

# Prevalence And Demographic Incidence Of Neck Tuberculous Cervical Lymphadenitis (TCL) In Bangladesh

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## Abstract

**Introduction:** Tuberculous Cervical Lymphadenitis (TCL) is a common manifestation of extrapulmonary tuberculosis, with significant variations in prevalence and clinical presentations across different regions and populations. Despite the high burden of tuberculosis in Bangladesh, there is a paucity of research on the prevalence and demographic incidence of TCL in the country. The aim of this study was to investigate the socio-demographic characteristics and clinical presentations of TCL patients in Dhaka, Bangladesh, and to compare these findings with those of other studies to provide a comprehensive understanding of the disease's epidemiology and clinical manifestations.

**Methods:** This prospective observational study was conducted at the Dhaka Medical College Hospital, Dhaka, Bangladesh, over a period of four years. A total of 189 TCL patients were included in the study, with data collected on socio-demographic characteristics, clinical presentations, neck swelling-related characteristics, and various laboratory findings.

**Result:** The study encompassed 189 participants, with a majority (71.43%) falling within the 15-30 age range. Females constituted a larger share (68.25%) of the participants. Fever (66.67%) and abscess (49.21%) were the most prevalent clinical presentations. Unilateral neck swelling was observed in 76.72% of the participants, with a higher incidence on the right side (41.27%) compared to the left (35.45%). High erythrocyte sedimentation rate was found in 58.73% of the participants, indicating an elevated inflammatory response. Among the 89 participants who had a biopsy done, 98.88% showed evidence of caseous necrosis. Among the 96 participants who had Gene-Xpert testing done, 87.50% tested positive for the target gene.

**Conclusion:** The study provides valuable insights into the prevalence and clinical presentations of TCL in Dhaka, Bangladesh. The findings underscore the importance of early detection and intervention strategies, particularly among younger populations and urban dwellers. The study also highlights the need for further research to understand the underlying factors contributing to the observed gender and geographical disparities in TCL prevalence. The high sensitivity of the Gene-Xpert test for detecting TB suggests its potential utility as a diagnostic tool in resource-limited settings.

**Keywords:** Tuberculosis, Tuberculous Cervical Lymphadenitis, Fever, Extrapulmonary TB, Bacteria

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## I. INTRODUCTION

Tuberculous Cervical Lymphadenitis (TCL), a form of extrapulmonary tuberculosis (TB), is a significant global health concern. TB, caused by the bacterium *Mycobacterium tuberculosis*, is one of the leading causes of death worldwide, with the majority of fatalities occurring in developing countries.(1–3) The World Health Organization (WHO) estimates that approximately one-third of the world's population is infected with TB, predominantly in developing countries.(4) TCL is a common manifestation of extrapulmonary TB, affecting different organs of the human body, with the cervical lymph nodes being the most commonly involved.(5,6) The disease manifests in various ways, with cervical lymphadenitis being a common presentation. It is estimated that TB affecting the cervical lymph nodes represents about 50% of all extrapulmonary TB cases.(7) The global prevalence of TCL is significant. A study conducted in Ethiopia found that 69.5% of lymph node aspirates examined were diagnosed with TCL.(8) This prevalence is echoed in other developing countries, with similar figures reported in Israel and India.(9–11) However, the prevalence of TCL can vary greatly between regions and populations due to factors such as age, sex, and the site of lymph node involvement. In Asia, the prevalence of TCL is also high. A study conducted in Pakistan reported a TCL prevalence of 44%, while another study in India reported a prevalence of 73.75%.(11,12) These figures highlight the significant burden of TCL in the Asian population. In Bangladesh, TB is a major public health issue. The country ranks 6th among the 30 high TB burden countries globally. However, specific data on the prevalence of TCL in Bangladesh is limited, underscoring the need for more focused research in this area. The global mortality rate of TB is high, with an estimated 1.4 million TB deaths in 2019.(13) The mortality rate of TCL is not well documented, but it is known that delayed diagnosis and treatment can lead to severe complications, including airway obstruction and dissemination of TB to other parts of the body.(14) Epidemiologically, TCL is associated with several risk factors. These include a weakened immune system, close contact with a person with active TB, and living in or traveling to areas with high TB prevalence.(15) TCL typically manifests as a painless swelling in the neck. However, if left untreated, it can lead to the formation of a cold abscess, fistula, or scarring.(16) Other manifestation patterns include fever, weight loss, and night sweats. TB primarily affects the lungs, but it can also affect other parts of the body, including the lymph nodes in the neck. This is significant as cervical lymphadenitis is a common manifestation of extrapulmonary tuberculosis.(17) The study of the prevalence and demographic incidence of TCL in Bangladesh is of great importance. Given the high prevalence of TB in the country, understanding the specific characteristics and demographics of TCL cases is crucial for developing targeted prevention and treatment strategies.

## II. METHODS

This prospective observational study was conducted over a span of four years, from July 2019 to July 2023, at the Department of Ear, Nose, Throat and Head Neck Surgery, Dhaka Medical College Hospital, Dhaka, Bangladesh. The initial sample size comprised 189 patients who were diagnosed with TCL during the study period. The inclusion criteria for the study were patients of any gender over the age of 15 who presented with neck swelling and were subsequently diagnosed with TCL based on clinical examination, laboratory investigations, and histopathological confirmation. Exclusion criteria were applied to omit patients who had a history of anti-tuberculous treatment, those who were diagnosed with other forms of tuberculosis or any other concurrent chronic or infectious diseases, children with TB, and those who showed resistant TB strains. Patients who were unable to provide informed consent or were lost to follow-up were also excluded from the study. Following the application of these criteria, 6 patients were lost to follow-up, 2 patients passed away before the initiation of treatment, and 2 patients were found to have resistant TB strains. This led to a final sample size of 189 patients for the study. Informed consent was obtained from all the participants or their legal guardians (in case of minors) before their inclusion in the study. The consent process involved explaining the purpose of the study, the procedures involved, and the potential risks and benefits to the participants in a language they could understand. Participants were also assured of their right to withdraw from the study at any point without any impact on their treatment. The study was approved by the Ethical Review Committee of Dhaka Medical College Hospital. All data collected for the study were anonymized to maintain the confidentiality of the participants.

## III. RESULTS

**Table 1:** Distribution of participants by socio-demographic characteristics (n=189)

Characteristics	Frequency	Percentage
<b>Age</b>		
15-30	135	71.43%
31-45	40	21.16%
>45	14	7.41%
<b>Gender</b>		
Male	60	31.75%

<b>Female</b>	129	68.25%
<b>Residence</b>		
<b>Urban</b>	132	69.84%
<b>Rural</b>	57	30.16%
<b>Occupation</b>		
<b>Student</b>	70	37.04%
<b>Housewife</b>	64	33.86%
<b>Service Worker</b>	23	12.17%
<b>Businessman</b>	14	7.41%
<b>Others</b>	18	9.52%
<b>Socioeconomic Status</b>		
<b>Lower class</b>	68	35.98%
<b>Middle class</b>	116	61.38%
<b>Upper class</b>	5	2.65%

Table 1 displays the distribution of participants (n=189) in terms of their socio-demographic characteristics. In terms of age, the majority of participants, accounting for 71.43%, fell within the 15-30 age range. A significant proportion (21.16%) belonged to the 31-45 age group, while 7.41%, were above the age of 45. In terms of gender, females constituted the larger share with 68.25%, while males accounted for 31.75% of the participants. In terms of residence, 69.84% of the participants were from urban areas, whereas 30.16% resided in rural areas. Analyzing the occupation of the participants, the largest group consisted of students, representing 37.04% of the sample. Housewives accounted for 33.86% of the study population. Service workers comprised 12.17% of the participants, while businessmen represented 7.41%. The remaining 9.52% of the participants belonged to other occupation categories. Among the participants, 35.98% were classified as belonging to the lower class, while the majority (61.38%) fell into the middle-class category. A smaller proportion of participants, 2.65%, were classified as upper class.

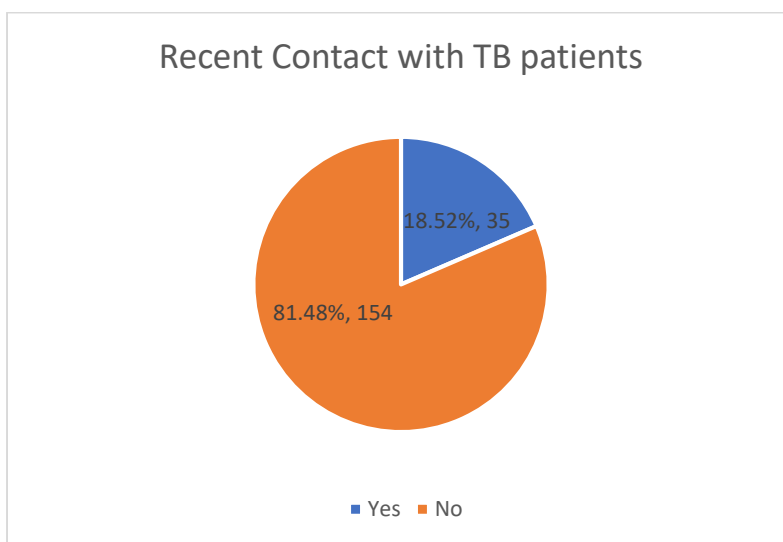


Figure 1: Distribution of participants by recent direct contact with TB patients (n=189)

Figure 1 illustrates the distribution of participants (n=189) based on their recent direct contact with tuberculosis (TB) patients. Among the participants, 18.52% reported having had direct contact with TB patients, while the majority, 81.48%, indicated no recent direct contact with TB patients.

Table 2: Distribution of participants by clinical presentations (n=189)

Clinical Presentations	Frequency	Percentage
<b>Fever</b>	126	66.67%
<b>Abscess</b>	93	49.21%
<b>Cough</b>	57	30.16%
<b>Loss of weight</b>	7	3.70%
<b>Night Sweat</b>	5	2.65%
<b>Weakness</b>	4	2.12%
<b>Comorbidities (DM, HTN, Asthma etc.)</b>	23	12.17%

Table 2 presents the distribution of participants based on their clinical presentations. The most prevalent clinical presentation among the participants was fever, accounting for 66.67% of the cases. Abscess was another commonly reported clinical presentation, with 49.21% of the participants experiencing it. Cough was observed in 30.16% of the cases, while a smaller proportion reported loss of weight (3.70%) and night sweat (2.65%) as clinical presentations. Weakness was reported by 2.12% of the participants. Additionally, 12.17% (n=23) of the participants reported having comorbidities such as diabetes mellitus (DM), hypertension (HTN), asthma, among others.

**Table 3:** Distribution of participants by duration of TB presentation (n=189)

Duration of TB presentation	Frequency	Percentage
<2 weeks	11	5.82%
2 weeks to 1 month	62	32.80%
>1 month	116	61.38%

Table 3 displays the distribution of participants based on the duration of tuberculosis (TB) presentation. Among the participants, only 5.82% had a TB presentation lasting less than 2 weeks. A larger proportion, 32.80% (n=62), reported a duration of TB presentation ranging from 2 weeks to 1 month. The majority of participants, accounting for 61.38% had a TB presentation lasting more than 1 month.

**Table 4:** Distribution of participants by neck swelling related characteristics (n=189)

Characteristics	Frequency	Percentage
<b>Swelling Type</b>		
Bilateral	44	23.28%
Unilateral (Right side)	78	41.27%
Unilateral (Left side)	67	35.45%
<b>Swelling Size</b>		
≤3 cm	97	51.32%
>3 cm	92	48.68%
<b>Presence of Tenderness</b>		
Yes	134	70.90%
No	55	29.10%
<b>Swollen Node</b>		
Single Level Node	71	37.57%
Multiple Level Nodes	118	62.43%
<b>Node Level</b>		
Node Level I	10	5.29%
Node Level II	88	46.56%
Node Level III	73	38.62%
Node Level IV	80	42.33%
Node Level V	111	58.73%
Node Level VI	13	6.88%

Table 4 presents the distribution of participants based on neck swelling-related characteristics. The participants' neck swelling type was categorized into three groups: bilateral, unilateral on the right side, and unilateral on the left side. Among the participants, 23.28% exhibited bilateral neck swelling, while 41.27% had unilateral swelling on the right side, and 35.45% had unilateral swelling on the left side. Approximately 51.32% of the participants had a swelling size of 3 cm or smaller, while 48.68% had a swelling size larger than 3 cm. The presence of tenderness in the neck swelling was also recorded. A majority of the participants (70.90%) reported tenderness, while 29.10% did not experience tenderness. Among the participants, 37.57% had swelling in single level node, while 62.43% had swelling in multiple level of nodes. Due to this, node level distribution of the participants was as follows: Node Level I accounted for 5.29% (n=10) of the participants, Node Level II comprised 46.56% (n=88), Node Level III encompassed 38.62% (n=73), Node Level IV represented 42.33% (n=80), Node Level V constituted 58.73% (n=111), and Node Level VI encompassed 6.88% (n=13) of the participants.

**Table 5:** Distribution of participants by laboratory findings (n=189)

Laboratory Findings	Frequency	Percentage
High ESR	111	58.73%
Severely High ESR	5	2.65%
Sputum Positive	5	2.65%
Chest x-ray opacification	13	6.88%
FNAC Chronic granulomatous disease (CGD)	189	100.00%
<b>Biopsy Done (n=89)</b>		
Caseous Necrosis	88	98.88%
Suspicious Finding	1	1.12%
<b>Gene-Xpert Done (n=96)</b>		
Positive	84	87.50%
Negative	12	12.50%

Table 5 presents the distribution of participants based on various laboratory findings. Among the participants, 58.73% had high erythrocyte sedimentation rate (ESR), indicating an elevated inflammatory response. However, a smaller proportion (2.65%) had severely high ESR. Regarding sputum analysis, 2.65% of the participants tested positive for the presence of sputum, indicating potential infection. Additionally, 6.88% of the participants exhibited chest x-ray opacification, suggesting abnormal findings on the x-ray images. Furthermore, all participants (100.00%, n=189) underwent fine needle aspiration cytology (FNAC) and had an assessment of chronic granulomatous disease (CGD). Among the 89 participants who had a biopsy done, 98.88% (n=88) showed evidence of caseous necrosis, which is a characteristic finding associated with certain diseases. Only one participant had a suspicious finding on biopsy. Among the 96 participants who had Gene-Xpert testing done, 87.50% tested positive, indicating the presence of the target gene. The remaining 12.50% tested negative for the target gene.

#### IV. DISCUSSION

The epidemiology and clinical presentations of Tuberculous Cervical Lymphadenitis (TCL) exhibit considerable variation across different regions and populations. A comprehensive understanding of these variations is crucial for the development of effective detection, intervention, and treatment strategies. The present study, conducted at Dhaka Medical College Hospital in Dhaka, Bangladesh, provides valuable insights into the socio-demographic characteristics and clinical presentations of TCL patients. The majority of the participants were within the age range of 15-30 years, a finding that aligns with multiple previous studies where TCL was found to be more common among those aged 15 to 44 years old.(18,19) This similarity suggests that TCL is a significant health concern for the younger population. In terms of gender, the present study found a higher prevalence among females, a finding that aligns with some other studies that observed a higher female prevalence.(18,20) However, an Ethiopian study observed a very close distribution of participants, with a slightly higher percentage of females compared to males.(8) This discrepancy in gender prevalence could be attributed to differences in exposure to risk factors, health-seeking behavior, and sociocultural factors in the respective study populations. The present study also found that a significant proportion of the participants were from urban areas, a finding that reinforces the general perception that TB is more prevalent in urban areas.(21) The higher prevalence of TCL in urban areas in this study could be attributed to factors such as higher population density and increased exposure to TB patients.

The clinical presentations reported by the participants were diverse, with fever and abscess being the most prevalent. These findings are consistent with the typical clinical manifestations of TCL, which often include systemic symptoms such as fever and localized symptoms such as abscess formation.(22) The distribution of participants based on neck swelling-related characteristics in this study shows a higher prevalence of unilateral swelling on the right side (41.27%) compared to the left side (35.45%) and bilateral swelling (23.28%). This is in line with a study by Fontanilla et al. (2011), which reported a higher incidence of unilateral swelling in TCL patients.(23) The size of the swelling was also a significant characteristic, with approximately half of the participants (51.32%) having a swelling size of 3 cm or smaller, while the other half (48.68%) had a swelling size larger than 3 cm. This is consistent with the findings of a study by Huda et al., which reported a similar distribution of swelling sizes in TCL patients.(24) In terms of laboratory findings, a high erythrocyte sedimentation rate (ESR) was observed in 58.73% of the participants, indicating an elevated inflammatory response. This is a common finding in TCL and other forms of TB due to the body's immune response to the infection.(17) A smaller proportion of participants tested positive for the presence of sputum (2.65%) and exhibited chest x-ray

opacification (6.88%), suggesting potential pulmonary involvement. This aligns with a study by Lee (2015), which reported that TB can affect both the pulmonary and extrapulmonary systems.(25) Finally, the majority of participants who had a biopsy done showed evidence of caseous necrosis (98.88%), a characteristic finding associated with TB.(26,27) Among the participants who had Gene-Xpert testing done, a high proportion tested positive (87.50%), indicating the presence of the target gene. This is consistent with the high sensitivity of the Gene-Xpert test for detecting TB, as reported by a study by Kabir et al.(28) In conclusion, the prevalence and clinical presentations of TCL are influenced by a multitude of factors, including age, gender, geographical location, immune status, and exposure to TB-endemic areas. A comprehensive understanding of these factors is crucial for the development of effective detection, intervention, and treatment strategies for TCL.

### **Limitations of The Study**

This study, while providing valuable insights, has several limitations that should be acknowledged. Firstly, the study was conducted in a single hospital, which may limit the generalizability of the findings to the broader community. The sample size was relatively small, which could potentially affect the statistical power and the precision of the estimates. Secondly, although a CT scan was recommended for the diagnosis of the patients, it was not feasible for all participants due to the high cost associated with this diagnostic tool. This could have potentially limited the accuracy of the diagnosis and the comprehensiveness of the clinical data collected. Lastly, the study utilized the Gene-Xpert test for the diagnosis of tuberculosis, despite the known higher accuracy of the culture test. The decision to use the Gene-Xpert test was influenced by several factors, including the high cost and limited availability of the culture test, as well as the extended time required for test results. This reflects the real-world challenges of tuberculosis diagnosis in resource-limited settings and underscores the need for more affordable and accessible diagnostic tools.

## **V. CONCLUSION**

In conclusion, this study provides a comprehensive analysis of the socio-demographic characteristics and clinical presentations of patients with Tuberculous Cervical Lymphadenitis (TCL) in Dhaka, Bangladesh. The findings highlight the significant prevalence of TCL among the younger population, particularly among females and urban dwellers. The clinical presentations were diverse, with fever and abscess formation being the most prevalent symptoms. The majority of the participants exhibited unilateral neck swelling, with a higher incidence on the right side. Laboratory findings revealed a high erythrocyte sedimentation rate, indicative of an elevated inflammatory response, in over half of the participants. The majority of participants who underwent a biopsy showed evidence of caseous necrosis, a characteristic finding associated with TB. These findings underscore the importance of early detection and intervention strategies for TCL, particularly in urban areas and among younger populations. The study also highlights the need for further research to understand the underlying factors contributing to the observed gender and geographical disparities in TCL prevalence. The high sensitivity of the Gene-Xpert test for detecting TB, as evidenced by the high proportion of positive results among the participants, suggests its potential utility as a diagnostic tool in resource-limited settings.

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**Conflict of interest:** None declared

**Ethical approval:** The study was approved by the Institutional Ethics Committee

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