ensured data integrity and ethical confidentiality throughout the study process (Sudaryono & Emzir, 2022). This methodological approach is aligned with best practices for retrospective studies, enabling valid interpretation of epidemiological and cytological patterns relevant to clinical management and public health planning (Creswell, 2021).

RESULTS

Classification of Gender

Table 1. Classification of Tuberculous Lymphadenitis Patients Based on Age

Age	Amount	Percentage (%)
0-11	3	11.8
12-23	9	41.2
24-35	8	32.4
37-45	6	5.9
46-54	4	2.9
55-61	4	5.9
<u>Total</u>	<u>34</u>	<u>100.0</u>



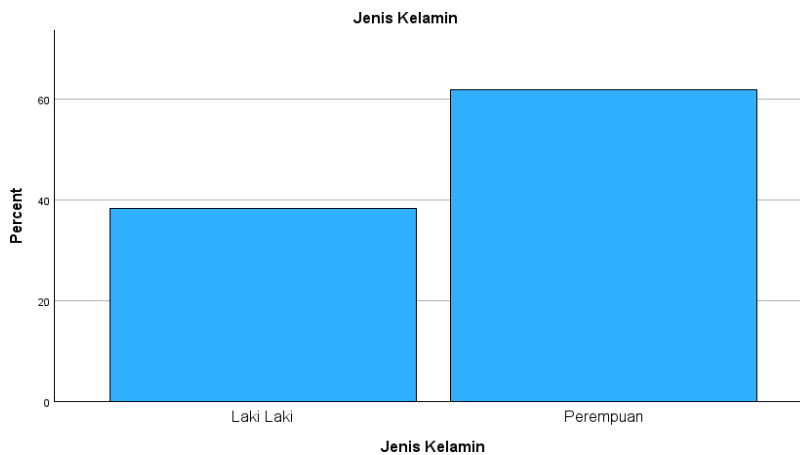
Graph 1. Classification of Tuberculous Lymphadenitis Patients Based on Age

Table and Graph 1 show that the highest number of patients was in the 12–23 age group, amounting to 14 people (26.5%), which falls into the adolescent–young adult category. Meanwhile, the fewest cases were found in the 48–59 age group, with 1 person (2.9%) experiencing tuberculous lymphadenitis during the 2022–2024 period at Madani General Hospital Medan.

1. Classification of Gender

Table 2. Classification of Tuberculous Lymphadenitis Patients Based on Gender

Gender	Amount	Percentage (%)
LAKI-LAKI	13	38.2
PEREMPUAN	21	61.8
Total	34	100.0



Grafik 2. Klasifikasi Penderita Limfadenitis Tuberkulosis Berdasarkan Jenis Kelamin

Table and Figure 2 show that out of the tuberculosis lymphadenitis patients at Madani General Hospital Medan, 61.8% are female and 38.2% are male.

2. Classification of Distribution Regions

Table 3. Classification of Tuberculosis Lymphadenitis Patients Based on Distribution Region

Location	Amount	Percentage (%)
Right neck	14	41.2
Left neck	11	32.4
Right armpit	6	17.6
Left armpit	2	5.9
Left ear	1	2.9

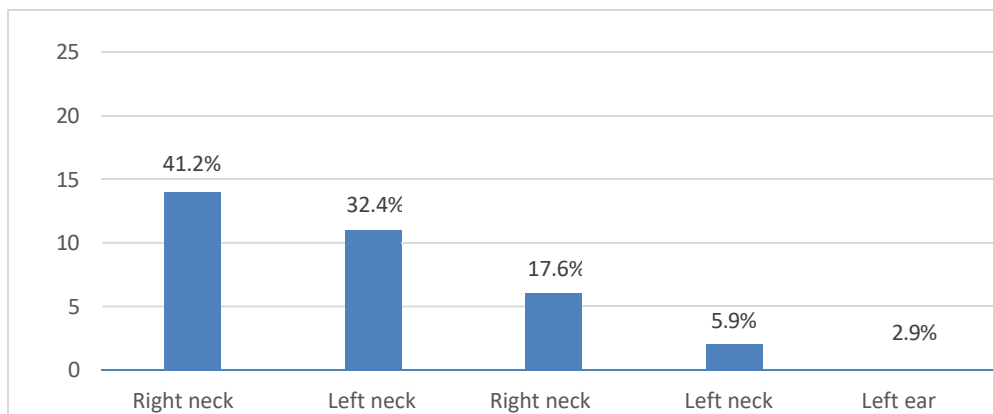


Figure 3. Classification of Tuberculous Lymphadenitis Patients Based on Region of Distribution

Table and Figure 3 show that the most common location of lymph node enlargement is in the cervical region, with a total of 25 cases (73.6%), consisting of 14 cases in the right neck (41.2%) and 11 cases in the left neck (32.4%). The next most common location is the axillary region (armpit) with 8 cases (23.5%), and the remaining 1 case (2.9%) in the left submandibular region. The predominance in the cervical region indicates that the neck lymph nodes are the primary predilection site for tuberculous lymphadenitis.

3. Cytological Diagnosis Classification

Based on the medical record results and cytology examination data (FNAB) of patients with tuberculous lymphadenitis at RSU Madani Medan from 2022–2024, all research samples were confirmed to have tuberculous lymphadenitis through the findings of cytological features typical of tuberculosis, namely the presence of epithelioid cells, lymphocytes, and Langhans-type giant cells.

These features are characteristic morphological signs of Mycobacterium tuberculosis infection in the lymph nodes.

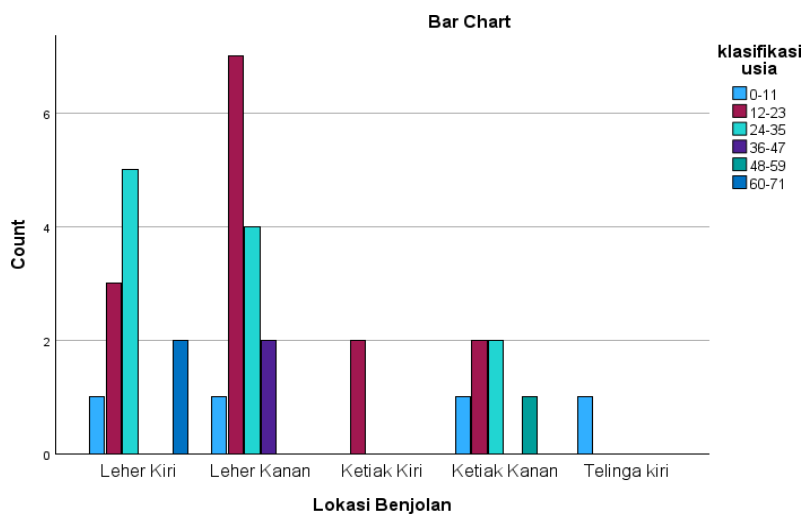
Since all samples showed cytological characteristics consistent with a diagnosis of TB

lymphadenitis, further classification into granuloma type variations (such as caseous granuloma, non-caseous granuloma, or necrosis without granuloma) was not conducted in this study.

4. Age Classification Based on Regional Distribution

Table 5. Table of Tuberculous Lymphadenitis Patients Classification Based on Age and Distribution Location

		Distribution Location					
		Neck	Neck	Armpit	Armpit	Ear	Total
		right	left	right	left	left	
USIA	0-11	1	1	1	0	1	4
	12-23	7	3	2	2	0	14
	24-35	4	5	2	0	0	11
	36-47	2	0	0	0	0	2
	48-59	0	0	1	0	0	1
	60-71	0	2	0	0	0	2
Total		14	11	6	2	1	34



Graph 5. Classification of Tuberculous Lymphadenitis Patients Based on Age and Distribution Location

Table and Graph 5 show that the most common location of lymph node enlargement is in the cervical region, with a total of 25 cases (73.6%), consisting of 14 cases in the right neck (41.2%) and 11 cases in the left neck (32.4%). The next location is the axillary region (armpit) with 8 cases (23.5%), and the remaining 1 case (2.9%) in the left submandibular region.

The predominance in the cervical region indicates that the lymph nodes in the neck are the main predilection site for tuberculous lymphadenitis.

5. Age Range Classification by Gender

Table 6. Classification of Tuberculous Lymphadenitis Patients Based on Age Range and Gender

Age range	Amount	Male	Female
0-11	4	1	3
12-23	14	5	9
24-35	11	3	8
36-47	2	2	0
48-59	1	1	0
60-71	2	1	1
Total	34	13	21

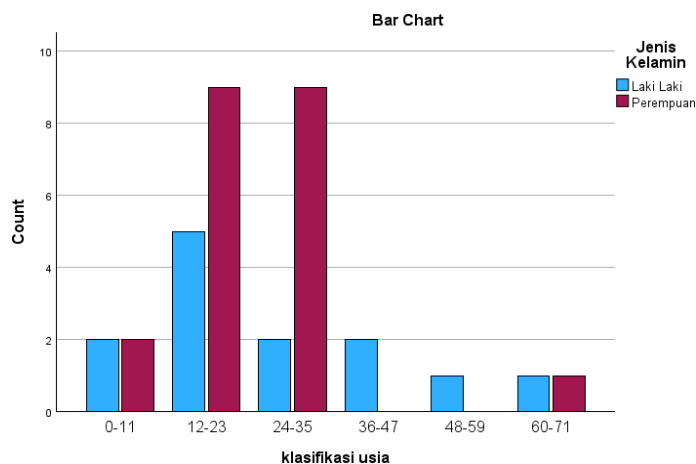


Figure 4.2.6 Classification of TB Lymphadenitis Patients Based on Age Range and Gender

Table and Figure 6 show that TB lymphadenitis patients are most commonly found in the 12–23 age group, with 14 people (41.2%) consisting of 5 males (35.7%) and 9 females (64.3%). The 24–35 age group ranks second with 11 cases (32.4%) consisting of 3 males and 8 females.

The lowest number of cases was found in the 48–59 age group with 1 person (2.9%), and in the 60–71 age group with 2 people (5.9%).

6. Classification of TB Lymphadenitis Patients by Year of Examination

Table 7. Classification of Tuberculosis Lymphadenitis Patients by Year of Examination

No	Audit Year	Amount
1.	The year 2022	5
2.	The year 2023	10
3.	The year 2024	19
Total		34

Table 7 shows that the number of tuberculosis lymphadenitis patients at Madani Hospital Medan has shown an increase in cases each year during the study period. In 2022, there were 5 patients (14.7%), increasing to 10 patients (29.4%) in 2023, and reaching 19 patients (55.9%) in 2024.

DISCUSSION

The research results show that the majority of patients with tuberculous lymphadenitis are in the productive young age group and are more frequently experienced by females. This is in line with several previous studies that show a tendency for increased cases in the adolescent–early adult age group due to factors of social activity and dynamic immunity. The most common location in the neck region also aligns with the theory that cervical lymph nodes are the main site for the spread of extrapulmonary TB infection. Below are the patients with Soft Tissue Tuberculosis Based on Age and Gender, and year of examination:

Age can determine the diagnostic status occurring in patients with soft tissue tuberculosis, which is in the productive age group vulnerable to infection due to high activity levels and environmental exposure, namely at the age of 12–23 years, accounting for 14 patients (41.2%), followed by the age group of 24–35 years with 11 patients (32.4%). The lowest cases were found in the age group of 48–59 years, with only 1 patient (2.9%). This distribution indicates that young and early adult age groups are the most frequently affected by TB lymphadenitis. This can be explained by the high social activity and mobility in the productive age group, increasing the risk of exposure to *Mycobacterium tuberculosis*. In young age, the body's immunity against infection is still good, making the inflammatory reaction to TB infection more evident. In contrast, in the elderly age group, the immune response decreases, resulting in fewer occurrences of TB lymphadenitis.

The cases tend to increase every year, with 6 cases (17.6%) in 2022, rising to 10 cases (29.4%) in 2023, and reaching 18 cases (52.9%) in 2024. This increase may indicate two things, namely the improved detection and reporting of cases at Madani Medan Hospital, as well as the ongoing transmission of *Mycobacterium tuberculosis* in the community. This

suggests that health promotion and TB control efforts still need to be enhanced, especially among the productive age group that is most exposed.

The most common location was found in the right neck region, totaling 14 patients (41.2%), followed by the left neck with 11 patients (32.4%). This indicates that the cervical region (neck) is the most frequent location in cases of tuberculous lymphadenitis, with a total of 25 out of 34 patients (73.6%). Next, the right armpit region ranked third with 6 cases (17.6%), followed by the left armpit with 2 cases (5.9%), and the left ear with 1 case (2.9%). The predominance of the cervical region as the most common location is very consistent with the pattern of extrapulmonary TB spread, where *Mycobacterium tuberculosis* often infects the cervical lymph nodes because this area receives lymph flow from the oral cavity, pharynx, and upper respiratory tract — the main entry points for TB bacteria.

Most tuberculosis lymphadenitis patients are in the young productive age group, which is 12–35 years old, with a proportion of more than 70% of all cases. This indicates that the productive age group is the most vulnerable to *Mycobacterium tuberculosis* infection, in line with the high social activity and mobility in this age group.

The distribution of cases between males and females shows that there are more female patients than male patients, with 21 females (61.8%) compared to 13 males (38.2%). This indicates that females represent the group with a higher proportion of cases in this study. Although both sexes show typical TB cytology patterns, females of reproductive age more frequently experience tuberculous lymphadenitis, due to hormonal and immunological factors. Estrogen is known to enhance cellular immune responses against *Mycobacterium tuberculosis* infection, leading to more distinct granuloma formation. Overall, the results of this study demonstrate that females, particularly of reproductive age, are the group most commonly affected by tuberculous lymphadenitis with positive TB-specific cytology results, while males have a smaller proportion but exhibit similar cytological characteristics.

CONCLUSION

The present study reveals that tuberculous lymphadenitis predominantly affects young adults, particularly those aged 12 to 23 years, accounting for the highest proportion of cases. Females comprised the majority of patients, representing 61.8%, highlighting a gender predilection possibly influenced by immunological and hormonal factors that enhance granuloma formation. The cervical region was identified as the primary site of lymph node involvement in 73.6% of cases, consistent with established patterns of extrapulmonary tuberculosis dissemination. The yearly increase in diagnosed cases from 2022 to 2024 suggests improved detection and reporting mechanisms, alongside ongoing community transmission of *Mycobacterium tuberculosis*. Cytological examination via fine needle aspiration biopsy proved effective in identifying hallmark features characteristic of tuberculosis, reinforcing its role as a minimally invasive, rapid, and reliable diagnostic tool in resource-limited clinical settings.

Despite providing valuable epidemiological and cytological data, this study is limited by its retrospective design and relatively small sample size of 34 patients, which may affect generalizability. The lack of further granuloma subtype classification restricts deeper pathological insights. Future research should consider prospective longitudinal studies with larger cohorts and inclusion of molecular diagnostics to enhance sensitivity and specificity. Exploring the immunopathological aspects underlying sex differences would also contribute to a more nuanced understanding. Practically, these findings underscore the importance of strengthening FNAB diagnostic capacity and targeted health promotion efforts focusing on young productive age groups, especially females, to facilitate early diagnosis and treatment.

Enhanced surveillance and public health interventions remain critical in curbing the tuberculosis burden in high-prevalence regions like Medan.

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