

# Tuberculosis- Frequency and Differential Diagnosis- Analysis of Cases in Pakistan

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## Abstract

**Background:** Tuberculosis is highly prevalent in Pakistan and the numbers are on increase each year. Cervical lymphadenopathy, a common finding in tuberculosis and other inflammatory, infectious and malignant etiologies, is commonly encountered in hospital setting in Karachi, Pakistan. Signs and symptoms of tuberculosis are blood tinged sputum, weight loss, night sweats, loss of appetite and weakness. A thorough history, complete physical examination and investigations are needed to diagnose tuberculosis.

**Objective:** To determine the burden of tuberculosis in cases of cervical lymphadenopathy and to find the most common etiologies of cervical lymphadenopathy in hospital setup in Karachi, Pakistan.

**Methods and Materials:** Patients with cervical lymphadenopathy attending the surgical outpatient department of Jinnah Post Graduate Center, Karachi, Pakistan were conveniently sampled for this study without age and gender limitations. This cross sectional, descriptive study was conducted from January 2010 to January 2011.

**Results:** A total of 250 patient cases with cervical lymphadenopathy were studied. The age group with the highest number of patients was between 21 to 40 years, which included 97 females and 21 males. The patients with unilateral single cervical lymph node swelling were found to be 13.2%, while 86.8 % patients had multiple bilateral lymph node swellings. Tuberculosis was found in majority of patients, 63.6% followed by inflammatory hyperplasia which was present in 28.4% patients, other causes included lymphoma 5.2% and metastasis 2.8%.

**Conclusion:** Tuberculosis is the most common etiology of cervical lymphadenopathy, followed by inflammatory hyperplasia, lymphoma and metastasis.

*Key Words: Tuberculosis, Cervical lymphadenopathy, Lymphadenitis, Malignancy*

## Background

Cervical lymphadenopathy is a clinical symptom directing towards a benign, malignant, inflammatory or infectious process [1]. Cervical lymphadenopathy is painless in majority of patients but can become painful [2]. A number of patients with asymptomatic cervical lymphadenopathy never visit physicians for the condition and thus, this important sign is often missed by the medical practitioner if it is not the presenting complain.

In adults, cervical lymph nodes are not normally palpable. A node is palpable if it is over 1 cm in size however in contrast, children up to 12 years of age can have enlarged lymph nodes without any sign of pathology [3,4]. Clinical assessment of cervical lymphadenopathy which includes its duration of swelling, assessment of the site, distribution of cervical lymphadenopathy provide important clues to the physician in making differential diagnosis. A comprehensive history and thorough physical examination are crucial for proper management [5].

Cervical lymphadenopathy can be infectious or non-infectious in etiology, infectious causes include tuberculosis, rubella, cat scratch fever, streptococcal pharyngitis, histoplasmosis, infectious mononucleosis and brucellosis, while the non-infectious causes include lymphomas, reactive lymphadenopathy and metastasis. Tuberculosis can be differentiated in types by the site of the disease, as Tuberculosis in the pulmonary system is known as 'Pulmonary Tuberculosis, tuberculosis outside the Pulmonary system is known as 'Extra pulmonary tuberculosis', however 'Miliary tuberculosis' is referred to the condition caused by the hematogenous

dissemination of mycobacterium tuberculosis [3,6-9].

Tuberculosis is a communicable disease, caused by various strains of mycobacteria, however 90-95 % of those who are infected with mycobacterium tuberculosis never develop active tuberculosis and remains asymptomatic [10,11]. Common symptoms of tuberculosis include chronic cough with blood tinged sputum, night sweats, cervical lymphadenopathy and weight loss, however it can affect almost every organ.

Tuberculosis is a major cause of mortality and morbidity worldwide [12]. Tuberculosis, after HIV/AIDS is the second frequent etiology for mortality due to a single infectious agent.

Low income countries have greater incidence and prevalence of tuberculosis as compared to high income countries. Tuberculosis is highly prevalent in African and Asian countries particularly South East Asia [13].

According to the World Health Organization (WHO), it is thought that globally more than 2 billion humans have been infected or exposed to the mycobacterium tuberculosis [14]. Tuberculosis is highly prevalent in low income countries and according to an estimation by WHO in 2013 there were 8.8 million new cases and 1.5 million deaths by tuberculosis occurring mostly in the developing countries [15,16]. More than 80 percent of Asian and African population tests positive in tuberculin test in comparison to developed nations' population such as the United States where only 5-10 percent tests positive in tuberculin test [10].

Several studies have been conducted in Pakistan to assess the common etiologies of cervical lymphadenopathy, however due to massive migration to and within Pakistan from neighboring cities and countries especially Afghanistan

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in the recent years, it is valuable to study more in this area to observe any change in the past statistics available. Our study was done to evaluate the differential diagnosis of cervical lymphadenopathy in a tertiary care hospital in Karachi and the frequency of tuberculosis in those patients.

### Methodology

This prospective, cross sectional, descriptive study was conducted at the surgical outpatient department, Jinnah Post graduate Medical Center Karachi (JPMC). JPMC is one of the largest tertiary care facilities in Pakistan and bears around 20-30 percent of patient's burden of the city 'Karachi'. The length of this study was 1 year extended from January 2010 to January 2011. Convenient sampling of the participants was done and the data was collected from one hospital which is the largest tertiary care hospital in Karachi. Overall 275 patients were recruited initially but only 250 participants stayed in the study till the end. The inclusion criterion included all patients with cervical lymphadenopathy. There was no gender or age restriction to participate in the study. The patients who had primary complaints of cervical lymphadenopathy and the patient who were found to have cervical lymphadenopathy during the physical examination were included in the study. The diagnosis was confirmed by the standard investigations such as Complete blood counts, ESR levels, Chest and abdominal radiography, abdominal ultrasound and Fine Needle Aspiration Cytology (FNAC). Radiography included chest x-ray (Posteroanterior and Anteroposterior views) and abdominal x-ray either erect or supine.

Oral and written consent was obtained from the participants before the study and they were briefed that they can quit the study any time before the end of the study. Ethical approval was obtained from the Medical center's ethical committee. The data was analyzed with Statistical Package for Social Sciences (SPSS) version 17.

### Results

A total of 250 patients participated in the study with a response rate of 91 %. Amongst the participants 195(78%) were females while 55(22%) were males. The youngest patient was 11 years old and the oldest being 78 years of age. The age group with the highest number of patients with cervical lymphadenopathy was between 21 to 40 years of age, comprising of 97 females and 21 males followed by the age group 41 to 60 years, comprising 35 females and 14 males (*Table 1, Figure 1*).

Some participants had single while others had multiple lymphadenopathy. The patients with unilateral single cervical lymph node swelling were found to be 33(13.2%), while patients who had multiple cervical lymph nodes swellings were 217(86.8 %).

On the results of clinical history, physical examinations and diagnostic investigations, majority of the patients (n=159, 63.6%) were found to have tuberculosis as the cause of their cervical lymphadenopathy with the P-value of 0.04 (*Table 2*). Amongst those who had tuberculosis, 129 were female and 30 were males. Second most common cause of cervical lymphadenopathy was found to be inflammatory hyperplasia which was present in 71 (28.4%, P-value 1.22) patients. Other causes included lymphoma in 13(5.2%, P-Value 0.8) and metastasis which was present in 7 (2.8%, P-Value 1.6) of the patients (*Table 2*).

### Discussion

As a South Asian country Pakistan has a high rate of Tuberculosis, and Karachi as its largest city our study demonstrated that 63.6 percent of the patients having cervical lymphadenopathy were diagnosed with tuberculosis, followed by inflammatory hyperplasia (28.4 %), lymphoma (5.2 %) and metastasis (2.8%). Other studies done in Pakistan also showed comparative results, where a Pakistani study conducted by Channa et al. reported that 70 % of the patients with cervical lymphadenopathy were found to have tuberculosis, while in another study conducted in Pakistan revealed that 69 % of the patients with enlarged cervical lymph nodes had tuberculosis confirming after investigations [17,18].

In contrast to the results of our study, a study conducted in China showed that the most common etiology of cervical lymphadenitis is metastasis which was present in 37.5 % of the patients and the second most common etiology was tuberculosis which was present in only 28 % of the cases with cervical lymphadenopathy [19]. In another study done in Korea, results showed the 22.4 % of patients had tuberculosis and the same percentage had non-specific lymphadenitis as the cause of their cervical lymphadenopathy, while only 8 % malignancies as the etiology for their condition [20]. Peters et al. found out that in younger age group, the most common cause of cervical lymphadenopathy was a self-limited systematic viral infections [21].

Reasons for high incidence and prevalence of tuberculosis in Karachi, Pakistan could be presence of risk factors attributable to tuberculosis which are poverty, congested and shared housing hampering ventilation and facilitating disease transmission, lack of health awareness and healthcare facilities, malnourishment and vaccination. A study conducted in India showed that the risk factors associated with tuberculosis were low education levels, shared kitchens, and urbanization [22]. In another study by Geldmacher et al. showed that in Germany that immigrants have six to seven fold increases in prevalence of tuberculosis than the local population [23].

Our study revealed that the age group most affected was between 21 to 40 years, in another study by Scott et al,

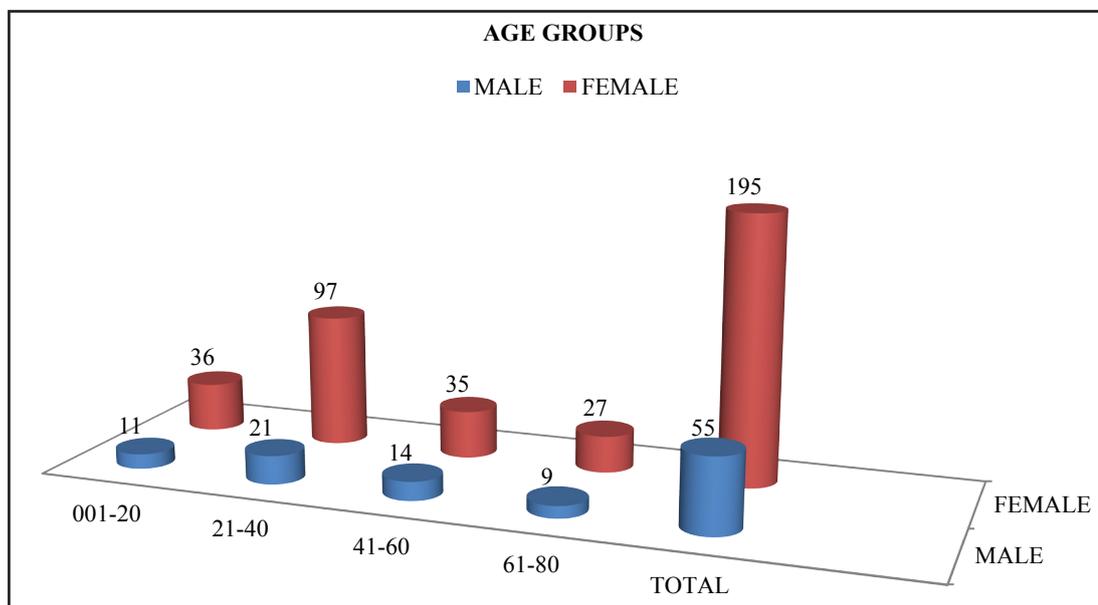
*Table 1. Age groups.*

AGE GROUPS (YEARS)	MALE	FEMALE	TOTAL
1-20	11 (4.4%)	36 (14.4%)	47 (18.8 %)
21-40	21 (8.4%)	97 (38.8%)	118 (47.2 %)
41-60	14 (5.6%)	35 (14.0%)	49 (19.6%)
61-80	9 (3.6%)	27 (10.8%)	36 (14.4%)
<b>TOTAL</b>	<b>55 (22.0%)</b>	<b>195 (78%)</b>	<b>250 (100%)</b>

**Table 2.** Frequency of causes of 250 cases of cervical lymphadenopathy.

S.NO.	ETIOLOGY	MALE	FEMALE	TOTAL	%	P-Value (etiologies)
1	Tuberculosis	30	129	159	63.6	0.04
2	Inflammatory hyperplasia	20	51	71	28.4	1.22
3	Lymphoma	03	10	13	5.2	0.8
4	Metastasis	02	05	07	2.8	1.60

P value is correlation of burden of Tuberculosis with etiology of cervical lymphadenopathy.



**Figure 1.** Age groups of the patients participated in the study.

also showed the younger age group more affected by the tuberculosis and maximum patients were between the age group of 13 to 40 years. A reason for such a high rate in adolescent and young adults could be due to availability of medical facilities/health insurance provided by employment and they more concerned and vigilant regarding their condition as compared to elders [24].

Our study indicates that majority of the cases (86.8 %) had bilateral lymphadenopathy while only 13.2% of the patients had unilateral lymphadenopathy. In a study by Leung et al. the most common cause of unilateral cervical lymphadenitis was upper respiratory tract infections or streptococcal pharyngitis while multiple lymphadenitis was caused by viral infections

and less frequently by malignancies and collagen vascular diseases [2].

### Conclusion

Tuberculosis remains an important differential diagnosis in patients with cervical lymphadenopathy in Karachi, Pakistan. To decrease the incidence and prevalence of tuberculosis, it is needed to increase awareness regarding tuberculosis infection, disease prevention, disease manifestation, management and disease limitation in the patients with cervical lymphadenopathy. The health initiatives especially awareness entails joint efforts of healthcare system, government and the community.

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