# Prevalence of Tuberculosis Infection among a rural and urban health training center of a medical college

**Dr. Prachi Saxena[1], Dr. Manish Kumar Sharma2*, Dr. Pooja[3]**

[1]Assistant Professor, Department of Respiratory Medicine, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.

[2]Assistant Professor, Department of Respiratory Medicine, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.

[3]PG Final Year Student, Department of Respiratory Medicine, Santosh Medical College & Hospital, Santosh Deemed to be University, Ghaziabad.

*Dr. Manish Kumar Sharma - Corresponding Author

**ABSTRACT**

**Background:** The bacterium Mycobacterium tuberculosis is the cause of the disease tuberculosis, which is easily spread by inhaling air droplets from an infected person. Due to its methods of transmission and extensive treatment requirements, tuberculosis has emerged as a major public health concern on a global scale.

**Materials and methods**: The purpose of this study was to determine the prevalence of this disease in rural and urban health training center of a medical college in Ghaziabad.

Results: The study included 400 participants (220 from first medical college and 180 from another medical college) who were in attendance at the medical institutions, yielding a total prevalence of 29.84%. Rural recorded a prevalence of 29.7%, whilst urban recorded a prevalence of 26.3%. Patients under the age of 10 made up 8(1.9)% of the total prevalence, while patients between the ages of 30-39 made up 143(35.8%). 61% of the subjects were male, compared to 39% of the subjects being female.

**Conclusion:** Given that most patients assumed they would receive prompt care at the urban, a state-owned specialised hospital, as opposed to rural, a federally-owned facility with numerous bottleneck protocols, this may have explained the increased occurrence. However, it is crucial to maintain surveillance and provide patients who have been diagnosed with TB with free or heavily discounted TB medications. Other ways to reduce its prevalence include placing patients in quarantine until the bacterium has completely left their bodies in order to prevent cross-contamination and transmission to healthy people at home, at work, or while traveling. Additionally, reducing the amount of people crammed into our remote communities' schools, churches, mosques, and prisons would undoubtedly help.

**Keywords:** Mycobacterium tuberculosis; Infection; Risk factors; Prevalence

## INTRODUCTION

Mycobacterium tuberculosis is the culprit behind tuberculosis (TB). M. tuberculosis is a member of the diverse class of bacteria known as acid-fast bacilli. The bacteria M. leprae, which causes leprosy, is another member of this genus. Microscopy, GeneXpert, a molecular assay, and chest X-rays are frequently used for its detection. There are two variations of this illness: pulmonary tuberculosis (PTB) and extrapulmonary tuberculosis (EPTB). Untreated patients are frequently the source of an infection; when they cough, sneeze, or spit out microscopic droplets that contain tubercules, these are

transmitted through inhalation of these droplet nuclei [1]. Although the bacterium can affect almost all body organs, at least 80% of TB cases primarily affect the lungs [1]. However, EPTB also affects the meninges, lymph nodes, lungs, bones, and joints [2]. While the symptoms of EPTB depend on the part of the body being affected, they may include blood in urine (TB of the kidney), hoarseness (TB of although it fully took off in 2003), fever, fatigue, and weight loss that cannot be explained. Symptoms of TB infection include cough that lasts for three weeks or more without producing sputum, chest pain, haemoptysis (coughing up blood), and haemorrhaging. There were 3,459 DOTS centres as of 2009, with at least two centres in each LGA. It is firmly believed that since 2009, 1,025 facilities, including laboratories with powerful microscopes, have been available, making Acid-Fast Bacilli (AFB) diagnosis simple. However, it is further said that drug resistance due to two major first-line medications, which are rifampicin and isoniazid, has been believed to be one crucial explanation for its increased incidence and chronic infection among the vulnerable or susceptible groups [5]. The majority of its preventative and control programmes, though, are built around early diagnosis and strain identification [8]. Unfortunately, TB is still seen as a serious public health issue in Nigeria with significant clinical ramifications, despite the DOTS strategy's deployment across all of the country's states and regions. Therefore, it is imperative that its prevalence be determined at all times in order to assess how effective the effort to stop its spread has been achieved over time. Second, it will aid in the development of national TB control and diagnostic strategies as well as government guidelines and regulations. It is widely accepted that the study's primary objective was to ascertain the prevalence of the TB epidemic in two government-run hospitals in Port Harcourt, Rivers State, one of the richest oil-producing regions.

**Materials and Methods**

This study was conducted in rural and urban health training center of a medical college. Both urban and rural health training provided subjects for the study. East-West Road is home to the federally rural hospital. The hospital opened its doors in 1980, but it wasn't officially opened until 1985. In addition to serving the State and the oil-rich Niger Delta region, the hospital serves as a tertiary health care teaching and research center. It currently has about 500 beds. Eldred Curwen Braithwaite, a British physician and the first surgeon in Rivers State, which is situated in the former Government Residential Area (GRA). It was initially intended for senior public workers when it was founded in 1925 under the name Braithwaite Memorial Hospital. It boasts 731 medical professionals and 375 licenced beds.

Study population

The majority of the locals are government employees. Fewer people, however, are involved in farming, fishing, trading, or oil prospecting. The people who visited hospitals during the study period and were thought to have pulmonary TB were the subjects of this study. Regardless of their age or gender, subjects were conveniently enrolled; however, those already receiving TB treatment were disqualified from the study, as were those who refused to give their consent. There were 400 participants in total, 220 from rural hospital and 180 from the urban hospital.

Ethical consideration

Each patient's consent was also obtained before they were included in this study after receiving ethical clearance from the rural ethical committee and the State Ministry of Health. All results were treated with the utmost confidentiality, and patients who required further medical care were referred to the lab staff and doctors.

**Sample collection**

Smears is frequently used when PTB is suspected, even if other samples, such as cerebral fluid, pus, urine, or pleural fluid, can be used to identify the presence of MTB. But in this case, it was decided to use a practical sampling technique, and on the day the patient visited the medical facility, 2 ml of the patient's sputum was collected using sterile sample bottles. Each sample had a unique laboratory identification number attached to it, and the collection date and patient's sex were noted. As soon as possible, the laboratory for analysis received the gathered samples in ice-packed coolers. The method Chesbrough [9] described was followed when doing the microscopy procedure. As soon as the gathered samples reached the laboratory, they were all properly processed and dyed. The samples were immediately transported to the laboratory for analysis after being collected and placed in ice-filled coolers. The microscopy procedure was carried out in accordance with Chesbrough's method [9]. As soon as the samples arrived in the lab, they were all properly processed and dyed. Microscopy-based M. tuberculosis detection A common name for mycobacteria is "acid-fast bacilli" (AFB). This is due to their waxy layer, which after being decolored by acid-alcohol maintains an aniline dye (such as carbol fuchsin).Ziehl-Neelsen staining technique is the name of this staining procedure. On a clean slide, a smear of the sputum is applied, fixed, and covered with carbol fuchsin. This is then left for three minutes. Heat is used, tap water is used to rinse, and a decolorizer with acid-alcohol for 5 seconds is used. Then it is processed for 30 seconds with a counterstain (methylene blue), rinsed once more with tap water, and left to dry by air. The 100 x oil immersion lens is then used to see the stained smear under a microscope. The bacilli frequently take the form of 2-4 mm length by 0.2-0.5 mm diameter scarlet beaded rods. For each sputum sample that was taken, same procedure was followed.

**RESULTS**

220 samples were taken from the first medical college and 180 samples were taken from another medical college each provided 400 sputum samples for this investigation .Nevertheless, the study found that the prevalence was overall 27.8%.

The prevalence rates for rural and urban were 29.84% and 26.53%, respectively. 39% of the population was female, while 61% of the population was male. For clarity, the findings are displayed using the charts below.

**Table 1: Total prevalence of MTB**

| | | Frequency (%) |
|---|---|---|
| Age groups | ≤ 10 | 8(1.9%) |
| | 11-19 | 22(5.6%) |
| | 20-29 | 71(17.9%) |
| | 30-39 | 143(35.8%) |
| | 40-49 | 89(22.2%) |
| | 50-59 | 37(9.3%) |
| | ≥60 | 30(7.4%) |
| Gender | Male | 244(61%) |

| | | |
|---|---|---|
| | Female | 156(39%) |

**Table 2: Prevalence of MTB based on location**

| | Positive | Negative |
|---|---|---|
| Rural | 29.84% | 70.16% |
| Urban | 26.53% | 73.47% |

## DISCUSSION

Due to its growing prevalence and airborne transmission, tuberculosis, a respiratory tract infection, has long been viewed as a public health concern. Usually, antibiotics like rifampicin and isoniazid are used to treat it. Recently, however, there has been evidence of drug resistance to these substances. Thus, it is crucial that routine surveillance be conducted to ascertain its prevalence at any given time, particularly in endemic areas like Nigeria with an increasing trend of evidence-based weak health infrastructure combined with expounding risk factors, such as poverty and poor personal hygiene outcomes, that favour the spread of the scourge in our remote communities.

This study, which examined 400 people with TB from the rural and urban health training center of a medical college found a prevalence rate of 26.3%. This is greater than the prevalence of 10.3% reported by Azuonwu et al. in their study conducted in Bayelsa State, Nigeria, but close to that of Nwachukwu and Peter (21.6%) in Abia State, Nigeria [10]. This study's larger sample and the fact that Port Harcourt is more populated than Yenagoa, where the previous study was conducted, may be responsible for the difference in prevalence. Males and females made up 63% and 37% of the total prevalence respectively. Jumbo et al. reported this gender disparity in their study conducted between 2003 and 2012 at a DOTS centre in Igbogene, Yenagoa [4]. They discovered that within the same time period, men made up 61.4% of the total prevalence while women made up 38.6%. Males were shown to have a higher prevalence in similar research by Okonko et al. [12], Obiora et al. [13], and Akpaka et al. [14]. Males also had a greater rate of TB infection, according to Nwachukwu and Peter [10]. However, the study by Azuonwu et al. did not concur with this study because a higher percentage of females (55.7%) than males made up the total prevalence [11]. Although the cause of this difference was not looked into, Diwan et al. suggested that immunological and biological variations may be the reason that men contract TB more frequently than women [15].

Another hypothesis that may be connected to this situation is that men are more likely than women to have a larger and more active social network, which exposes them to the pathogenic virus [4]. Additionally, women are more likely than men to seek medical attention[16]. Men may be reluctant to speak up for extended periods of time or attend a hospital for a potential early diagnosis and treatment since they are perceived as risk-takers. However, individuals under the age of 10 made up 1.9% of the entire prevalence, while those between the ages of 30-39 made up 35.8% of the total prevalence (the highest). This

almost matches the outcome noted by Azuonwu et al., who discovered a higher among those aged 20 to 39 in comparison to other age groups [11]. A higher frequency was observed among people between the ages of 26 and 35 in another study conducted by Nwachukwu and Peter [10]. This increased prevalence could have been caused by the poor living conditions of the population, which may have made it difficult for them to eat healthfully and fend off infections. This increased prevalence rate among the age brackets may have also been caused by improperly implemented or inconsistent government regulations and a weak system for delivering healthcare [17,18].

It should be noted that most people with TB symptoms, such as chest pain or persistent coughing, may not want to go to a hospital for a diagnosis, preferring instead to visit a pharmacy where they may be prescribed antibiotics without receiving an accurate, evidence-based diagnosis and treatment plan from a trained health professional. While the TB infection may not be cured, this could worsen the antibiotic resistance crisis, a serious public health concern with grave health repercussions. When it gets bad, some people may opt to use conventional herbal remedies, while others may turn to visiting places of worship. On the other hand, the majority of people who are ill would prefer not to know the name or origin of their illness because they already believe that it could not have originated from a medical standpoint but rather had an ancestoral origin. When asked to visit a health facility for a medical checkup, those with latent TB (asymptomatic) may appear healthy, but they will always feel hesitant and decline the offer because they continue to believe that they are healthy as far as outward signs and symptoms go.

## CONCLUSION

The prevalence rate for this investigation, which involved participants and samples from two famous hospitals was 28.4%. A rural and urban health training center of a medical college Based on sex and age, patients between the ages of 30-39 and men showed the highest prevalence. According to reports, factors contributing to this increased prevalence include crowding in homes and markets, a refusal to seek early diagnosis at a medical facility, rifampicin resistance, poverty, and a fear of dying. Therefore, it is highly advised that public awareness campaigns be launched because latent TB is obviously a silent killer. The general public should be encouraged to go to medical institutions for routine examinations and discouraged from obtaining medications without a prescription from a doctor. Patients with confirmed TB should be urged to finish their medication and come back for a diagnosis to make sure the bacterium has been eliminated from their system. Using glasses and other utensils that could touch their mouths or nostrils should be avoided by people who live with TB sufferers. To avoid overcrowding, housing at subsidised rates should be made available wherever possible. This is because overcrowding can promote the spread of most respiratory infections, including TB.

In order to fully and simply explain the causes of the higher rates of tuberculosis infection in men than in women, as shown by this study, additional research should be conducted. Potential stakeholders should mobilise more coordinated and effective efforts to lower the risk factors, with a

focus on reducing the risk of HIV infection because the correlation between HIV/AIDS and TB co-infection has long been a source of public health concerns in areas where both diseases are endemic. To compare the findings with those of a single patient's sputum used to detect the presence of MTB, additional research with two or more sputa obtained from the patient may be conducted.

**REFERENCES**


1. http://www.who.int/hiv/pub/guidelines/nigeria_tb.pdf
2. Ghosh S (1983) Primary health care for developing countries. Indian Pediatr 20: 235 -242.
3. American Thoracic Society (2000) Diagnostic standards and classification of tuberculosis in adults and children. Am J Respir Crit Care Med 161: 1376–1395.
4. Jumbo J, Obaseki DO, Ikuabe PO (2013) Tuberculosis and gender parity in a TB Referral Centre, South –South Nigeria. Greener J Med Sci 3:270-275.
5. World Health Organization (2013) The use of bedaquiline in the treatment of multidrug-resistant tuberculosis: Interim Policy Guidance.WHO, Geneva, Switzerland.
6. World Health Organization (2012) Report of First National TB Prevalence Survey. Federal Republic of Nigeria.
7. National Tuberculosis and Leprosy Control Programme (2014) Towards Universal Access to Prevention, Diagnosis and Treatment. The National Strategic Plan for Tuberculosis Control.
8. World Health Organization (2009) Non-commercial culture and drug susceptibility testing for rapid screening of patients at risk of MDR-TB.WHO, Geneva, Switzerland.
9. Cheesbrough M (2006) District laboratory practice in tropical countries. Part 2. Cambridge University Press, US. pp: 39-40.
10. Nwachukwu E, Peter GA (2010) Prevalence of Mycobacterium tuberculosis and human immunodeficiency virus (HIV) infections inUmuahia, Abia state, Nigeria. Afri J Micro Res 4: 1486-1490.
11. Azuonwu O, Ihua N, Koomasiruchi W (2017) Molecular detection of Mycobacterium tuberculosis (MTB) and rifampicin resistant strain among subjects accessing health care at federal medical centre, Yenegoa, Bayelsa State; Nigeria. Transl Biomed 8: 120.
12. Okonko IO, Soleye FA, Adeniji FO, Okerentugba PO (2012) HIV and TB co-infection among patients on directly observed treatment of short course in Abeokuta, Ogun State, Nigeria. Nature and Science 10: 10-14.
13. Nwobu GO, Okodua MA, Tatfeng YM (2004) Comparative study of HIV associated pulmonary tuberculosis in chest clinics from two regions of Edo state, Nigeria. Online J Health Allied Scs 3: 4.
14. Akpaka PE, Tulloch-Reid M, Justiz-Vaillant A, Smikle MF (2006) Prevalence of human immunodeficiency virus infection in patients with pulmonary tuberculosis at the National Chest Hospital in Jamaica. Rev Panam Salud Publication 19: 38–43.

15. Diwan VK, Thorson A (1999) Sex and gender and tuberculosis. Lancet 353: 1000-1001.
16. Thorson A, Hoa NP, Long NH (2000) Health-seeking behaviour of individuals with a cough for more than 3 weeks. Lancet 356: 1823-24.
17. Azuonwu O, Nnenna I, Uwuma OE (2017) Evaluation of haematological profile of geriatric subjects in port Harcourt metropolis of Niger Delta of Nigeria. J Clin Lab Med 2: 111.
18. Azuonwu O, Nnenna I, Douglass AS, Ntaa NB (2016) Consequences of haemolytic disease of the fetus and newborn (HDFN) and the clinical significance of antibody screening in prenatal diagnosis: A study of multigravidal and primigravidal women in Port Harcourt, Niger Delta. J Clin Lab Med 1: 106.