Project On

Survey on the causes and management of Tuberculosis patient's in shaymoli, Dhaka

Submitted To

The Department of Pharmacy,

Faculty of Allied Health Sciences,

Daffodil International University

In the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy

Submitted By

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APPROVAL

This project A survey on Tuberculosis, submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

BOARD OF EXAMINERS

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Abstract

One of the oldest human illnesses is tuberculosis (TB), for which there is molecular evidence dating back more than 17,000 years. Unfortunately, TB is still one of the top 10 infectious illnesses that kill people globally, second only to HIV, despite advances in detection and treatment. The World Health Organization (WHO) claims that TB is an international epidemic. In this survey, I want to find out what people think about tuberculosis and how it affects their health and happiness. That was completely a cross-sectional study and the target population was asked to respond those questions. The questionnaire starts with a review and 20 questions that are right on target. There are 121 people between the ages of 20 andover 40 who want to take part in this study. Nearly 40% of respondents to this study believe that TB may travel via the air from one person to another, 25% believe that it can spread by respiratorydroplets, and 35% believe that it can transmit through either of these channels. This study will aidin understanding the state of the TB epidemic in Shaymoli, Dhaka, Bangladesh.

Key words: Tuberculosis, Drug, Diseases, Antibiotic, Isoniazid.

DECLARATION

I, at this moment, announce that I am carrying out this project study under the supervision of "Dr.Md. Sarowar Hossain," Associate Professor, Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, Impartial Compliance with the Bachelor of PharmacyDegree Requirement (B. Pharm). This project, I declare, is my original work. I also state that neither this project nor any part thereof has been submitted for the Bachelor's award or any degreeelsewhere.

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I am also grateful to my research supervisor **Dr. Md. Sarowar Hossain,** Associate Professor, Department of Pharmacy, Daffodil International University. I am incredibly thankful and indebted to him for sharing his expertise and sincere and valuable guidance and encouragement extended to me.

I take this opportunity to thank all Department faculty members for their help and support. I also thank my parents for their unceasing encouragement, support, and attention.

I also place on record my sense of gratitude to one and all who directly or indirectly have put their hand in this venture.

Author

Nusrat Jahan Monisha

DEDICATION

I dedicate this work to my parents and my teachers and my friends.

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Chapter one: Introduction

1.1. Tuberculosis

The infectious illness known as tuberculosis (TB) is caused by a bacterium known as Mycobacterium tuberculosis, abbreviated MTB. Despite the fact that TB most often manifests in the lungs, the disease may manifest in any part of the body. When an infection has not yet produced any symptoms, medical professionals speak of it as having latent tuberculosis. People who have latent infections have a mortality rate of around fifty percent if they are not treated, although only about ten percent of latent infections will develop into active illness. [1] Active TB is characterized by a number of symptoms, the most common of which are a persistent cough that produces bloody mucus, a high body temperature, increased nighttime sweating, and a lack of appetite. The disorder was historically referred to by that term because of the frequent loss of weight that occurs in conjunction with consumption. If an infection has moved to another organ, you may have a number of other symptoms [2]. When a person who has active tuberculosis in their lungs coughs, sneezes, speaks, or spits, they have the potential to spread the illness to others. [3]

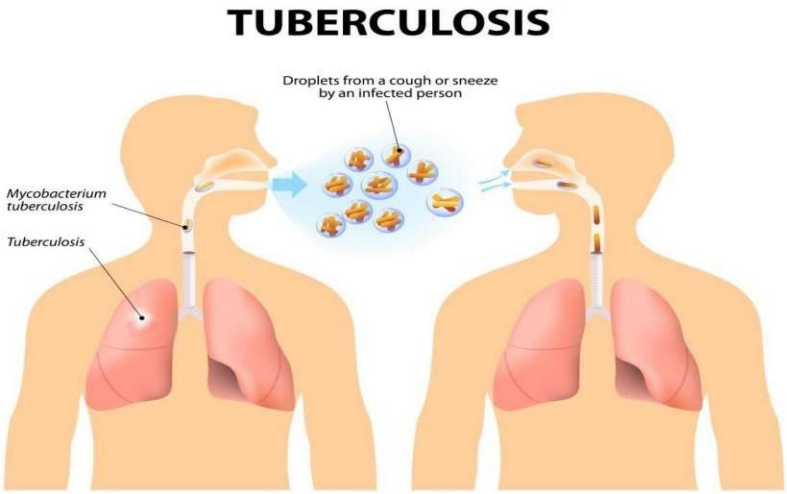


Fig 01: Tuberculosis (TB) [71]

There is no risk of contracting latent tuberculosis (TB) [4] from another individual. Smokers and HIV/AIDS patients who are already infected have an increased chance of becoming actively infected. Active tuberculosis may be diagnosed with the use of chest X-rays, a microscopic inspection, and the culture of body secretions. A tuberculin skin test, also known as a TST, or blood tests may be used to identify latent tuberculosis infection (also known as LTBI) [5]. The bacillus Calmette-Guérin (BCG) vaccination is one of the most essential methods for avoiding TB, along with screening for high-risk persons, early diagnosis, and treatment of cases. Those who come into contact with a person who has tuberculosis, whether at home or at work, are at an increased risk of developing the illness themselves. In order to obtain any level of efficacy in the therapy, many antibiotics must be taken for a significant amount of time throughout a period of time. There has been an increase in the number of cases of tuberculosis that are resistant to several drugs, which brings with it the risk of antibiotic resistance (MDR-TB). It was projected that twenty-five percent of the world's population had a latent case of TB in the year 2018.According to , each year around one percent of the population becomes sick for the first time. The World Health Organization (WHO) estimates that there will be 10 million cases of active tuberculosis diagnosed in the year 2020. This is expected to result in an estimated 1.5 million deaths, making tuberculosis the second deadliest infectious disease in the world in the year 2020, behind only COVID-19.[6] In 2018, more than half of all cases of tuberculosis were identified in only seven countries: India (27%), China (9%), Indonesia (8%), the Philippines (6%), Pakistan (6%), Nigeria (4%) and Bangladesh (4%).[7] These areas accounted for 44 percent of the world's total tuberculosis cases. [8] The yearly rate of reduction in the number of new cases was around 2% by the year 2021. The tuberculin test has a substantially greater percentage of positive in numerous Asian and African countries, at approximately 80%, than it does in the United States, at around 5-

10%. This is due to the fact that tuberculosis is more prevalent in certain parts of the world. [9] Since the beginning of time, infectious TB has been a problem for humans. [10]

1.1.1. Mycobacterium tuberculosis

Mycobacterium tuberculosis, also known as M. tuberculosis, is a type of dangerous bacteria that belongs to the family Mycobacteriaceae. It is responsible for the development of TB. [11-12] M. tuberculosis possesses a peculiar waxy coating on its cell surface, which is principally caused by the presence of mycolic acid. Robert Koch was the one who found it for the first time in 1882. Because of this coating, the cells are resistant to Gram staining; as a consequence, M. tuberculosis might give the impression of being weakly Gram-positive. [13] Instead of using acid-fast stains like Ziehl–Neelsen, fluorescent stains like auramine are used while using a microscope to detect M. tuberculosis. M. tuberculosis is characterized by its highly aerobic physiology, which necessitates the presence of significant amounts of oxygen. Its primary target is the respiratory system of mammalian hosts, namely the lungs, which it infects. The tuberculin skin test, acid-fast stain, culture, and polymerase chain reaction are the types of diagnostic procedures that are used the most commonly while attempting to identify TB. [14] In 1998, the genome of M. tuberculosis was successfully sequenced. [15]

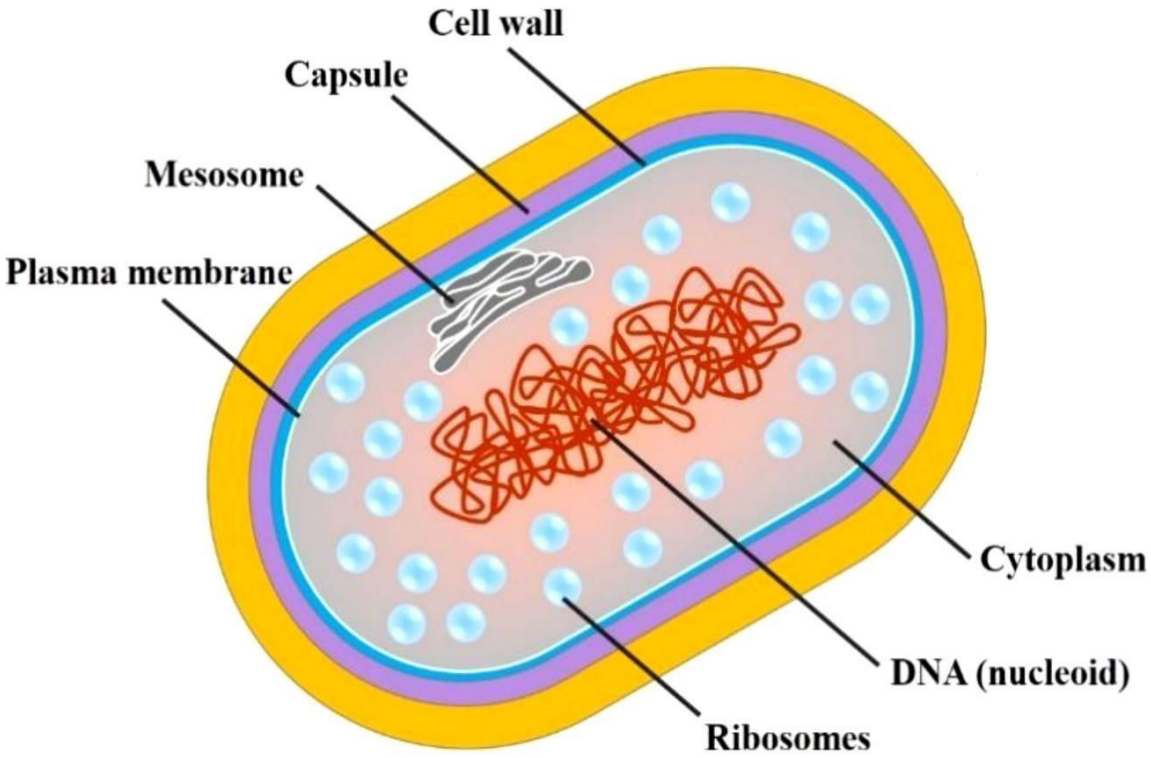


Fig 02: Mycobacterium tuberculosis [72]

1.2. History

Tuberculosis has been a problem for humans since since the disease was first discovered. The earliest unmistakable M. tuberculosis were identified in bison bones from Wyoming that were dated to roughly 17,000 years ago. The evidence presented here confirms the presence of the disease. At this time, it is unclear if human tuberculosis evolved from a disease that originated in bovines or vice versa. [16] A comparison of M. tuberculosis complex (MTBC) genes in humans and MTBC genes in animals disproves the long-held theory that humans contracted MTBC from animals during the domestication of these species. Since both strains of tuberculosis bacteria originate from a common ancestor, the illness may have affected humans as far back as the Neolithic period.Egyptian mummies dating back to between 3000 and 2400 BC have shown tubercular degeneration in their spines, according to researchers. Tuberculosis was present in the

bodies of certain ancient people as far back as 4000 BC, as shown by their skeletons. [17-18] Genetic studies indicate that TB existed in the Americas by the year 100 AD. [19-20]

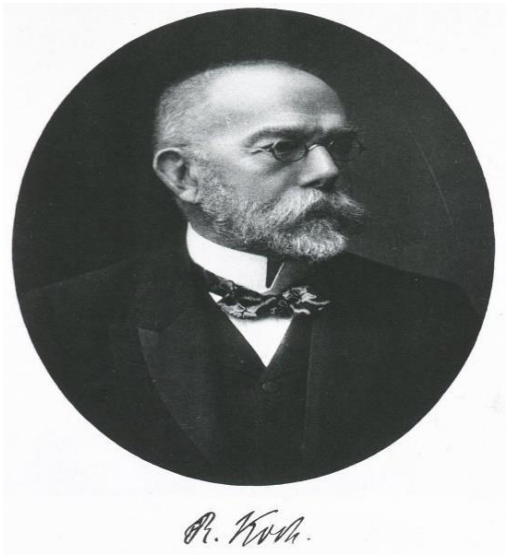


Fig 03: Robert Koch [73]

Before the Industrial Revolution, many assumed vampires transmitted TB. After a sick relative died, others' health plummeted.[21] The TB patient was considered fatigued. Richard Morton reported pulmonary TB in 1689, but it wasn't recognized until 1820s. Variable symptoms. Benjamin Marten said tight quarters spread cholera around 1720. 1819, René Laennec hypothesized tuberculosis caused pulmonary TB. 1832: [22-25] Schonlein published "tuberculosis." John Croghan, proprietor of Mammoth Cave from 1839 to 1845, felt the cave's constant temperature and pure air would cure TB. After caving, they all perished. First TB hospital founded in 1859 by Hermann Brehmer. In 1865, Jean Antoine Villemin injected TB. John Burdon-Sanderson later corroborated Villemin's results. [26] Robert Koch discovers TB in 1882. Physiology or Medicine Nobel since 1905. Koch believed cattle and human TB were distinct, therefore tainted milk wasn't identified as a vector. Early 1900s pasteurization hampered this

source's spread. 1890: Koch advocated a TB glycerine "cure." Tuberculin. It's a reliable presymptomatic TB test. [27-30] TB Day recognizes Koch's discovery. 1906 saw the first TB vaccination from Calmette and Guérin. Infected animals used. BCG (BCG). First administered in France in 1921[31], the BCG vaccination wasn't extensively employed in the U.S., U.K., and Germany until after World War II. In the 19th and 20th centuries, TB was rampant among the poor. One in four Britons died of "consumption" in 1815. 1918 TB killed 1/6 Frenchmen. In the 1880s, Britain tried to ban public spitting and "encouraged" the poor to enter jail-like sanatoria.[32] Once TB was found, this happened (the sanatoria for the middle and upper classes offered excellent care and constant medical attention). Despite "clean air" and hard work, half of sanatoria patients perished within five years (c. 1916). The Medical Research Council was created in 1913 to study TB. 18th-century TB killed 25% of Europeans. In the 18th and 19th centuries, tuberculosis swept Europe. [33-34] In the 1950s, Europe's death rate fell 90%. Cleanliness, vaccination, and other public health measures decreased TB before streptomycin. Persistent sickness Streptomycin made treating TB possible in 1946. Before this medicine, the only TB therapy was surgery (pneumothorax). Therapy. MDR-TB requires surgery for some. Bullae removal minimizes microbial burden and enhances antibiotic effectiveness. Drug-resistant strains thwarted 1980s TB eradication efforts. WHO proclaimed a worldwide TB emergency in 1993.[35]

1.3. Pathogenesis

About 90% of those infected with Mycobacterium tuberculosis [36] develop LTBI, or latent tuberculosis infection. On the other hand, the likelihood of a latent infection becoming an active case of TB throughout a person's lifetime is just 10%. [37] There is an annual rise of around 10% in the risk of developing active TB among HIV-positive people. The death rate for a patient with active TB might be as high as 66% if they are not treated.The initial stage in the development of

tuberculosis (TB) begins when mycobacteria infiltrate and replicate within the endosomes of alveolar macrophages. This happens when mycobacteria invade the alveolar air sacs of the lungs. [38-39] After determining that the bacterium is foreign to their environment, macrophages resort to phagocytosis to eliminate it. In this phase, the macrophage takes in the bacterium and stores it temporarily in a vesicle called a phagosome, which is covered by a membrane. Once thisoccurs, a lysosome will join the phagosome to create a phagolysosome. The phagolysosome is where the cell employs both acid and reactive oxygen species in an attempt to kill off any lingeringbacteria. However, M. tuberculosis is protected from these substances by its thick and waxy mycolic acid capsule. Once within the macrophage, M. tuberculosis may replicate, eventually leading to the death of the immune cell.Both the top section of the lower lobe and the lower half of the upper lobe may serve as the Ghon focus, the primary location of infection in the lungs. You'll find both of them in the lower lobe's upper region.Another possible cause of TB in the lungsis a systemic infection . The upper lobes of the lungs are a common place to find a kind of lung nodule called a Simon focus. [40] Illnesses spread by this route have the potential to reach far- flung organs and tissues including the kidneys, brain, and bones. The infection may also spread tothe lymph nodes in the body's periphery. However, for reasons that are not well understood, the condition most seldom occurs in the organs of the heart, skeletal muscles, pancreas, and thyroid. Common examples are TB and other granulomatous inflammatory diseases. The aggregation of infected cells, including macrophages, epithelioid cells, T lymphocytes, B lymphocytes, and fibroblasts, results in the formation of granulomas. A group of lymphocytes clusters around a group of macrophages. If a healthy macrophage attacks an infected macrophage in the alveolar lumen, the two cell types will ultimately fuse together to form a gigantic multinucleated cell. Thegranuloma has the potential to halt the spread of the mycobacteria and create a niche where

immune system cells may communicate with one another. [41] However, more recent studies have shown that the bacteria use the granulomas as a defense mechanism to evade the human immune system. Macrophages and dendritic cells are components of granulomas, however they are unable to provide antigen to the body's lymphocytes. Due to this, the immune system is slowed down. [42] A latent infection may develop from the dormant bacteria inside the granuloma. Necrosis, or the abnormal death of cells, often occurs in the center of granulomas when tubercles are present. Caseous necrosis, often known as a white cheese-like consistency, may be seen by the naked eye. It is possible for TB germs to spread throughout the body and create many foci of infection if they get access to the bloodstream via an area of damaged tissue. In the tissues, these infection hotspots appear as little white tubercles. Miliary tuberculosis (TB) is a severe form of the disease that disproportionately affects small children and HIV-positive adults. Disseminated TB has a death rate of around 30% even with treatment.Throughout their lives, many people will have intermittent infection. Many times, the destructive processes of necrosis and tissue degeneration may be balanced by the reparative processes of healing and fibrosis. All the spaces left by the afflicted tissue will be filled with scar tissue and caseous necrotic matter. Some of these spaces become connected to the breathing tubes (bronchi) while the disease is active, and the contents of these spaces may be coughed up. It might transmit the disease further since it contains live bacteria and viruses. After receiving therapy, the body will be free of the infectious microbes necessary for recovery. After the problem has been treated and the affected tissues have healed, scar tissue will replace them. [43]

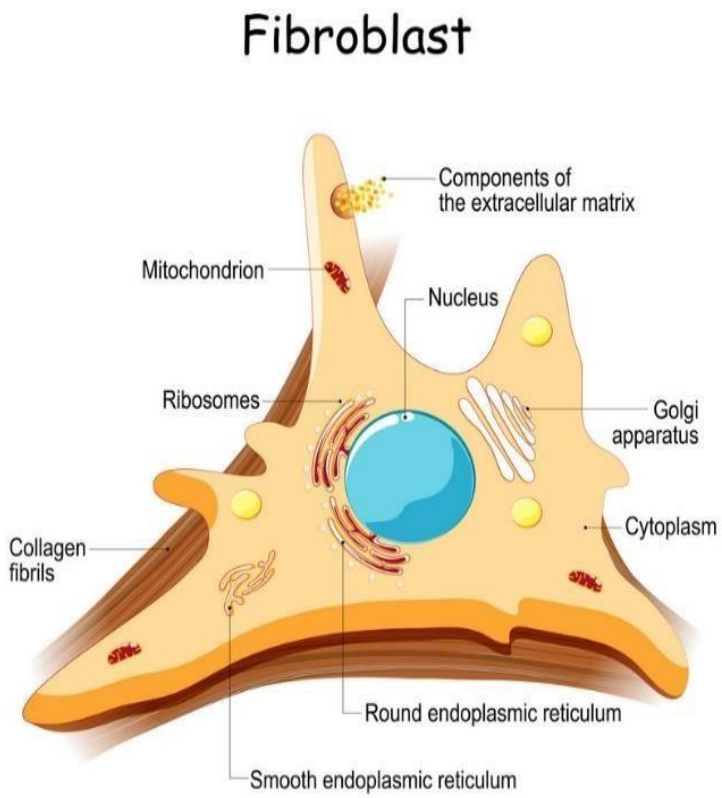


Fig 04: Fibroblasts [74]

1.4. Prognosis

After the bacilli have succeeded in evading the defenses of the immune system and have started to multiply, the infection will develop into a full-blown case of tuberculosis (TB). This is an early stage in the course of the main TB sickness, which accounts for around one percent to five percent of all cases. Nevertheless, asymptomatic latent infection is present in the majority of cases. In five to ten percent of these instances of latent tuberculosis, the dormant bacilli eventually become active and cause tuberculosis, usually several years after the initial infection.Those with weakened

immune systems, such as those infected with HIV, have an increased risk of experiencing reactivation. Ten percent of individuals who are infected with both M. tuberculosis and HIV are at risk of experiencing reactivation on a yearly basis. DNA fingerprinting of M. tuberculosis strainshas demonstrated that reinfection contributes substantially more to recurrent TB than was previously thought [44]. It is predicted that reinfection may be responsible for more than fifty percent of reactivated cases in locations where tuberculosis is prevalent.The mortality riskassociated with tuberculosis was around 4% in 2008, a significant decrease from 8% in 1995 [45].

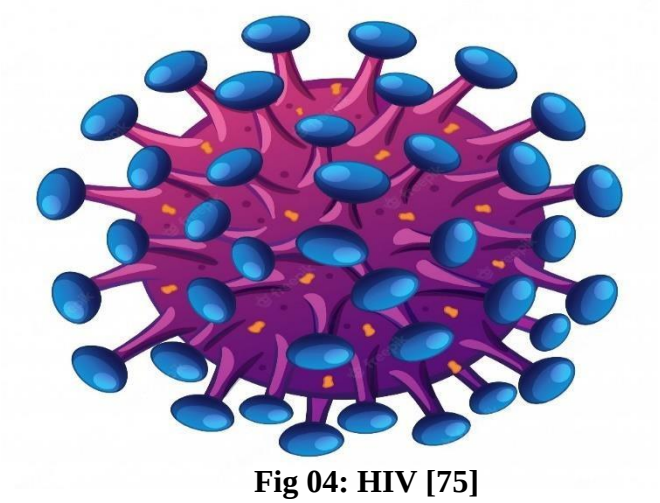


Fig 04: HIV [75]

20-25% of people with smear-positive pulmonary TB (without HIV co-infection) have their symptoms disappear on their own, whereas 50% - 65% of those who do not get therapy for their condition will pass away within 5 years (cure). It is well knowledge that tuberculosis (TB), when present in untreated HIV co-infected individuals, almost inevitably results in death. It is also well known that mortality rates remain elevated even after HIV infection is treated with antiretroviral medication. [46]

1.5. Symptoms of TB

General symptoms of TB

- Lack of appetite and weight loss
- The presence of a high temperature
- Persistent perspiration throughout the night
- A state of great exhaustion
- The presence of these symptoms is not always indicative of tuberculosis, since there are many other conditions that might cause them.[47]

Lung-affecting tuberculosis (pulmonary TB)

The lung is the most common site of TB infection, which may lead to:

- Prolonged coughing for more than three weeks, sometimes accompanied by the production of phlegm that may be bloody
- Progressive shortness of breath[48]

TB outside the lungs

Outside of the lungs, TB infections may manifest in the lymph nodes (tiny glands that are part of the immune system), bones and joints, the digestive system, the bladder and reproductive system, the brain and nerves, and sometimes elsewhere (the nervous system).

There may be a variety of symptoms, such as:

- Continually swollen glands
- Suffering from stomach ache

- Discomfort and immobility due to damage to a bone or joint
- Confusion
- Headache that won't go away
- Fits (seizures) (seizures)

People with compromised immune systems are more likely to get TB that has spread to other regions of the body.[49-50]

1.6. Tuberculosis Risk Factors

If you fit any of these categories, you may have a higher risk of contracting tuberculosis :

- Active tuberculosis has been diagnosed in the company of a friend, coworker, or family member.
- You are a resident of or recent visitor to a country or region where tuberculosis is endemic, such as Russia, Africa, Eastern Europe, Asia, Latin America, or the Caribbean.
- You work or live with someone who is tuberculous-prone, or you belong to a high-risk group yourself. Everyone who lives on the streets, has HIV, is incarcerated, or injects drugs falls under this category.
- You're a healthcare worker or nursing home inhabitant.
- You provide care for those who are at high risk for tuberculosis.
- You've admitted that you smoke cigarettes.[51]

The TB germs are no match for a strong immune system. However, if you have the following, you may not be able to fight against active TB disease:

- Sickness caused by HIV or AIDS

- Diabetes
- Kidney failure, severe
- Disorders of the head and neck
- Methods of treating cancer include chemotherapy
- Subpar nutrition and a lack of calories cause a low body weight.
- Pharmaceuticals used in organ transplants
- Drugs used to treat psoriasis, Crohn's disease, and rheumatoid arthritis

Due to immature immune systems, infants and young children also have a greater risk of contracting the disease.[52]

1.7. Tuberculosis Tests and Diagnosis

There are generally two types of tests that are used to diagnose tuberculosis:

Skin test. The Mantoux tuberculin skin test is another name for this particular examination. A technician will puncture the skin of your lower arm with a needle and inject a very little quantity of fluid. After two or three days, they will examine your arm to look for any signs of swelling. In the event that your test results are positive, tuberculosis germs are likely present in your body. On the other hand, a false positive is also a possibility. If you have received a tuberculosis vaccination known as bacillus Calmette-Guerin (BCG), the test may indicate that you have tuberculosis even if you do not in fact have the disease. If you have a very recent infection, the test results can give you a false negative, which would imply that you do not have tuberculosis when in fact you have. It's possible that you'll have to take this exam more than once.[53]

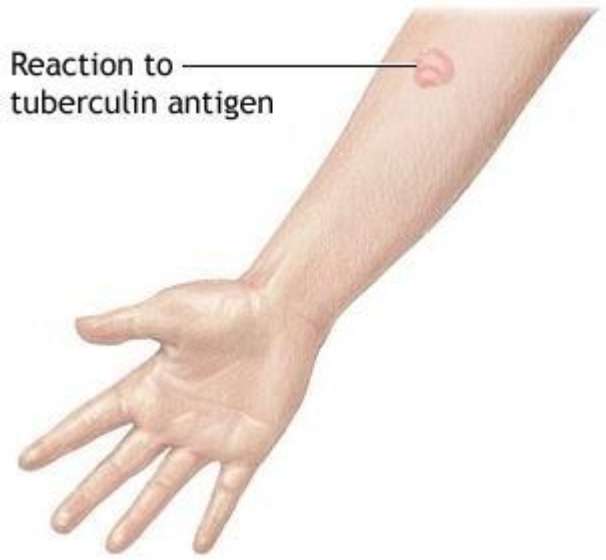


Fig 06 : Tuberculin skin test [76]

Blood test. These tests, which are also known as interferon-gamma release assays (IGRAs), examine the reaction that occurs when a little quantity of your blood is combined with proteins that are associated with tuberculosis.These tests are unable to determine if your infection is dormant or active in your body. If either your skin test or your blood test comes back positive, your doctor will be able to determine which kind of HIV you have by doing the following tests:

- ✓ An x-ray of your chest or a computed tomography scan to search for any abnormalities in your lungs
- ✓ The acid-fast bacillus, often known as AFB, is a test that looks for tuberculosis germs in your sputum, which is the mucus that is produced when you cough.[54-55]

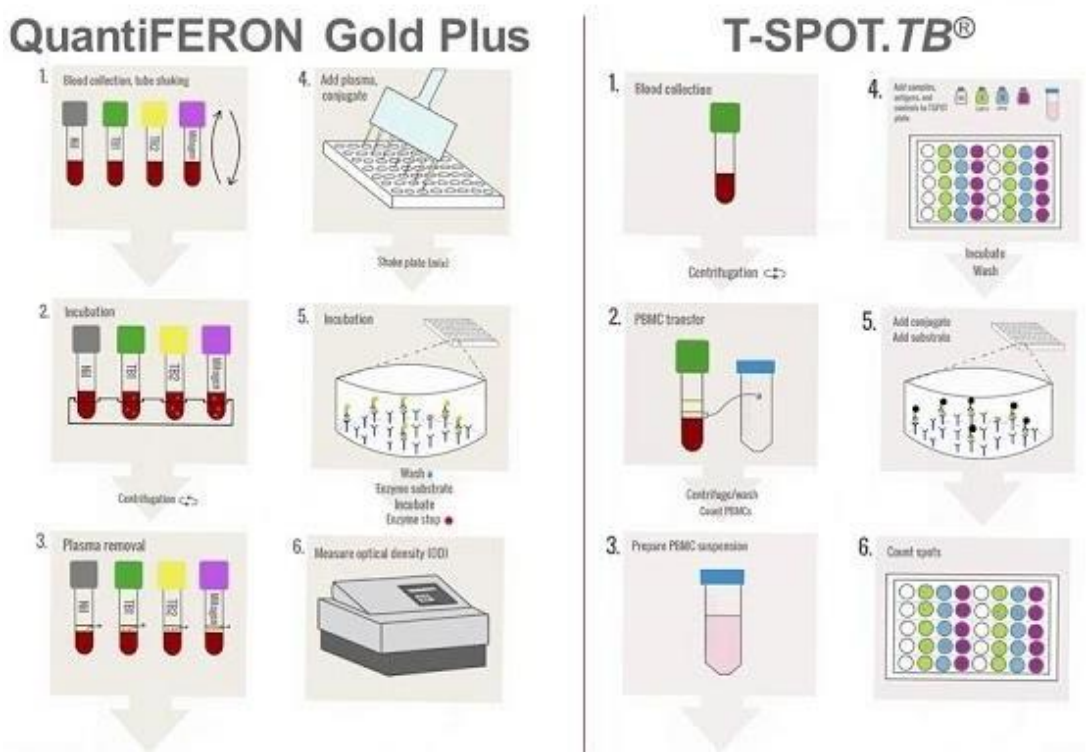


Fig 07: Interferon-gamma release assays [77]

1.8. Causes

Mycobacteria

Mycobacterium tuberculosis (MTB) is a tiny, aerobic, non-motile bacillus that is responsible for most cases of tuberculosis.Many of this pathogen's unusual clinical features may be traced back to its high fat content, as stated in .[56]Unlike other bacteria, which can replicate in about an hour, this one takes 16-20 hours to go through a generational cycle.Mycobacteria contain a lipid bilayer in their outer membrane.Due to the high lipid and mycolic acid content of its cell wall, MTB either stains extremely faintly "Gram-positive" or does not absorb dye if a Gram stain is done. In addition

to being resistant to mild disinfectants, MTB may also thrive in a dry condition for weeks. M. tuberculosis can only replicate inside the cells of a host organism in the wild, although it can be cultivated in the lab.Phlegm (also known as sputum) samples that have been expectorated are examined under a microscope for MTB using histology stains.[57] MTB is considered an acid-fast bacillus because to its ability to maintain specific stains after being subjected to an acidic solution. The Ziehl-Neelsen stain and the Kinyoun stain are the most widely used methods for staining acid-fast bacilli, and they both color the bacteria a vivid red that stands out against a blue background. Some other methods include fluorescence microscopy and aurumine-rhodamine staining.There are four more TB-causing mycobacteria that make up the M. tuberculosis complex (MTBC): M. bovis, M. africanum, M. canetti, and M. microti.Although M. africanum does not cause TB everywhere, it is a major problem in certain areas of Africa.[58]Pasteurized milk has almost eradicated M. bovis as a public health hazard in industrialized nations, where it was previously a common cause of TB Although a few instances of M. canetti have been reported among African immigrants, the disease is very uncommon and seems to be confined to the Horn of Africa.M. microti is similarly uncommon, affecting nearly exclusively those with compromised immune systems. However, its true frequency is probably much higher than previously thought.M. leprae, M. avium, and M. kansasii are some more examples of pathogenic mycobacteria. These latter two are examples of what are known as "nontuberculous mycobacteria," or NTM for short. The pulmonary disorders caused by NTM are not tuberculosis or leprosy, although they are quite similar to those diseases. [59]

Transmission

Active pulmonary TB patients expel infectious aerosol droplets with a diameter of 0.5 to 5.0 m whenever they cough, sneeze, speak, sing, or spit. These droplets may be spread from person to person via the air. One single sneeze is thought to release as much as 40,000 droplets of water, according to some estimates. [60] Due of the low infectious dose associated with tuberculosis (TB), even a single droplet has the ability to transmit the disease (the inhalation of fewer than 10 bacteria may cause an infection). [61]

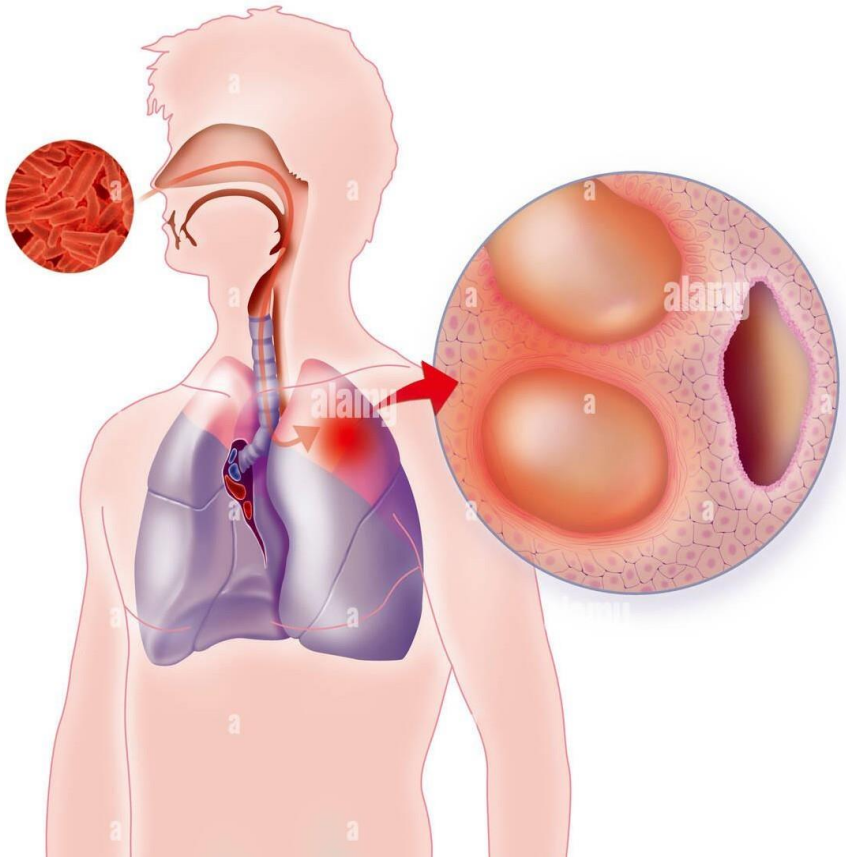


Fig 08: Pulmonary tuberculosis [78]

1.9. Prevention

Infant immunization programs and early diagnosis and treatment of current cases are essential to global efforts to reduce the spread of tuberculosis.Enhanced treatment protocols implemented by the World Health Organization (WHO) have resulted in a slight decline in overall case numbers. Legislation exists in several nations to involuntarily hold, evaluate, and treat TB suspects if they are found to be infected with the disease. [62]

Vaccines

Topics covered in detail here include: tuberculosis vaccinations, and the BCG vaccineAs of 2021, bacillus Calmette-Guérin is the sole vaccination on the market (BCG).This treatment reduces the risk of infection by 20% and the likelihood of infection progressing to active illness by approximately 60% in young people. More than 90 percent of the world's youngsters have been immunized thanks to this vaccine.After around 10 years, the immunity it provides is diminished. Due of the low prevalence of TB in the Western Hemisphere, BCG is usually only given to patients who are particularly at risk.There is concern that the vaccination might render the tuberculin skin test inaccurate.Several different vaccines are in the research and development stages. [16]To prevent TB, it is not necessary to get both the BCG injection and the intradermal MVA85A vaccination.[63]

Public health

To combat the spread of tuberculosis and other airborne diseases, public health campaigns in the 1800s targeted overcrowding, public spitting, and regular sanitation (including hand washing), all

of which, in conjunction with contact tracing, isolation, and treatment, led to the disease's virtual eradication in most developed economies.[64-65] Malnutrition and other risk factors that aided the spread of tuberculosis have been reduced, but with the advent of HIV, a new population of immunocompromised people has become accessible for TB to infect.In 1993, the WHO labeled tuberculosis a "global health emergency,"and in 2006, the Stop TB Partnership created a Global Plan to Stop Tuberculosis with the goal of saving 14 million lives between its introduction and 2015.[66] The rise of HIV-associated TB and the introduction of multidrug-resistant tuberculosis meant that many of the goals they set for 2015 were not met. The American Thoracic Society's TB categorization system is widely utilized by government agencies. [67] Its End TB Strategy aimed to cut TB-related fatalities by 95% by 2035, and TB incidence by 90%. Lack of fast diagnostics, short and efficient treatment periods, and entirely effective vaccinations all work against the objective of TB eradication. [68]The dangers and benefits of treating those exposed to MDR-TB with antitubercular medicines are not well understood.[69] In order to slow the development of tuberculosis among people living with HIV, it is essential that they have access to HAART treatment. [70]

1.10. Treatment

These medications are used to treat both TB infection and TB disease:

- ✓ Isoniazid (Hyzyd®).
- ✓ Rifampin, also known as Rifadin®.
- ✓ Ethambutol (Myambutol®).
- ✓ Pyrazinamide (Zinamide®).
- ✓ Rifapentine (Priftin®).

If you don't finish all of the medicine that your doctor has given you, there's a chance that not all of the germs will be eliminated. You will be required to continue taking these drugs for as long as your doctor instructs you to do so, which may be as long as nine months in certain cases.There have been reports of certain strains of tuberculosis developing resistance to treatment. It is extremely essential, and it is quite probable, that your healthcare professional will prescribe more than one medication to treat your tuberculosis. It is essential that you take all of the medication prescribed to you.

Complications/side effects of treatment

The medications that are used in the treatment of tuberculosis might have negative effects in certain patients, which may include the following:

- ✓ Rash and several other allergic responses.
- ✓ Symptoms include nausea as well as stomach discomfort.
- ✓ Dry and itchy skin.
- ✓ Yellow skin or eyes (jaundice).
- ✓ Dark urine.

Talk to your healthcare practitioner about any adverse effects you're having since some of them might indicate that your liver is being damaged.

Fig 09 : Rifampin & Isoniazid

Fig 10 : Pyrazinamide

Chapter two: Literature review

2.1. P. Sudre, G. ten Dam, and A. Kochi "Tuberculosis: a global overview of the situation today" Bull World Health Organ. 1992; 70(2): 149–159.

By examining case notifications to the WHO and tuberculosis mortality reports, the overall tuberculosis situation in the world in 1990 and its recent trends are examined. Simple epidemiological models were used to estimate the incidence of TB sickness and mortality as well as the prevalence of tuberculosis infection in 1990. A third of the world's population is thought to be infected with Mycobacterium tuberculosis. An average of 2.5 to 3.2 million cases were reported year worldwide during the previous ten years, with population increase offsetting a recent little decline in reporting rates. Around the globe, 8 million people were thought to have TB in 1990, and 2.6 to 2.9 million perished from it. The bulk of these incidents—both infections and fatalities—occurred in Asia, and an uptick in HIV-positive people was particularly noticeable in Africa. Data on TB cases reported by WHO Member States show the severity of the issue, but they should be evaluated cautiously. Due to their lower occurrence than anticipated, they highlight the shortcomings of programs designed to combat TB. This assessment supports the extremely serious worldwide scope of the TB issue and urges a rapid revival of global tuberculosis control initiatives.

2.2. Connolly M, Nunn P "Women and tuberculosis." World Health Statistics quarterly. Rapport Trimestriel de Statistiques Sanitaires Mondiales, 01 Jan 1996, 49(2):115- 119

The most common infectious killer of women globally is tuberculosis. The illness presents a serious danger to the well-being of women. It is certain that the burden of this illness on women would rise as a result of population expansion, the HIV pandemic, growing levels of poverty, and rising degrees of treatment resistance. During their reproductive years, women are more

susceptible to illness development. However, in the majority of low-income nations, there are twice as many males as women who are diagnosed with TB. The majority of this disparity may be explained by biological reasons, but socioeconomic and cultural variables that create obstacles to health care access may contribute to under-notification among women. To enable women to start and finish treatment, tuberculosis control programs should be considerate of the barriers that women confront in obtaining healthcare. Women are more often put in a difficult social and economic situation than males as a result of the fear and shame connected with TB. Women's tuberculosis causes orphans, weakens families, and slows down social and economic advancement. Women often experience and lose their lives to avoidable causes due to tuberculosis.

2.3. David G. Russell "Mycobacterium tuberculosis: here today, and here tomorrow" Nature Reviews Molecular Cell Biology volume 2, pages569–578 (2001)

A very effective pathogen that parasitizes its host's macrophages is Mycobacterium tuberculosis. Its success is directly attributable to its capacity to control the phagosome it lives in and to stop it from developing normally into an acidic, hydrolytic compartment. The interaction between the virus and its host cell indicates an ongoing struggle for control since the macrophage is crucial to eradicating the infection.

Chapter three: Purpose of the study

A bacterial illness called tuberculosis (TB) is acquired by breathing microscopic droplets from an infected person's cough or sneeze. It mostly affects the lungs, although it may also harm the stomach (abdomen), glands, bones, and neurological system. Although TB is a potentially dangerous infection, it is curable when treated with the appropriate drugs. My objectives are given bellow about this study

A) To see that how many peoples are affected by tuberculosis
B) To know the current medication of tuberculosis
C) To know which age of peoples are suffering with tuberculosis
D) To identify the symptoms of tuberculosis.

Chapter Four: Methodology

4.1. Introduction:

The questionnaire starts with a review and 20 questions that are right on target. There are 121 people between the ages of 20 and over 40 who want to take part in this study.

4.2. Research Design:

I'm doing this survey to find out what people think about tuberculosis and how it affects their health and happiness. That was completely a cross-sectional study and the questionnaires were created for the target population and they were asked to respond.

4.3. Method of Data Analysis:

After an assortment of information, all information was checked for precision and internal consistency to deny missing or clashing data, and those were discarded. Information investigation was done through Microsoft's dominant refreshed rendition.

4.4. Ethical Considerations

Before beginning the information assortment, educated verbal permission was taken from the investigation members. The obscurity of the respondents was kept private, and study subjects were educated that they could have the option to leave the program at any.

Survey Question

1. How old are you? A)10-21. B)21-30. C)30-40. D) Above 40 years.
2. Where is your location? A) Rural. B) Urban.
3. What is your marital status? A) Married. B) Unmarried.
4. Are you affect with TB? A) Yes. B) No.
5. Do you have any knowledge about TB? A) Yes. B) No.
6. What kind of symptoms have you faced? A) Weight loss. B) Night sweat. C)High temperature. D) Loss of Appetite. E) All of this.
7. Are you taking any medication now? A) Yes. B) No. C) Fully cured.
8. What kind of medication were given to you? A) Isoniazid. B) Rifampicin. C) Combined.
9. How does TB spread? A) Air from one person to another. B) Respiratory droplets. C) All of this.
10. Do you have recurrent TB infection? A) Yes. B) No.
11. Do you have any familiar affected with TB? A) Yes. B) No. C) Maybe.
12. Is TB bacteria or virus? A) Bacteria. B) Virus. C) No Idea.
13. How long have you had TB? A) Six months. B) Four months. C) One year.
14. Are there any social impact about TB? A) Yes. B) No.
15. Did you take routine medication to recover from TB? A) Regular medicine. B) Gap of medication.
16. Do you have any family history about TB? A) Yes. B) No.
17. Does TB genetically spread? A) Yes. B) No.
18. Does there any smoking effect on TB? A) Yes. B) No.

Chapter five: Result and Discussion

5. Result and Discussion

5.1. Age

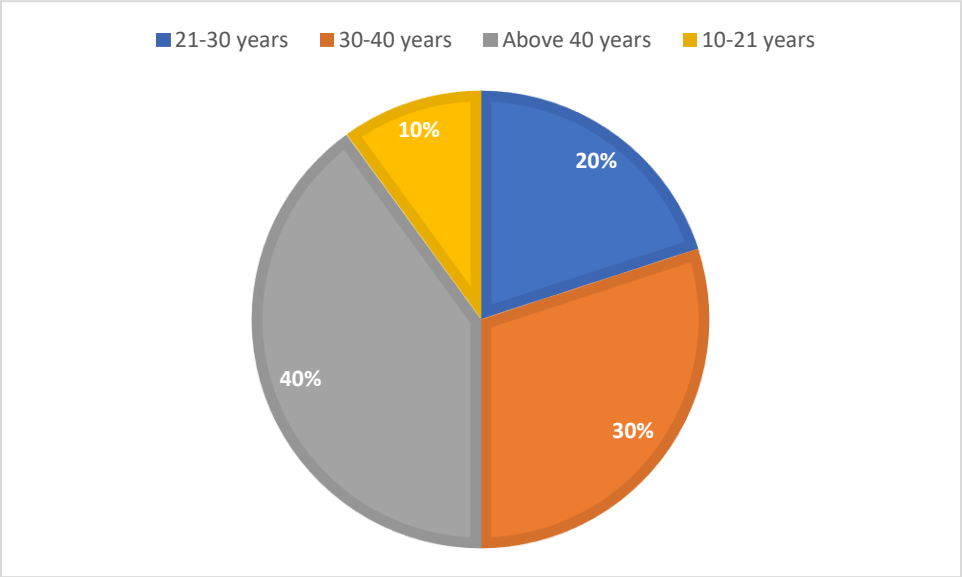
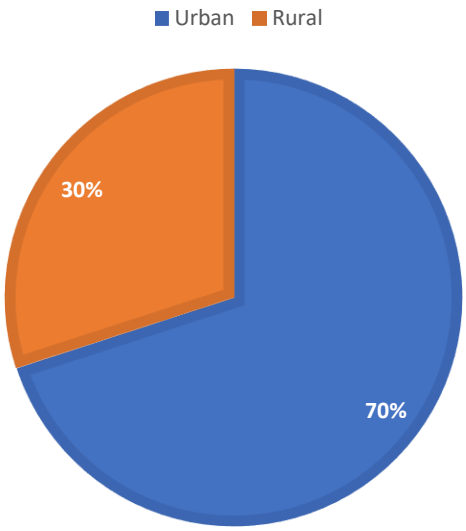


Fig 11: Age

According to this study, over 40% of respondents are over 40, 30% are in their 30 years or 40 , 20% are in their 21s or 30s, and 10% are between the ages of 10 and 21.

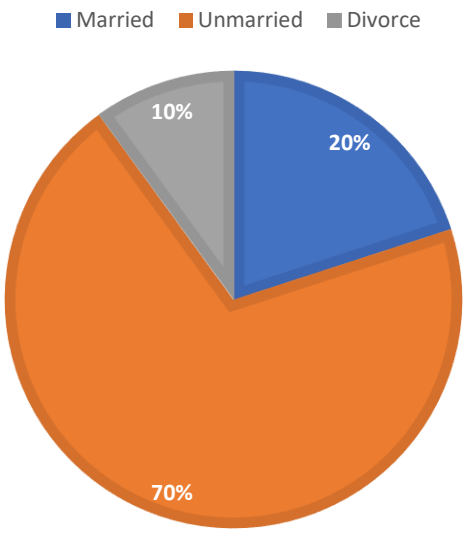
5.2. Location



Section 1.01 Fig 12: Location

The respondents of this survey about 70% lived in Urban area and 30% lived in rural area so, urban area respondents are significant than rural area.

5.3. Marital Status

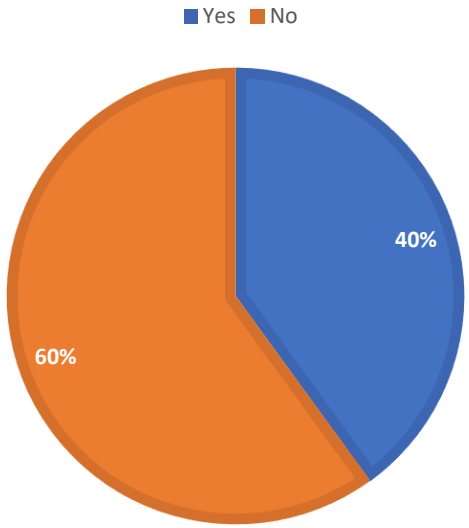


Section 1.02 Fig 13: Marital Status

According to this survey the respondents of this survey 10% respondents are divorced, 70% respondents are unmarried and 20 respondents are married.

5.4. Affect with tuberculosis

- **Are you affected with TB?**

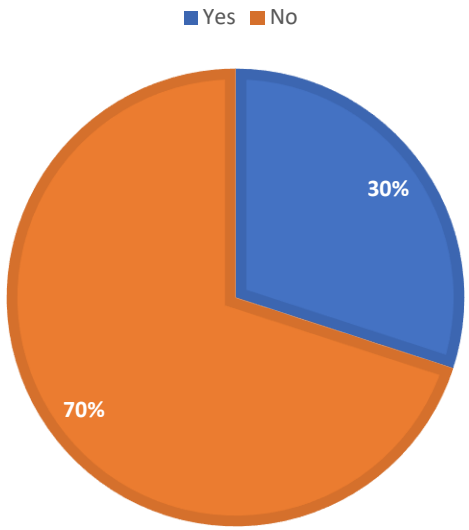


Section 1.03 Fig 14: Affect with tuberculosis

According to this survey total 40% respondents was affected with tuberculosis and 40% was not affected with tuberculosis

5.5. Knowledge About Tuberculosis

- **Do you have any knowledge about TB?**

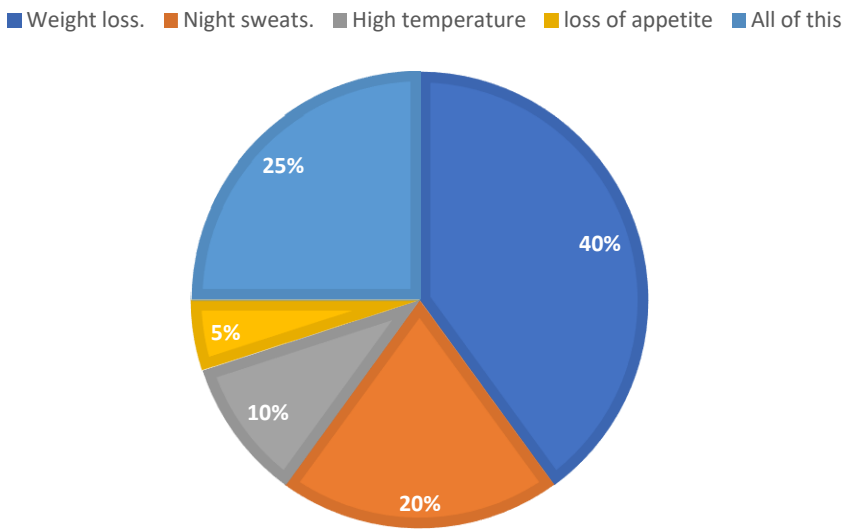


Section 1.04 Fig 15: Knowledge About Tuberculosis

According to this survey around 30% respondents has knowledge about tuberculosis and 70% has no idea about tuberculosis

5.6. Symptoms

- **What kind of symptoms have you faced??**

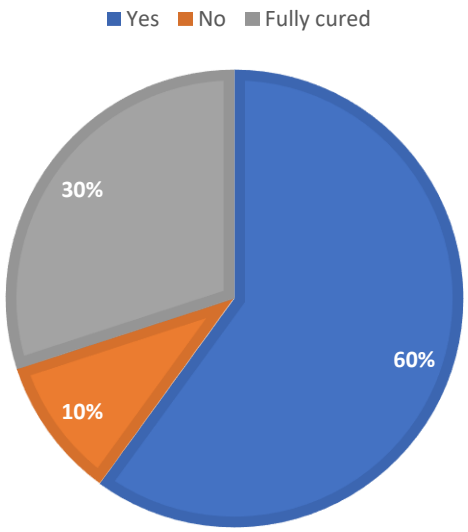


Section 1.05 Fig 16: Symptoms

According to this survey, about 40% of respondents reported weight loss, 20% reported night sweats, 10% reported high temperatures, 5% reported appetite loss, and 25% reported all of these symptoms.

5.7. Currently under medication

- **Are you taking any medication now?**

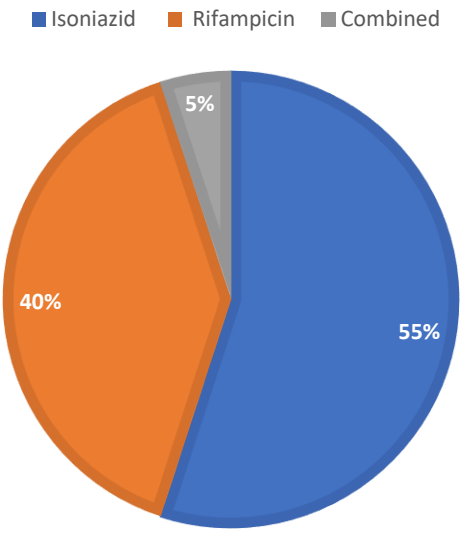


Section 1.06 Fig 17: Currently Medication

According to this survey, 30% of respondents are now completely healed after taking medicine, 10% of respondents are no longer taking medication because they are unable to afford it, and 60% of respondents are still taking medication.

5.8. Management

- **What kind of medication were given to you?**

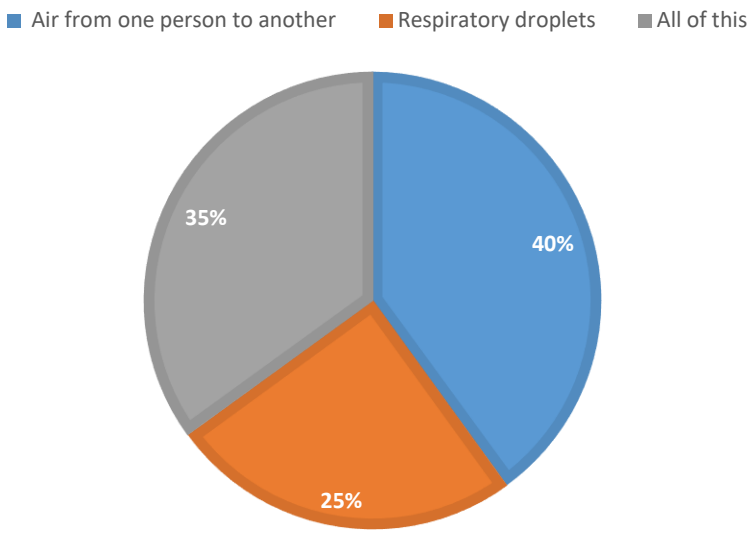


Section 1.07 Fig 18: Management

According to this poll, around 55% of respondents use isoniazid, 40% take rifampicin, and 5% take both of these medications together.

5.9. Tuberculosis Spread

- **How does TB spread?**

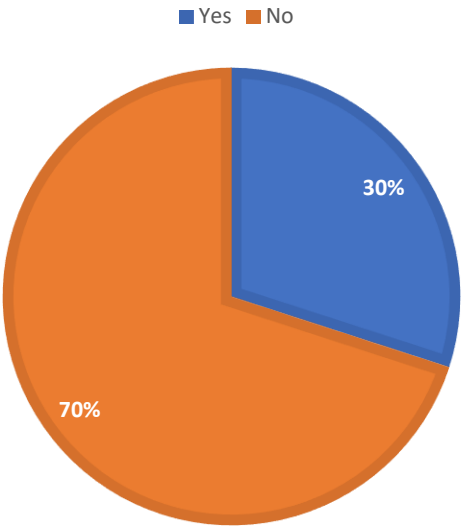


Section 1.08 Fig 19: Tuberculosis spread

According to this poll, almost 40% of respondents think TB may spread via the air from one person to another, 25% think it can spread by respiratory droplets, and 35% think it can spread through all of these means.

5.10. Recurrent TB infection

- **Do you have recurrent TB infection?**



Section 1.09 Fig 20: Recurrent TB infection

According to this survey 30% respondents has claimed about recurrent infection of tuberculosis and 70% respondents has no claimed about this

5.11. Familiar affected with TB

- **Do you have any familiar affect with TB?**

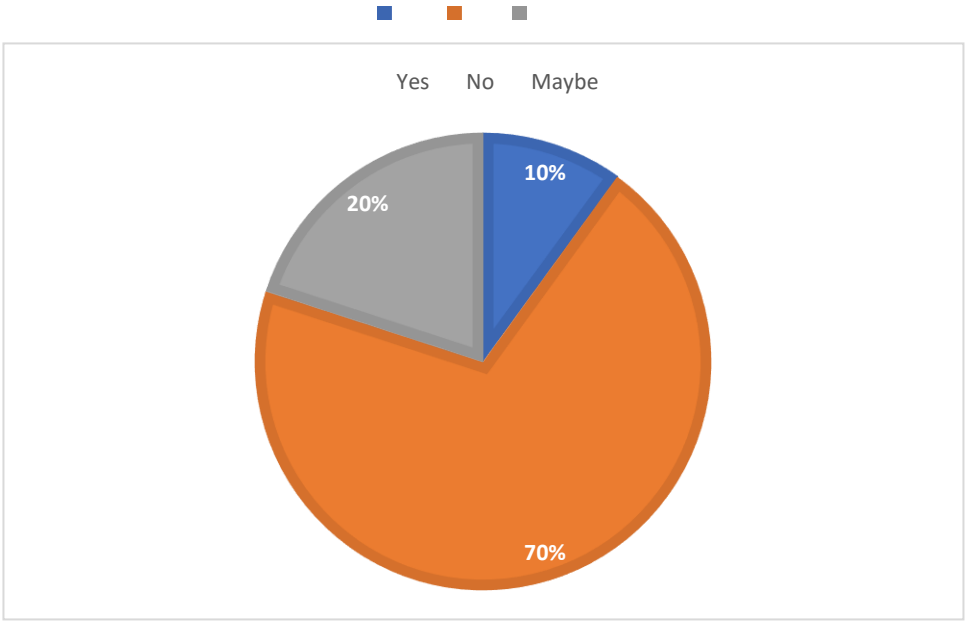


Fig 21: Familiar affected with TB

This poll indicates that roughly 10% of respondents are acquainted with someone who has TB, 20% are unsure, and 70% are not familiar with someone who has TB.

5.12. Is TB bacteria or Viruses

- **Is TB bacteria or Viruses?**

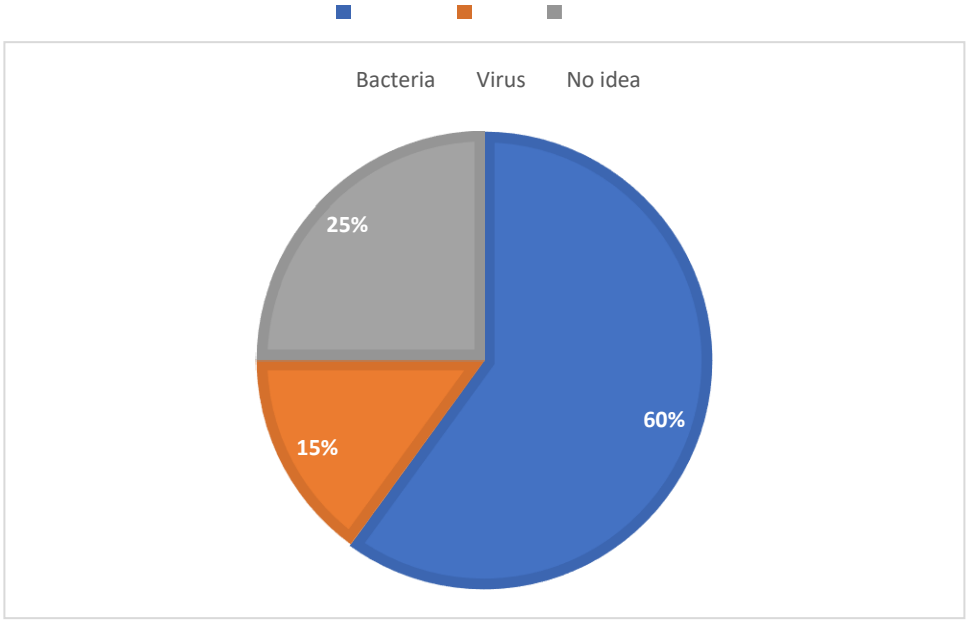


Fig 22: Is TB bacteria or Viruses

In this survey about 60% respondents believe TB is Bacterial microorganism, 25% has no idea about that and 15% respondents believe TB is viruses type microorganism.

5.13. Duration of having TB

- **How long have you had tuberculosis?**

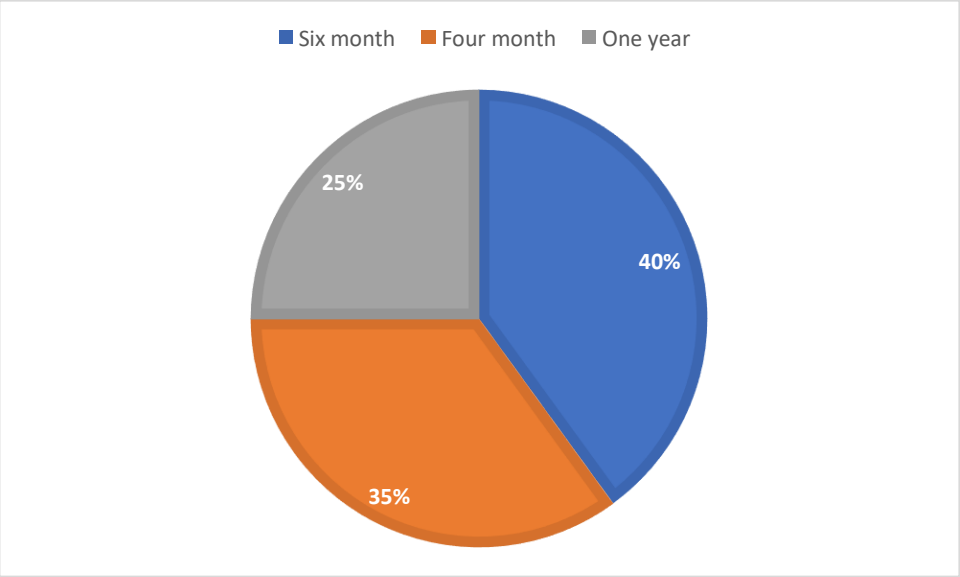


Fig 23: Duration of having TB

In this survey around 40% respondents has affected with TB for six months, 35% respondents affected with TB for four month and 25% respondents affected with TB for one year.

5.14. Social Impact

- **Are there any social impact about TB?**

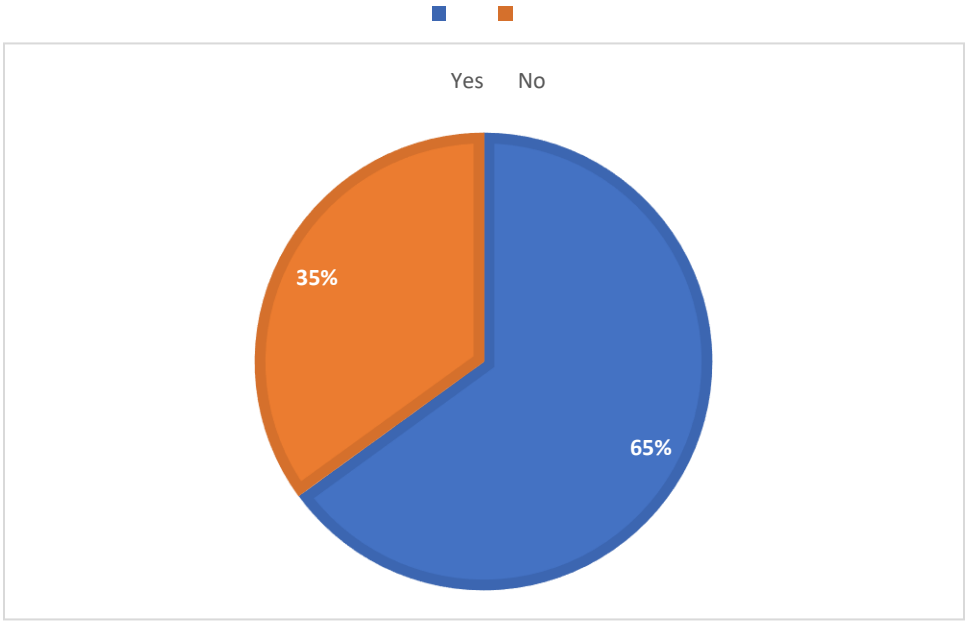


Fig 24: Social Impact

In this survey around 65% respondents suffered social impact for TB and 35% respondents had no problem for this.

5.15. Taking routine medication to recover from TB

- **Did you take routine medication to recover from TB?**

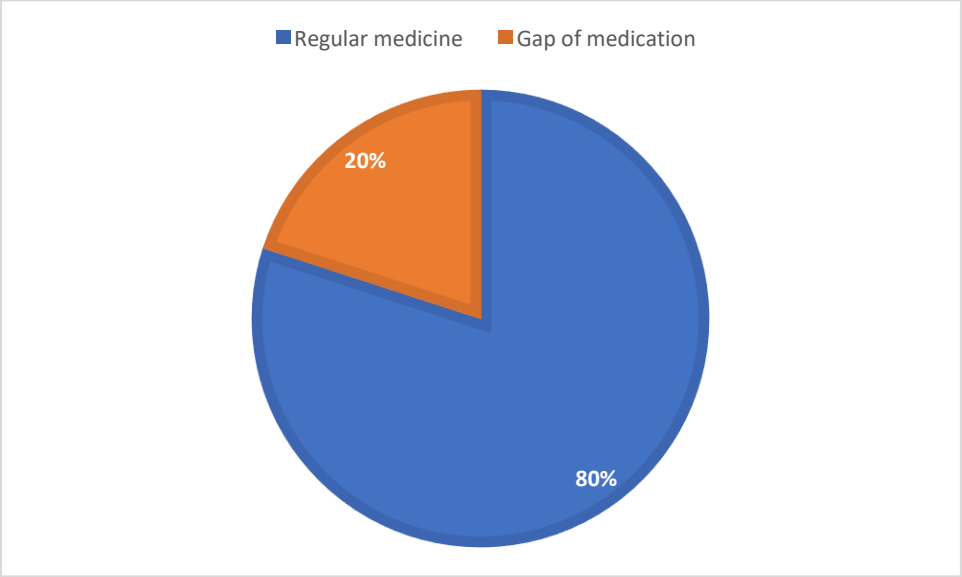


Fig 25: Taking routine medication to recover from TB

In this survey, about 80% of respondents reported taking regular medication to treat their TB, while 20% reported not taking regular medication because it was too expensive.

5.16. Family History

- **Do you have any family history about TB?**

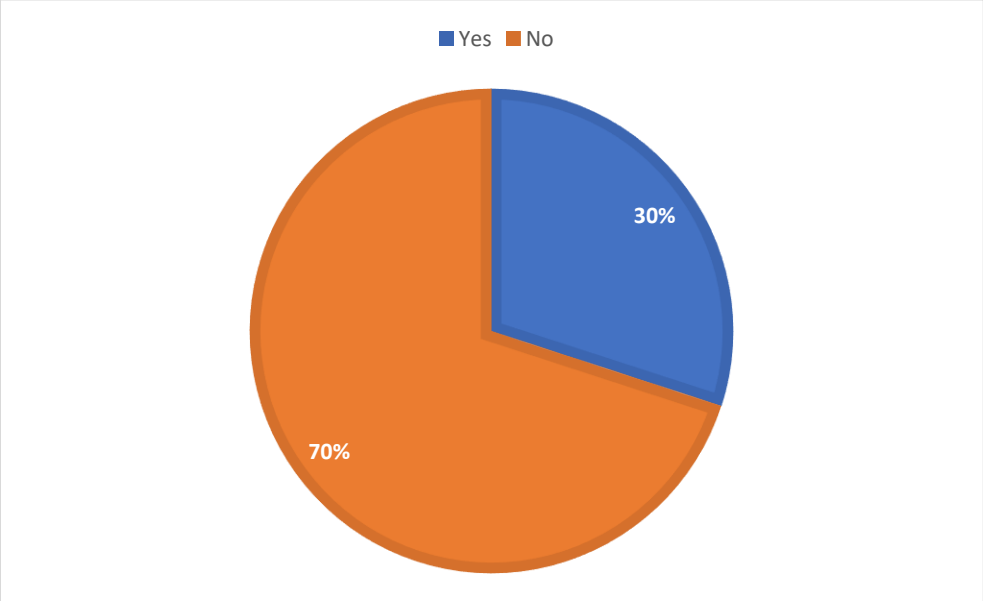


Fig 26: Family History

In this survey,70% people has no family history in TB. 30% people has familly history.

5.17. Genetical Disease

- **Does TB genetically spread?**

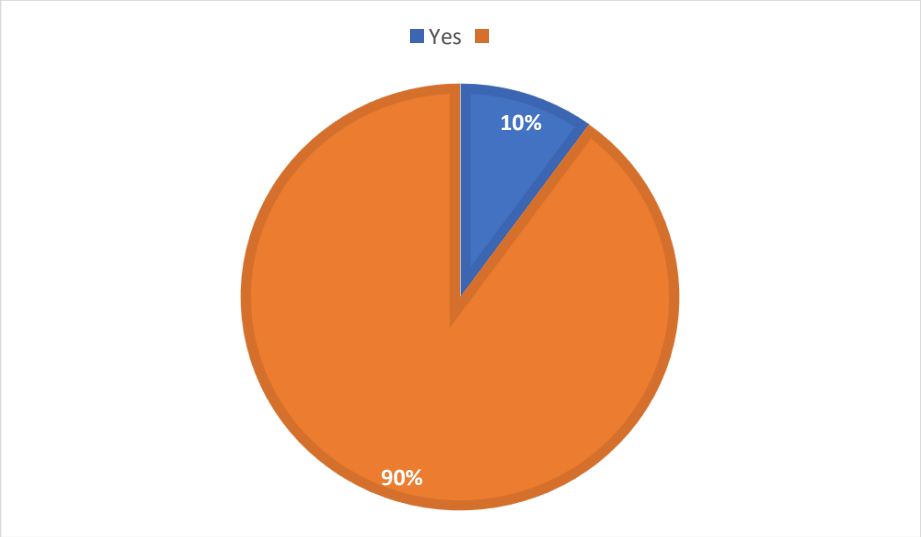


Fig 27: Genetical Disease

In this survey, 90% people think its not a genetical disease. 10% think, it's a genetical disease.

5.18. Smoking cause

- **Does there any smoking effect on TB?**

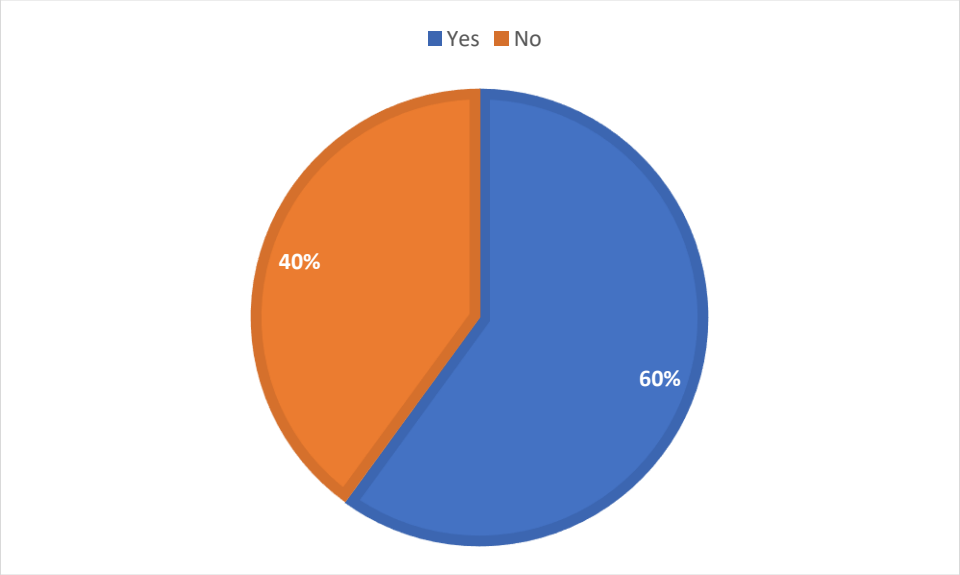


Fig 28: Smoking cause

According to this survey, 60% people think TB can cause by smoking. 40% people think,TB can not cause by smoking.

Discussion:

Mycobacterium tuberculosis is the bacterium that is responsible for the spread of tuberculosis (TB). The lungs are the typical target of the bacteria's attack; TB bacteria can infect any part of the body, including the kidneys, spine, and brain. Some people infected with the TB bacteria never develop symptoms of the disease. In this review, I show that urban people know more about TB than rural people. People are not always taking protection to save themselves from infectious diseases. There is more awareness campaign needed for TB.

Chapter six: Conclusion

6. Conclusion

Mycobacterium tuberculosis is the bacteria that causes tuberculosis (TB). Although the TB germs typically assault the lungs, they may also affect the kidney, spine, and brain. Not every person who contracts the TB germs becomes ill. Latent TB infection (LTBI) and TB disease are therefore two TB-related diseases. TB illness may be lethal if it is not adequately treated. This study was conducted to learn more about the state of the TB epidemic in Dhaka, Bangladesh.

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