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Incidence Of Tuberculosis Among Individuals Aged 15-64 In Urban Area

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ABSTRACT

Tuberculosis (TB) remains a significant global public health challenge, with millions of new cases and deaths reported annually. This study aims to examine the prevalence and major causes of tuberculosis, focusing on the socio-economic, environmental, and biological factors that contribute to its spread. A systematic review of recent epidemiological data from high and low-burden countries was conducted, highlighting the role of factors such as HIV co-infection, malnutrition, overcrowding, and inadequate healthcare infrastructure in facilitating TB transmission. Additionally, the study explores the impact of drug-resistant strains, particularly multi-drug-resistant tuberculosis (MDR-TB), and the barriers to timely diagnosis and treatment. Understanding these factors is crucial for developing targeted strategies to control and ultimately eradicate tuberculosis. The findings underscore the need for enhanced public health interventions, improved diagnostic tools, and better access to healthcare, particularly in high-risk communities. The paper concludes by emphasizing the importance of a multi-faceted approach to address the complex causes of TB and reduce its global burden.

Keywords: *Tuberculosis, prevalence, causes, socio-economic factors, drug-resistant tuberculosis, public health interventions, global health.*

1. INTRODUCTION

Tuberculosis (TB) remains a major cause of illness and death globally. According to World Health Organization (WHO) estimates, in 2017, approximately 10 million people were affected by TB, and nearly 1.3 million lives were lost to the disease worldwide [1]. However, over a third of the estimated TB cases are not detected or reported, fueling the TB epidemic by significantly contributing to transmission within communities [1]. More accurate assessments of the TB burden at the national level are necessary to design and implement evidence-based policies, ultimately supporting the WHO End TB Strategy, which aims to reduce TB mortality and incidence by 95% and 90%, respectively, compared to 2015 levels [2]. In Vietnam, TB surveillance is conducted through a web-based system, which has been in place since 2009 and used by TB personnel nationwide from the district to national levels since 2015 [3]. Despite this, a considerable number of TB patients remain undiagnosed and unreported, posing a significant risk for further transmission [4]. Therefore, national TB prevalence surveys are crucial, as they provide more accurate estimates of TB prevalence than notification data alone [5]. Vietnam conducted its first national TB prevalence survey in 2006–2007 to assess the TB situation in the country. This survey, which used traditional screening methods and diagnostics to detect TB cases, found a prevalence of bacteriologically confirmed pulmonary TB in adults at 307 per 100,000 population [4]. The Vietnam National TB Programme (NTP) has implemented a range of interventions to reduce TB burden, including household contact investigations, TB preventive treatment, new TB medications and diagnostics, active case finding, and strengthening routine TB care and treatment [6], [7]. In 2017, the Vietnam NTP conducted the second national TB prevalence survey, aiming to evaluate the current TB burden and inform future actions to meet the End TB targets by 2035, using advanced TB diagnostics [2].

2. MATERIAL AND METHODS

SAMPLE SIZE

A study will be conducted on a random sample of 1250. Sputum specimen, with 100 identified as Tuberculosis. The 100 sample will be studied at the Microbiology lab of School of health sciences CSJMU Kanpur, and GSVM Medical College Kanpur.

DURATION OF STUDY

This study was done in duration of 6 months.

STUDY PLACE

Study were conducted at the school of health sciences CSJMU Kanpur in collaboration with the department of microbiology GSVM Medical College Kanpur.

STUDY DESIGN

Cross-sectional study subjects. All cases sputum sample has been sent to the department of microbiology school of health sciences CSJMU Kanpur and GSVM Medical College Kanpur for complete TB investigation .

DATA COLLECTION, SAMPLING COLLECTION AND STORAGE

From age between 15-64 years male and female enrolled in the study. information regarding age, occupation, education they were collected. Morning sputum were collected from each patient and placed in sterilized container for TB investigation for smear preparation and ZN staining.

GENERAL LABORATORY EQUIPMENT-

S.NO	INSTRUMENT
1.	REFRIGENERATOR
2.	MICROSCOPE
3.	GLASS SLIDE
4.	LOOP WIRE
5.	BIOSAFETY CABINATE
6.	BUNSEN BURNER
7.	ZIEHL NEELSEN STAIN (ZN STAIN)

3. INVESTIGATION

1. Smear Preparation:

Smear Making:

A small drop of the sputum sample is placed in the center of a clean glass microscope slide. Using another slide, the sputum drop is spread evenly by placing one slide at a 30–45° angle to the first slide and drawing it along the surface of the first slide. This creates a thin, even smear. The smear should ideally cover about one-third of the slide.The smear is allowed to air dry completely to prevent distortion of the sample**.**

2. Fixation:

The dried smear is then heat-fixed. This is done by briefly passing the slide over a flame or using a slide warmer to kill the bacteria and make the sample adhere to the slide.Heat fixation ensures that the bacteria don't wash off during the staining process.

3. Staining (Ziehl-Neelsen Staining):

Carbol Fuchsin Staining: The smear is stained with carbol fuchsin (a red dye) by placing a few drops of the dye on the smear. The slide is heated gently to help the dye penetrate the cell walls of the bacteria.

Decolorization: After staining, the slide is washed with acid-alcohol (a mixture of hydrochloric acid and ethanol) to remove excess dye from non-acid-fast bacteria. This step is critical, as it differentiates acid-fast bacilli from other bacteria.

Counterstaining: The slide is then stained with methylene blue or another counterstain to stain the non-acid-fast bacteria. This step makes the non-acid-fast bacteria appear blue under the microscope.

4. Examination Under the Microscope:

The smear is examined under a microscope, typically using the oil immersion lens (100x magnification).

A positive result is indicated by the presence of red-stained acid-fast bacilli (AFB) under the microscope.

4. RESULT

*On the basic of occupation-

Occupation	Tuberculosis Percentage
Students	23.2%
Employed	25.3%
Unemployed	51.4%

*On the basis of Age group-

Age	Number of patient	In Percent
15-24	8	8.0%
25-34	14	14.0%
35-44	17	17.0%
45-54	25	25.0%
55-64	36	36.0%

5. FACTOR ASSOCIATED WITH ANEMIA

In the ultimate logistic regression model, the prevalence of tuberculosis was observed to be greater among those who were unemployed compared to students and individuals who were employed..

6. DISCUSSION

This study focused on assessing the prevalence of tuberculosis among urban residents, revealing an overall prevalence of 8%. This underscores the significance of tuberculosis as a substantial public health concern in the examined region. the most affected are unemployed people 51.4% student are 23.2% and employed are 25.3% in study area.

7. CONCLUSION

his study provides significant insights into the ongoing challenges of tuberculosis (TB) diagnosis, treatment, and prevention, emphasizing the importance of early detection, accurate diagnostic methods, and effective treatment regimens. Our findings indicate that despite the availability of diagnostic tools such as sputum smear microscopy , there remain significant barriers to early diagnosis, particularly in resource-limited settings. Moreover, the emergence of drug-resistant TB strains further complicates treatment and control efforts. Our research highlights the critical need for continued advancements in TB diagnostics, including the development of more rapid, sensitive, and affordable tests that can be deployed in low-resource environments. Additionally, the findings underscore the importance of improving adherence to treatment protocols to reduce the risk of drug resistance and relapse. Public health strategies should focus on enhancing awareness of TB symptoms, expanding access to diagnostic services, and ensuring timely treatment initiation. There is also a need for stronger global cooperation and investment in TB control programs, particularly in high-burden countries. Future research should aim to explore novel therapeutic approaches, including new drugs and vaccines, to combat TB more effectively. Additionally, exploring the role of social determinants of health, such as poverty, malnutrition, and access to healthcare, will be essential for comprehensive TB control strategies. In conclusion, while significant progress has been made in the fight against TB, continued research and global collaboration are essential to eliminate this preventable disease and achieve the goal of a TB-free world.

8. ACKNOWLEDGEMENT

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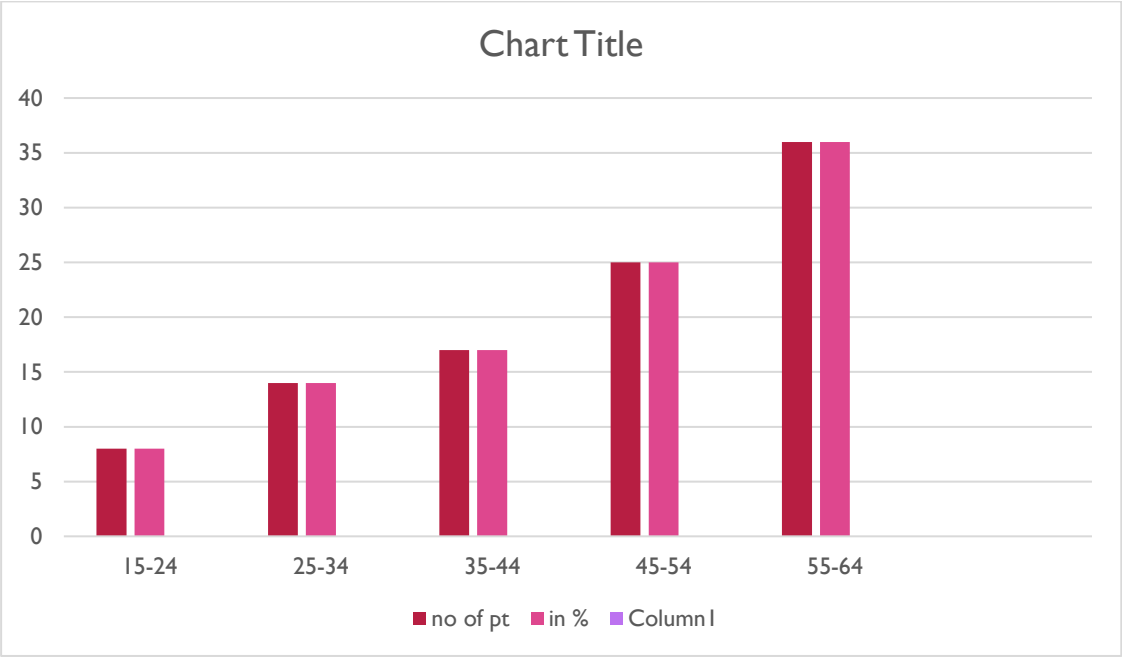
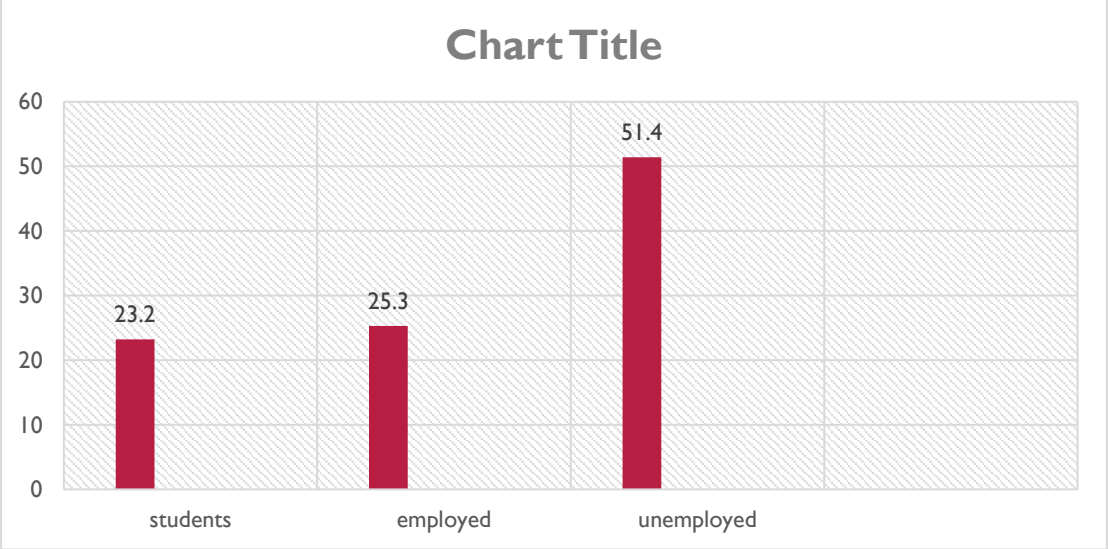
TOTAL NUMBER OF TUBERCULOSIS PATIENT =100

According to age group.



According to their occupation.

NUMBER OF TUBERCULOSIS PATIENT = 100



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