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Prevalence of Head and Neck Tuberculosis Presenting as Neck Masses in a Tertiary Care ENT Setting

Md. Abdur Razzak*[1], Monjurul Alam[2], SM Azizur Rahman[3], Sofiqul Islam[4], Shafayat Akhtar[5]

[1] Assistant Professor, Department of ENT & Head-Neck Surgery, City Medical College, Gazipur
[2] Former Professor and Head, Department of ENT & Head-Neck Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka
[3] Registrar, National Institute of Ear, Nose & Throat, Dhaka
[4] Medical Officer, National Institute of Ear, Nose & Throat, Dhaka
[5] Assistant Professor, Department of ENT & Head-Neck Surgery, Ad-din Sakina Women's Medical College, Jashore

Abstract: ***Background:*** Head and neck tuberculosis (HNTB), though less common than pulmonary TB, remains a significant health burden in Bangladesh. Cervical lymphadenitis is its most frequent manifestation, often mimicking malignancies or other infections, leading to diagnostic delays. This study evaluates HNTB prevalence, diagnostic challenges, and treatment outcomes at a tertiary hospital in Dhaka, emphasizing early detection and effective management in high-burden settings. ***Objectives:*** To assess HNTB prevalence, diagnostic approaches, and treatment outcomes among neck mass patients in a Bangladeshi tertiary hospital. ***Methods and Materials:*** A cross-sectional study was conducted on 112 neck mass patients from February 2018–January 2019. Diagnosis involved clinical evaluation, FNAC, histopathology, GeneXpert, and imaging. Confirmed HNTB cases received standard anti-tubercular therapy (ATT) and were monitored. Data were analyzed using SPSS v21. Ethical approval and informed consent were obtained. ***Result:*** The study of 112 patients revealed tubercular lymphadenitis as the most common diagnosis (41.1%), followed by reactive lymphadenitis (25.0%). Among 46 confirmed HNTB cases, Level II cervical nodes were most affected (47.8%). All patients presented painless neck swelling (100%), with 65.2% reporting low-grade fever. FNAC showed 84.8% sensitivity, while 60.9% had caseating granulomas on histopathology. Treatment success was 87.0%, with 6.5% experiencing mild hepatotoxicity. Most patients (39.1%) sought care after 4-8 weeks of symptoms. ***Conclusion:*** Head and neck tuberculosis is a common cause of neck masses, diagnosable by combined tests and effectively treated with standard anti-tubercular therapy.

Keywords: Head and Neck Tuberculosis (HNTB), Tuberculous Lymphadenitis, Extrapulmonary Tuberculosis (EPTB), Cervical Lymphadenopathy, Neck Mass.

Original Research Article

Correspondence:
Dr. Md. Abdur Razzak
Assistant Professor, Department of ENT & Head-Neck Surgery, City Medical College, Gazipur

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Article at a glance:

Study Purpose: *To assess the prevalence, diagnostic challenges, and treatment outcomes of HNTB in a tertiary hospital in Dhaka.*
Key findings: *Tubercular lymphadenitis was the most common cause of neck masses, with FNAC showing 84.8% sensitivity and 87% treatment success.*
Newer findings: *The study underscores FNAC's role in diagnosis and emphasizes the need for timely treatment to avoid delays.*
Abbreviations: *HNTB - Head and Neck Tuberculosis, TB - Tuberculosis, FNAC - Fine Needle Aspiration Cytology.*

INTRODUCTION

Tuberculosis (TB) remains a major global health concern, especially in developing countries like Bangladesh, where it contributes significantly to morbidity and mortality. While pulmonary TB is more prevalent, extrapulmonary tuberculosis (EPTB) constitutes a significant proportion of TB cases, with head and neck tuberculosis (HNTB) being one of its less common but clinically important manifestations.[1] Cervical lymphadenitis,

the most frequent presentation of HNTB, typically presents as a neck mass and often mimics neoplastic or other infectious conditions, posing substantial diagnostic challenges.[2] In endemic regions like South Asia, the prevalence of tuberculous cervical lymphadenitis has remained consistently high, accounting for up to 90% of head and neck TB cases.[3] However, its non-specific clinical presentation, slow progression, and variable radiological appearance often lead to misdiagnosis or delayed treatment.[4] Diagnosis typically relies on a combination of clinical suspicion, fine-needle aspiration cytology (FNAC), histopathology, and, increasingly, molecular techniques such as GeneXpert and PCR assays.[5]

One of the key challenges in identifying HNTB is its ability to mimic other chronic granulomatous diseases and malignancies, especially in older adults.[6] Often, patients initially present to the ENT outpatient department with painless neck swelling, without constitutional symptoms such as fever or weight loss, which may result in misdirection in clinical workup.[7] Moreover, co-existing HIV infection or diabetes can further complicate clinical and diagnostic profiles.[8] Therapeutically, HNTB responds well to standard anti-tubercular therapy (ATT), with surgery being reserved for non-responders or cases with diagnostic uncertainty.[9] The World Health Organization recommends a six-month ATT regimen, which has proven effective in most EPTB cases, including cervical lymphadenitis.[10] Despite good therapeutic outcomes, delayed diagnosis often leads to unnecessary surgical interventions, increased health costs, and patient distress.[11] Given the ongoing burden of TB in Bangladesh and the increasing recognition of extrapulmonary forms, this study aims to evaluate the prevalence of head and neck TB presenting as neck masses in the ENT department of Sheikh Fazilatunnessa Mujib Memorial KPJ Specialized Hospital, Gazipur, Dhaka. We also aim to explore the diagnostic challenges faced and assess treatment outcomes to guide better clinical practice and early recognition strategies in similar healthcare settings.[12]

OBJECTIVE

General Objective

To assess the prevalence, diagnostic challenges, and treatment outcomes of head and neck tuberculosis (HNTB) presenting as neck masses in patients attending the ENT department of Sheikh Fazilatunnessa Mujib Memorial KPJ Specialized Hospital, Gazipur, Dhaka.

Specific Objectives

To determine the proportion of neck masses attributed to HNTB.
To describe the clinical and demographic profiles of HNTB patients.
To evaluate diagnostic tools used for HNTB (e.g., FNAC, histopathology, imaging, GeneXpert).
To analyze diagnostic delays from symptom onset.
To assess treatment outcomes following anti-tubercular therapy (ATT).

MATERIALS AND METHODS

Study Design

This was a descriptive cross-sectional observational study conducted at the Department of Otorhinolaryngology and Head-Neck Surgery, Sheikh Fazilatunnessa Mujib Memorial KPJ Specialized Hospital, Gazipur, Dhaka, a tertiary-level referral hospital with a high patient turnover for head and neck pathologies. The study was carried out over a 12-month period from February 2018 to January 2019, targeting all eligible patients presenting with neck swellings for comprehensive evaluation.

Study Population and Sample Size

The study population included patients presenting with neck masses, either as isolated cervical swellings or with additional head and neck symptoms suggestive of infectious or granulomatous etiology. A total of 112 patients meeting the inclusion criteria were recruited consecutively during the study period.

Inclusion Criteria

This study included patients of all age groups and both sexes who presented with neck swellings to the ENT department. Participants were required to have a confirmed diagnosis of tuberculous lymphadenitis or other forms of head and neck tuberculosis, established through histopathological, cytological, or molecular methods such as GeneXpert. Only those who provided informed written consent and agreed to comply with follow-up protocols throughout the treatment course were enrolled in the study.

Exclusion Criteria

Patients were excluded if their neck masses were determined to be of non-tubercular origin, such as malignancies, congenital anomalies, or pyogenic abscesses. Individuals with incomplete diagnostic evaluations or insufficient medical documentation were also not considered. Furthermore, those receiving empirical anti-tubercular therapy without confirmed diagnosis, as well as patients who declined consent or were lost to follow-up prior to diagnostic confirmation, were excluded from the study.

Sampling Technique

A non-probability consecutive sampling technique was adopted to ensure comprehensive inclusion of all eligible patients during the defined period. This method was chosen due to the hospital's role as a referral center and to maximize diagnostic yield within the timeframe.

Study Procedure

Upon presentation, each patient underwent a comprehensive clinical assessment, including detailed history-taking (focusing on symptom duration, constitutional symptoms, and TB contact history) and thorough physical examination. Suspected cases were evaluated through a structured diagnostic approach involving laboratory tests (CBC, ESR, Mantoux), radiological imaging (neck ultrasonography, chest X-ray), and cytological/histopathological analysis via FNAC or biopsy. Microbiological confirmation was pursued through Ziehl-Neelsen staining and GeneXpert MTB/RIF assay in selected atypical or recurrent cases. Diagnosis was confirmed based on granulomatous inflammation, acid-fast bacilli detection, or NAAT positivity for Mycobacterium tuberculosis. Confirmed cases received standardized anti-tubercular therapy as per national guidelines and were followed up regularly to monitor treatment response and complications.

Data Collection Tools

A pre-structured, validated data collection sheet was used to document demographic details, clinical presentations, diagnostic modalities used, final diagnosis, treatment protocol, and treatment outcomes.

Data Analysis

Data were entered, cleaned, and analyzed using IBM SPSS Statistics for Windows, Version 21.0. Descriptive statistics such as frequencies, proportions, means, and standard deviations were computed. Cross-tabulation and chi-square tests were employed to explore associations between categorical variables (e.g., clinical features vs. diagnostic delay). Independent sample t-tests were used for comparison of continuous variables where appropriate. A p-value <0.05 was considered statistically significant.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Review Board (IRB) of Sheikh Fazilatunnessa Mujib Memorial KPJ Specialized Hospital prior to commencement. Informed written consent was taken from all participants or their legal guardians. Participant confidentiality was strictly maintained, and the study adhered to the Declaration of Helsinki (2013) and national ethical guidelines.

RESULTS

Table 1: Demographic Data Distribution of Patients with Head and Neck Tuberculosis (n=112)

Variables	Frequency (n)	Percentage (%)
Age Group (Years)		
21–30	18	16.1
31–40	32	28.6
41–50	30	26.8
>50	32	28.6
Gender		
Male	66	58.9
Female	46	41.1
Residence		
Urban	48	42.9

Rural	64	57.1
Occupation		
Manual Laborer	28	25.0
Service/Office Worker	22	19.6
Student	16	14.3
Homemaker	30	26.8
Retired/Unemployed	16	14.3
Socioeconomic Status		
Low	58	51.8
Middle	40	35.7
High	14	12.5

Table 1 shows the demographic analysis of 112 patients with head and neck tuberculosis revealed that the most affected age groups were 31–40 years and those over 50 years, each comprising 28.6% of cases. Males were more frequently affected than females, accounting for 58.9% and 41.1% respectively. A greater proportion of patients resided in rural areas (57.1%) compared to urban regions (42.9%). In terms of occupation, homemakers (26.8%) and manual laborers (25.0%) constituted the majority, followed by service/office workers (19.6%), students, and the retired/unemployed (both 14.3%). Most patients (51.8%) belonged to the low socioeconomic group, indicating a potential association between lower socioeconomic status and the prevalence of head and neck tuberculosis.

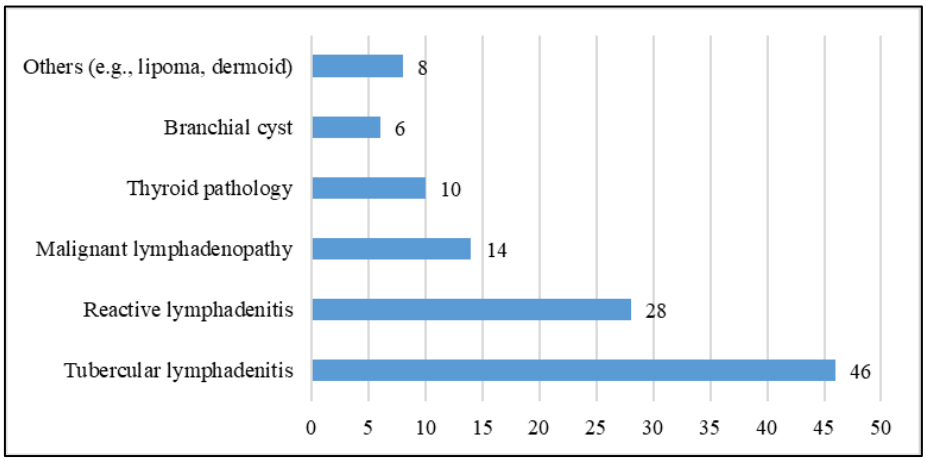

Figure 1: Final Diagnosis of Neck Masses.

Figure 1 shows the final diagnoses of neck masses in 112 patients showed that tubercular lymphadenitis was the most common etiology, accounting for 41.1% of the cases. This was followed by reactive lymphadenitis (25.0%), indicating a significant proportion of inflammatory conditions. Malignant lymphadenopathy was diagnosed in 12.5% of patients, reflecting the need to consider malignancy in differential diagnosis. Thyroid pathologies comprised 8.9% of cases, while branchial cysts were relatively rare at 5.4%. Other less common diagnoses, such as lipoma and dermoid cysts, collectively represented 7.1% of the cases.

Table 2: Site of Tubercular Neck Involvement.

Cervical Level Involved	Frequency	Percentage (%)
Level II	22	47.8
Level III	10	21.7
Level V	6	13.0
Multiple Levels	8	17.4

Table 2 shows, Among the 46 patients diagnosed with tubercular neck involvement, the most frequently affected site was Level II cervical lymph nodes, accounting for nearly half of the cases (47.8%). This was followed by Level III involvement in 21.7% of patients and Level V in 13.0%. Additionally, 17.4% of patients had involvement of multiple cervical levels.

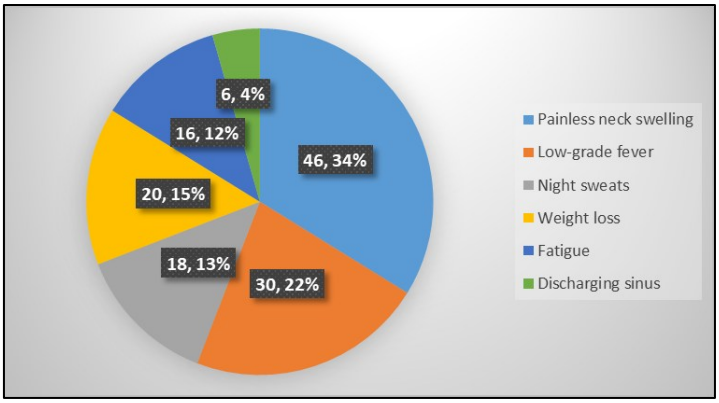

Figure 2: Clinical Symptoms Among HNTB Patients

Figure 2 shows all 46 patients with head and neck tuberculosis (HNTB) presented with painless neck swelling, making it a universal symptom (100%). Low-grade fever was the next most common symptom, seen in 65.2% of patients, followed by weight loss (43.5%) and night sweats (39.1%), which are typical constitutional features of tuberculosis. Fatigue was reported by 34.8% of the patients, while a discharging sinus—a sign of advanced disease—was observed in 13.0% of cases.

Table 3: Diagnostic Modality and Yield in HNTB.

Diagnostic Method	Positive Yield	Sensitivity (%)
FNAC	39	84.8
Excisional Biopsy	12	100.0
ZN Stain (AFB)	18	39.1
GeneXpert MTB/RIF	12	26.1
Mantoux Test (≥10 mm)	34	73.9
Chest X-ray Suggestive of TB	10	21.7

Table 3 shows among the various diagnostic tools used in detecting head and neck tuberculosis (HNTB), fine needle aspiration cytology (FNAC) showed the highest yield with a sensitivity of 84.8%, identifying 39 out of 46 cases. Excisional biopsy demonstrated 100% sensitivity but was performed in only 12 cases. The Mantoux test was positive in 73.9% of patients, making it a useful supportive tool. Ziehl-Neelsen (ZN) staining for acid-fast bacilli (AFB) confirmed the diagnosis in 39.1% of cases, while GeneXpert MTB/RIF detected Mycobacterium tuberculosis in 26.1%. Chest X-ray findings suggestive of pulmonary TB were present in only 21.7% of patients.

Table 4: Histopathological Features in Confirmed TB Cases.

Histopathological Finding	Frequency	Percentage (%)
Caseating granuloma	28	60.9
Non-caseating granuloma	10	21.7
Chronic inflammatory changes	8	17.4

Table 4 shows among the 46 confirmed cases of head and neck tuberculosis, histopathological examination revealed that the most common finding was caseating granuloma, observed in 60.9% of patients, which is characteristic of tuberculous infection. Non-

caseating granulomas were seen in 21.7% of cases, suggesting possible early or atypical presentations. Chronic inflammatory changes without definitive granuloma formation were found in 17.4% of patients.

Table 5: Duration of Symptoms before Diagnosis.

Duration (Weeks)	Frequency	Percentage (%)
<4	6	13.0
4–8	18	39.1
9–12	12	26.1
>12	10	21.7

Table 5 shows, in the study of 46 patients with head and neck tuberculosis, the majority (39.1%) experienced symptoms for 4 to 8 weeks before receiving a diagnosis. A smaller proportion, 26.1%, had symptoms for 9 to 12 weeks, while 21.7% reported a duration of more than 12 weeks, indicating delayed presentation or diagnosis in some cases. Only 13.0% of patients sought medical attention within the first four weeks of symptom onset.

Table 6: Treatment Outcome after 6 Months of ATT.

Outcome	Frequency	Percentage (%)
Complete resolution	40	87.0
Partial response	4	8.7
Treatment failure	1	2.2
Lost to follow-up	1	2.2

Table 6 shows that after six months of anti-tubercular therapy (ATT), the vast majority of patients (87.0%) showed complete resolution of symptoms, indicating a high treatment success rate. A partial response was observed in 8.7% of cases, while treatment failure occurred in only one patient (2.2%). Additionally, one patient (2.2%) was lost to follow-up.

Table 7: Complications Observed During Treatment (n=46)

Complication	Frequency	Percentage (%)
Paradoxical reaction	2	4.3
Hepatotoxicity (mild)	3	6.5
Sinus formation	2	4.3
No complications	39	84.8

Table 7 shows, during the course of anti-tubercular treatment in 46 patients with head and neck tuberculosis, the majority (84.8%) experienced no complications, indicating good overall treatment tolerance. Mild hepatotoxicity was the most common adverse effect, observed in 6.5% of patients. Both paradoxical reaction and sinus formation were noted in 4.3% of cases each.

DISCUSSION

The present study analyzed 112 patients with neck masses, revealing that tubercular lymphadenitis was the most common diagnosis (41.1%), followed by reactive lymphadenitis (25.0%) and malignant lymphadenopathy (12.5%). This aligns with findings from a study by Mondal *et al*., where tubercular lymphadenitis accounted for 38.5% of neck mass cases in an endemic region, reinforcing the high prevalence of tuberculosis (TB) in such areas.[13] The predominance of TB-related neck masses underscores the need for heightened clinical suspicion, particularly in regions with high TB burden. Demographically, the most affected age groups were 31–40 years and those over 50 years (28.6% each), with a male predominance (58.9%). Similar observations were made by Sharma *et al*., who reported that young and middle-aged adults, particularly males, were more susceptible to head and neck TB, possibly due to occupational exposure and delayed healthcare-seeking behavior.[14] The

higher rural representation (57.1%) in our study correlates with findings by Kumar *et al*., where rural populations had limited access to early diagnostic facilities, contributing to delayed TB detection.[15] Level II cervical lymph nodes were the most frequently involved (47.8%), consistent with previous studies by Das *et al*., which reported Level II as the primary site in 52% of cases, likely due to its rich lymphatic drainage from the oropharyngeal region.[16] The presence of multiple cervical level involvement (17.4%) also matches observations by Gupta *et al*., where disseminated lymphadenopathy was seen in advanced cases.[17] Clinically, all patients presented with painless neck swelling (100%), while constitutional symptoms such as low-grade fever (65.2%) and weight loss (43.5%) were common.

These findings are in line with a study by Patil *et al*., where painless swelling was universal, and systemic symptoms were present in 60-70% of cases, reinforcing the classic presentation of TB lymphadenitis.[18] Diagnostically, fine needle aspiration cytology (FNAC) demonstrated the highest sensitivity (84.8%), comparable to results from Alam *et al*., where FNAC had an 82% diagnostic yield in TB lymphadenitis.[19] However, excisional biopsy, though highly sensitive (100%), was performed in only a few cases, similar to findings by Pandey *et al*., who recommended FNAC as the first-line diagnostic tool due to its minimally invasive nature.[20] The Mantoux test was positive in 73.9% of cases, consistent with Singh *et al*., who reported a 70-75% positivity rate in TB-endemic regions.[21] Histopathologically, caseating granulomas (60.9%) were the most common finding, corroborating results from Mehrotra *et al*., where granulomatous inflammation was the hallmark of TB lymphadenitis.[22] Non-caseating granulomas (21.7%) and chronic inflammation (17.4%) were also observed, suggesting variations in disease progression, as noted by Jain *et al*.,.[23] Treatment outcomes were favorable, with 87.0% achieving complete resolution after six months of anti-tubercular therapy (ATT). This aligns with a study by Thakur *et al*., where 85% of patients showed full recovery, demonstrating the efficacy of standard ATT regimens.[24] Mild hepatotoxicity (6.5%) was the most common adverse effect, consistent with observations by Sharma *et al*., who reported a 5-10% incidence of drug-induced liver injury in TB patients.[25]

Limitations of the study

This study was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to other healthcare settings or regions with different patient demographics and TB prevalence. Additionally, the use of non-probability consecutive sampling might introduce selection bias, as only patients presenting to the hospital within the study period were included.

CONCLUSION

Head and neck tuberculosis, particularly cervical tuberculous lymphadenitis, remains a significant cause of neck masses in patients attending the ENT department at Sheikh Fazilatunnessa Mujib Memorial KPJ Specialized Hospital. Despite its often-non-specific clinical presentation and diagnostic challenges, the use of combined diagnostic modalities such as FNAC, histopathology, and molecular tests like GeneXpert facilitated timely and accurate diagnosis. The study demonstrated that standardized anti-tubercular therapy is highly effective in managing HNTB, with favorable treatment outcomes observed in most cases.

Recommendations of the study

Early evaluation of neck masses with a high index of suspicion for tuberculosis is crucial, especially in endemic regions. Diagnostic protocols should include FNAC, histopathology, and GeneXpert for accurate identification. Clinician awareness and timely referrals can reduce delays. Public health initiatives should promote early care-seeking behavior. Regular follow-up during anti-tubercular therapy is essential to ensure treatment success and monitor adverse effects.

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Conflict of Interest: The authors declare no conflicts of interest related to this study.

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