"EVALUATION OF CONTACTS OF TUBERCULOSIS FOR ACTIVE OR LATENT TUBERCULOSIS AND FACTORS ASSOCIATED WITH MANAGEMENT"

Submitted By,

DR. SAGARIKA N SURESH

P.G. IN RESPIRATORY MEDICINE

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SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE,

VIJAYAPURA, KARNATAKA-586103

In partial fulfilment of the requirements for the degree of

DOCTOR OF MEDICINE

IN

RESPIRATORY MEDICINE

Under the guidance of

DR. KEERTIVARDHAN D KULKARNI,

DNB RESPIRATORY MEDICINE,

PROFESSOR AND HOD,

DEPARTMENT OF RESPIRATORY MEDICINE

SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE,

BLDE (DEEMED TO BE UNIVERSITY),

VIJAYAPURA, KARNATAKA - 586103

BLDE (DEEMED TO BE UNIVERSITY),
SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE,
VIJAYAPURA, KARNATAKA-586103

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Date: 29/04/2025

Place: Vijayapura DR. SAGARIKA N SURESH

BLDE (DEEMED TO BE UNIVERSITY),
SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE,
VIJAYAPURA, KARNATAKA-586103

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Date: 29/04/2025

Place: Vijayapura

DR. KEERTIVARDHAN D KULKARNI
DNB Respiratory Medicine
Professor and HOD
Department of Respiratory Medicine
BLDE (Deemed to be) University,
Shri B.M. Patil Medical College, Hospital and
Research Centre, Vijayapura-586103

BLDE (DEEMED TO BE UNIVERSITY),

SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE,

VIJAYAPURA, KARNATAKA-586103

ENDORSEMENT BY THE HEAD OF THE DEPARTMENT, PRINCIPAL/HEAD OF THE INSTITUTION

This is to certify that the dissertation entitled "**EVALUATION OF CONTACTS OF TUBERCULOSIS FOR ACTIVE OR LATENT TUBERCULOSIS AND FACTORS ASSOCIATED WITH MANAGEMENT**" is a bonafide research work done by **DR. SAGARIKA N SURESH** under the guidance of **DR. KEERTIVARDHAN D KULKARNI**, Professor and HOD, Department of Respiratory Medicine, BLDE (Deemed to be University), Shri B. M. Patil Medical College and Research Centre, Vijayapura.

Seal and Signature of Head,
Department of Respiratory Medicine
Dr. Keertivardhan D Kulkarni
DNB (Respiratory Medicine)
BLDE (Deemed to be University)
Shri B.M. Patil Medical College,
Hospital and Research Centre,
Vijayapura-586103

Date: 29/04/2025
Place: Vijayapura

Seal and Signature of the Principal

Dr. Aravind V Patil
M.S. (General Surgery)
BLDE (Deemed to be University)
Shri B.M. Patil Medical College,
Hospital And Research Centre,
Vijayapura-586103

Date: 29/04/2025
Place: Vijayapura

BLDE (DEEMED TO BE UNIVERSITY),
SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE,
VIJAYAPURA, KARNATAKA-586103

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Date: 29/04/2025

Place: Vijayapura DR. SAGARIKA N SURESH

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%	:	Percentage
TB	:	Tuberculosis
DSTB	:	Drug-sensitive tuberculosis
MDRTB	:	Multi-drug resistant tuberculosis
LTBI	:	Latent tuberculosis infection
TST	:	Tuberculin skin test
TPT	:	Tuberculosis preventive therapy
LMICs	:	Low- and middle-income countries
HICs	:	High-income countries
HHCs	:	Household contacts
BMI	:	Body mass index
CXR	:	Chest x-ray
mm	:	millimetre
ZN stain	:	Zeihl-Neelsen stain
US	:	United States
WHO	:	World Health Organization
TBI	:	Tuberculosis infection
ACF	:	Active case finding
HRGs	:	High-risk groups
NSP	:	National Strategic Plan
PA	:	Postero-anterior view
AFB	:	Acid fast bacilli

COVID-19	:	Coronavirus disease of 2019
HIV	:	Human immunodeficiency virus
RR-TB	:	Rifampicin-resistant tuberculosis
BC	:	Before Christ
BCG	:	Bacillus Calmette-Guérin
IGRA	:	Interferon-gamma release assay
INH/ H	:	Isoniazid
DTH	:	Delayed-type hypersensitivity
OT	:	Old tuberculin
PPD	:	Purified protein derivative
PPD-S	:	Purified protein derivative-standardized
PPD-RT	:	Purified protein derivative-research tuberculin
QFT	:	QuantiFERON-TB gold in-tube
CE	:	Conformité Européenne
T-SPOT.TB	:	T-cell ELISspot test for tuberculosis
FDA	:	U.S. Food and Drug Administration
RD1	:	Region of difference 1
ESAT-6	:	Early secreted antigenic target 6 kDa
CFP-10	:	Culture filtrate protein 10
MTB	:	Mycobacterium tuberculosis
NTM	:	Non-tuberculous mycobacteria
ELISA	:	Enzyme-linked immunosorbent assay
IU	:	International units

IFN-γ	:	Interferon-gamma
ELISPOT	:	Enzyme-linked immunosorbent spot
PBMCs	:	Peripheral blood mononuclear cells
PMTPT	:	Programmatic Management of Tuberculosis Preventive Treatment
TNF	:	Tumor necrosis factor
SFCs	:	Spot-forming cells
FQ	:	Flouroquinolone
R	:	Rifampicin
HP	:	Isoniazid plus rifapentine
MIC	:	Minimum inhibitory concentration
μg/mL	:	Micrograms per millilitre
mg	:	Milligram
kg	:	Kilogram
NAD	:	Nicotinamide adenine dinucleotide
NADH	:	Nicotinamide adenine dinucleotide + hydrogen
PLHIV	:	People living with HIV
ART	:	Antiretroviral therapy
CYP450	:	Cytochrome P450

CYP3A4	:	Cytochrome P450 3A4
CYP2C9	:	Cytochrome P450 2C9
CYP2E1	:	Cytochrome P450 2E1
SJS	:	Stevens-Johnson syndrome
TEN	:	Toxic epidermal necrolysis
RNA	:	Ribonucleic acid
DNA	:	Deoxyribonucleic acid
NAT2	:	N-acetyltransferase 2
GST	:	Glutathione S-transferase
CSF	:	Cerebrospinal fluid
IM	:	Intramuscular
GABA	:	Gamma-aminobutyric acid

ABSTRACT

BACKGROUND:

Tuberculosis is an infectious disease resulting from infection with the Mycobacterium tuberculosis (MTB) bacilli. Latent tuberculosis infection (LTBI) refers to a state in which individuals harbor a persistent immunological reaction to MTB antigens in the absence of symptoms of active tuberculosis. Household contacts, in particular, face the highest risk due to prolonged and repeated exposure within shared living spaces. It is estimated that approximately. Among individuals with latent tuberculosis infection, an estimated 5–10% will eventually transition to active tuberculosis over the span of their lifetime. Tuberculosis preventive therapy significantly reduces the likelihood of transitioning from tuberculosis infection to clinically active disease. While the early detection and management of active disease remain a central focus of the public health strategy, targeted identification and management of latent tuberculosis particularly among populations at elevated risk, notably household contacts of patients with active tuberculosis are essential components of tuberculosis elimination efforts.

AIMS AND OBJECTIVES:

To evaluate household contacts of tuberculosis for active or latent tuberculosis infection and to assess willingness for tuberculosis preventive treatment and the factors associated with management.

MATERIALS AND METHODS:

A cross-sectional analysis of 264 household contacts (HHCs) having history of prior exposure to active tuberculosis cases, was carried out in the Department of Respiratory Medicine, B.L.D.E. (Deemed to be) University's, Shri B. M. Patil Medical College, Hospital and

Research Centre, Vijayapura, Karnataka. Sputum for acid fast bacilli (AFB), chest x-ray postero-anterior view (CXR-PA view) and tuberculin skin test (TST) was done in each patient and evaluated for active TB and LTBI and patient's willingness to initiate therapy was assessed and tuberculosis preventive therapy (TPT) was offered accordingly. If the patient was unwilling for TPT, the reason for unwillingness was assessed.

RESULTS:

A total sample of 264 household contacts was included in the analysis. Among them, females constituted the majority of the study population. The average age of participants in the study was 34.55 ± 16.45 years, with a mean body mass index of 22.29 ± 4.16 kg/m². Among the study population, 2 individuals were diagnosed with active tuberculosis. Latent tuberculosis infection characterized by a positive tuberculin skin test, was diagnosed in 43 participants. Among eligible contacts, willingness to initiate TPT was high, with 81.3% expressing willingness for initiation of treatment. Among those who declined TPT, the most common reason cited was misconception, reported by 93.9%. Despite the high initial willingness, treatment completion rates were low, with only 37.2% of those who started TPT completing the full course.

CONCLUSION:

There is a significant burden of latent tuberculosis infection was observed among the contacts of active TB, particularly in individuals with diabetes mellitus. Although the majority of participants demonstrated a willingness to initiate TB preventive therapy, treatment completion rates were suboptimal. Misconceptions about LTBI and TPT emerged as a major barrier to treatment initiation. Comprehensive contact screening programs, improved patient education, and strategies to enhance adherence to TPT could significantly strengthen TB control efforts,

particularly in high-burden settings.

KEYWORDS: Tuberculosis, latent tuberculosis infection, tuberculosis preventive therapy, household contacts

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease caused by the bacillus *Mycobacterium tuberculosis*.[1] India carries the highest global burden of tuberculosis infection (TBI), with an estimated 35–40 crore individuals infected and approximately 26 lakhs new cases of tuberculosis (TB) disease diagnosed annually. [2]

Latent tuberculosis infection (LTBI) is characterized by a sustained immune response to *Mycobacterium tuberculosis* antigens in the absence of clinical evidence of active disease.[3]

Latent tuberculosis infection often results from close and prolonged exposure to individuals with active tuberculosis.[4] The likelihood of acquiring infection is enhanced by greater exposure intensity and duration. Household contacts are particularly vulnerable, as they continuously share the same airspace with infectious TB patients over extended periods.[5]

It is projected that 5–10% of those with latent tuberculosis infection (LTBI) will develop active tuberculosis (TB) at some point during their lifetime.[6]

Although the early diagnosis and management of active tuberculosis (TB) continue to be critical priorities in India, TB prevention efforts—particularly through the identification and management of latent tuberculosis infection and the adoption of active case finding (ACF) approaches among high-risk groups (HRGs)—are becoming equally essential for achieving TB elimination goals. TPT has been shown to lower the risk of progression to active TB disease by approximately 60%.[2]

Management of TBI is recognized as a key strategy within India's National Strategic Plan (NSP) 2017–2025 for Ending Tuberculosis. The NSP outlines a "Detect-Treat-Prevent-Build" framework, emphasizing that the effective implementation of preventive therapy is crucial to accelerate the reduction in TB incidence from the current 2.5% to the targeted 10% annual reduction necessary to meet the 2025 goal.[6]

Since India is having an ambitious goal of ending tuberculosis by 2025 and contacts of active tuberculosis cases are the most vulnerable people for developing tuberculosis, screening and treating of tuberculosis contacts is an important step in early recognition and effective tuberculosis preventive measure.

This study aims to assess the prevalence of latent and active tuberculosis infections and to identify factors influencing their management among household contacts of patients with active TB.

AIMS AND OBJECTIVES OF THE STUDY

AIM:

The aim of the study is to evaluate contacts of tuberculosis for active or latent tuberculosis and to assess the factors associated with management.

OBJECTIVES:

1. To evaluate contacts of tuberculosis for active or latent tuberculosis with Chest X-ray (PA view), tuberculin skin testing and sputum for acid fast bacilli (AFB) for all the contacts of tuberculosis.
2. To determine willingness for tuberculosis preventive therapy among contacts of tuberculosis.
3. To assess willingness for treatment among contacts with latent tuberculosis infection.

REVIEW OF LITERATURE

INTRODUCTION:

Tuberculosis remains a major global public health challenge. Mycobacterium tuberculosis, the bacteria that causes tuberculosis, has plagued humanity for millennia.[7] Before the pandemic of COVID-19, tuberculosis (TB) was one of the infectious causes leading to increased number of deaths worldwide.[8] The World Health Organization (WHO) has set an ambitious target to reduce TB incidence by 90% between 2015 and 2035. However, significant challenges remain in the detection, management, and prevention of TB. [9]

BURDEN OF TUBERCULOSIS:

According to the WHO, an estimated 10.8 million people developed tuberculosis globally in 2023, corresponding to 134 incident cases per lakh population - the highest number reported since 1995.[10]

In 2023, the majority of tuberculosis cases were reported in the WHO regions of South-East Asia (45%), Africa (24%), and the Western Pacific (17%), with smaller percentages observed in the Eastern Mediterranean (8.6%), the Americas (3.2%), and Europe (2.1%).[11]

Eight countries contributed to more than two-thirds of global tuberculosis cases in 2023: India (26%), Indonesia (10%), China (6.8%), the Philippines (6.8%), Pakistan (6.3%), Nigeria (4.6%), Bangladesh (3.5%), and the Democratic Republic of the Congo (3.1%). These countries experience a high TB burden due to factors such as high population density, limited healthcare access, and socioeconomic conditions that facilitate transmission and delays in treatment.[12]

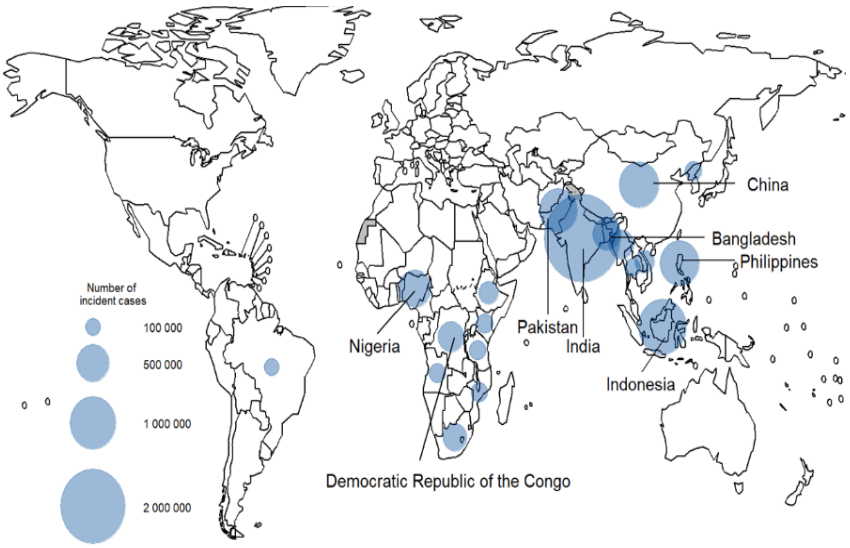


Figure-1: Estimated global incidence of tuberculosis cases in 2023.[12]

In 2023, individuals with HIV constituted for approximately 6.1% of the incident tuberculosis cases.[12] Around 1.09 million deaths related to TB occurred among individuals without HIV, while 161,000 deaths were reported among people living with HIV.[13]

In 2023, 5 countries represented more than one-half of the incident multidrug-resistant (MDR) and rifampicin-resistant tuberculosis (RR-TB) cases globally: 27% cases in India, the Russian Federation constituting 7.4%, 7.4% in Indonesia and 7.3% in China, and the Philippines (7.2%).[12]

The India TB report indicates a decline in both TB incidence and mortality rates.[14] The tuberculosis incidence rate in India has declined by 17.7%, from 237 per 100,000 population in 2015 to 195 per 100,000 population in 2023. Similarly, TB-related deaths have decreased by 21.4%, from 28 per 100,000 population in 2015 to 22 per 100,000 population in 2023.[15]

HISTORY:

Tuberculosis is one of humanity's most ancient diseases, with evidence of its existence found in human remains dating back thousands of years.[16] However, Latent Tuberculosis Infection was only formally recognized in the late 19th century as scientific understanding of TB evolved.[17]

Biological History of Tuberculosis:

Since time immemorial, tuberculosis (TB) has afflicted human beings. Evidence of TB in Neolithic humans has been confirmed through skeletal remains discovered in various parts of the world, with lesions characteristic of TB found in bones dating back thousands of years.[18] One of the earliest clear indications of TB spine, also referred to as Pott's disease, comes from mummified bodies recovered from Egyptian tombs, dating back to approximately 5000 BC.[19]

In India, references to TB can be traced back to around 300 BC. The ancient Indian physician Sushruta, in his medical treatise *Sushruta Samhita*, described a disease resembling TB, referring to it as "Rajayakshma" and noting its severe and often incurable nature.[20] Similarly, the ancient Ayurvedic text *Charaka Samhita* (circa 200 BC) detailed symptoms of TB, emphasizing its contagious nature and the difficulty of treatment.[21]

These historical accounts and archaeological findings highlight TB's deep-rooted presence in human history, reinforcing the disease's long-standing challenge to medical science.

Tuberculosis (TB) has earned various names throughout history due to its devastating impact. In the 18th and 19th centuries, TB was commonly referred to as the "White Plague," a term derived from the extreme pallor observed in those affected.[22] In Europe, the

tuberculosis epidemic was referred to as the "Great White Plague," which began in the 17th century and continued over the 200 years. During this period, TB was a leading cause of mortality, devastating populations across the continent. The disease was also known as "consumption," highlighting the severe weight loss and wasting experienced by patients.[23]

The bacterium that causes tuberculosis, *Mycobacterium tuberculosis*, was discovered by the German scientist Robert Koch (1843–1910). He identified the bacterium in 1882 and presented his groundbreaking findings in his famous lecture, *Die Ätiologie der Tuberkulose* (The Etiology of Tuberculosis), on March 24, 1882, in Berlin.[24]

For Tuberculosis, "Phthisis" is a Greek term. Phthisis has been identified by Hippocrates in around 460 BC as one of most prevailing disease of that time involving fever and coughing up blood that was almost disastrous. It was transmitted from individual to individual through the droplets from the lungs and throat of a person who has been suffering from active tuberculosis disease.[22]

The first significant breakthrough in tuberculosis immunization was achieved in 1906 by French bacteriologists Albert Calmette and Camille Guérin. They developed a vaccine using an attenuated strain of the bovine form of tuberculosis, *Mycobacterium bovis*. This vaccine, named Bacillus Calmette-Guérin (BCG) in their honor, is the extensively used TB vaccine currently. It was first administered to humans in 1921.[25]

Tuberculosis is a two- step process. The first stage is associated with attainment of infection and to the second stage is of development of disease. Infected persons are neither infectious nor ill even though they may progress to active TB. The infection is transmitted by the individuals infected with TB.[26]

The understanding of tuberculosis infection has evolved significantly over time. Recent studies suggest that TB infection exists along a "continuum", spanning from the inhalation of micro-organism to the eventual establishment of clinically apparent TB disease. Rather than a simple latent-to-active progression, the progression of disease from LTBI to active disease is now recognized as a complex, dynamic process. This spectrum is influenced by a balance between the innate and adaptive immune responses in the host and the metabolic activity of *Mycobacterium tuberculosis*, including phases of dormancy, intermittent replication, and active replication.[26]

The stages of TB can be broadly categorized as follows[26]:

- Uninfected individual
- Tuberculosis infection
- Incipient tuberculosis
- Subclinical TB without recognized signs or symptoms
- Subclinical TB with unrecognized signs or symptoms
- Tuberculosis disease with clinical signs and symptoms

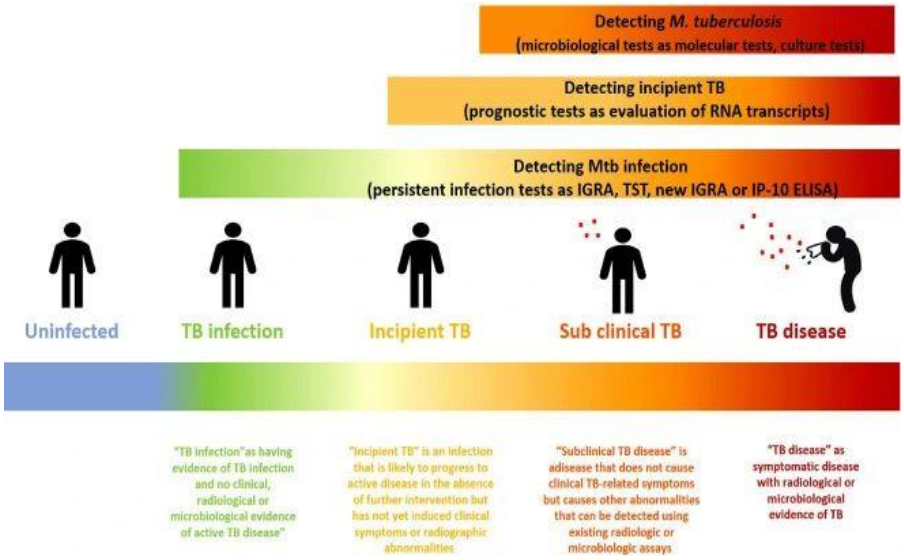


Figure – 2: Stages along the TB infection continuum.[27]

LATENT TUBERCULOSIS INFECTION (LTBI):

Latent tuberculosis infection is characterized by a sustained immunological response to M. tuberculosis antigens in the absence of clinically apparent tuberculosis.[28]

Mycobacterium tuberculosis (M. tuberculosis) employs various evasion mechanisms to circumvent the host immune system, enabling it to establish a latent infection. This latent state persists as long as the immune system effectively controls the bacteria. However, if immune function declines and bacterial replication surpasses immune defences, the infection can progress to active tuberculosis (TB), characterized by typical clinical symptoms. Notably, individuals with LTBI who are immunocompromised face a significantly higher risk of developing active infection during their lifetime.[29]

Considering that *M. tuberculosis* can be isolated in humans only during the active phase of the disease, detecting LTBI relies solely on indirect immune response to antigenic challenge.[30]

Diagnosing Latent Tuberculosis Infection:

The low bacterial burden in tissues, linked to LTBI undermines any diagnostic approach that aims to identify the bacteria or its constituent parts. LTBI is diagnosed indirectly, based on the presence of mycobacterial antigens that trigger the cellular immune system. The gold standard test for LTBI does not exist. For the diagnosis of LTBI, the intradermal tuberculin test (TST) and IGRA are the most often utilized tests.[31]

VON PIRQUET TEST:

The Von Pirquet test was one of the earliest tuberculin skin tests (TST) developed to detect latent or active tuberculosis (TB). This test, introduced in 1907 by Austrian paediatrician Clemens Von Pirquet, helped establish the concept of tuberculin hypersensitivity.[32]

Method:[33]

- Two variations of Koch's old tuberculin were used: a 25% diluted tuberculin solution (combined with carbolic acid and normal saline) and an undiluted tuberculin solution.
- A control solution (carbolic acid and normal saline without tuberculin) was applied to rule out non-specific reactions.
- Three separate areas on the forearm were superficially scarified (scratched), each approximately two inches apart. The skin was pricked or lightly scarified using a lancet to allow antigen penetration.
- After 48-72 hours**,** the site was examined for a delayed-type hypersensitivity (DTH) reaction**,** indicating prior TB exposure.

Interpretation:[34]

- **Positive Reaction**: Red, raised, or ulcerated lesion, suggests prior exposure or TB infection.
- **Negative Reaction**: No reaction

Limitations:

- Low specificity due to the use of Old Tuberculin (OT)**,** which contained impurities and cross-reactive antigens**.**
- Variability in skin absorption, leading to inconsistent results.

MORO PERCUTANEOUS TEST:

The Moro Percutaneous Test was a historical tuberculin skin test developed by Erich Moro in 1908 as an alternate method to the Von Pirquet test for diagnosing TBI. This test employed a simple percutaneous (through the skin) administration of tuberculin.[35]

Method:

A small amount of Old Tuberculin (OT) was mixed with an ointment or petroleum jelly and rubbed onto the skin, typically on the abdomen or forearm. After 48-72 hours, the skin was examined for a delayed-type hypersensitivity (DTH) reaction.[36]

Interpretation:[37]

- **Positive Reaction**: Formation of papules, vesicles, or eczema-like lesions at the site.
- **Negative Reaction**: No visible skin changes.

Limitations:

- Lower sensitivity and specificity compared to the Mantoux test.
- Surface absorption was inconsistent, leading to false negative results**.**
- Replacement by intradermal tests (Mantoux test, Heaf test) by the mid-20th century.

SCARIFICATION TEST[38]:

This method was derived from the Von Pirquet test (1907) and relied on creating small scratches (scarification) on the skin to introduce tuberculin.

Method:

A drop of Old Tuberculin (OT) or Purified Protein Derivative (PPD) was placed on the skin, usually on the forearm. The skin was superficially scratched or scarified using a sterile lancet or needle to facilitate tuberculin absorption. The test site was examined after 48-72 hours, for a delayed-type hypersensitivity (DTH) reaction.

Interpretation:

- **Positive Reaction**: A red, raised, or ulcerated lesion at the test site.
- **Negative Reaction**: No visible reaction.

Limitations:

- Less reliable as tuberculin absorption was inconsistent**.**
- Difficult to standardize, leading to variable interpretations of results.
- Potential risk of skin infections due to open scratches.

HEAF TEST:

The Heaf test is a tuberculin skin test that was developed in the 1950s and most commonly used in the United Kingdom as an alternative to the Mantoux test, primarily for use in mass screening programs. The test was phased out in the 2000s in favour of the Mantoux test and Interferon-Gamma Release Assays.[39]

Method:

The test used a heaf gun, a spring-loaded device with six fine needles arranged in a circular pattern. PPD was applied to the skin, typically on the forearm and the heaf gun was pressed against the skin, creating small punctures to introduce the tuberculin. The test site was examined after 48-72 hours for any reaction.[40]

Interpretation:[41]

• *Grade 0*: No reaction.

• *Grade 1*: Small punctate induration, borderline reactivity indicating a possible exposure.

• *Grade 2*: Discrete, raised papules suggests prior TB or BCG immunisation.

• *Grade 3*: Confluent papules are positive, indicating tuberculosis infection.

• *Grade 4*: Intense induration and ulceration indicates active tuberculosis.

Limitations:

• Less precise as results depended on the Heaf gun's calibration.

• Difficult to standardise, resulting in inconsistent results.

• Risk of cross-reactivity after BCG immunisation.

TUBERCULIN SKIN TEST (TST):

In tuberculin skin test, 0.1 ml of tuberculin-purified protein derivative (PPD) into the

inner aspect of forearm using a tuberculin syringe with the needle bevel up. If done correctly, this intradermal injection creates a pale, raised wheal on the skin, measuring 6 to 10 mm in diameter.[42]

PPD Derivatives[43] –

1. **Old Tuberculin:**
    - Previously used but now replaced by PPD due to standardization and reliability.
2. **PPD (Purified Protein Derivative):**
    - The most commonly used tuberculin.
    - It is a standardized product derived from *M. tuberculosis* cultures, following the method described by Siebert.
    - Known as PPD-S when referring specifically to the standardized version.
3. **PPD-RT (Research Tuberculin) 23:**
    - Commonly used for research and diagnostic purposes.

Classification of tuberculin reaction[44]:

CRITERIA FOR TUBERCULIN POSITIVITY, BY RISK GROUP

Reaction ≥ 5 mm of Induration	Reaction ≥ 10 mm of Induration	Reaction ≥ 15 mm of Induration
Human immunodeficiency virus (HIV)-positive persons	Recent immigrants (i.e., within the last 5 yr) from high prevalence countries	Persons with no risk factors for TB
Recent contacts of tuberculosis (TB) case patients	Injection drug users	
Fibrotic changes on chest radiograph consistent with prior TB	Residents and employees† of the following high-risk congregate settings: prisons and jails, nursing homes and other long-term facilities for the elderly, hospitals and other health care facilities, residential facilities for patients with acquired immunodeficiency syndrome (AIDS), and homeless shelters	
Patients with organ transplants and other immunosuppressed patients (receiving the equivalent of ≥ 15 mg/d of prednisone for 1 mo or more)*	Mycobacteriology laboratory personnel	
	Persons with the following clinical conditions that place them at high risk: silicosis, diabetes mellitus, chronic renal failure, some hematologic disorders (e.g., leukemias and lymphomas), other specific malignancies (e.g., carcinoma of the head or neck and lung), weight loss of ≥ 10% of ideal body weight, gastrectomy, and jejunoileal bypass	
	Children younger than 4 yr of age or infants, children, and adolescents exposed to adults at high-risk	

* Risk of TB in patients treated with corticosteroids increases with higher dose and longer duration.

† For persons who are otherwise at low risk and are tested at the start of employment, a reaction of ≥ 15 mm induration is considered positive.

Source: Adapted from Centers for Disease Control and Prevention. Screening for tuberculosis and tuberculosis infection in high-risk populations: recommendations of the Advisory Council for the Elimination of Tuberculosis. M.M.W.R. 1995;44(No. RR-11):19–34.

Figure-3: Classification of tuberculin reaction.[44]

Causes of False-positive and False-negative TST[45]:

False-negative	*False-positive*
Incorrect administration or interpretation of test	Incorrect interpretation of test
HIV infection	BCG vaccination
Improper storage of tuberculin	Infection with non-tuberculous mycobacteria
Viral infections (e.g., measles, varicella)	
Vaccinated with live viral vaccines (within 6 weeks)	
Malnutrition	
Bacterial infections (e.g. typhoid, leprosy, pertussis)	
Immunosuppressive medications (e.g. corticosteroids)	
Neonatal patient	
Primary immunodeficiencies	
Diseases of lymphoid tissue (e.g. Hodgkin disease, lymphoma, leukemia, sarcoidosis)	
Low protein states	
Severe TB	

Figure-4: Causes of false-positive and false-negative TST.[45]

INTERFERON GAMMA RELEASE ASSAY (IGRA):

The QuantiFERON-TB Gold In-Tube (QFT) assay (Cellestis/Qiagen, Carnegie,

Australia) and the T-SPOT.TB assay (Oxford Immunotec, Abingdon, UK) are two commercially available IGRAs.[46] Both tests are CE (Conformité Européenne) certified for use in Europe and have been approved by Health Canada and the U.S. Food and Drug Administration (FDA).[47]

QUANTIFERON-TB GOLD IN-TUBE (QFT) ASSAY:

Peptides from the RD1 antigens ESAT-6 and CFP-10, as well as peptides from one other antigen (TB7.7 [Rv2654c], which is not an RD1 antigen but specific to M. tuberculosis complex), are used in the QFT assay, an enzyme-linked immunosorbent assay (ELISA)-based whole-blood test, in an in-tube format.[48] The addition of TB7.7 enhances the specificity of the QFT assay for detecting *Mycobacterium tuberculosis*.[49] These antigens activate T-cells that are specifically targeted against *M. tuberculosis*, leading to the release of interferon-gamma (IFN-γ) into the plasma, which is then quantified in international units (IU) per millilitre. Results are expressed quantitatively, providing flexibility for interpretation and monitoring.[50]

The test is highly specific for M. tuberculosis, with minimal cross-reactivity to BCG or most NTMs and ideal for both high- and low-burden TB settings, especially for BCG-vaccinated populations.[51]

Interpretation of Results[52] –

- **Positive Result:**
    - An IFN-γ response exceeding the defined cut-off, after adjustment for the negative control, is considered positive for TB antigens.
    - Indicates likely infection with *M. tuberculosis*.
- **Negative Result:**
    - An IFN-γ response to antigens against TB that falls below the cut-off or is similar

to the negative control is considered negative.

- Suggests absence of infection or anergy (e.g., due to immunosuppression).

- **Indeterminate Result:**
  - An inadequate response in comparison to the positive control or an excessively elevated background response in the negative control indicates an indeterminate result.
  - Often due to technical issues, immunosuppression, or improper handling.

THE T-SPOT.TB ASSAY:

The T-SPOT.TB assay is a sophisticated diagnostic tool used to detect *Mycobacterium tuberculosis* infection. It belongs to the category of enzyme-linked immunospot (ELISPOT) assays and assesses the T-cell-mediated immune response.[53]

Peripheral blood mononuclear cells (PBMCs) are isolated, counted, and then stimulated with *M. tuberculosis*-specific antigens, ESAT-6 and CFP-10.[54] The test measures the number of interferon-gamma (IFN-γ)-secreting T cells, reported as spot-forming cells (SFCs).[55]

Interpretation of Results:

- **Positive Result:**
  - An individual is considered to have tuberculosis infection if the number of spots in the antigen wells exceeds the established threshold in comparison to the negative control wells.
- **Intermediate Result:**

Occur when:

- The positive control (mitogen) shows a low IFN-γ response, possibly indicating immunosuppression or insufficient cell viability.
- The negative control has a high background response, possibly reflecting non-specific activation or poor sample quality.

This assay provides a reliable tool for detecting latent or active tuberculosis infection but requires careful interpretation, particularly in cases of indeterminate results.

Preferred test	IGRA	TST	EITHER
Recommendation Indian[35]			HHCs >5 years of pulmonary TB patients after ruling out active disease; on immunosuppressants, anti-TNF alpha drugs, dialysis, silicosis patients, preparing for transplant
WHO[13]		Low- to middle-income countries with limited resources and a high TB burden, such as India, testing is recommended only in HIV and children <5 years of age. TST is preferred in view of the comparable performance and lower cost of TST	High- to upper-middle-income countries with a TB incidence of<100 per 100,000: HIV, contacts of active cases, patients on dialysis, antitumor necrosis factor (TNF) therapy, and immunosuppressed, patients with silicosis those living in close conditions include prisons and nursing homes
ATS, CDC, IDSA[36]	Low to intermediate risk of progression to active disease patients who are unlikely to return for TST read and a history of BCG vaccination		High risk of progression to active disease; A dual testing strategy can be performed, i.e., If one test comes negative, perform the other; any one of the positive tests is considered positive
NTCA[37]	Non-United States-born patients who had received BCG vaccination	For other individuals, depending on availability and cost, either a TST or IGRA may be used	Dual testing can be considered for patients who are at risk of severe forms of TB disease, and TB infection is strongly suspected and has a poor immune response

Figure – 5: Summary of guidelines for selecting between TST and IGRA.[56]

SPUTUM COLLECTION:

Sputum specimens should be collected in clean, properly labeled containers. A commonly used container is a 50-ml screw-capped, plastic clear vessel, which ensures a tight

seal to prevent spillage or contamination. The transparency of the container will allow for visual assessment of the consistency and quality of the sputum sample. The container should be clearly labeled with the name of patient and the date of specimen collection. Once collected, specimen will have to be refrigerated at 2 to 8°C until it is sent to the laboratory for analysis.[57]

American Centre for Disease Control and Prevention recommends collection of minimum of three consecutive samples, at around 8 to 24-hour intervals, and one sample being an early morning expectorate, is considered necessary for establishment of diagnosis.[58]

SPUTUM FOR ACID-FAST BACILLI:

Acid-fast bacteria, also referred to as acid-fast bacilli (AFB), are a class of bacteria that share a physical characteristic known as "acid fastness" which allows a bacterium to withstand decolourisation by acids during staining.[59]

Organisms demonstrating acid-fastness include:[57]

- Mycobacterium species**:** including *M. leprae, M. tuberculosis*, and *Mycobacterium kansasii, M. smegmatis*, *Mycobacterium avium* complex.
- Nocardia species: including *N. brasiliensis*, *N. farcinica*, *N. cyriacigeorgica*, and *N. nova*.

Acid-fastness is also exhibited by various non-bacterial structures, which include[57]:

- Bacterial endospores
- Spermatozoal heads
- Protozoan parasites such as *Cyclospora cayetanensis*, *Cryptosporidium parvum*, *Isospora belli*.

- Helminthic elements like eggs of *Taenia saginata* and hydatid cysts
- *Sarcocystis* species
- Inclusion bodies in the nucleus, particularly those associated with lead toxicity.

Sputum for AFB by immunofluorescence:

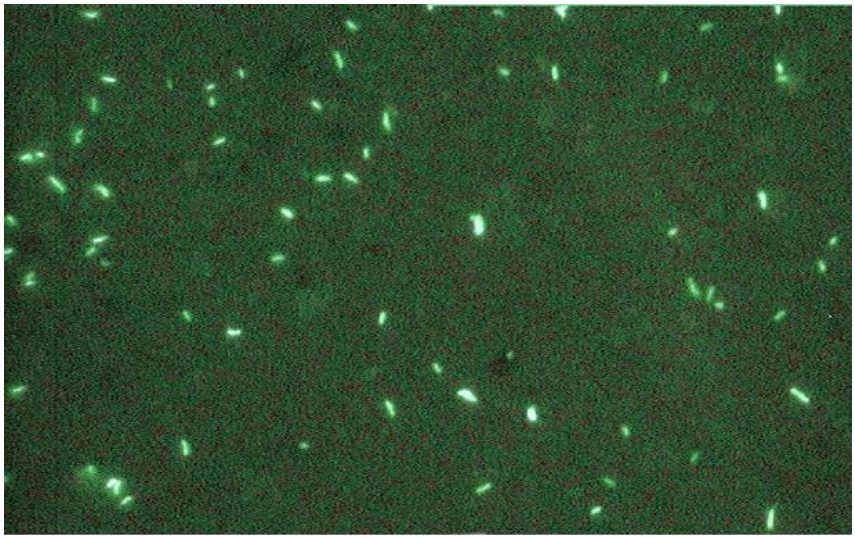


Figure-6: Microscopic Immunofluorescence image showing AFB.[60]

Number of AFB seen	Result	Grading
More than 100 AFB per field in atleast 20 fields	Positive	3+
11–10 AFB per field in atleast 50 fields	Positive	2+
1–10 AFB per 100 fields	Positive	1+
1–3 AFB per 100 fields	Positive	Scanty
No AFB per 100 fields	Negative	-

Figure-7: Grading of immunofluorescence for AFB.[61]

Sputum for AFB by Ziehl-Neelsen staining:

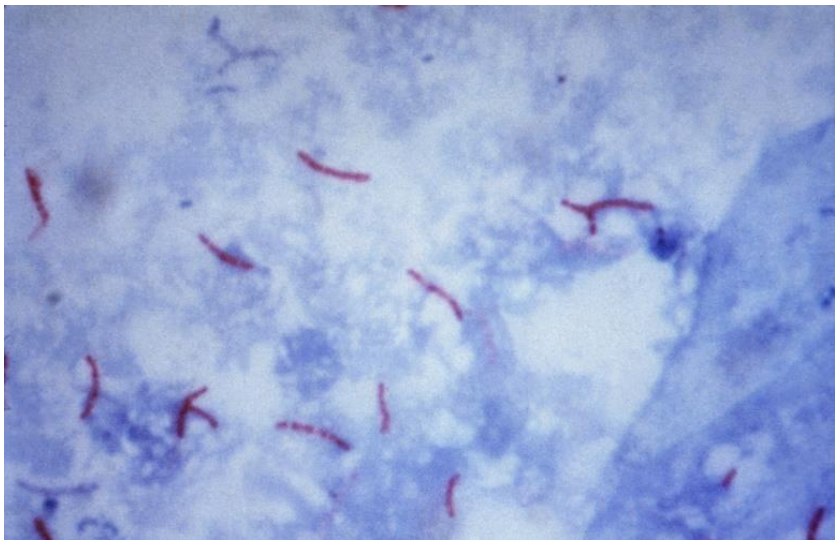


Figure-8: Microscopic image of Ziehl-Neelsen staining showing AFB.[62]

NO. OF AFB	NO OF FIELD EXAMINED	REPORT
No AFB in 100 oil immersion fields	100	Negative
1-9 AFB per 100 oil immersion fields	100	scanty
10-99 AFB per 100 oil immersion fields	100	1+
1-10 AFB per oil immersion field	50	2+
>10 AFB per oil immersion field	20	3+

Figure-9: Grading of Ziehl-Neelsen staining for AFB.[63]

HOUSEHOLD CONTACT:

A household contact refers to a person who, in the last three months prior to the start of the present treatment, has shared the indoor environment with the index case for minimum of one night or had frequent or extended interactions during daytime in that space.[2]

CONTACT INVESTIGATION:

Contact investigation is the process of systematically identifying previously undetected cases of active disease and TBI among those exposed to an index case, within settings where spread may have occurred, involves conducting clinical evaluations, testing, and administering the proper ATT (for individuals with confirmed disease) or TPT (for individuals without active disease).[2]

HIGH TUBERCULOSIS TRANSMISSION SETTING:

It describes an environment where the risk of TB transmission is increased, where undiagnosed or untreated TB cases are common, or where individuals with infectious TB are present. When TB patients are left untreated or receive insufficient treatment, they are most contagious. The presence of populations with increased vulnerability and activities that generate aerosols will boost transmission.[2]

TUBERCULOSIS PREVENTIVE THERAPY:

Preventive treatment aims to halt the development of active infection by targeting the latent *Mycobacterium tuberculosis* organisms that are sequestered in granulomas.[64]

Usage of isoniazid for TB treatment began in the 1950s. In 1954, its potential as a

preventive therapy was first proposed. Subsequently, the initial trial assessing isoniazid's efficacy in preventing TB development among children was conducted.[65] The American Thoracic Society, by 1965 issued its inaugural expert recommendation, advocating for 12 to18 months of isoniazid as preventive treatment for individuals with positive TST results and presence of certain risk factors, including history of exposure, age and pre-existing lung disease.[66]

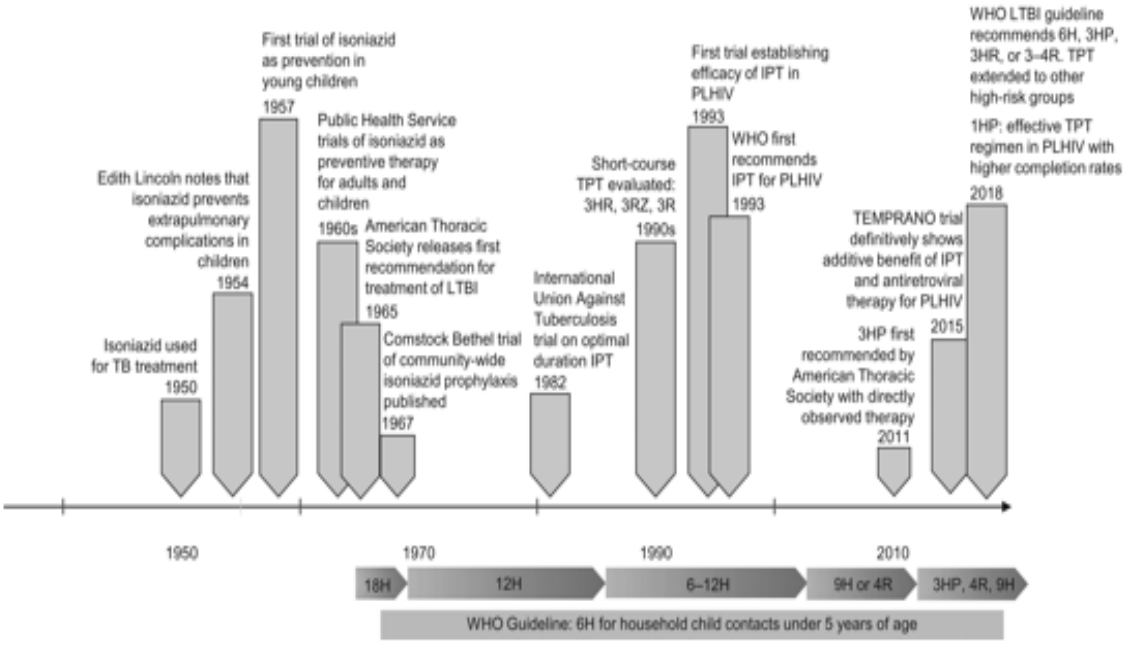


Figure – 10: Timeline of key milestones in the history of TPT.[64]

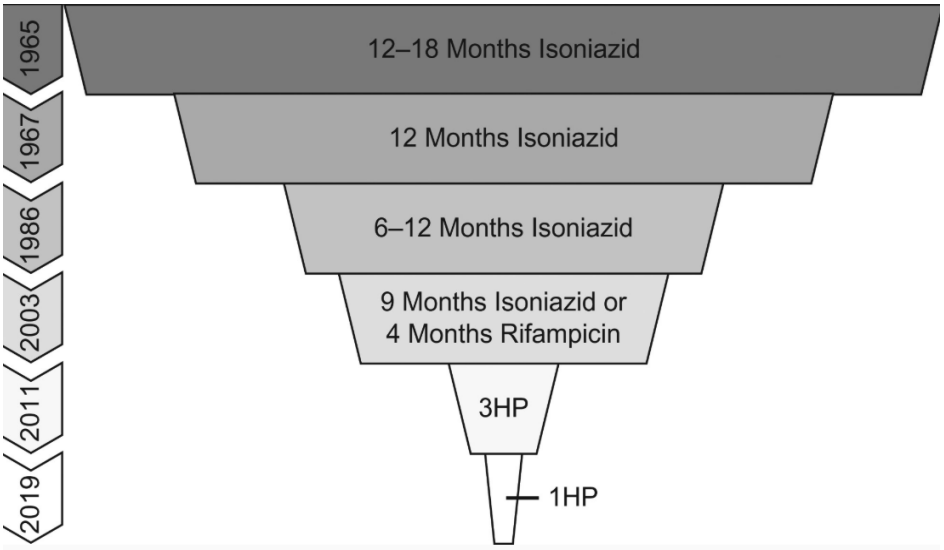


Figure-11: Evolution of the recommended duration for tuberculosis preventive therapy, as per the American Thoracic Society guidelines.[64]

The End TB Strategy, by the World Health Organization targets a 90% decrease in tuberculosis incidence by 2030, compared to 2015.[67] India's tuberculosis elimination strategy sets an ambitious target of a 90% reduction in incidence of tuberculosis by 2025, necessitating a 10% annual decrease in cases for reaching this goal.[68] Achieving this would require coordinated efforts across all four pillars: prevention, early detection, effective treatment, and strengthening capacity.[69]

Eliminating the reservoir of LTBI is essential for achieving elimination of tuberculosis. In 2015, the World Health Organization introduced the Programmatic Management of Tuberculosis Preventive Treatment (PMTPT) strategy, which encompasses a series of strategies: identifying target populations for testing and treatment, excluding active disease, testing for latent infection, administering preventive therapy, supervising treatment outcomes. Implementing these steps systematically is vital for reducing the incidence of active TB and moving towards global TB elimination goals.[70]

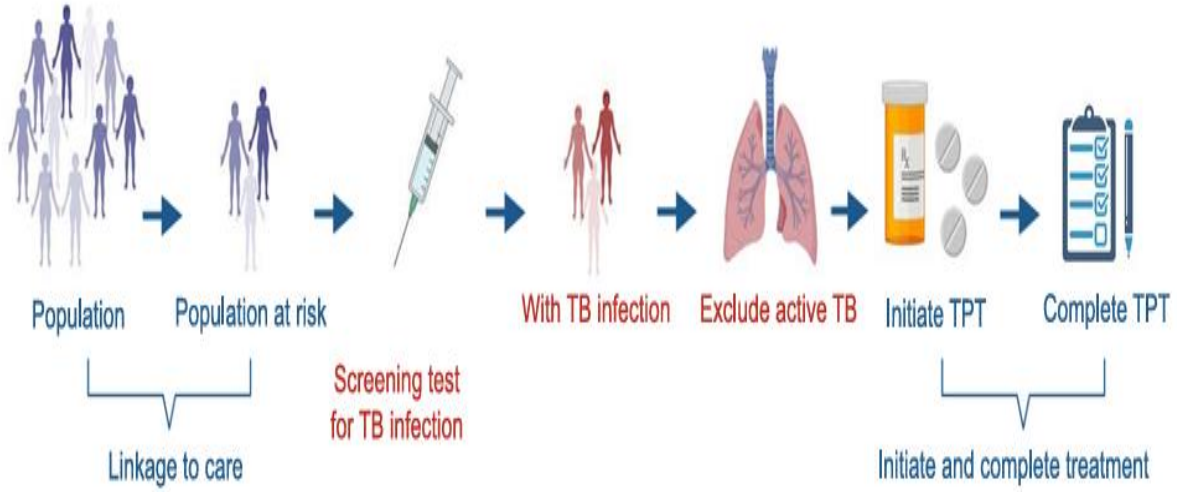


Figure - 12: The continuum of care in the structured management of LTBI.[71]

TARGET POPULATION FOR LTBI TESTING:[2]

The purpose of testing is to detect population groups at elevated risk for developing active tuberculosis (TB) who would be benefitting from treatment of latent TB infection.

Target population	Strategy
• People living with HIV (+ ART) ▸ Adults and children >12 months ▸ Infants <12 months with HIV in contact with active TB • HHC below 5 years of pulmonary* TB patients	TPT to all after ruling out active TB disease
• HHC 5 years and above of pulmonary* TB patients#	TPT among TBI positive# after ruling out TB disease

#Chest X Ray (CXR) and TBI testing would be offered wherever available, but TPT must not be deferred in their absence

Figure - 13: Identification of populations eligible for latent tuberculosis infection (LTBI) screening.[2]

Target population	Strategy
Individuals who are: • on immunosuppressive therapy • having silicosis • on anti-TNF treatment • on dialysis • preparing for organ or hematologic transplantation	TPT after ruling out TB disease among TBI positive

Figure- 14: Risk groups targeted for latent tuberculosis infection screening.[2]

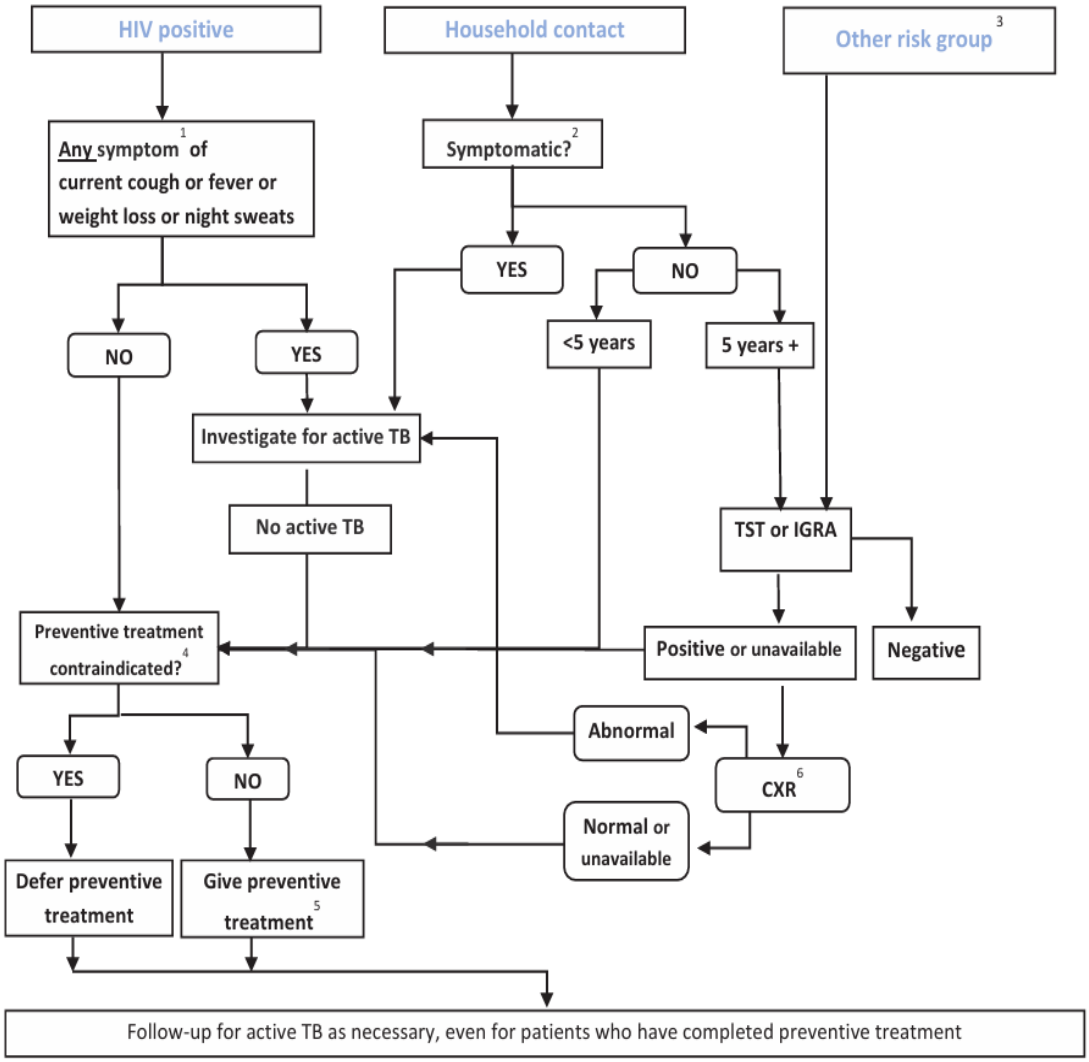


Figure –15: Flowchart for tuberculosis screening and preventive treatment in India.[2]

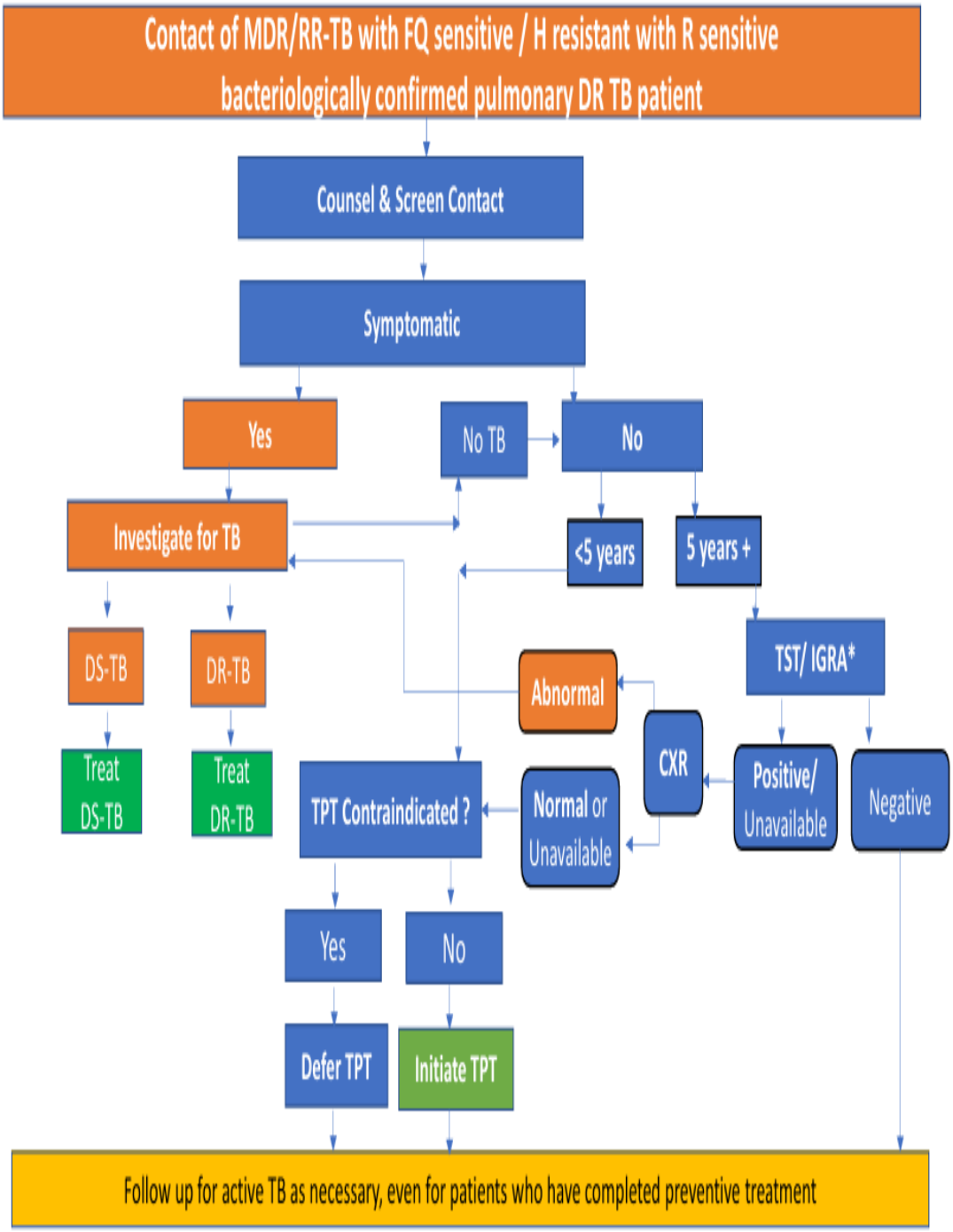


Figure – 16: Integrated algorithm for screening household contacts of DRTB.[2]

TPT TREATMENT REGIMEN:[2]

The proposed treatment guidelines for individuals with LTBI, regardless of HIV status of the individual, include:

- **Six months of daily isoniazid therapy (INH):** This traditional regimen has been widely used for LTBI treatment. The recommended dosing of isoniazid is 5 mg/kg in adult patients and 10 mg/kg for pediatric patients, not exceeding a maximum dose of 300 mg.
- **3-month regimen of once weekly isoniazid with rifapentine (3HP):** This shorter regimen has shown greater treatment completion rates and is effective irrespective of HIV-status.
- **4 months of daily rifampicin (4R):** An alternative regimen that is effective and associated with higher completion rates compared to longer isoniazid monotherapy.

According to WHO guidelines, contacts of active disease with known multidrug-resistant tuberculosis, who are fluoroquinolone sensitive should be given six months of levofloxacin, using a pediatric formulation for child contacts, provided it is well tolerated.

Contacts may receive 6H if RR-TB index patients have confirmed H susceptibility. Rifampicin is advised to be used for four months in contacts who have been exposed to people who have known H-resistant TB and are R sensitive.[2]

Following initiation of Tuberculosis Preventive Treatment (TPT), it is essential to monitor individuals for both clinical symptoms and potential side effects to ensure treatment efficacy and safety. The following monitoring measures are recommended:[2]

- **Clinical Assessment:**[2]
    - **Symptom Screening:** Regular evaluation for the presence of the "4S symptoms—cough, night sweats, fever and loss of weight"—which are indicative of active TB disease.
    - **Side Effect Monitoring:** Observe and document any adverse reactions to the medication, such as hepatotoxicity or hypersensitivity reactions.
    - **Emergence of TB Signs/Symptoms:** If new symptoms suggestive of TB develop during TPT, a comprehensive clinical assesment to be done to rule out active disease.
- **Laboratory Monitoring:**[2]
    - Prior to starting TPT, baseline tests, including complete blood counts and assessment of liver function, are to be carried out to assess for any pre-existing conditions that may influence treatment.
    - Periodically laboratory tests to be repeated to detect potential drug-related toxicities, especially in individuals at higher risk for adverse effects.

Target population	Treatment option
• People living with HIV (adults and children >12 months) • Infants <12 months in contact with active TB • HHC below 5 years of pulmonary* TB patients	• 6-months daily isoniazid (6H) • 3-month weekly Isoniazid and Rifapentine (3HP) in persons older than 2 years
• HHC 5 years and above of pulmonary* TB patients (testing would be offered whenever available)	• 3-month weekly Isoniazid and Rifapentine (3HP) • 6-months daily isoniazid (6H)
b. Other risk groups expansion	
• Children/adult on immunosuppressive therapy, silicosis, anti-TNF treatment, dialysis, transplantation	• 3-month weekly Isoniazid and Rifapentine (3HP) • 6-months daily isoniazid (6H)

Figure -17: Target population and TPT regimen options.[2]

Regimen	Dose by age and weight band					
6 months of daily isoniazid monotherapy (6H)	Age 10 years & older: 5 mg/kg/day[d] Age <10 years: 10 mg/kg/day (range, 7–15 mg)					
Three months of weekly rifapentine plus isoniazid (12 doses) (3HP)	**Age 2-14 years[c]**					
	Medicine, formulation	10–15 kg	16–23 kg	24–30 kg	31–34 kg	>34 kg
	Isoniazid, 100 mg[a]	3	5	6	7	7
	Rifapentine, 150 mg	2	3	4	5	5
	Isoniazid + rifapentine FDC (150 mg/150 mg)[b]	2	3	4	5	5
	Age >14 years[c]					
	Medicine, formulation	30–35 kg	36–45 kg	46–55 kg	56–70 kg	>70 kg
	Isoniazid, 300 mg	3	3	3	3	3
	Rifapentine, 150 mg	6	6	6	6	6
	Isoniazid + rifapentine FDC (300 mg/300 mg)[b]	3	3	3	3	3

Figure -18: Regimen options for TB preventive therapy with recommended dosages of medicines.[2]

Regimen	Dose by age and weight band
Six months of daily levofloxacin (6Lfx) for contacts of R resistant FQ sensitive patients#	Age > 14 years, by body weight: < 45 kg, 750 mg/day; ≥ 45 kg, 1g/day Age < 15 years (range approx. 15–20 mg/kg/day), by body weight: 5–9 kg: 150 mg/day 10–15 kg: 200–300mg/day 16–23 kg: 300–400mg/day 24–34 kg: 500–750mg/day
Four months of rifampicin daily (4R) for contacts of H resistant R sensitive patients*	Age 10 years & older: 10 mg/kg/day@ Age <10 years: 15 mg/kg/day (range, 10–20 mg)

Figure - 19: Recommended TPT regimens and dosages for contacts of DR-TB index cases.[2]

CONTRAINDICATIONS:[2]

1. **Active TB Disease:** Individuals with confirmed or suspected active TB should receive anti-tubercular therapy rather than preventive therapy.

2. **Severe Liver Disease:** Conditions such as acute hepatitis or cirrhosis with liver failure contraindicate TPT due to the hepatotoxic potential of medications like isoniazid and rifampicin.

3. **Known Drug Hypersensitivity:** A history of severe allergic reactions to components of the TPT regimen (e.g., isoniazid, rifampicin, rifapentine) precludes their use.

4. **Severe Peripheral Neuropathy:** Isoniazid can exacerbate neuropathy, making it unsuitable for those with significant peripheral nerve disorders (presence of symptoms like persistent tingling, numbness and burning sensation).

5. **Frequent and excessive consumption of alcohol.**

ISONIAZID:

Isoniazid, also referred to as, isonicotinic acid hydrazide (INH), a nicotinic acid derivative was the first antibiotics used to treat tuberculosis (TB).[72] INH was first biosynthesized at the German University in Prague in 1912 by Hans Meyer and Josef Mally, but its antitubercular properties were not explored for decades.[73] In the early 1950s, researchers including Walsh McDermott, Irving Selikoff, and Edward Robitzek, Carl Muschenheim, systematically studied INH's effectiveness in tuberculosis patients**.**[74] Their work led to the widespread adoption of INH in standard TB regimens**.** By the late 1950s**,** INH became a cornerstone of tuberculosis treatment worldwide**.**[73]

Isoniazid is effective against both intracellular and extracellular *Mycobacterium tuberculosis*. Its bactericidal activity is most pronounced during the bacterium's active replication phase. The minimum inhibitory concentration (MIC) for INH-susceptible MTB isolates is typically ranging from 0.03 to 0.125 µg/mL.[75]

Mechanism of action:

Isoniazid (INH), acts as a pro-drug requiring activation by *Mycobacterium tuberculosis* enzyme catalase-peroxidase (KatG) to exert its bactericidal effect.[76] KatG functions

by catalyzing the isonicotinic acyl radical formation, subsequently coupling with NADH leading to formation of the nicotinoyl-NAD adduct. The adduct subsequently binds with high affinity to enoyl-acyl carrier protein reductase (InhA), obstructing the interaction between the natural enoyl-AcpM substrate and fatty acid synthase. This inhibition disrupts the biosynthesis of mycolic acids, crucial constituents of the mycobacterial cell wall, ultimately resulting in bacterial cell death.[77]

Pharmacokinetics:[78]

- **Absorption:** Following oral or intramuscular (IM) administration, INH is quickly and efficiently absorbed, attaining peak plasma levels within 1 to 2 hours. Absorption primarily occurs in the intestine, and the drug is transported to the liver via the portal system.
- **Distribution:** It distributes widely across all body tissues, including penetration into the cerebrospinal fluid (CSF). Plasma protein binding is low (10%–15%), allowing for efficient tissue distribution.
- **Metabolism:** INH undergoes hepatic inactivation via N-acetylation by N-acetyltransferase 2 (NAT2) in the liver and intestines. The acetylated metabolite, acetylhydrazine, is further oxidized by CYP2E1, producing hepatotoxic metabolites.
    - Individuals with rapid NAT2 metabolism may generate hepatotoxins more quickly, increasing the risk of INH-induced hepatotoxicity.

    - Glutathione S-transferase (GST) plays a protective role by detoxifying hepatotoxic metabolites, converting them into water-soluble and less toxic compounds for excretion.

- **Elimination:** The majority (75%–95%) of INH and its metabolites are eliminated in urine, with smaller quantities being eliminated via faeces and saliva.

INH resistance is primarily due to *katG* and *inhA* genes mutations. The *katG* gene codes for a catalase-peroxidase enzyme essential for activating INH; mutations here can lead to high-level resistance. Conversely, alterations in inhA gene or its promoter region frequently lead to the development of resistance to INH (low-level). Evidence from studies have suggested that high-dose INH therapy (10–15 mg/kg daily) retains bactericidal activity against strains with *inhA* mutations, analogous to the standard 5 mg/kg dosage against drug-sensitive strains. However, high-dose INH lacks early bactericidal activity against strains with *katG* mutation.[76]

Adverse Effects of Isoniazid (INH):

Isoniazid (INH) is usually well tolerated. Despite its efficacy, it is associated with both dose-dependent and idiosyncratic adverse effects, primarily affecting the liver, nervous system, and gastrointestinal tract.

1. *Hepatotoxicity* –

- Most serious and common adverse effect; can range from asymptomatic liver enzyme elevation to fulminant hepatitis.[79]

- Risk factors: Older age group (>35 years), alcoholism, pre-existing liver disease, genetic polymorphisms (NAT2 slow acetylators).[80]

2. *Peripheral Neuropathy* –

- Occurs due to pyridoxine (vitamin B6) depletion, leading to sensory nerve dysfunction. There is a relative lack of biologically active pyridoxine as INH and pyridoxine combine to generate a hydrazone that is eliminated in the urine.[81]

- Symptoms: Numbness, tingling, burning sensations in hands and feet.[82]

- Risk factors: Malnutrition, diabetes, alcohol use, pregnancy, HIV infection, and slow acetylators.[81]

- Prevention: Vitamin B6 supplementation (25–50 mg/day) is advised in high-risk population.[83]

3. *Neuropsychiatric Effects* –

- Rare but serious effects include seizures, psychosis, depression, and suicidal ideation, likely related to GABA depletion due to pyridoxine deficiency.[84]

4. *Gastrointestinal Effects* –

- Nausea, vomiting, epigastric pain, and diarrhoea are common but mild and self-limiting.[79]

5. *Hypersensitivity Reactions* –

- Fever, rash, eosinophilia, and drug-induced lupus.[85]

- Rare reactions: Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN).[86]

6. *Hematologic Effects* –

- Aplastic anaemia, agranulocytosis, and thrombocytopenia.[85]

7. *Endocrine Effects* –

- Gynecomastia and metabolic acidosis.[87]

RIFAMPICIN:

Rifampicin (also referred to as rifampin), is a semi-synthetic, broad-spectrum antimicrobial, obtained from rifamycin B, being produced by *Amycolatopsis rifamycinica*.[88] It has potent bactericidal activity, especially against *Mycobacterium tuberculosis*, making it a cornerstone in tuberculosis (TB) treatment.[89] It is also used to treat leprosy, bacterial infections, and as a prophylactic agent for meningococcal and staphylococcal infections.[90]

Mechanism of Action:

Rifampicin belongs to the rifamycin class of antibiotics and exerts its effect by inhibiting bacterial RNA synthesis. It binds to the beta subunit of bacterial DNA-dependent RNA polymerase, thereby obstructing transcription and ultimately causing bacterial cell death.[91] This mechanism makes rifampicin a potent bactericidal agent against *Mycobacterium tuberculosis* as well as a range of Gram-positive and Gram-negative bacteria. It is effective against both actively dividing bacteria and those in a dormant state.[92]

Pharmacokinetics:

- **Absorption:** It is rapidly absorbed into the blood stream from the gastrointestinal tract and bioavailability is reduced with food.[93]

- **Distribution:** Wide distribution, including intracellular penetration. It crosses the blood-brain barrier.[94]

- **Metabolism:** Primarily metabolized in the liver via deacetylation.[95]
- **Excretion:** Excreted mainly in bile (65%) and to some extent in urine.[92]

Adverse Effects:[96]

- Hepatotoxicity (risk increases with pre-existing liver disease)
- Occurrence of red-orange discoloration in bodily fluids, notably urine, sweat, and tears
- Gastrointestinal disturbances (nausea, vomiting, diarrhoea)
- Hypersensitivity reactions (rash, fever)
- Haematologic such as thrombocytopenia, haemolysis (rare)
- Renal – acute kidney injury

Drug Interactions:[97]

Rifampicin is a strong inducer of cytochrome P450 enzymes (CYP3A4, CYP2C9), which affects the metabolism of several drugs, including:

- **Oral contraceptives** - Reduced effectiveness and increases risk of pregnancy.
- **Warfarin** - Increased clearance, reducing anticoagulation effects.
- **Protease inhibitors (HIV treatment)** - Reduced plasma concentrations.
- **Antiepileptic drugs (e.g., phenytoin, carbamazepine)** – Increased metabolism and decreased effectiveness.

- **Immunosuppressants (Cyclosporine, Tacrolimus)** – Reduced plasma levels, risk of rejection.

RIFAPENTINE:

Rifapentine is a rifamycin antibiotic that is structurally similar to rifampin**,** with a key difference being the substitution of a cyclopentyl group at the C-3 position**.** This modification improves its lipophilicity and extends its half-life**,** which makes it suitable for less frequent dosing**.**[98]

Mechanism of Action:

Rifapentine targets the beta-subunit of bacterial RNA polymerase, effectively inhibiting RNA synthesis. This prevents transcription of genes of the bacteria, resulting in bacterial cell death.[99] It demonstrates antimicrobial effect against a diverse array of gram-positive and gram-negative pathogens, particularly Mycobacterium tuberculosis**.**[100]

Pharmacokinetics:

- **Long half-life**: Rifapentine has a half-life of 13-14 hours, facilitating less frequent administration compared to rifampin. This contributes to its potential use in once-weekly regimens.[101]
- **Absorption**: Well-absorbed orally, though it should be taken with food to enhance absorption.[102]
- **Metabolism**: Metabolized in the liver, predominantly by the CYP450 enzyme system.[103]

- **Drug interactions**: Rifapentine, like rifampin, induces the CYP450 enzymes, leading to potential interactions with other medications metabolized by these pathways (e.g., antiretrovirals, oral contraceptives).[103]

Adverse Effects:[104]

- Hepatotoxicity
- Orange discoloration of body fluids
- Gastrointestinal effects – nausea, vomiting.

BARRIERS FOR TPT:

Tuberculosis Preventive Treatment (TPT) is a critical strategy for minimizing the likelihood of latent infection progressing to active tuberculosis, especially within high-risk population, such as people living with HIV (PLHIV) and household members of tuberculosis patients. Despite its benefits, several barriers hinder the widespread implementation and uptake of TPT.

1. Limited Awareness and Knowledge:

- Many healthcare providers and at-risk populations lack sufficient awareness about TPT, its benefits, and eligibility criteria.[71]
- Misconceptions and fear of TB drug side effects contribute to low adherence rates.[105]

2. Health System Challenges:[106]

- Weak diagnostic and reporting systems hinder the identification of eligible individuals for TPT.
- Inadequate training for healthcare workers results in inconsistent prescription practices.
- Stockouts of TPT medications disrupt continuity of care, particularly in areas with low-resources.

3. Stigma and Fear of TB Association:

- Some individuals avoid TPT due to the stigma associated with TB, fearing discrimination in their communities.[107]
- PLHIV may be reluctant to take TPT due to concerns about additional pill burden alongside antiretroviral therapy (ART).[106]

4. Adverse Drug Reactions and Adherence Issues:[108]

- Concerns about side effects (e.g., liver toxicity with isoniazid) deter patients from completing TPT regimens.
- Longer treatment regimens (e.g., isoniazid preventive therapy for 6-9 months) reduce adherence, though newer regimens like 3HP (rifapentine weekly-once dosing and isoniazid for 3 months) show promise.

5. Policy and Funding Gaps:[71]

- Many high-burden TB countries lack strong national TPT policies and funding for implementation.

- Insufficient integration of TPT into primary healthcare systems limits access.

Recommendations to Overcome Barriers:[109]

- Expanding access to shorter regimens (e.g., 3HP and 1HP) to improve adherence.
- Strengthening healthcare provider training to ensure proper TPT prescription and patient counselling.
- Addressing stigma through community education and advocacy programs.
- Ensuring continuous supply chains to prevent medication shortages.

OTHER SIMILAR STUDIES:

In a study done by Reichler MR et al.,[110] to determine factors for development tuberculosis and the impact of prophylactic treatment in close contacts of individuals with tuberculosis, they concluded that treatment for latent TB infection was highly effective in preventing active infection as active infection developed in 49(9.8%) of 446 patient who did not receive prophylaxis compared to 1(0.2%) of 517 patient who completed the treatment.

A study conducted by Nair D et al.,[111] among 683 HHCs of 280 index cases, 71(13%) patients had abnormal findings on chest x-ray and 70% of them had symptoms. 29 were diagnosed to have sputum smear positive TB among the contacts. They concluded that screening of HHCs is an efficient method to identify new cases among contacts.

Karbito K et al.,[112] used the TST to detect latent tuberculosis infection in household contacts with active tuberculosis patients and concluded that there was a high incidence of latent tuberculosis infection in household members of active patients. Out of the 138 subjects selected

from 241 family contacts of 112 active cases, 88 subjects were found to have latent tuberculosis infection based on TST.

A study was conducted by Krishnamoorthy Y et al.,[113] to evaluate the burden and factors influencing latent tuberculosis infection in household contacts of individuals with active tuberculosis. They included 1523 household contacts, out of which 801(52.6%) had latent tuberculosis infection and 6(0.4%) developed active tuberculosis infection in the follow up period of 1 year. 4 out of these 6 individuals had latent tuberculosis infection during baseline evaluation.

Cohen A et al.,[114] undertook a study to estimate the global distribution of latent tuberculosis infection based on both interferon-gamma release assays (IGRA) and tuberculin skin test. A total of 3280 subjects were screened from 36 countries and the global prevalence was found to be 24.8 % and 21.2%, based on IGRA and 10mm TST cut-off respectively. It was concluded that the estimated prevalence correlated well with the WHO incidence rates.

A study conducted by Kashyap RS et al.[115] aimed to evaluate the diagnostic utility of QuantiFERON TB Gold and the tuberculin skin test for detecting latent tuberculosis infection in the high tuberculosis endemic region of Nagpur, India.The study estimated a prevalence of 42% with TST and 48% with QFT-G and an overall prevalence of around 69%. The study concluded a presence of greater number of LTBI in high TB endemic areas.

A retrospective study comprising of 278 HHCs of 27 pulmonary tuberculosis cases was conducted in Oman, a country with low tuberculosis incidence, by Singh J et al.,[116] to identify the number of individuals with latent tuberculosis infection and to compare the rates of infection based on exposure characteristics. Latent tuberculosis infection was detected in 22.8% of people exposed to active cases and they received counselling and given the option of

chemoprophylaxis following national treatment protocols.

A study conducted by Velen K et al.,[117] aimed at estimating the prevalence of LTBI among HHCs of TB patients and to evaluate the efficacy of contact investigation in contrast to passive case detection methods. The study found that contact investigation played a crucial role in enhancing TB case detection and notification, leading to a decrease in mortality rates and a reduction in the prevalence of TB within the population. Among contacts, the combined prevalence of LTBI was 42.4%.

In another cross-sectional study done by Wysocki AD et al.,[118] for diagnosis and treatment of tuberculosis infection among 336 contacts; 140 were symptomatic, 9 had active infection and 106 (48%) had positive tuberculin skin test result. 64 patients were started on treatment for latent tuberculosis infection. They concluded that contact investigation is required for TB control.

Htet K. K. K.et al.,[119] in their study conducted in Myanmar, observed that 14(12.2%) patients had active TB infection and 10 patients presented with clinical features suggestive of TB with an abnormal chest radiograph, among the 115 contacts. They concluded that an integrated approach is required for TB contact tracing using chest x-ray, sputum microscopy and Gene Xpert which resulted in a high rate of TB identification among exposed.

Reichler MR et al.,[120] conducted a study to assess the risks and time frame for development tuberculosis in contacts of patients with active infection. Of the 4490 contacts, 158 developed tuberculosis in 5 consecutive years following the diagnosis of index patient. They concluded that close contacts to active tuberculosis patients have higher risk of developing infection within 3 months and hence contact screening is required to detect and treat latent infection and prevent the disease.

MATERIALS AND METHODS

SOURCE OF DATA:

This prospective study was carried out in the Department of Respiratory Medicine, Shri B. M. Patil Medical College, Hospital and Research Centre, BLDE (Deemed to be) University, Vijayapura, Karnataka, from April 2023 to January 2025, on 264 household contacts of active tuberculosis patients attending the out-patient and in-patient department. This study was conducted after receiving approval from the Institutional Ethical Committee. The procedure of the study was explained to all participants and written informed consent was taken prior to enrollment.

METHOD OF COLLECTION OF DATA:

Study design: Cross-sectional study.

Study Period: Twenty-two months.

Sample size:

With the anticipated Proportion of latent tuberculosis infection 22.8% [116], the study would require a sample size of 264 patients with 95% level of confidence and 5% absolute precision.

Formula used:

$$n=\frac{z^2\, p*q}{d^2}$$

Where Z= Z statistic at α level of significance

d^2= Absolute error

P= Proportion rate

$q = 100 - p$

Statistical Analysis:

Data entry was performed using Microsoft Excel 2019, followed by analysis with SPSS version 20. Descriptive statistics summarized sociodemographic and clinical variables. For continuous data, results are presented as mean ± SD or median (IQR), while categorical data are represented as frequencies and percentages. Appropriate statistical tests were used based on data type. Variables with $p < 0.05$ were considered significant.

INCLUSION CRITERIA:

- All contacts of TB patients more than 5 years of age.
- Individuals ready to give informed consent for inclusion in the study.

EXCLUSION CRITERIA:

- Patients already diagnosed as having tuberculosis.
- Those already on chemoprophylaxis for tuberculosis.
- Pregnant and lactating women.
- Children less than 5 years of age.
- Individuals not willing to take part in the study or to give informed consent for the study.

METHODOLOGY:

All household contacts of pulmonary tuberculosis and extrapulmonary tuberculosis with history of exposure to individuals with active tuberculosis, attending the out-patient and in-patient department at Shri B. M. Patil Medical College, Hospital and Research Centre, Vijayapura, from April 2023 to January 2025, were enrolled in the study. Data were collected using a structured questionnaire, which comprised demographic details, contact history, and relevant personal history (e.g., smoking, alcohol use, comorbidities).

All participants underwent the following investigations:

- Chest X-ray (posteroanterior view)
- Tuberculin Skin Test: The Mantoux test was administered using 0.1 mL (5 TU) of purified protein derivative injected intradermally on the volar aspect of the forearm. The test result was read after 48 to 72 hours. An induration of ≥10 mm was considered positive.
- Sputum examination for AFB: An early morning sample of sputum (3–10 mL) was collected from each participant under proper sterile conditions. The specimen was subjected to smear microscopy using either Auramine-O fluorescent staining or ZN staining. For Auramine-O staining, smears were examined under a fluorescent microscope, whereas Ziehl-Neelsen-stained smears were examined under light microscopy using oil immersion fields. The presence of acid-fast bacilli was recorded and graded according to standard guidelines provided by the Revised National Tuberculosis Control Programme (RNTCP)/National TB Elimination Programme (NTEP).

Diagnostic Categorization:

- Active Tuberculosis: Participants with positive sputum smear microscopy for AFB were diagnosed with active TB and started on standard anti-tubercular therapy in accordance with national guidelines.
- Latent Tuberculosis Infection (LTBI)**:** Participants who tested positive for TST but had negative sputum AFB were diagnosed with LTBI. These individuals were offered TB preventive therapy (TPT), and their willingness to initiate treatment was recorded.
- No Evidence of TB Infection: Participants with negative results on all three tests (TST, sputum AFB, and chest X-ray) were considered uninfected but were still offered TPT. Their willingness to initiate treatment was similarly documented.

Assessment of TPT Uptake and Adherence:

For all participants eligible for TPT, willingness to accept therapy was assessed. Among those who declined treatment, the reasons for unwillingness were recorded. In participants who initiated TPT, treatment completion rates were monitored and documented.

RESULTS

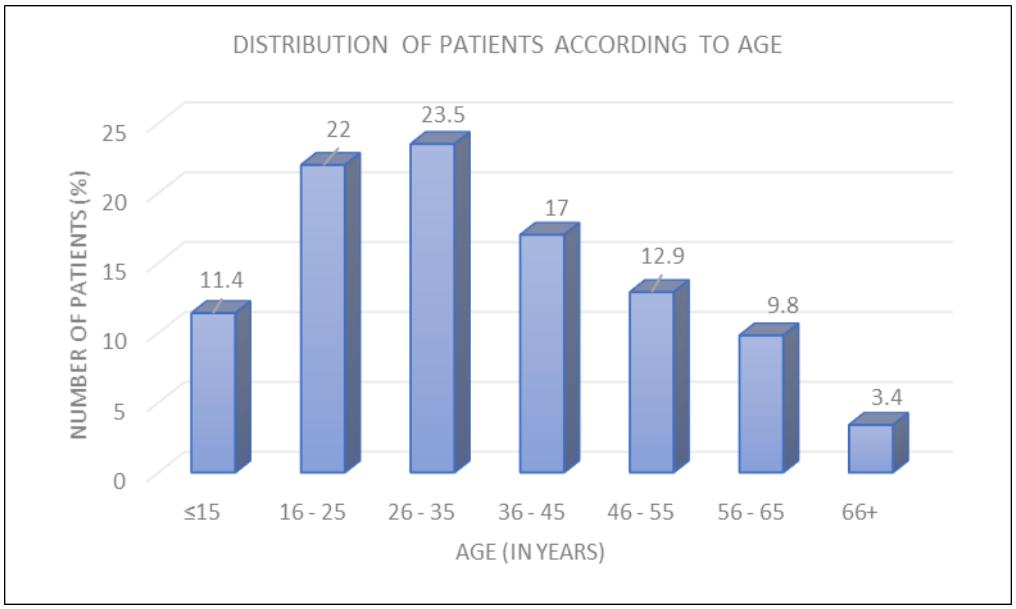
Distribution of patients according to age:

The distribution of patients according to different age groups is depicted in graph-1, with majority of patients being in the age group of 16-35 years. The mean age was 34.55 ±16.45.

Table-1: Distribution of patients according to age.

Age (in years)	Number of patients	Percentage (%)
≤15	30	11.4
16 – 25	58	22.0
26 – 35	62	23.5
36 – 45	45	17.0
46 – 55	34	12.9
56 – 65	26	9.8
66+	9	3.4
Total	264	100.0

Graph-1: Distribution of patients according to age.



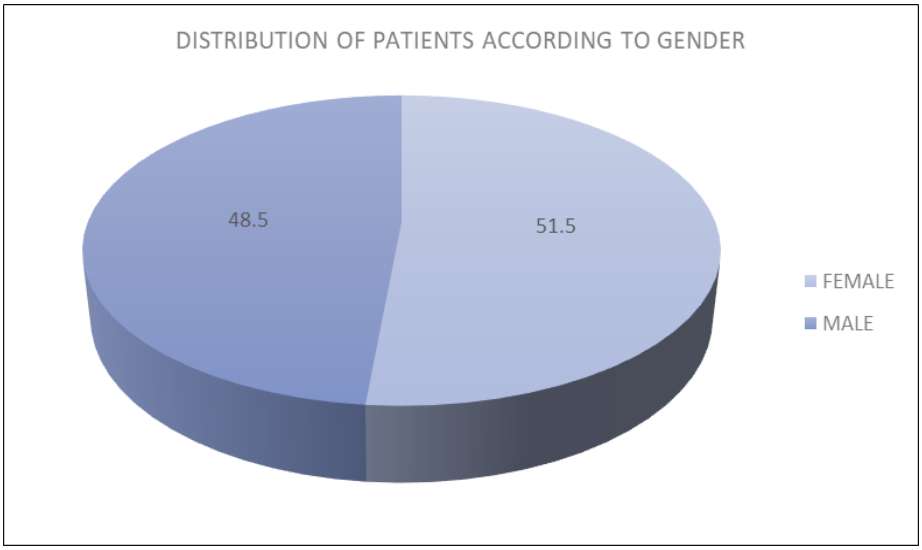
Distribution of patients according to gender:

It was observed that the gender inclination was slightly towards females, constituting 51.5% of study population (136 in number), while 48.5% of patients were males (128 in number), as represented in graph-2.

Table-2: Distribution of patients according to gender.

Gender	Number of patients	Percentage (%)
Female	136	51.5
Male	128	48.5
Total	264	100.0

Graph-2: Distribution of patients according to gender.



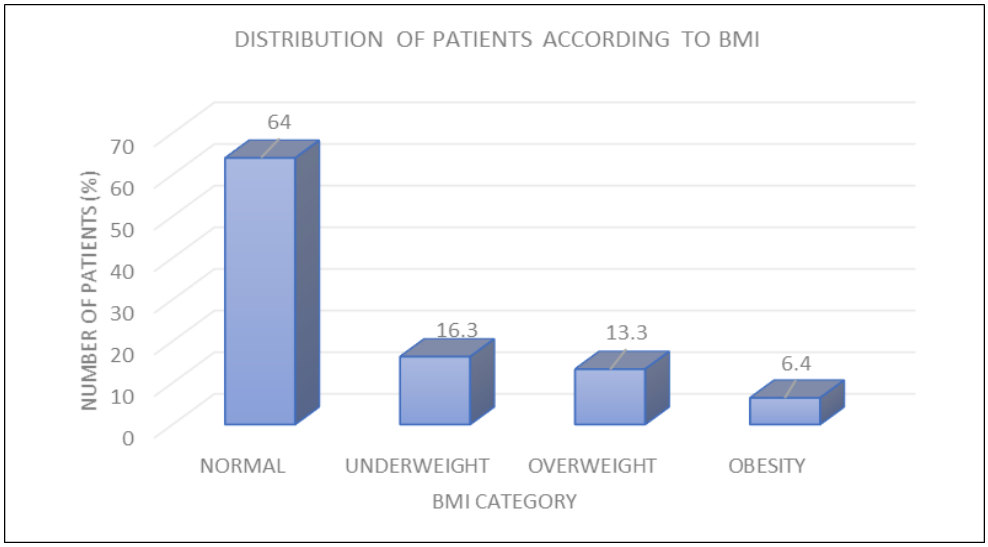
Distribution of patients according to BMI:

Of the 264 patients, 64% were of ideal body weight (169 in number), whereas 16.3% (43 patients) were underweight. 35 (13.3%) and 13 (6.4%) patients belonged to the overweight and obese category respectively. The mean body mass of index of the study population was 22.29 ± 4.16.

Table-3: Distribution of patients according to BMI.

BMI category	Number of patients	Percentage (%)
Normal	169	64.0
Underweight	43	16.3
Overweight	35	13.3
Obesity	17	6.4
Total	264	100.0

Graph-3: Distribution of patients according to BMI.



Distribution of patients based on comorbidities:

The distribution of patients based on comorbidities is represented in graph-4. Diabetes mellitus (8.7%) was the most common comorbidity observed.

Table-4: Distribution of patients based on comorbidities.

Comorbidities	Number of patients	Percentage (%)
Diabetes	23	8.7
Diabetes and hypertension	7	2.7
Hypertension	20	7.6
Hypothyroidism	6	2.3
None	208	78.8
Total	264	100.0

Graph-4: Distribution of patients based on comorbidities.

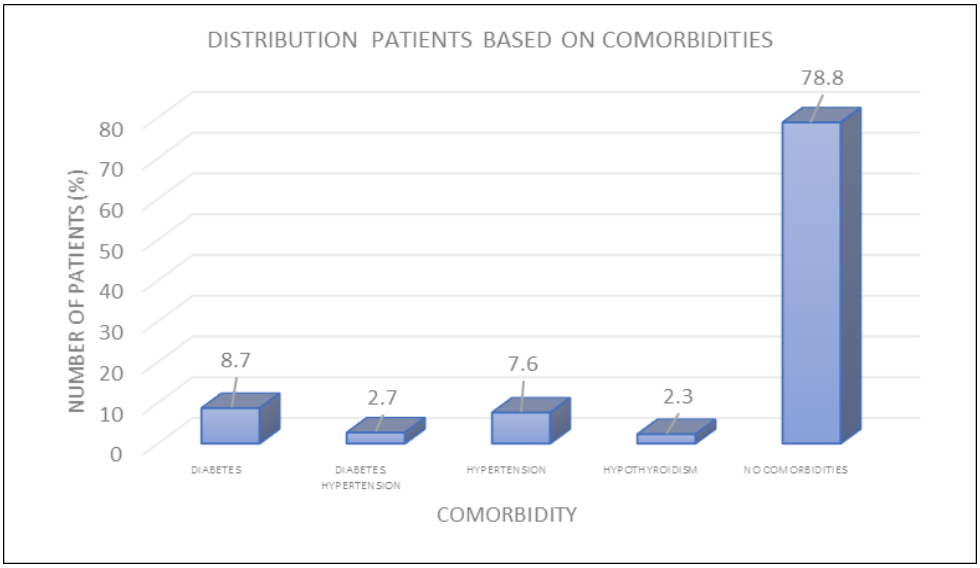


Table-5: Distribution of patients based on diabetes mellitus and its association with LTBI.

			Diagnosis		Total	Chi-square Value	p-value
			LTBI	Normal			
Diabetes Mellitus	**Yes**	Number of patients	9	21	30	4.559	0.032*
		Percentage	30.0%	70.0%	100.0%		
	No	Number of patients	34	198	232		
		Percentage	14.7%	85.3%	100.0%		
Total		Number of patients	43	219	262		
		Percentage	16.4%	83.6%	100.0%		
***Statistically significant**							

Table-6: Distribution of patients based on hypertension and its association with LTBI.

			Diagnosis		Total	Chi-square Value	p-value
			LTBI	Normal			
Alcohol Use	**Yes**	Number of patients	5	22	27	0.097	0.755
		Percentage	18.5%	81.5%	100.0%		
	No	Number of patients	38	197	235		
		Percentage	16.2%	83.8%	100.0%		
Total		Number of patients	43	219	262		
		Percentage	16.4%	83.6%	100.0%		
Statistically not significant							

Distribution of patients based on smoking habits:

The distribution of smoking habits among the study population is depicted in graph-5.

Table-7: Distribution of patients based on smoking habits.

Smoking habits	Number of patients	Percentage (%)
None	191	72.3
Smoker	35	13.3
Smoker, tobacco chewer	9	3.4
Tobacco chewer	29	11.0
Total	264	100.0

Graph-5: Distribution of patients based on smoking habits.

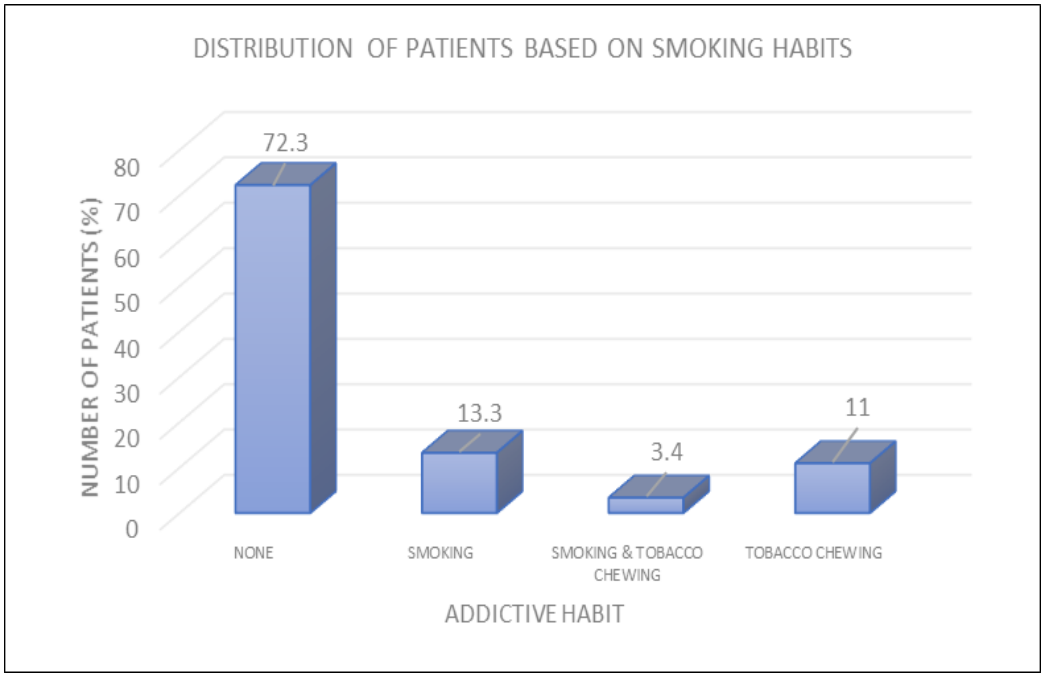


Table-8: Distribution of patients based on tobacco use and its association with LTBI.

			Diagnosis		Total	Chi-square Value	p-value
			LTBI	Normal			
Tobacco Use	**Yes**	Number of patients	11	62	73	0.461	0.497
		Percentage	15.1%	84.9%	100.0%		
	No	Number of patients	32	157	189		
		Percentage	16.9%	83.1%	100.0%		
Total		Number of patients	43	219	262		
		Percentage	16.4%	83.6%	100.0%		
Statistically not significant							

Distribution of patients based on alcoholism:

Out of the 264 patients enrolled in the study, 39 patients (14.8%) had history of alcohol consumption while 85.2% were non-alcoholics, the distribution depicted in graph-6.

Table-9: Distribution of patients based on alcohol use.

Alcohol use	Number of patients	Percentage (%)
Present	39	14.8
No	225	85.2
Total	264	100.0

Graph-6: Distribution of patients based on alcohol use.

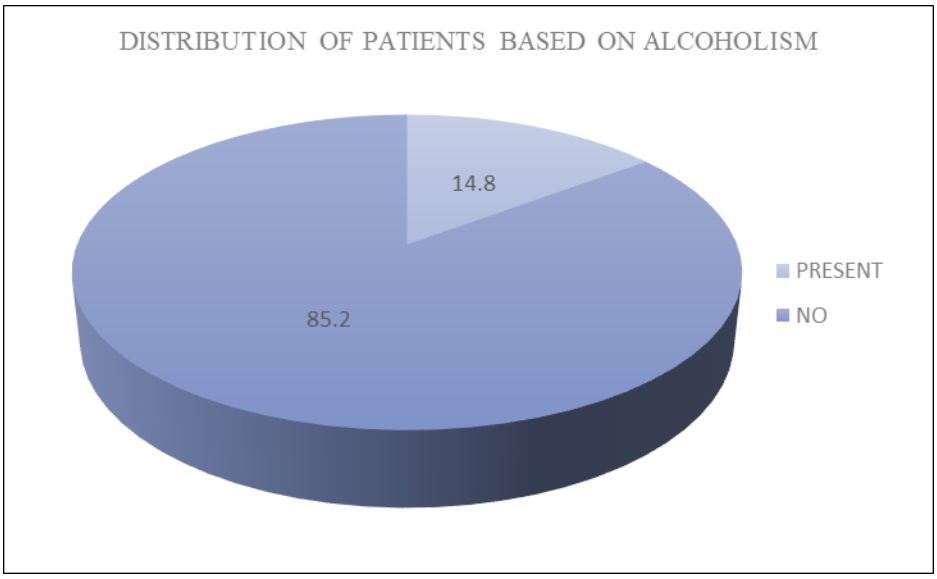


Table-10: Distribution of patients based on alcohol use and its association with LTBI.

			Diagnosis		Total	Chi-square Value	p-value
			LTBI	Normal			
Alcohol Use	**Yes**	Number of patients	7	32	39	0.343	0.558
		Percentage	17.9%	82.1%	100.0%		
	No	Number of patients	36	187	223		
		Percentage	16.1%	83.9%	100.0%		
Total		Number of patients	43	219	262		
		Percentage	16.4%	83.6%	100.0%		
Statistically not significant							

Distribution of patients based on chest radiograph findings:

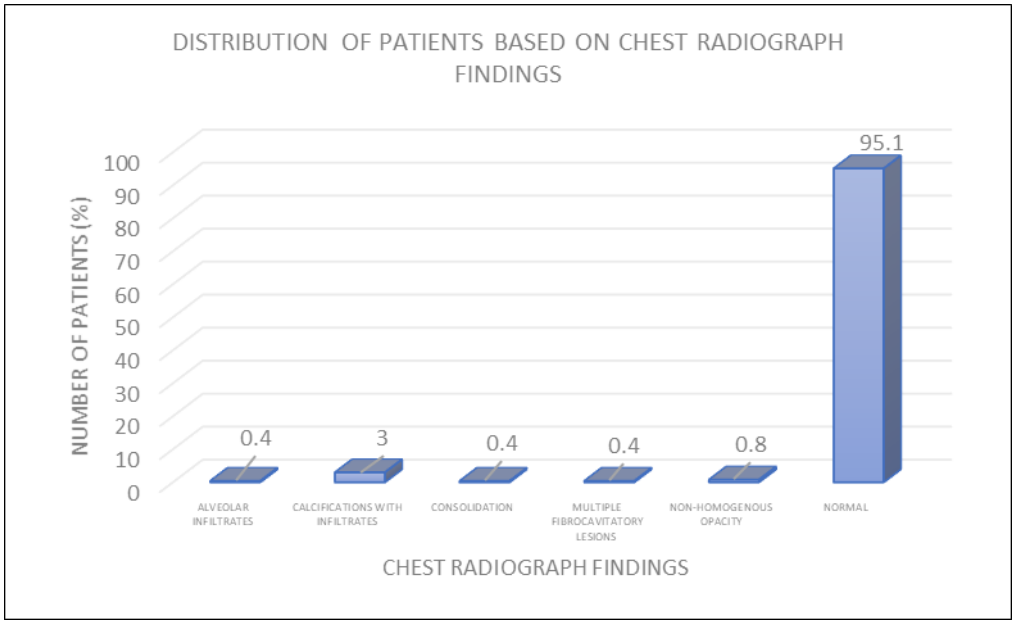
Majority of patients (95.1%) had normal chest radiograph. Among the 13 patients

with abnormalities on chest radiograph, maximum number of patients (3.0%) had calcifications with infiltrates, the distribution of patients based on chest radiograph findings is depicted in graph-7.

Table-11: Distribution of patients based on chest radiograph findings.

Chest radiograph findings	Number of patients	Percentage (%)
Alveolar infiltrates	1	0.4
Calcifications with infiltrates	8	3.0
Consolidation	1	0.4
Multiple fibrocavitatory lesions	1	0.4
Non-homogenous opacity	2	0.8
Normal	251	95.1
Total	264	100.0

Graph-7: Distribution of patients based on chest radiograph findings.



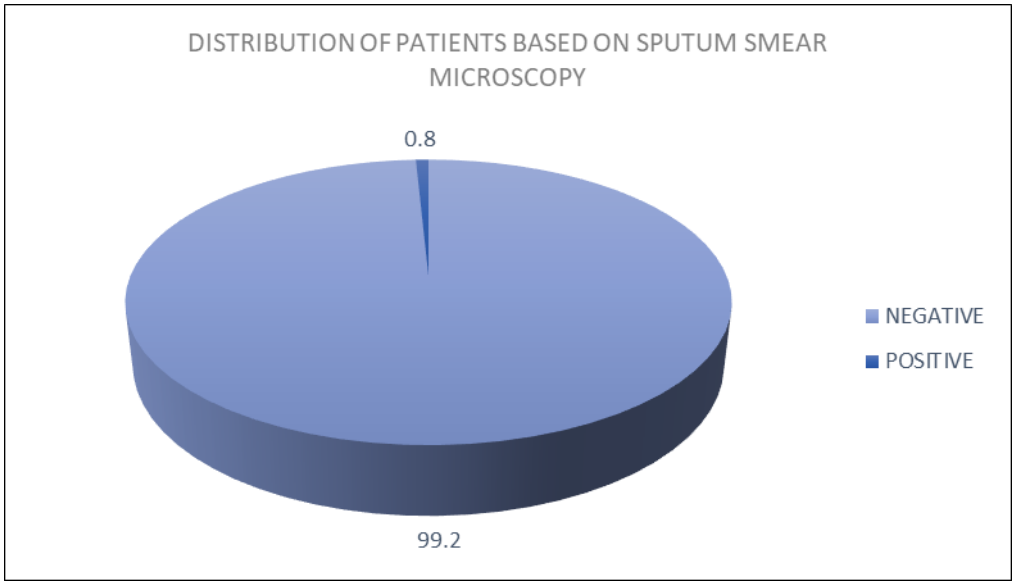
Distribution of patients based on sputum smear microscopy:

Sputum smear microscopy positivity for acid fast bacilli was observed in 2 patients (0.8%), the distribution is represented in graph-8.

Table-12: Distribution of patients based on sputum smear microscopy.

Sputum smear microscopy	Number of patients	Percentage (%)
Negative	262	99.2
Positive	2	0.8
Total	264	100.0

Graph-8: Distribution of patients based on sputum smear microscopy.



Distribution of patients based on tuberculin skin test:

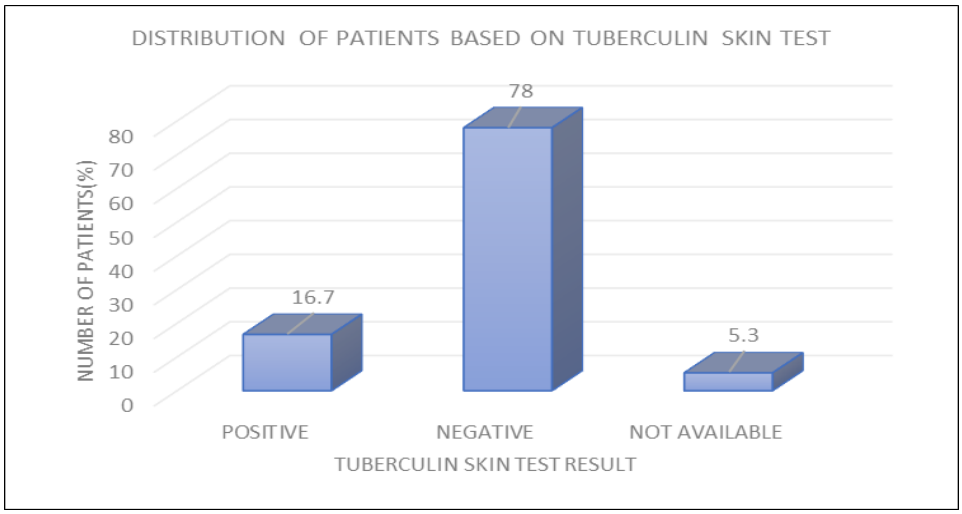
Tuberculin skin test was positive in 16.7% of the contacts, and was negative in

78.0%. Distribution of contacts with respect to tuberculin skin test is shown in graph-9.

Table-13: Distribution of patients based on tuberculin skin test.

Tuberculin skin test	Number of patients	Percentage (%)
Positive	44	16.7
Negative	206	78.0
Not available	14	5.3
Total	264	100.0

Graph-9: Distribution of patients based on tuberculin skin test.



Distribution of patients based on chest radiograph findings with respect to sputum smear microscopy

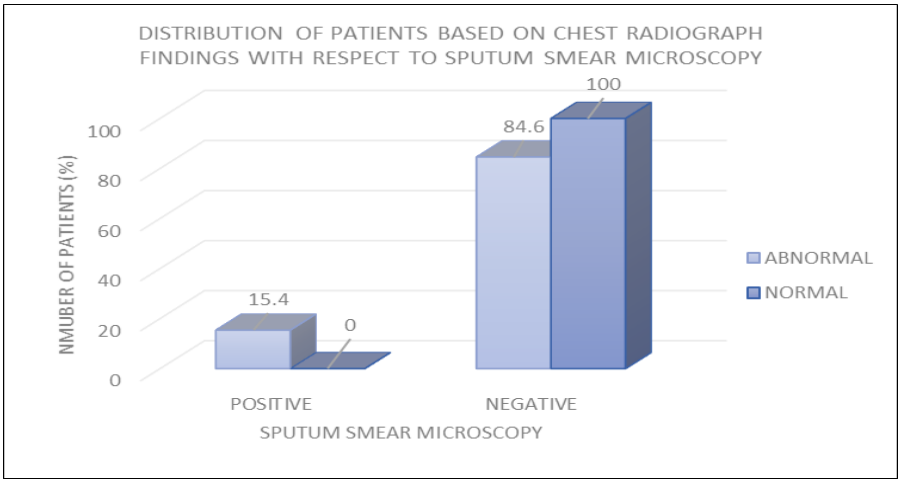
Sputum smear microscopy was positive in 15.4% and negative in 84.6% contacts with abnormal chest radiograph findings, as depicted in graph-10. There was a statistically significant association between sputum smear microscopy and chest radiograph findings

(p<0.05) (Table-14).

Table-14: Distribution of patients based on chest radiograph findings with respect to sputum smear microscopy.

			Sputum Microscopy		Total	Chi-square Value	p-value
			Positive	Negative			
Chest X-ray	Abnormal	Number of patients	2	11	13	197.539	0.000*
		Percentage	15.4%	84.6%	100.0%		
	Normal	Number of patients	0	251	251		
		Percentage	0.0%	100.0%	100.0%		
Total		Number of patients	2	262	264		
		Percentage	0.8%	99.2%	100.0%		
*Statistically significant							

Graph-10: Distribution of patients based on chest radiograph findings with respect to sputum smear microscopy.



Distribution of patients based on chest radiograph findings with respect to tuberculin skin test

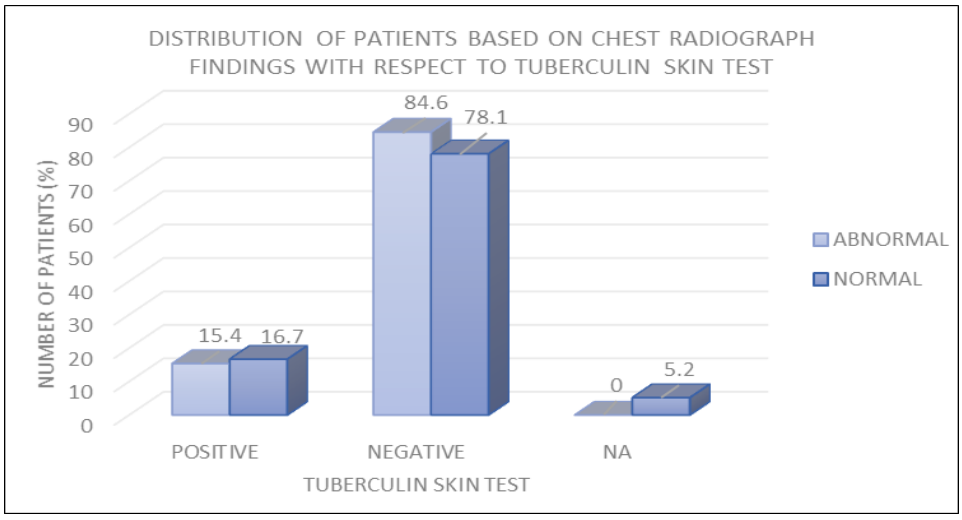
Out of the 13 household contacts with abnormal chest radiograph findings, 2

patients (15.4%) had positive tuberculin skin test while 84.6% had negative results, the distribution depicted in graph-11. The association was not statistically significant (p>0.05) (Table-15).

Table-15: Distribution of patients based on chest radiograph findings with respect to tuberculin skin test.

			Tuberculin Skin test			Total	Chi-square Value	p-value
			Positive	Negative	NA			
Chest X-ray	**Abnormal**	Number of patients	2	11	0	13	13.066	0.220
		Percentage	15.4%	84.6%	0.0%	100.0%		
	Normal	Number of patients	42	196	13	251		
		Percentage	16.7%	78.1%	5.2%	100.0%		
Total		Number of patients	44	207	13	264		
		Percentage	16.7%	78.4%	4.9%	100.0%		
Statistically not significant								

Graph-11: Distribution of patients based on chest radiograph findings with respect to tuberculin skin test.



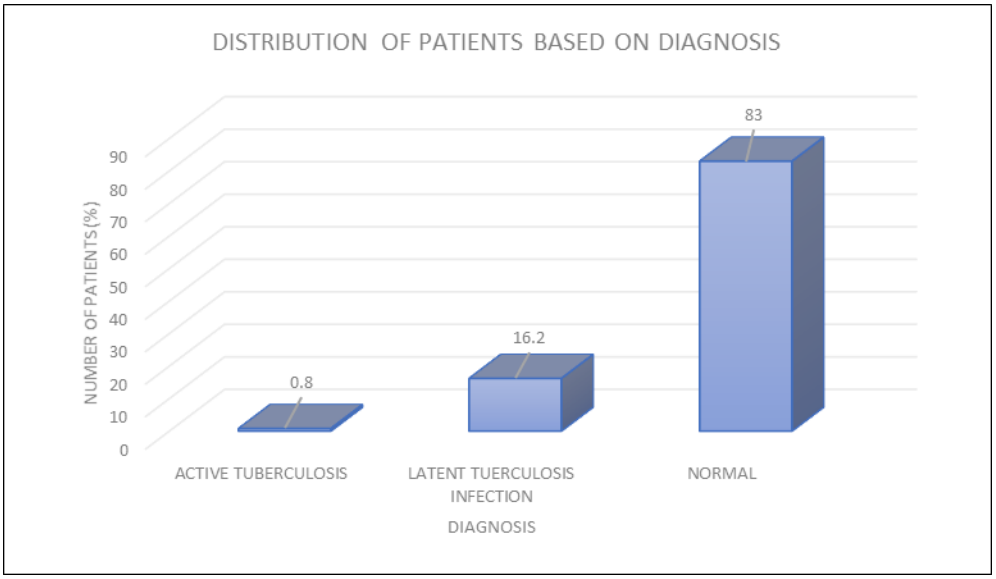
Distribution of patients based on diagnosis:

Maximum number of patients were normal (83.0%), with negative tuberculin skin test and sputum smear microscopy. Active tuberculosis and latent tuberculosis infection were diagnosed in 0.8% and 16.2% of the contacts respectively. The distribution of cases according to diagnosis is represented in graph-12.

Table-16: Distribution of patients based on diagnosis.

Contact diagnosis	Number of patients	Percentage (%)
Active tuberculosis	2	0.8
Latent tuberculosis infection	43	16.2
Normal	219	83.0
Total	264	100.0

Graph-12: Distribution of patients based on diagnosis.



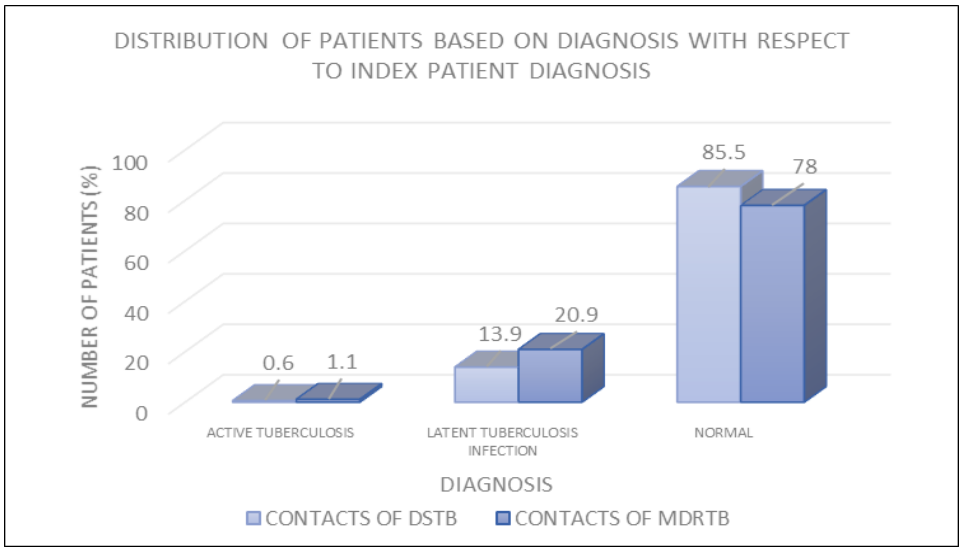
Distribution of patients based on diagnosis with respect to index patient diagnosis:

The distribution of cases based of diagnosis with respect to diagnosis of index case is represented in graph-13. The association was found to be not statistically significant (p>0.05) as depicted in table-17.

Table-17: Distribution of patients based on diagnosis with respect to index patient diagnosis.

			Diagnosis			Total	Chi-square	p-value
			Active TB	LTBI	Normal		Value	
Index Patient Diagnosis	DSTB	Number of patients	1	24	148	173	2.418	0.298
		Percentage	0.6%	13.9%	85.5%	100.0%		
	MDRTB	Number of patients	1	19	71	91		
		Percentage	1.1%	20.9%	78.0%	100.0%		
Total		Number of patients	2	43	219	264		
		Percentage	0.8%	16.2%	83.0%	100.0%		
Statistically not significant								

Graph-13: Distribution of patients based on diagnosis with respect to index patient diagnosis.



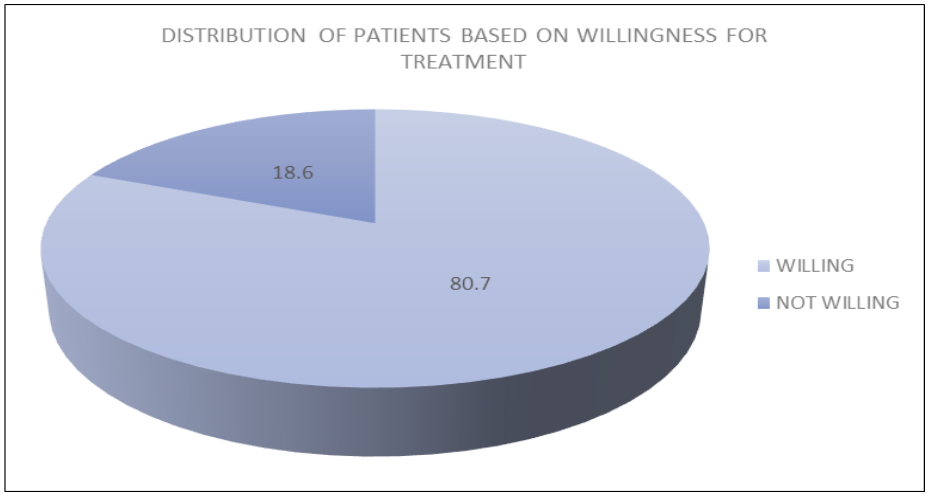
Distribution of patients based on willingness for tuberculosis preventive treatment:

Out of the 262 patients without active tuberculosis eligible for tuberculosis preventive treatment, 213 patients (81.3%) were willing for tuberculosis preventive treatment whereas 49 patients (18.7%) were unwilling (Graph-14).

Table-18: Distribution of patients based on willingness for tuberculosis preventive treatment.

Willingness for TPT	Number of patients	Percentage (%)
Yes	213	81.3
No	49	18.7
Total	262	100.0

Graph-14: Distribution of patients based on willingness for tuberculosis preventive treatment.



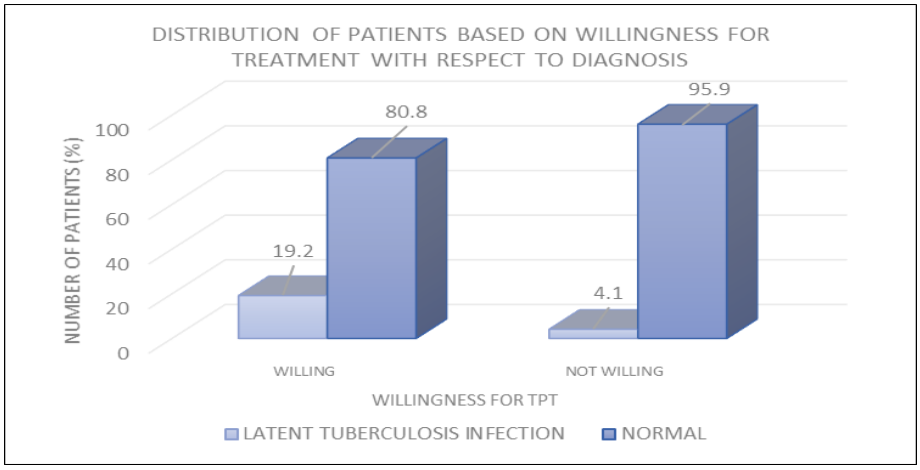
Distribution of patients based on willingness for tuberculosis preventive treatment with respect to diagnosis (latent tuberculosis infection):

Willingness to initiate tuberculosis preventive therapy (TPT) was observed in 95.3% of patients diagnosed with latent tuberculosis infection, compared to 78% among those without tuberculosis infection, as shown in graph-15. There was a statistically significant association between latent tuberculosis infection and willingness for tuberculosis preventive treatment.

Table-19: Distribution of patients based on willingness for tuberculosis preventive treatment with respect to diagnosis

			Willingness for TPT		Total	Chi-square value	p-value
			Willing	Not willing			
Diagnosis	**LTBI**	Number of patients	41	2	43	270.731	0.010*
		Percentage	95.3%	4.7%	100.0%		
	Normal	Number of patients	172	47	219		
		Percentage	78.5%	21.5%	100.0%		
Total		Number of patients	213	49	262		
		Percentage	81.3%	18.7%	100.0%		
***Statistically significant**							

Graph-15: Distribution of patients based on willingness for tuberculosis preventive treatment with respect to diagnosis



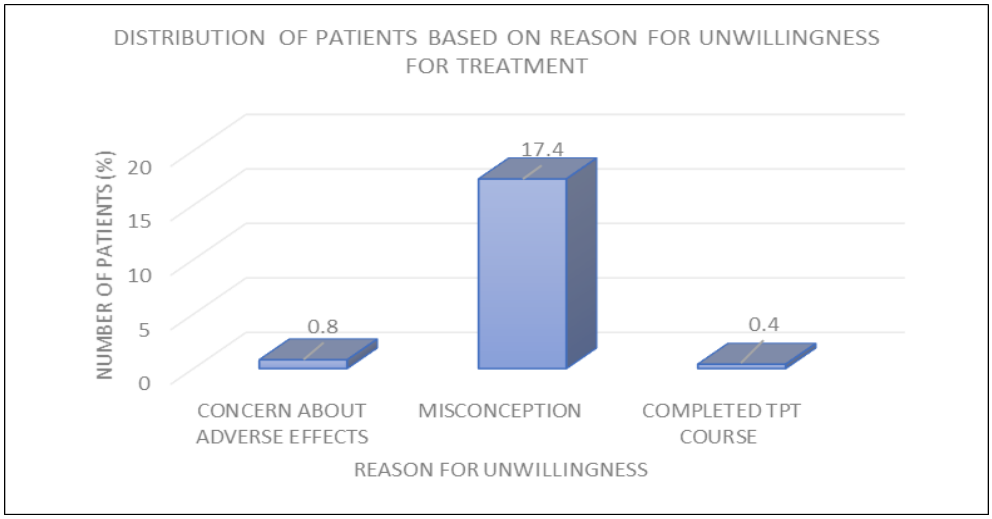
Distribution of patients based on reason for unwillingness for tuberculosis preventive treatment:

The distribution of cases based on reason for unwillingness for initiation of tuberculosis preventive treatment is represented in Graph-16, misconception being the most common (93.9%).

Table-20: Distribution of patients based on reason for unwillingness for tuberculosis preventive treatment

Reason for unwillingness	Number of patients	Percentage (%)
Concern about adverse effects	2	4.1
Misconception	46	93.9
Completed course of TPT	1	2.0
Total	49	100.0

Graph-16: Distribution of patients based on reason for unwillingness for tuberculosis preventive treatment



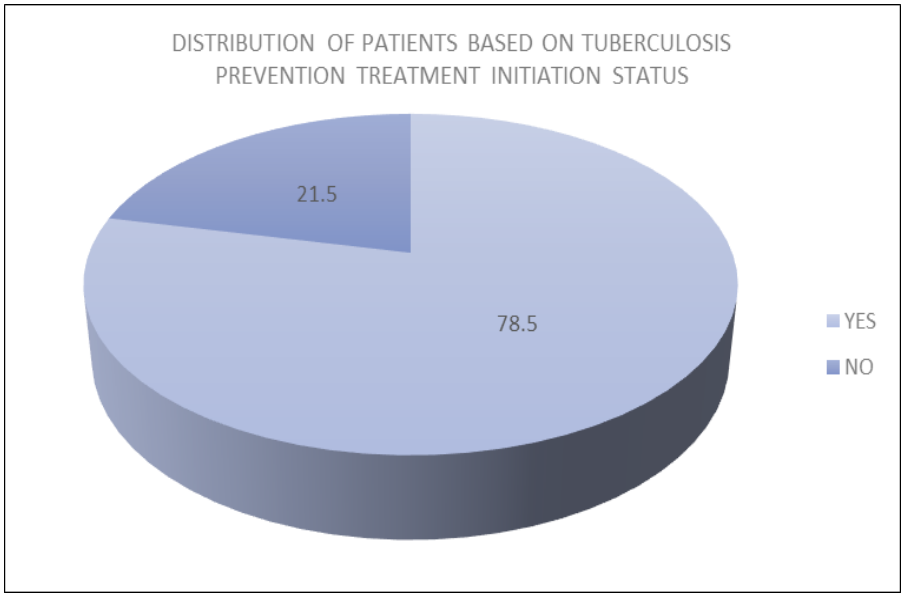
Distribution of patients based on tuberculosis preventive treatment initiation status:

207 household contacts (79.0%) were started on tuberculosis prevention treatment. The distribution of patients based on treatment initiation status in those eligible for tuberculosis prevention treatment is represented in graph-17.

Table-21: Distribution of patients based on tuberculosis preventive treatment initiation status.

TPT initiated	Number of patients	Percentage (%)
Yes	207	79.0
No	55	21.0
Total	262	100.0

Graph-17: Distribution of patients based on tuberculosis preventive treatment initiation status.



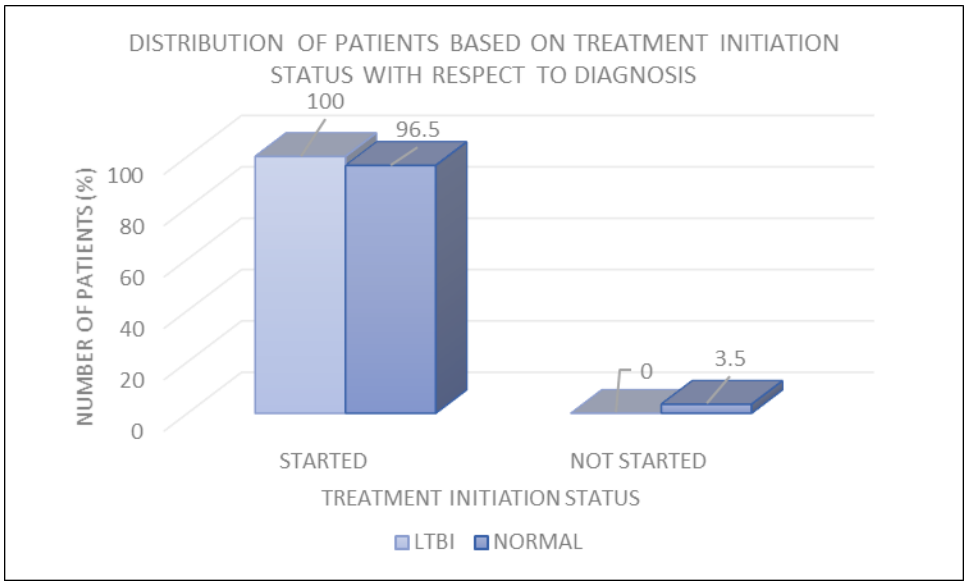
Distribution of patients based on tuberculosis preventive treatment initiation status with respect to diagnosis (latent tuberculosis infection):

41 patients (100%) with and 166 patients (96.5%) without latent tuberculosis infection were initiated on tuberculosis preventive treatment, as represented in graph-18. The association between initiation of tuberculosis prevention treatment and latent tuberculosis infection, as depicted in table-22, was found to be statistically significant ($p<0.05$).

Table-22: Distribution of patients based on tuberculosis preventive treatment initiation status with respect to diagnosis.

			TPT Initiation Status		Total	Chi-square value	p-value
			Started	Not started			
Diagnosis	**LTBI**	Number of patients	41	0	41	509.265	0.004*
		Percentage	100.0%	0.0%	100.0%		
	Normal	Number of patients	166	6	172		
		Percentage	96.5%	3.5%	100.0%		
Total		Number of patients	207	6	213		
		Percentage	97.2%	2.8%	100.0%		
***Statistically significant**							

Graph-18: Distribution of patients based on tuberculosis preventive treatment initiation status with respect to diagnosis



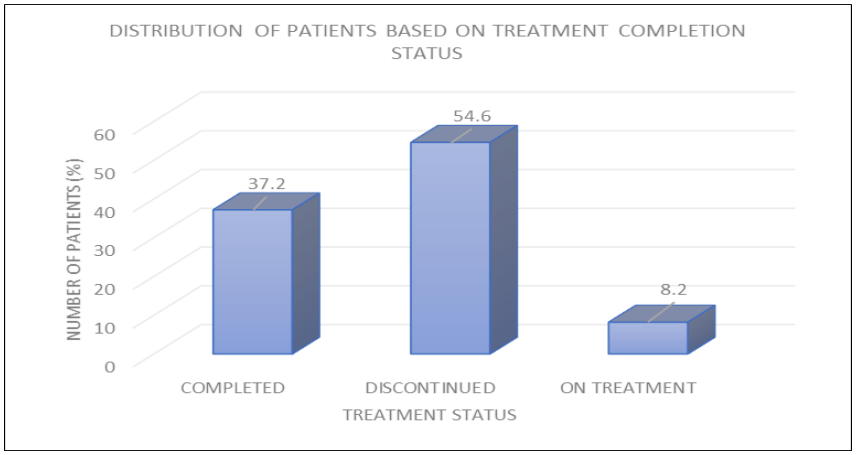
Distribution of patients based on tuberculosis preventive treatment completion status:

The distribution of cases according to treatment completion status is represented in graph-19. Majority of the patients (54.6%) discontinued the treatment.

Table-23: Distribution of patients based on tuberculosis preventive treatment completion status.

Treatment status	Number of patients	Percentage (%)
Completed	77	37.2
Discontinued	113	54.6
On treatment	17	8.2
Total	207	100.0

Graph-19: Distribution of patients based on tuberculosis preventive treatment completion status.



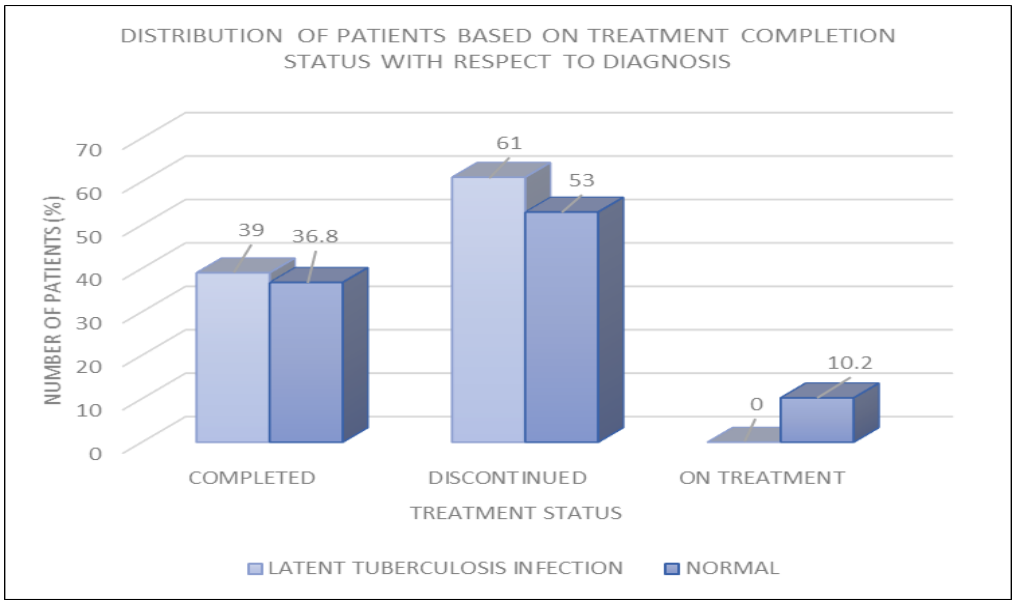
Distribution of patients based on tuberculosis preventive treatment completion status with respect to diagnosis (latent tuberculosis infection):

Based on the diagnosis, the distribution of patients according to treatment completion status is shown in graph-20. The association between latent tuberculosis infection and treatment completion was statistically not significant (Table-24).

Table-24: Distribution of patients based on tuberculosis preventive treatment completion status with respect to diagnosis.

			TPT Completion Status			Total	Chi-square Value	p-value
			Completed	Discontinued	On treatment			
Diagnosis	LTBI	Number of patients	16	25	0	41	19.963	0.787
		Percentage	39.0%	61.0%	0.0%	100.0%		
	Normal	Number of patients	61	88	17	166		
		Percentage	36.8%	53.0%	10.2%	100.0%		
Total		Number of patients	77	113	17	207		
		Percentage	37.2%	54.6%	8.2%	100.0%		
Statistically not significant								

Graph-20: Distribution of patients based on tuberculosis preventive treatment completion status with respect to diagnosis.



DISCUSSION

Close contacts within the household setting represent a key population at risk for both LTBI and its development to active tuberculosis. Systematic screening of the household contacts plays a pivotal role in active case finding and has been examined in multiple studies undertaken in various parts of the world. Early identification of latent infection among HHCs, coupled with the assessment of factors leading to progression of disease, and preventive treatment is critical for reducing incidence of TB is a cornerstone of global control strategies. In the present study, 264 household members were examined for latent infection and active tuberculosis and willingness for tuberculosis preventive treatment was assessed.

Out of the 264 household contacts enrolled, 62 patients (23.5%) were within the age group of 26-35 years, 58(22.0%) and 45(17.0%) patients, in the age groups of 16-25 years and 36-45 years respectively. The average age of the study group being 34.55 ± 16.45 years. This observation aligns with the findings of the study carried out by K Joza et al.,[121] in which 344 contacts were screened and the mean age being 35 ± 16 years. A study by Aman AM et al.,[122] in Sudan, the average age of household contacts of smear-positive tuberculosis was 33.07 ± 14.87 years, while for smear-negative cases, it was 32.35 ± 14.87 years.

In the current study, it was found that the gender inclination was towards females with 51.5% of household contacts (136 in number), while 48.5% were males (128 in number) which corroborates the results of the study carried out in Sao Paulo, Brazil by Wysocki AD et al.,[118] which also consisted majorly of female population (50.7%). Studies from South Indian states by Munisankar S et al.,[123] and Krishnamoorthy Y et al.,[113] also showed female preponderance.

DISTRIBUTION OF BMI AND ITS ASSOCIATION WITH LATENT TUBERCULOSIS INFECTION

One established factor that raises the burden of active infection is low body weight. The impact of weight on the likelihood of LTBI, however, is the subject of conflicting research. Though the real association between obesity and tuberculosis infection is unclear, there is evidence that obesity and overweight are linked with latent tuberculosis infection probably because of the decreased production of T-helper-1 cytokines in response to infection, which also increases cardiometabolic indicators that hinder the burst of respiratory secretions necessary to expel the pathogenic micro-organisms.

Out of the 264 patients in study, most of the patients i.e. 64% (169 patients) had ideal body weight, whereas 13.3% and 6.4% were overweight and obese respectively, while 16.3% of the patients were underweight. In our study, the mean BMI was 22.29 ± 4.16 kg/m^2, which is in the normal range.

There are few studies conducted to identify the association of BMI with latent infection. Cubilla-Batista I et al.,[124] conducted a study in Panama, to identify the relationship between overweight, obesity and latent infection in household contacts, and results revealed a significant positive association between higher BMI and risk of latent infection. Furthermore, it is unclear if obesity causes a pro-inflammatory response that could lead to LTBI and halt the progression of the disease or an increased immune response to a mycobacterial challenge and, consequently, the clearance of MTB which prevents advancement to clinically active disease.

PREVALENCE OF DIABETES MELLITUS AND ITS ASSOCIATION WITH LATENT TUBERCULOSIS INFECTION

In our study, 11.4% household contacts had diabetes mellitus at baseline. Out of the 30 known diabetics, 9 individuals were tuberculin skin test positive, with a prevalence of diabetes of 20.9% in contacts with tuberculosis infection. The study identified a statistically significant positive association ($p < 0.05$) between latent tuberculosis infection and diabetes. The association of diabetes and LTBI has been identified in several studies, with a high prevalence rates among contacts with latent infection. This is in agreement to a study by Djibougou DA et al.,[125] in which 11.88% of the participants had diabetes mellitus, and the association was also statistically significant. Krishnamoorthy Y et al.,[113] conducted a study to evaluate the determinants associated with LTBI among the contacts. Their findings indicated that 63% of the contacts had diabetes mellitus, but no statistically significant association was identified between diabetes and latent tuberculosis infection. Our findings showed a higher yield compared to that reported from Indonesia (4.0%)[126], Iraq (2.1%)[127] and Chandigarh (2.4%)[128].

PREVALENCE OF HYPERTENSION AND ITS ASSOCIATION WITH LATENT TUBERCULOSIS INFECTION

Hypertension could be a potential risk factor for latent tuberculosis (LTBI), primarily due to shared underlying mechanisms such as chronic low-grade inflammation and immune system dysregulation. Hypertension is associated with alterations in cytokine profiles and vascular damage, which may impair the body's ability to contain *Mycobacterium tuberculosis*.

Of the household contacts in this study, 27 (10.2%) had hypertension and 5 were

diagnosed as latent tuberculosis infection (18.5%). No statistically significant association was found between latent tuberculosis infection (LTBI) and hypertension. A study by Huaman MA et al.,[129] showed a higher prevalence of hypertension among the study population (65%). Although, the percentage of hypertensive patients tested positive for LTBI was 63%, much higher than our study, there was no significant association between history of hypertension and LTBI status, which correlates to the results of our study. In contrast, a cross-sectional study by Munisankar S et al.,[123] found that 15% of individuals with LTBI had hypertension, similar to our results, but they identified a significant association between hypertension and latent tuberculosis infection.

In contrary, in a study by Salindri AD et al.,[130] prevalence of hypertension was 49.8% with a high prevalence among those with LTBI (48.3%). However, a study conducted by Aravindhan V et al.,[131] in South India found a significantly greater proportion of hypertensive individuals among household contacts, with a strong association observed between latent tuberculosis infection (LTBI) and hypertension. Some observational studies, have shown an increased prevalence of LTBI among hypertensive individuals, suggesting a possible bidirectional relationship. However, confounding factors may complicate this association.

SMOKING AND ITS ASSOCIATION WITH LATENT TUBERCULOSIS INFECTION

Tobacco smoking has been linked to an increased susceptibility to LTBI, likely due to its deleterious effects on respiratory and immune function. Cigarette smoke compromises mucociliary clearance and impairs the activity of alveolar macrophages, facilitating the initial establishment of *Mycobacterium tuberculosis* following exposure. Additionally, chronic inflammation and immune modulation caused by smoking may contribute to both increased infection risk and progression from latent to active disease.

Tobacco use was prevalent among 27.7% of individuals enrolled in our study, encompassing both cigarette smoking and tobacco chewing. Out of 73 individuals who reported tobacco use, 35 were cigarette smokers, 29 were tobacco chewers, and 9 reported using both forms. However, among individuals with LTBI, 11 reported consuming tobacco products. The role of smoking as a risk factor for LTBI and its transition to active disease has been well-established in the literature. The association between smoking and LTBI was not statistically significant ($p>0.05$) in our study.

These results are in accordance to the study conducted by Sangma VSC et al.,[128] conducted in Chandigarh, with 35.6% and 17% prevalence of smoking in the study population and among individuals with LTBI respectively, and the association was also not statistically significant. Djibougou DA et al.,[125] reported smoking in 22.35% LTBI positive individuals, although the association of smoking with LTBI was not statistically significant. In a study conducted by Abdulkareem FN et al.,[127] the prevalence of smoking was lower in both the study group and LTBI group in comparison to our study, but there was a statistically significant association in their study. These observations emphasize the potential impact of integrating tobacco cessation support into LTBI management strategies.

ALCOHOL CONSUMPTION AND ITS ASSOCIATION WITH LATENT TUBERCULOSIS INFECTION

In our study, 39 participants consumed alcohol, accounting for 14.8% of the study population. Out of the 43 cases with LTBI, only 7 patients consumed alcohol (16.2%). The association between alcohol use and LTBI was not statistically significant ($p>0.05$) Supporting the results of our study, a study by Krishnamoorthy Y et al.,[113] showed that 10.4% of the patients

consumed alcohol and there was no significant association between alcohol consumption and LTBI.

In addition, the predominance of female participants in our study may have introduced confounding effects, particularly in the analysis of behavioral risk factors such as alcohol consumption and smoking, which are more commonly reported among males in many settings. As a result, the potential associations between these factors and LTBI may have been attenuated or obscured. Previous research has demonstrated that both alcohol use and smoking are independently associated with increased risk of TB infection and disease progression, underscoring the importance of accounting for these behaviors in risk assessments. Future studies with more balanced gender representation are warranted to gain a more comprehensive understanding of their impact on LTBI.

CHEST RADIOGRAPH AND ITS ASSOCIATION WITH ACTIVE AND LATENT TUBERCULOSIS INFECTION

Chest radiograph was performed in all 264 household contacts, among whom an abnormal chest x-ray was observed in 4.9% (13 in number). No abnormality in chest x-ray was observed in 95.1% of contacts. Out of the 13 patients with abnormal chest radiograph, two cases (15.4%) were microbiologically – confirmed tuberculosis. The results of our study are consistent with the study conducted by Nababan B et al.,[126] in Indonesia, with radiological evidence on chest X-ray suggestive of tuberculosis observed in 2.4% cases (68 of 2857 screened). Another study by Mudoola D et al.,[132] in Uganda reported similar results as our study with 3.1% patients showing abnormal chest x-ray findings.

A recent systematic review and meta-analysis by Velen K et al.,[133] found that 1893

out of 88103 contacts screened for active tuberculosis with chest radiographs in 25 studies had radiological changes suggestive of active tuberculosis, accounting for a pooled prevalence of 3.6%. These findings suggest that chest radiography may help identify pathological changes prior to the onset of TB symptoms. On the contrary, in a study from Chennai by Ananthakrishnan R et al.,[134] chest radiograph abnormalities were observed in 531 cases of 5553 evaluated, accounting to 9.56%. Mendelsohn SC et al.,[135] in their study, reported a high incidence of chest radiograph abnormalities (14.7%) in the study population, compared to our study.

TUBERCULIN SKIN TEST

Among the household contacts tested for latent tuberculosis infection, positive reaction (cut-off >10mm) was observed in 44 household contacts. The current study revealed that among HHCs with pulmonary TB, the prevalence of latent TB was 16.7%, which is less than the global estimate. Given that these lower numbers only reflect statistics from a limited geographic area and do not reflect the prevalence of a nation, they must be evaluated with caution.

In agreement to our study, studies conducted by Martinson NA et al.,[136] in South Africa, A L Innes et al.,[137] in Vietnam and MacPherson P et al.,[138] in South African provinces have shown similar results with a tuberculin skin test positivity rate of 13%, 13.1% and 13.1% respectively among the contacts.

Several studies in various countries across the world have showed varied results with a very high incidence of tuberculin test positivity in contrast to our study. A study conducted by Karbito K et al.,[112] in Indonesia showed a positive TST result in 63.8% of contacts. In a longitudinal observational study with prospective data collection conducted in Delhi, by

Sharma N et al.,[139] 61.5% cases showed a positive response to tuberculin test.

Immune response to tubercular protein in the host is a major determinant of Mantoux positivity. Therefore, immunocompromised conditions such as diabetes, HIV, malnourishment, and individuals receiving immunosuppressants will have an impact on the Mantoux induration. Selection bias may have also been introduced by the inclusion of participants from index patient's household contacts in this study. However, the impact of seroconversion which results from exposure to new TB patients on the incidence of latent TB is called into question by the comparatively lower prevalence of latent TB among HHCs in the current study.

Characteristics and TST positivity in similar studies:

Author and Year	**Country**	**Study Period**	**Study Design**	**Method Used with Cut-off**	**TST Positivity Rate**
MacPherson P et al.[138] 2020	South Africa	2015-2016	Cluster randomised trial	Tuberculin skin test ≥10mm ≥5mm	13.1% 16.8%
Paradkar M et al.[140] 2020	India	August 2014 – December 2017	Cohort study	Tuberculin skin test ≥10mm	26%
Abdulkareem FN et al.[127] 2020	Iraq	May – October 2018	Cross - sectional	Tuberculin skin test ≥5mm	24.05%
Corbett C et al.[141] 2020	Kyrgyz Republic	November 2018 – March 2019	Cross - sectional	Tuberculin skin test	36.8%

Aman A M et al.[122] 2017	Sudan	November 2015 – April 2016	Cross - sectional	Tuberculin skin test	11.6%
Martinson NA et al.[136] 2022	South Africa	December 2016 – March 2019	Randomised control trial	Tuberculin skin test ≥10mm	13%
Krishnamoorty Y et al.[113] 2021	South India	2014 – 2019	Cohort study	Tuberculin skin test	52.6%
Gutierrez J et al.[142] 2024	Uganda	June 2016 - March 2020	Cross - sectional	Tuberculin skin test ≥10mm	27.7%
Ghanaiee RM et al.[143] 2022	Iran	July 2017 – August 2019	Cohort	Tuberculin skin test ≥5mm	46.4%
A L Innes et al.[137] 2023	Vietnam	2020 – 2021	Cross - sectional	Tuberculin skin test ≥10mm ≥5mm	13.1% 37.4%
Sangma VSC et al.[128] 2024	Chandigarh, India	January 2020 – July 2021	Cross - sectional	Tuberculin skin test ≥10mm	26.36%
Warria K et al.[144] 2020	Kenya	March 2014 – June 2016	Prospective cohort	Tuberculin skin test	34.1%
Singh J et al.[145] 2020	Oman	2018 – 2019	Cross - sectional	Tuberculin skin test ≥10mm	22.8%

Cohen A et al.[114] 2019	Global	January 2005 – July 2018	Systematic review and meta-analysis	Tuberculin skin test ≥10mm	21.2%
Nababan B et al.[126] 2024	Indonesia	June 2020 – December 2022	Prospective cohort study	Tuberculin skin test ≥10mm	40.4%
Our study	Karnataka, India	March 2023 – January 2025	Cross – sectional	Tuberculin skin test ≥10mm	16.7%

SPUTUM SMEAR MICROSCOPY

Overall, in our study, sputum smear positivity was observed in 2 household contacts (0.8%), indicating active tuberculosis. These results are comparable to a study from Rajasthan by Gupta M et al.,[146] to determine the TB prevalence among household contacts of newly diagnosed sputum smear TB index cases which reported similar results, with a prevalence of 1.15% (5 patients) among 521 contacts. A study by Krishnamoorthy Y et al.,[113] in which prevalence of active TB disease was reported in 6 (0.4%) of the 1523 HHCs screened, which was much lower than that observed in our study.

Of the 2 HHCs diagnosed with sputum smear positivity, the prevalence of active tuberculosis was 0.6% (1 of 173 HHCs) and 1.1% (1 of 91 HHCs) among HHCs of DS-TB and MDR-TB index cases. These results are similar to a study by Seid G et al.,[147] 11 (1.48%) of 765 HHCs and 2 (1.24%) of 161 HHCs of the DS-TB and MDR-TB index case groups were diagnosed with active disease, respectively. Furthermore, it was observed that, the overall prevalence of TB among the enrolled HHCs was 1.44% (13 in number).

The percentage of active TB recorded from HHC screening has varied between previous studies. Our findings align with those reported in previous studies conducted by

Ghanaiee RM et al.,[143] in Iran and Ohene SA et al., in Ghana[148] with a prevalence of 1.1% and 0.65% respectively.

In another study in sub-Saharan African countries by Seid G et al.,[147] reported that the overall pooled prevalence rate of tuberculosis among household contacts stood at 3.29%. Notable among them are studies by Daniel W et al.[149] and Adane A et al.[150] in Ethiopia which reported a prevalence of 6.9% and 7.8%, which was much higher than our study.

Characteristics and prevalence of active tuberculosis in similar studies:

Author and Year	Country	Study Period	Study Design	Method Used	Prevalence among HHC
Jude S et al.[151] 2025	Uttar Pradesh, India	October 2021 – March 2022	Cross - sectional	Sputum smear microscopy	2.72%
Ananthakrishnan R et al.[134] 2020	Chennai, India	January 2015 – March 2016	Cross - sectional	Sputum smear microscopy and Xpert	1.33%
Seid G et al.[147] 2025	Central Ethiopia	January – December 2023	Cross - sectional	Sputum smear microscopy, Xpert and culture	1.44%
Nair D et al.[111] 2016	Chennai, India	2007 – 2014	Retrospective	Sputum smear microscopy	4.2%
Ohene SA et al.[148] 2018	Ghana	June 2010 – December 2014	Retrospective	Sputum smear microscopy	0.65%

Gupta V et al.[152] 2020	Haryana, India	January – June 2019	Cross - sectional	Sputum smear microscopy	1.97%
Krishnamoorty Y et al.[113] 2021	South India	2014-2019	Cohort study	Sputum smear microscopy	0.4%
Moosazadeh M et al.[153] 2015	North of Iran	2010-2011	Cross - sectional	Sputum smear microscopy, culture	0.9%
Ghanaiee RM et al.[143] 2022	Iran	July 2017 – August 2019	Cohort	Sputum smear microscopy, culture	1.1%
Gupta M et al.[146] 2016	Rajasthan, India	July 2013 – February 2014	Cohort	Sputum smear microscopy	1.15%
Sangma VSC et al.[128] 2024	Chandigarh, India	January 2020 – July 2021	Cross - sectional	Sputum smear microscopy	3.03%
Warria K et al.[144] 2020	Kenya	March 2014 – June 2016	Prospective cohort	Sputum smear microscopy, Xpert and culture	3.5%
Beyanga et al.[154] 2018	Tanzania	August – December 2016	Retrospective cohort	Sputum smear microscopy	0.9%
Our study	Karnataka, India	March 2023 – January 2025	Cross - sectional	Sputum smear microscopy	0.8%

This discrepancy may be explained by variations in the study populations, study environments, such as the prevalence of tuberculosis, community living practices, differences in the infectiousness of index cases, susceptibility of household contacts, and study methodologies—including disparities in sample size, screening protocols, and diagnostic precision—may account for variability in findings across studies.

TUBERCULOSIS PREVENTION TREATMENT

There is variability in the implementation of TPT across studies, particularly regarding eligibility criteria. Some studies offered TPT exclusively to individuals with confirmed LTBI, typically based on TST or IGRA. In contrast, other studies have adopted a broader approach by providing TPT to all HHCs, regardless of LTBI test results. This universal approach aims to overcome barriers related to LTBI testing access, reduce transmission risk, and streamline preventive care—especially in high-burden settings or in young children where testing may be less reliable. In our study, TPT was offered to all HHCs of individuals with active tuberculosis, irrespective of their LTBI status. A comparative analysis was conducted to assess differences in willingness, treatment initiation, and completion rates between HHCs with and without confirmed LTBI.

In our study, 83% of the HHCs were normal, with no active or latent tuberculosis infection, while 16.2% of the contacts had latent tuberculosis infection and 0.8% had active TB. Among the patients eligible for TPT, 213 patients (81.3%) were willing for TPT and 18.7% declined treatment. When stratified by LTBI status, willingness to initiate TPT was higher among household contacts with LTBI compared to those without. Specifically, 95.3% of LTBI-positive contacts were willing to start TPT, whereas only 78.5% of LTBI-negative contacts

expressed willingness. This suggests that a confirmed diagnosis of LTBI may strengthen patient acceptance of TPT. The willingness for TPT among household contacts in another study by Sharma N et al.,[139] conducted in Delhi, was found to be 73.5%, which is comparable to our study. A study by Matias GL et al.[155] showed 26.1% of HHCs diagnosed with tuberculosis infection were willing for initiation of treatment, which is lower compared to our study group.

Among LTBI-negative household contacts who expressed willingness to initiate TPT, treatment was not started in 6 individuals due to non-provision of drugs. This highlights the impact of logistical and supply-side challenges on the implementation of preventive therapy, even when patient acceptance is present. Hence, TPT was initiated in a total of 207 household contacts, including 41 individuals with confirmed LTBI and 166 without LTBI.

Of the 207 household contacts who were initiated on TPT, 77 (37.2%) completed the full course, 113 (54.6%) discontinued treatment before completion, and 17 (8.2%) were still on treatment at the time of analysis. Treatment completion rates were similar between those with LTBI and those without. 39% of contacts with LTBI completed treatment compared to 36.8% of normal contacts, indicating no statistically significant difference ($p>0.05$) in adherence between the two groups. A study by Kumar A et al.[156] showed 22% of patients completed the full course of treatment, which is comparable to our study, whilst studies by Shah D et al.[157] and Mahajan P et al.[158] showed treatment completion rates of 90% and 90.6% respectively, which is higher when compared to our study.

<u>Prevalence of tuberculosis preventive treatment (TPT) initiation and completion among contacts across studies</u>:

Author and Year	Country	Study Period	Study Design	TPT Initiation Rate	TPT Completion Rate
Vo LNQ et al.[159] 2023	Vietnam	May 2019 – September 2022	Cohort study	63.3%	80.6%
Shah D et al.[157] 2024	Mumbai, India	September – December 2021	Cross - sectional study	85%	90%
Park SH et al.[160] 2016	Korea	October 2009 – August 2013	Randomized control trial	48.9%	58.1%
Mundoola D et al.[132] 2025	Uganda	November 2023 – September 2024	Pilot study	82.8%	95.1%
Felisia F et al.[161] 2023	Indonesia	January 2020 – August 2022	Cross - sectional study	78.8%	91.5%
Rahman MT et al.[162] 2024	Bangladesh	February 2018 – March 2019	Community-based implementation study	73%	97%
Sagili KD et al.[163] 2022	Global	2010 – 2021	Systematic review and meta-analysis	91%	65%
Mahajan P et al.[158] 2023	Maharashtra, India	October 2021 – March 2022	Cohort study	91.7%	90.6%
Samudyatha UC et al.[164] 2023	Karnataka, India	April – December 2022	Cohort + Descriptive study	98%	77%

Mukherjee O et al.[165] 2024	West Bengal, India	September – November 2023	Cross - sectional study	74.8%	69.3%
Kumar A et al.[156] 2025	India	January – March 2022.	Cross - sectional study	34%	22%
Hussain H et al.[166] 2023	Pakistan	2018 – 2021	Cross - sectional study	12.8%	75.4%
Malik AA et al.[167] 2021	Pakistan	-	Cohort study	80%	70.3%
Abdulkareem FN et al.[127] 2023	Iraq	April – September 2021	Cross - sectional study	74.0%	100%
Acuña-Villaorduña C et al.[168] 2022	Brazil	2008 – 2015	Retrospective	24%	71.9%
Our study	Karnataka, India	March 2023 – January 2025	Cross - sectional study	81.3%	37.2%

BARRIERS FOR TUBERCULOSIS PREVENTIVE THERAPY

There are several key barriers to the successful introduction and scale-up of tuberculosis preventive treatment, particularly among household contacts. At the health system level, challenges such as limited resources, drug supply interruptions, and weak service integration hinder consistent delivery of TPT. Healthcare provider-related issues, including

insufficient training, high workloads, and diagnostic uncertainty, further contribute to suboptimal implementation. Patient-level factors such as fear of adverse effects, low perceived risk due to the asymptomatic nature of latent TB, and stigma limit both initiation and adherence. Moreover, community-level barriers, including misinformation, cultural beliefs, and socioeconomic constraints, can significantly reduce access and implementation.

Of the 262 patients eligible for tuberculosis preventive therapy in whom active tuberculosis had been ruled out, willingness for TPT was observed in 213 contacts (81.3%). 49 participants were unwilling for therapy, accounting to 18.7% of the eligible population. Majority of the patients (93.9%) were reluctant for TPT due to lack of knowledge about preventive therapy and misconception about the necessity of TPT in healthy states. The fear of drug-related side effects emerged as a barrier to initiating tuberculosis preventive treatment (TPT) in 2 individuals (4.1%) as they perceived that the risks of TPT may outweigh the benefits. One patient declined tuberculosis preventive treatment due to completion of the full course of therapy. Out of the 219 normal individuals, 21.5% refused TPT (47 patients). Latent tuberculosis infection was perceived as an asymptomatic or 'healthy' state by 2 patients, leading to low perceived need for treatment and served as a barrier for TPT initiation in 4.7% of LTBI positive cases. In a study conducted by Sharma N et al.[169] in Delhi, the key reasons for lack of willingness to initiate TPT were absence of overt clinical symptoms (33.1%), perception of being in good health (42.9%), and concerns over potential adverse effects of the drugs (27.5%). Comparable to our study, J Ren et al.[170] in Delhi, also reported misconceptions about efficacy as the most common barrier, with 57.8% (517 out of 894) of participants expressing doubts regarding its uncertain effects on prevention. Additionally**,** concerns about potential side effects were reported by 32.7% (292/894) of participants.

LIMITATIONS

1. The study included 264 household contacts; a larger sample size may have provided stronger conclusions and more robust significance of associations.
2. The study population included household contacts who presented voluntarily for screening, introducing potential selection bias.
3. The study was carried out in a single-institution setting, which may limit the generalizability of the findings to larger population or other settings with different healthcare infrastructure or tuberculosis burden.
4. Latent tuberculosis infection in this study was diagnosed using the TST, which has limited sensitivity and specificity, potentially affecting diagnostic accuracy.
5. It was not possible to determine whether tuberculin skin test positivity reflected recent household exposure or prior infection, limiting causal interpretation.
6. The study relied on sputum smear microscopy and chest radiography without routine use of more sensitive diagnostics like GeneXpert MTB/RIF or culture, which could affect the accuracy of diagnosis of tuberculosis.

SUMMARY

A cross-sectional study was carried out on 264 household contacts of individuals with active tuberculosis, in the Department of Respiratory Medicine, Shri B. M. Patil Medical College, Hospital and Research Centre, BLDE (Deemed to be) University, Vijayapura. The household contacts were screened for active or latent tuberculosis through sputum smear microscopy for acid-fast bacilli, chest radiography, and the tuberculin skin test their willingness to initiate tuberculosis preventive treatment was assessed.

1. The most common age group was 26-35 years with 23.5%, followed by 16-25 years with 22%. The mean age of the study population was 34.55 ± 16.45 years.
2. In this study, female preponderance (51.5%) was observed.
3. 64% of the patients were of ideal body weight, whereas 16.3% were underweight. 13.3% and 6.4% patients belonged to the overweight and obese category respectively. The mean body mass of index of the study population was 22.29 ± 4.16 kg/m^2.
4. Diabetes mellitus was present in 8.7% of the study population, hypertension in 7.6%, and both in 2.7%. A statistically significant association was identified between diabetes and latent tuberculosis infection. However, no significant association was found between hypertension and latent infection.
5. A total of 27.7% of the study population reported a history of smoking or tobacco chewing, while 14.8% reported alcohol use.
6. Chest radiograph abnormalities was present in 4.9% of the study population. The most common abnormality was presence of calcifications with alveolar infiltrates in 3.0% of the contacts.

7. Of the total participants screened, sputum positivity for acid-fast bacilli was identified in 0.8% of participants, suggesting active tuberculosis.
8. A positive tuberculin skin test, defined by an induration greater than 10 mm, was observed in 16.7% of the study population.
9. A substantial proportion of the study population (83%) were classified as normal, as indicated by negative results on both sputum microscopy and tuberculin skin testing. While 0.8% of contacts were diagnosed with active tuberculosis, 16.3% were identified as having latent tuberculosis infection.
10. Sputum smear microscopy was positive in 15.4% and negative in 84.6% contacts with abnormal chest radiograph findings. There was a statistically significant association between sputum smear microscopy and chest radiograph findings.
11. Out of the 13 household contacts with abnormal chest radiograph findings, 2 patients (15.4%) had positive tuberculin skin test while 84.6% had negative results and the association was not statistically significant ($p>0.05$).
12. One contact each of a patient with multi-drug resistant tuberculosis and drug-sensitive tuberculosis developed active tuberculosis. The prevalence of latent tuberculosis infection was found to be 13.9% among drug-sensitive tuberculosis contacts and 20.9% among multi-drug resistant tuberculosis contacts.
13. Among contacts without active tuberculosis, overall, willingness to tuberculosis preventive treatment was observed in 81.3%. Among those with tuberculosis infection and normal individuals, 95.3% and 78.5% were willing for treatment respectively.
14. There was a positive and statistically significant association between willingness for tuberculosis prevention treatment and latent tuberculosis infection.

15. The most common reason for unwillingness for treatment was misconception (93.9%).
16. Overall, 79% of patients were started on tuberculosis preventive treatment. There was a statistically significant association between latent tuberculosis infection and initiation of treatment, with all contacts diagnosed with latent infection being started on preventive therapy.
17. In this study, the overall treatment completion rate among contacts initiated on tuberculosis preventive treatment (TPT) was 37.2%.
18. The treatment completion rates were 39.0% among contacts diagnosed with latent tuberculosis infection and 36.8% among those without, while discontinuation rates were 61.0% and 53.2%, respectively. This study revealed a statistically not significant association between latent tuberculosis infection status and treatment completion rates.

CONCLUSION

In the present study, the age distribution of the study population was skewed toward individuals aged 16–35 years, with female predominance. The study group predominantly constituted of contacts with ideal body weight. A large proportion of the patients included in the study, were found to be household contacts of drug-sensitive tuberculosis.

A substantial proportion of the study population had a history of diabetes mellitus, and a statistically significant association was found between diabetes and latent tuberculosis infection. However, no such association was observed between latent tuberculosis infection and other risk factors such as hypertension**,** smoking**,** or alcohol use.

The findings of this study provide insight into the prevalence of latent tuberculosis infection and active tuberculosis among household contacts of index tuberculosis cases, highlighting key epidemiological trends. There was a significant burden of latent tuberculosis infection among household contacts of both drug-sensitive and multidrug-resistant tuberculosis patients, with a higher prevalence observed in contacts of multi-drug resistant tuberculosis cases.

The actual initiation rates of tuberculosis preventive treatment were lower, emphasizing the need for improved counselling and follow-up. Importantly, all individuals diagnosed with tuberculosis infection were initiated on treatment, indicating good adherence to targeted prevention protocols. A statistically significant association between latent tuberculosis infection and treatment initiation underscores the value of targeted testing in contact investigations. A major factor contributing to non-initiation was patient unwillingness, predominantly driven by misconceptions about the necessity and safety of tuberculosis prevention treatment. These findings emphasize that strengthening health education can play a

pivotal role in addressing misinformation, improving treatment acceptance, and enhancing overall adherence.

This study highlights that while TPT remains a vital strategy in mitigating the conversion of latent tuberculosis infection into clinically active tuberculosis, treatment completion rates are still suboptimal. The findings support the integration of systematic screening, testing for LTBI, and preventive therapy into routine tuberculosis contact management to curb the transition from an asymptomatic latent infection to symptomatic active tuberculosis and accelerate progress toward tuberculosis elimination goals. This could help us mitigate the social and economic impact of infection as well as its increasing tide.

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ANNEXURE – I

Azadi Ka Amrit Mahotsav

BLDE

(DEEMED TO BE UNIVERSITY)

Declared as Deemed to be University u/s 3 of UGC Act, 1956

Accredited with 'A' Grade by NAAC (Cycle-2)

The Constituent College

SHRI B. M. PATIL MEDICAL COLLEGE, HOSPITAL & RESEARCH CENTRE, VIJAYAPURA

BLDE (DU)/IEC/ 873/2022-23 1/4/2023

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this University met on **Saturday, 18th March, 2023 at 11.30 a.m. in the CAL Laboratory, Dept. of Pharmacology,** scrutinizes the Synopsis/ Research Projects of Post Graduate Student / Under Graduate Student /Faculty members of this University /Ph.D. Student College from ethical clearance point of view. After scrutiny, the following original/ corrected and revised version synopsis of the thesis/ research projects has been accorded ethical clearance.

TITLE: "EVALUATION OF CONTACTS OF TUBERCULOSIS FOR ACTIVE OR LATENT TUBERCULOSIS INFECTION AND FACTORS ASSOCIATED WITH MANAGEMENT".

NAME OF THE STUDENT/PRINCIPAL INVESTIGATOR: Dr SAGARIKA N SURESH

NAME OF THE GUIDE: DR.RAMESH S.BARBAR, PROFESSOR AND HOD,DEPT. OF RESPIRATORY MEDICINE.

Dr. Santoshkumar Jeevangi
Chairperson
IEC, BLDE (DU),
VIJAYAPURA

Chairman,
Institutional Ethical Committee,
BLDE (Deemed to be University)
Vijayapura

Dr. Akram A. Naikwadi
Member Secretary
IEC, BLDE (DU),
VIJAYAPURA

MEMBER SECRETARY
Institutional Ethics Committee
BLDE (Deemed to be University)
Vijayapura-586103, Karnataka

Following documents were placed before Ethical Committee for Scrutiny:

- Copy of Synopsis/Research Projects
- Copy of inform consent form
- Any other relevant document

Smt. Bangaramma Sajjan Campus, B. M. Patil Road (Sholapur Road), Vijayapura - 586103, Karnataka, India.
BLDE (DU): Phone: +918352-262770, Fax: +918352-263303, Website: www.bldedu.ac.in, E-mail:office@bldedu.ac.in
College: Phone: +918352-262770, Fax: +918352-263019, E-mail: bmpmc.principal@bldedu.ac.in

ANNEXURE – II

INFORMED CONSENT FORM

B.L.D.E(DEEMED TO BE UNIVERSITY), SHRI B.M. PATIL MEDICAL COLLEGE HOSPITAL AND RESEARCH CENTRE, VIJAYAPURA, KARNATAKA – 586103

TITLE OF THE PROJECT: EVALUATION OF CONTACTS OF TUBERCULOSIS FOR ACTIVE OR LATENT TUBERCULOSIS AND FACTORS ASSOCIATED WITH MANAGEMENT

PRINCIPAL INVESTIGATOR: Dr. SAGARIKA N SURESH
Department of Respiratory Medicine

PG GUIDE: Dr. KEERTIVARDHAN D KULKARNI,
Professor and HOD,
Department of Respiratory Medicine,
BLDE (Deemed to be University),
Shri B.M. Patil Medical College Hospital and
Research Centre, Vijayapura,
Karnataka- 586103

PURPOSE OF RESEARCH:

I have been informed that the purpose of this study is to "EVALUATE

CONTACTS OF TUBERCULOSIS FOR ACTIVE OR LATENT TUBERCULOSIS AND FACTORS ASSOCIATED WITH MANAGEMENT"

I have been explained about the reason for conducting this study and selecting me/my ward as a subject for this study. I have also been given free choice for either being included or not in the study.

PROCEDURE:

I understand that I will undergo detailed history and clinical examination and investigations.

BENEFITS:

I understand that I/my ward's participation in this study will help to EVALUATE CONTACTS OF TUBERCULOSIS FOR ACTIVE OR LATENT TUBERCULOSIS AND FACTORS ASSOCIATED WITH MANAGEMENT.

CONFIDENTIALITY:

I understand that medical information produced by this study will become a part of this hospital records and will be subjected to the confidentiality and privacy regulation of this hospital. Information of a sensitive, personal nature will not be a part of the medical records, but will be stored in the investigator's research file and identified only by a code number. The code key connecting name to numbers will be kept in a separate secure location.

If the data are used for publication in the medical literature or for teaching purpose, no names will be used and other identifiers such as photographs and audio or video tapes will be used only with my special written permission. I understand that I may see the photograph and videotapes and hear audiotapes before giving this permission.

REQUEST FOR MORE INFORMATION:

I understand that, I may request for more questions about the study at any time. Dr. SAGARIKA N SURESH is available to answer my questions or concerns. I understand that, I will be informed of any significant new findings discovered during the course of this study, which might influence my continued participation.

If during this study, or later, I wish to discuss my participation in or concerns regarding this study with a person not directly involved, I am aware that the social worker of the hospital is available to talk with me. And that a copy of this consent form will be given to me for keep for careful reading.

REFUSAL OR WITHDRAWL OF PARTICIPATION:

I understand that my participation is voluntary and I may refuse to participate or may withdraw consent and discontinue participation in the study at any time without prejudice to my present or future care.

I also understand that Dr. SAGARIKA N SURESH will terminate my participation in this study at any time after she has explained the reasons for doing so and has helped arrange for my continued care.

INJURY STATEMENT:

I understand that in the unlikely event of injury to me/my ward, resulting directly to my participation in this study, if such injury were reported promptly, then medical treatment would be available to me, but no further compensation will be provided.

I understand that by my agreement to participate in this study, I am not waiving any

of my legal rights.

I have explained to _____, the purpose of this research, the procedures required and the possible risks and benefits, to the best of my ability in patient's own language.

Date: Dr. KEERTIVARDHAN D KULKARNI (Guide) Dr. SAGARIKA N SURESH (Investigator)

STUDY SUBJECT CONSENT STATEMENT:

I confirm that Dr. SAGARIKA N SURESH has explained to me the purpose of this research, the study procedure that I will undergo and the possible discomforts and benefits that I may experience, in my own language.

I have been explained all the above in detail in my own language and I understand the same. Therefore, I agree to give my consent to participate as a subject in this research project.

_____ _____

(Participant) Date

_____ _____

(Witness to above signature) Date

ANNEXURE -III

PROFORMA

Name: Age/Sex:

Address: O.P No:

Occupation:

Complaints:

Contact history:

Past history:

Personal history:

1. Diet:

2. Appetite:

3. Sleep:

4. Bowel and bladder habits:

5. Tobacco chewing:

6. Smoking:

7. Alcoholism:

Family history:

GENERAL PHYSICAL EXAMINATION:

Built:

Nourishment:

Height (cm):

Weight (kg):

BMI:

Pallor

Icterus

Clubbing

Cyanosis

Lymphadenopathy

Edema

6. Vital parameters:

a. Pulse:

b. BP:

c. Respiratory rate:

d. Temperature:

SYSTEMIC EXAMINATION:

RESPIRATORY SYSTEM

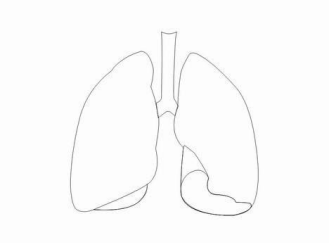
CARDIOVASCULAR SYSTEM

GASTROINTESTINAL SYSTEM

CENTRAL NERVOUS SYSTEM

INVESTIGATIONS:

Chest X-ray (PA View):



Tuberculin skin test:

Sputum for AFB:

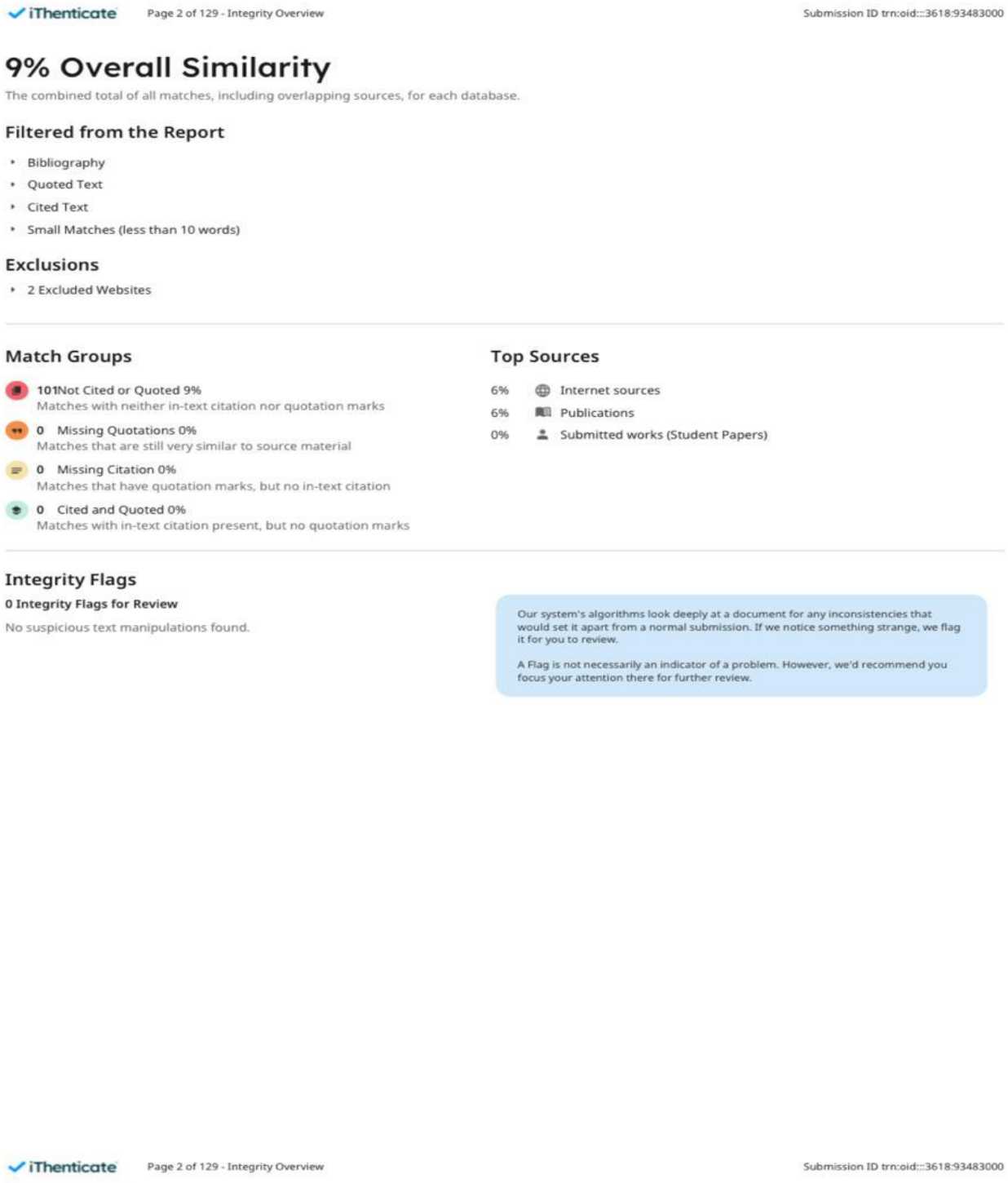
FINAL DIAGNOSIS:

Willingness for treatment:

If no, Reason for Unwillingness for treatment:

DATE SIGNATURE

ANNEXURE – IV



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ANNEXURE – V

SL NO.	NAME	INDEX PATIENT NAME	INDEX PATIENT DIAGNOSIS	NIKSHAY ID	CONTACT NUMBER	DATE	AGE (IN YEARS)	GENDER	HEIGHT (in cm)	WEIGHT (in kg)	BMI (in kg/m²)	CATEGORY	COMORBIDITIES	SMOKING/ TOBACCO HISTORY	ALCOHOL HISTORY	CONTACT HISTORY	CHEST XRAY FINDINGS	SPUTUM ZN/AR STAIN	TUBERCULIN SKIN TEST	DIAGNOSIS	WILLINGNESS FOR TPT	REASON FOR UNWILLINGNESS	TPT INITIATED	TREATMENT COMPLETION STATUS
1	SAVITRI MUMMADI	DEEPAK MUMMADI	DSTB	88058110	9611796448	10/29/2024	35	F	161	43.5	16.78	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
2	HEMANTH MUMMADI	DEEPAK MUMMADI	DSTB	88058110	9611796448	10/29/2024	40	M	169	60.6	21.22	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
3	ABHISHEK MUMMADI	DEEPAK MUMMADI	DSTB	88058110	9611796448	10/29/2024	18	M	165	51	18.73	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
4	NIKITA MUMMADI	DEEPAK MUMMADI	DSTB	88058110	9611796448	10/29/2024	12	F	142	33.4	16.56	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
5	VIDYASHREE BAICHBAL	BHIMAPPA BAICHBAL	DSTB	44693950	8105404851	12/19/2023	26	F	152	47.2	20.43	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
6	RAVI BAICHBAL	BHIMAPPA BAICHBAL	DSTB	44693950	8105404851	12/19/2023	31	M	160	52.6	20.55	NORMAL	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
7	ASHWINI BAICHBAL	BHIMAPPA BAICHBAL	DSTB	44693950	8296664844	12/19/2023	26	F	157	51.6	20.93	NORMAL	NONE	NONE	NO	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
8	VIJAYLAKSHMI BYAKOD	SHIVAPPA BYAKOD	DSTB	68144901	7411265761	2/5/2024	35	F	160	57.4	22.42	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
9	RAJU KONASHIRASAGI	SUJATA KONASHIRASAGI	DSTB	61202959	7022615957	10/28/2023	19	M	155	58.9	24.52	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
10	SIDDHARTH KONASHIRASAGI	SUJATA KONASHIRASAGI	DSTB	61202959	7022615957	10/28/2023	35	M	163	63.1	23.75	NORMAL	NONE	TOBACCO CHEWER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
11	SAHEBGOUDA KONASHIRASAGI	SUJATA KONASHIRASAGI	DSTB	61202959	7022615957	10/28/2023	43	M	171	69.7	30.68	OBESITY	NONE	SMOKER,TOBACCO CHEWER	PRESENT	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
12	BASAVVA NOVI	UMESH NOVI	DSTB	93966743	8217647040	11/29/2024	50	F	156	48.7	20.01	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
13	JAGADEESH NOVI	UMESH NOVI	DSTB	93966743	8217647040	11/30/2024	37	M	168	76.9	27.25	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
14	RENUKA PATIL	RAVI JAGAMSHETTI	DSTB	38666923	6361629767	6/8/2023	49	F	153	57.6	24.61	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
15	BASAVANTRAY PATIL	RAVI JAGAMSHETTI	DSTB	38666923	6361629767	6/8/2023	61	M	162	65.3	24.88	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
16	MUTTAPPA TUMBAGI	BASANNA TUMBAGI	DSTB	68769077	8105264148	2/14/2024	36	M	172	77.6	26.23	OVERWEIGHT	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
17	SHIVANNA TUMBAGI	BASANNA TUMBAGI	DSTB	68769077	8105264148	2/14/2024	55	F	154	53.5	22.56	NORMAL	DIABETES	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
18	PRAMILA TUMBAGI	BASANNA TUMBAGI	DSTB	68769077	8105264148	2/14/2024	28	F	158	57.1	22.87	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
19	SAMARTH TUMBAGI	BASANNA TUMBAGI	DSTB	68769077	8105264148	2/14/2024	6	M	105	21.6	19.59	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
20	SAMPREET TUMBAGI	BASANNA TUMBAGI	DSTB	68769077	8105264148	2/14/2024	5	M	97	19.7	20.94	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
21	BHAGAMMA BADIGER	SHRIMANT BADIGER	MDRTB	61272299	6362919946	11/17/2023	35	F	156	46.1	18.94	NORMAL	HYPOTHYROIDISM	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
22	BASAVARAJ BADIGER	SHRIMANT BADIGER	MDRTB	61272299	6362919946	11/17/2023	8	M	116	25.3	18.80	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
23	RAVINDRA ITAGI	SANGAMMA ITAGI	MDRTB	17536937, 92715346	8088557578	11/15/2024	58	M	172	57.3	19.37	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
24	CHANDAPPA MORATAGI	NILAMMA MORATAGI	DSTB	96484695	8105955081	12/31/2024	58	M	166	63.9	23.19	NORMAL	NONE	SMOKER, TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
25	SIDDANGOUDA EVUR	GOULAPPA EVUR	DSTB	9655597	7795208548	1/2/2025	21	M	159	52.6	20.81	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
26	AAKSH KILLIKETAR	ASHWINI KILLIKETAR	DSTB	60725134	8147259952	11/4/2023	21	M	165	73.5	27.00	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
27	ABHLASH KILLIKETAR	ASHWINI KILLIKETAR	DSTB	60725134	8147259952	11/4/2023	27	M	174	75.1	24.81	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
28	ASHWANI KILLIKETAR	ASHWINI KILLIKETAR	DSTB	60725134	8147259952	11/4/2023	23	F	157	50.7	20.57	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
29	SITABAI KILLIKETAR	ASHWINI KILLIKETAR	DSTB	60725134	8147259952	11/4/2023	50	F	160	56.4	22.03	NORMAL	NONE	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	LTBI	YES	NA	YES	COMPLETED
30	BAPU KILLIKETAR	ASHWINI KILLIKETAR	DSTB	60725134	8147259952	11/4/2023	28	M	172	75.8	25.62	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
31	SUSLABAI KILLIKETAR	ASHWINI KILLIKETAR	DSTB	60725134	8147259952	11/4/2023	69	F	156	47.8	19.64	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
32	SNEHA KILLIKETAR	ASHWINI KILLIKETAR	DSTB	60725134	8147259952	11/4/2023	5	F	97	11.4	12.12	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
33	AMBREESH MUDGAL	MALLAPPA MUDGAL	MDRTB	73448801	9902877233	5/2/2024	18	M	171	88.5	30.26	OBESITY	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	NA	NO TB	NO	MISCONCEPTION	NO	NA
34	ASHWINI BIRADAR	MITHUN TIPPAREDDY	DSTB	67272353	9980974702	1/24/2024	28	F	153	45.7	19.95	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
35	MAHESH CHIKKALAKI	KAVYA CHIKKALAKI	MDRTB	70864728	9008610145	6/13/2024	35	M	169	58.3	20.41	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	COMPLETED
36	TASLIM FAYAZAHAMAD	FAYAZAHAMAD NABISAB	MDRTB	66034670, 66308013	7676491649	2/9/2024	37	F	156	43.8	17.99	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	NO	NON-PROVISION
37	SAROJINI BHAVI	DAYANAND BHAVI	MDRTB	91163950	7892575506	11/7/2024	50	F	154	58.2	24.54	NORMAL	NONE	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
38	VASANTA BHAVI	DAYANAND BHAVI	MDRTB	91163950	7892575506	11/7/2024	28	F	165	49.7	18.26	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
39	ASHOK N	BEERAPPA NAYAKONDI	DSTB	69636651	9398002427	2/28/2024	55	M	161	73.9	28.51	OVERWEIGHT	HYPERTENSION	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
40	SHREEDEVI N	BEERAPPA NAYAKONDI	DSTB	69636651	9398002427	2/28/2024	48	F	152	54.2	23.46	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
41	SHARANAPPA BHAVIKATTI	MALLAVVA BHAVIKATTI	MDRTB	41796695	9945635189	6/4/2023	46	M	169	62.5	21.88	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
42	MALLAPPA DENGI	LAKSHMIBAI DENGI	DSTB	80159657	8296873016	7/30/2024	25	M	160	59.3	23.16	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
43	BHIMANNA PUJARI	UMALA PUJARI	MDRTB	64230638	8010507925	12/30/2023	36	M	167	78.3	28.08	OVERWEIGHT	HYPERTENSION	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
44	SANGANESH SAVALI	SAHABANNA SAVALI	DSTB	10445834	9663401644	1/20/2025	24	M	173	62.7	20.95	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
45	MALLAPPA GANTEPPAGOL	SHIVAPPA GANTEPPAGOL	DSTB	97926695	7795320612	1/2/2025	50	M	166	71.5	25.95	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
46	MALLANNA WATTAR	SIDDANNA WATTAR	DSTB	62801118	8971869509	11/20/2023	60	F	151	58.2	25.53	OVERWEIGHT	DIABETES, HYPERTENSION	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
47	BHUVANESHWARI WATTAR	SIDDANNA WATTAR	DSTB	62801118	8971869509	11/20/2023	30	F	158	53.6	21.47	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
48	MALLANNA WATTAR	SIDDANNA WATTAR	DSTB	62801118	8971869509	11/20/2023	35	M	163	64.1	24.13	NORMAL	HYPERTENSION	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
49	PADMAVATI CHOKARI	DHARMANNA CHOKARI	DSTB	71581365	9880037283	3/30/2024	56	F	149	52.9	23.83	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
50	JAGAPPA CHOKARI	DHARMANNA CHOKARI	DSTB	71581365	9880037283	3/30/2024	25	M	157	67.8	27.51	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
51	SEEMA SHRIVASTAV	GOPAL SHRIVASTAV	DSTB	70280196	9346280112	3/30/2024	27	F	151	48.7	21.36	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
52	MAHADEV PADASALAGI	APABALI PADASALAGI	DSTB	62237472	7411238019	11/6/2023	60	M	166	69.3	25.15	OVERWEIGHT	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
53	MINAKSHI PADASALAGI	APABALI PADASALAGI	DSTB	62237472	7411238019	11/6/2023	55	F	154	78.1	32.93	OBESITY	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
54	ABHISHEK PADASALAGI	APABALI PADASALAGI	DSTB	62237472	7411238019	11/6/2023	29	M	171	84.5	28.90	OVERWEIGHT	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
55	MANJULA REBINAL	CHANNAPPA REBINAL	MDRTB	62353860	9535507749	11/17/2023	24	F	158	56.5	22.63	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
56	AMPANNA REBINAL	CHANNAPPA REBINAL	MDRTB	62353860	9535507749	11/17/2023	5	M	104	20.7	19.14	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
57	BISMILLA HACHIYAL	HUSENSAB HACHIYAL	DSTB	40163994	8970130479	8/4/2023	41	F	150	73.2	32.53	OBESITY	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
58	KASTURIBAI KAMBLE	SADASHIV KAMBLE	DSTB	63117543	8861685205	11/21/2023	42	F	156	54.3	22.31	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
59	SUNIL KAMBLE	SADASHIV KAMBLE	DSTB	63117543	8861685205	11/21/2023	20	M	159	60.7	24.01	NORMAL	NONE	NONE	NO	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
60	KAVERI KAMBLE	SADASHIV KAMBLE	DSTB	63117543	8861685205	11/21/2023	19	F	153	57.5	24.56	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
61	SAGAR KAMBLE	SADASHIV KAMBLE	DSTB	63117543	8861685205	11/21/2023	18	M	161	71.4	27.55	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
62	GANESH BILLADAE	ASHOK BILLADAE	DSTB	72026707	7676604460	4/10/2024	18	M	158	65.9	26.40	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
63	GIRISH BILLADAE	ASHOK BILLADAE	DSTB	72026707	7676604460	4/10/2024	14	M	150	53.4	23.73	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
64	MAHESHWARI BILLADAE	ASHOK BILLADAE	DSTB	72026707	7676604460	4/10/2024	16	F	152	57.3	24.80	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
65	RENUKA NAGARAL	SHABANAPPA NAGARAL	DSTB	42072091	9845872387	7/27/2023	30	F	155	44.6	18.56	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
66	VIDYA NAGARAL	SHABANAPPA NAGARAL	DSTB	42072091	9845872387	7/31/2023	23	F	162	58.1	22.14	NORMAL	NONE	NONE	NO	YES	NON-HOMOGENOUS OPACITY	POSITIVE	NEGATIVE	ACTIVE TUBERCULOSIS	NA	NA	NA	NA
67	SACHIN NAGARAL	SHABANAPPA NAGARAL	DSTB	42072091	9845872387	7/27/2023	26	M	171	56.2	19.22	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
68	CHINAGBASHA KOTTALAGI	MAHIBASAB KOTTALAGI	MDRTB	72492706	9845728086	4/29/2024	46	M	170	71.9	24.88	NORMAL	HYPERTENSION	SMOKER, TOBACCO CHEWER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
69	NAZIA KOTTALAGI	MAHIBASAB KOTTALAGI	MDRTB	72492706	9845728086	4/29/2024	22	F	155	42.4	17.65	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
70	SHAHEEN KOTTALAGI	MAHIBASAB KOTTALAGI	MDRTB	72492706	9845728086	4/29/2024	24	F	156	46	18.90	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
71	NOORJAHAN KOTTALAGI	MAHIBASAB KOTTALAGI	MDRTB	72492706	9845728086	4/29/2024	65	F	150	69.4	30.84	OBESITY	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
72	IRFAN KOTTALAGI	MAHIBASAB KOTTALAGI	MDRTB	72492706	9845728086	4/29/2024	19	M	151	56.1	24.60	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
73	GURANNA LINGADALLI	NITIN LINGADALLI	DSTB	69637328	8618598202	2/23/2024	80	F	153	58.2	24.86	NORMAL	NONE	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
74	LAKSHMI LINGADALLI	NITIN LINGADALLI	DSTB	69637328	8618598202	2/23/2024	57	M	171	70.9	24.25	NORMAL	DIABETES	NONE	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
75	REKHA LINGADALLI	NITIN LINGADALLI	DSTB	69637328	8618598202	2/23/2024	45	F	154	52.3	22.05	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
76	ASHWINI LINGADALLI	NITIN LINGADALLI	DSTB	69637328	8618598202	2/23/2024	20	F	157	51.7	20.97	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
77	RADHIKA LINGADALLI	NITIN LINGADALLI	DSTB	69637328	8618598202	2/23/2024	22	F	153	55.6	23.75	NORMAL	HYPOTHYROIDISM	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
78	BASAVARAJ MELMALAGI	BASAMMA MELMALAGI	DSTB	71477275	9731462194	3/25/2024	38	M	161	64.2	32.48	OBESITY	NONE	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
79	SHARANAPPA YALAGOD	BHIMARAYA YALAGOD	DSTB	65417751	9591780152	1/5/2024	22	M	158	49.8	19.94	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	FEAR OF ADVERSE EFFECTS	NO	NA
80	RAVATAPPA BANSODE	KIRTHI BANSODE	MDRTB	73691111	9980037883	8/2/2024	38	M	160	61.1	23.87	NORMAL	HYPERTENSION	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
81	BABASAHEB BANSODE	KIRTHI BANSODE	MDRTB	73691111	9980037883	8/2/2024	35	M	162	53.6	20.42	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
82	LAXMI BANSODE	KIRTHI BANSODE	MDRTB	73691111	9980037883	9/2/2024	30	F	157	47.2	19.15	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
83	ASHOK HALAKATTI	AKSHAY HALAKATTI	DSTB	40520454	8050204494	6/26/2023	66	M	173	50.7	16.94	UNDERWEIGHT	NONE	SMOKER, TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
84	SHREEDEVI HALAKATTI	AKSHAY HALAKATTI	DSTB	40520454	8050204494	6/26/2023	54	F	159	76.3	30.18	OBESITY	DIABETES, HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
85	SHUBHASHREE HALAKATTI	AKSHAY HALAKATTI	DSTB	40520454	8050204494	6/26/2023	27	F	162	51.8	19.74	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
86	TRISHA HALAKATTI	AKSHAY HALAKATTI	DSTB	40520454	8050204494	6/26/2023	5	F	88	11.6	14.98	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
87	RACHANA SHAHI	REVANSIDDA SHAHI	DSTB	88406620	9980974731	10/19/2024	32	F	151	52.9	23.20	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
88	SARVESH S	REVANSIDDA SHAHI	DSTB	88406620	9980974731	10/19/2024	11	M	128	35.1	21.42	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
89	SHREYANSH S	REVANSIDDA SHAHI	DSTB	88406620	9980974731	10/19/2024	6	M	103	13.6	12.82	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
90	NARENDRA BHOSALE	PARASHURAM BHOSALE	MDRTB	42483441	8149476997	8/4/2023	34	M	161	52.9	20.41	NORMAL	HYPERTENSION	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	FEAR OF ADVERSE EFFECTS	NO	NA

91	ARAVIND KAMATAGI	SHARANAPPA KAMATAGI	DSTR	67441622	8722949851	1/20/2024	27	M	165	66.5	24.43	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
92	SIDDU KAMATAGI	SHARANAPPA KAMATAGI	DSTR	67441622	8722949851	1/20/2024	23	M	159	53.2	21.04	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
93	PRERNA KAMATAGI	SHARANAPPA KAMATAGI	DSTR	67441622	8722949851	1/20/2024	20	F	153	42.2	18.03	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
94	SAVITRI KAMATAGI	SHARANAPPA KAMATAGI	DSTR	67441622	8722949851	1/20/2024	21	F	157	50.8	20.61	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
95	NEELAMMA KAMATAGI	SHARANAPPA KAMATAGI	DSTR	67441622	8722949851	1/20/2024	55	F	154	57.3	24.16	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
96	VEDANT KAMATAGI	SHARANAPPA KAMATAGI	DSTR	67441622	8722949851	1/20/2024	6	M	99	18.7	19.08	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
97	UMAR DALWAI	FATHIM DALWAI	MDRTB	4015/2018, 45713840	8660075722	8/19/2023	25	M	174	68.8	22.72	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
98	CHANDRAVVA GOLASANGI	DHARPPA GOLASANGI	DSTR	68884578	6364581669	2/14/2024	73	F	156	45.3	18.61	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
99	MUTHAPPA GOLASANGI	DHARPPA GOLASANGI	DSTR	68884578	6364581669	2/14/2024	36	M	163	48.1	18.10	UNDERWEIGHT	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
100	NINGAPPA ITAGI	MADIVALAMMA ITAGI	DSTR	61072021	9145835703	10/19/2023	55	M	168	62.9	22.29	NORMAL	DIABETES	SMOKER, TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
101	PADDAVVA KADAPATI	RAMESH KADAPATI	DSTR	72784066	8296691706	4/25/2024	30	F	157	58.5	23.73	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
102	KANNAVVA PUJARI	PARAMESHWAR PUJARI	DSTR	92070219	7899323982	11/16/2024	54	F	152	85.6	37.05	OBESITY	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	TPT COMPLETED	NO	NA
103	RAVI HATTI	SUKHADEV HATTI	DSTR	32691707	9886541413	1/12/2024	37	M	161	59.3	22.87	NORMAL	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
104	PARASU HATTI	SUKHADEV HATTI	DSTR	32691707	9886541413	1/12/2024	32	M	165	71.8	26.37	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
105	SUNANDA HATTI	SUKHADEV HATTI	DSTR	32691707	9886541413	1/12/2024	33	F	154	62.4	26.31	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
106	SHIVAJI KAMBALE	RANJANA KAMBLE	MDRTB	81707348	8971396675	9/23/2024	29	M	159	50.7	20.05	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
107	PARVATI KARANDE	PANDIT KARANDE	DSTR	68982161	8008354122	2/15/2024	40	F	165	48.9	18.4	UNDERWEIGHT	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
108	GURUNATH BELLIKATTI	KAMALAVVA BELLIKATTI	MDRTB	75180404	8971772164	6/5/2024	53	M	170	65.8	22.77	NORMAL	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	INCOMPLETE
109	YASHODA MASHYAL	CHANDRAKANT MASHYAL	DSTR	37062149	6362003269	6/9/2023	34	F	155	56.1	23.35	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
110	VIRAT MASHYAL	CHANDRAKANT MASHYAL	DSTR	37062149	6362003269	6/9/2023	10	M	126	22.4	14.11	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
111	ARCHANA MASHYAL	CHANDRAKANT MASHYAL	DSTR	37062149	6362003269	6/9/2023	8	F	117	18.5	13.51	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
112	POORNIMA MASHYAL	CHANDRAKANT MASHYAL	DSTR	37062149	6362003269	6/9/2023	7	F	110	15.9	13.14	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
113	MOULALI AMEENSAB LATI	AMEENSAB LATI	MDRTB	38636681, 15745716	9380344138	6/19/2023	13	M	134	39.6	16.48	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
114	GUDUMA AMEENSAB LATI	AMEENSAB LATI	MDRTB	38636681, 15745716	9380344138	6/19/2023	37	F	152	51.4	22.25	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
115	MEENAJ AMEENSAB LATI	AMEENSAB LATI	MDRTB	38636681, 15745716	9380344138	6/19/2023	16	F	129	32.7	13.64	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
116	MOHIN AMEENSAB LATI	AMEENSAB LATI	MDRTB	38636681, 15745716	9380344138	6/19/2023	20	M	148	42.5	19.40	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
117	LAKSHMI SALOTAGI	TAPPANNA SALOTAGI	MDRTB	82053864	7899420955	9/12/2024	21	F	159	48.7	19.26	NORMAL	HYPOTHYROIDISM	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
118	JAKKAPPA SALOTAGI	TAPPANNA SALOTAGI	MDRTB	82053864	7899420955	9/12/2024	23	M	167	51.6	18.50	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
119	ADITHYA RATHOD	KASU NAMU RATHOD	DSTR	61895336	8496036272	10/31/2023	5	M	92	21.3	25.17	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
120	LACCHUBAI RATHOD	KASU NAMU RATHOD	DSTR	61895336	8496036272	10/31/2023	65	F	158	52.1	20.87	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
121	NANDULAL RATHOD	KASU NAMU RATHOD	DSTR	61895336	8496036272	10/31/2023	34	M	172	70.8	23.93	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
122	MANJULA RATHOD	KASU NAMU RATHOD	DSTR	61895336	8496036272	10/31/2023	30	F	163	65.3	24.58	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
123	PAYAL RATHOD	KASU NAMU RATHOD	DSTR	61895336	8496036272	10/31/2023	7	F	104	33.2	30.70	OBESITY	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
124	SATISH MOPAGAR	MAHANANDA MOPAGAR	DSTR	91126592	9986023748	11/1/2024	33	M	165	66.5	24.43	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
125	BIBIJAN SINGALIKAR	TASLEEM SINGALIKAR	MDRTB	75351741	8722357846	5/31/2024	45	F	161	54.4	20.99	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	INCOMPLETE
126	AYESHA SINGALIKAR	TASLEEM SINGALIKAR	MDRTB	75351741	8722357846	5/31/2024	8	F	121	33.9	16.32	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	INCOMPLETE
127	BANDAVVA KADAPATI	RAMESH KADAPATI	DSTR	72784066	8296691706	4/25/2024	58	F	166	61	22.14	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
128	ANITA SHINGRI	ARUNKUMAR SHINGRI	MDRTB	67315126	9972215089	6/8/2024	30	F	159	50.7	20.05	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NA	NO TB	NO	MISCONCEPTION	NO	NA
129	RENUKA GARNU	ARUNKUMAR SHINGRI	MDRTB	67315126	9972215089	6/13/2024	46	F	156	47.2	19.40	NORMAL	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NA	NO TB	NO	MISCONCEPTION	NO	NA
130	SHAHEEN MAMADAPUR	SAMEENA MAMADAPUR	DSTR	49930660	9986779509	10/6/2023	40	F	163	59.7	22.46	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
131	AYESHA MAMADAPUR	SAMEENA MAMADAPUR	DSTR	49930660	9986779509	10/6/2023	15	F	137	27.5	14.65	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
132	MEHEBOOB MAMADAPUR	SAMEENA MAMADAPUR	DSTR	49930660	9986779509	10/6/2023	32	M	174	61.3	20.25	NORMAL	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
133	MAZDA MAMADAPUR	SAMEENA MAMADAPUR	DSTR	49930660	9986779509	10/6/2023	48	F	160	68.9	26.91	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
134	LALITABAI GOGI	CHANDRASHEKAR GOGI	MDRTB	62020985	9663059321	11/1/2023	61	F	152	55.8	24.15	NORMAL	DIABETES, HYPERTENSION	TOBACCO CHEWER	NO	YES	NON-HOMOGENOUS OPACITY	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
135	BASAVARAJ GOGI	CHANDRASHEKAR GOGI	MDRTB	62020985	9663059321	11/1/2023	42	M	165	72.1	26.48	OVERWEIGHT	NONE	SMOKER, TOBACCO CHEWER	PRESENT	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
136	JALAXMI PANDITH	GAJANANAJI PANDITH	DSTR	89390804	7491185499	10/22/2024	63	F	153	73.8	31.53	OBESITY	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
137	PRAVEEN PANDITH	GAJANANAJI PANDITH	DSTR	89390804	7491185499	10/22/2024	42	M	170	83.6	28.93	OVERWEIGHT	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
138	KANCHANA UMESH	GAJANANAJI PANDITH	DSTR	89390804	7491185499	10/22/2024	39	F	148	66.3	30.27	OBESITY	HYPERTENSION	NONE	NO	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
139	SHARANABASU GOUR	BASAVANTRAYYA GOUR	DSTR	89579323	7337603837	10/19/2024	28	M	175	48.2	15.74	UNDERWEIGHT	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
140	PRATIKSHA HALAVAPPA	HALAVAPPA MYAGELIMANI	MDRTB	92637335	9740415778	11/25/2024	9	F	112	21.5	17.14	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
141	PREETUMI HALAVAPPA	HALAVAPPA MYAGELIMANI	MDRTB	92637335	9740415778	11/25/2024	13	M	126	32.9	20.72	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
142	PRIYA HALAVAPPA	HALAVAPPA MYAGELIMANI	MDRTB	92637335	9740415778	11/25/2024	10	F	118	26	18.67	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
143	SARASWATI MYAGELIMANI	HALAVAPPA MYAGELIMANI	MDRTB	92637335	9740415778	11/25/2024	31	F	155	53.1	22.1	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
144	BHAGYASHREE BIRADAR	PRAJWAL BIRADAR	DSTR	36214858	9986536861	4/27/2023	27	F	161	58.5	22.57	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
145	VIJAYALAXMI BIRADAR	PRAJWAL BIRADAR	DSTR	36214858	9986536861	4/27/2023	51	F	156	55.9	22.97	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
146	SHIVPRASAD BIRADAR	PRAJWAL BIRADAR	DSTR	36214858	9986536861	4/27/2023	56	M	164	65.1	24.20	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
147	SUVARNA SHINDE	ANKUSH SHINDE	MDRTB	28306799, 29434956	8605598825	6/19/2023	36	F	147	43.7	20.22	NORMAL	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
148	DEBISHA SHINDE	ANKUSH SHINDE	MDRTB	28306799, 29434956	8605598825	6/19/2023	9	F	112	21.5	17.14	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
149	MALLAPPA SHINDE	ANKUSH SHINDE	MDRTB	28306799, 29434956	8605598825	6/19/2023	10	M	118	26	18.67	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	COMPLETED
150	SADASHIV SHINDE	ANKUSH SHINDE	MDRTB	28306799, 29434956	8605598825	6/19/2023	21	M	163	45.3	17.05	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
151	VITTABAI KARALAGI	SAYABANNA KARALAGI	MDRTB	42067794	8105730494	7/24/2023	61	F	143	63.2	30.91	OBESITY	DIABETES	TOBACCO CHEWER	NO	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NO TB	YES	NA	NO	NON-PROVISION
152	CHANDRASHEKAR JAGALI	BASAPPA JAGALI	MDRTB	42213710	6360446788	9/28/2023	28	M	168	70.9	25.12	OVERWEIGHT	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
153	LALBI PATEL	RAJESAB PATEL	DSTR	67264815	9663086886	1/22/2024	55	F	160	57.2	22.34	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
154	KALLAPPA SINGE	PRAKASH SINGE	MDRTB	82999660	7259433223	9/13/2024	24	M	165	57.9	21.27	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
155	VEERESH B P	PRATEEK PATTANASHETTI	DSTR	91173561	9980635048	11/5/2024	63	M	176	60.7	19.60	NORMAL	NONE	SMOKER, TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
156	RATHNAPRABHA V P	PRATEEK PATTANASHETTI	DSTR	91173561	9980635048	11/5/2024	56	F	159	53.2	21.04	NORMAL	DIABETES, HYPERTENSION	NONE	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
157	BASAVARAJ MARAV V P	PRATEEK PATTANASHETTI	DSTR	91173561	9980635048	11/5/2024	28	M	168	48.8	17.33	UNDERWEIGHT	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
158	KALAMMA BADIGER	SHRASHMPA BADIGER	DSTR	91173561	9980635048	11/5/2024	45	F	157	52.8	21.42	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	INCOMPLETE
159	LALITA MADAR	SOMANING MADAR	DSTR	66379127	8951320823	1/4/2024	55	F	155	42.3	17.61	UNDERWEIGHT	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
160	BAPU MADAR	SOMANING MADAR	DSTR	66379127	8951320823	1/4/2024	25	M	162	52.6	20.04	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
161	AMBAVVA MASALI	SHAKARNAG MASALI	MDRTB	62067539	9900180853	11/5/2023	70	F	147	44.2	20.45	NORMAL	DIABETES, HYPERTENSION	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	NO	NON-PROVISION
162	DHANARAJ KALE	LAXMAN NARAYAN KALE	DSTR	80050147	8957188421	8/12/2024	26	M	167	54.7	19.61	NORMAL	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
163	SHOBHA KALE	LAXMAN NARAYAN KALE	DSTR	80050147	8957188421	8/12/2024	57	F	158	68.6	27.48	OVERWEIGHT	HYPERTENSION	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
164	KHUSHIT KALE	LAXMAN NARAYAN KALE	DSTR	80050147	8957188421	8/12/2024	21	M	160	48.3	18.87	NORMAL	NONE	NONE	NO	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	ON TREATMENT
165	MOHAMMAD MURTUJA MISAKI	MOHAMMAD MURTUJA ALLABAKSH HUNSAGI	MDRTB	68080514	9071214377	2/9/2024	33	M	162	54.9	20.92	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
166	HALUKARUN SABARAD	KASTURIBAI SABARAD	DSTR	74153969	8296691706	4/25/2024	38	M	173	72.1	24.09	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
167	MAHANANDA AIRODAGI	SHARANAMMA AIRODAGI	DSTR	98041965	7795643176	1/8/2025	30	F	149	55.1	24.86	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
168	PRAVEEN AIRODAGI	SHARANAMMA AIRODAGI	DSTR	98041965	7795643176	1/8/2025	24	M	170	62.8	19.3	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
169	ANILKUMAR BADIGER	SHRASHMPA BADIGER	DSTR	74427964	8105473537	5/16/2024	28	M	158	77.3	30.96	OBESITY	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	INCOMPLETE
170	PARVATI AWATI	NAGAPPA AWATI	DSTR	67608051	8867724513	1/23/2024	45	M	164	81.4	30.26	OBESITY	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
171	RENUKA KAMBLE	VIJAY KAMBLE	MDRTB	84498243	9611741128	9/26/2024	33	F	153	49.3	21.06	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
172	SIDDAMMA KAMBLE	VIJAY KAMBLE	MDRTB	84498243	9611741128	9/26/2024	62	F	158	61.2	24.52	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
173	MUTURAJ KORAB	YASHWANTH KORAB	MDRTB	65763596, 70014350	8951185508	2/28/2024	14	M	126	32.9	20.72	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NA	YES	INCOMPLETE
174	DEVAKAMMA KORAB	YASHWANTH KORAB	MDRTB	65763596, 70014350	8951185508	2/28/2024	30	F	152	62.6	27.09	OVERWEIGHT	HYPOTHYROIDISM	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
175	RENUKA JAGALI	RAYAPPA JAGALI	DSTR	75700556	8548020580	6/4/2024	50	F	157	65.2	26.45	OVERWEIGHT	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	INCOMPLETE
176	MAHANANDA PATAD	KALINGAPPA PATAD	DSTR	76980616	9945937253	6/18/2024	47	F	159	58.3	23.06	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NA	NO TB	YES	NA	YES	INCOMPLETE
177	KAVERI TALAWAR	SHANTAPPA TALAWAR	DSTR	71699950	9019531097	4/9/2024	17	F	132	35.8	20.55	NORMAL	NONE	NONE	NO	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NO TB	YES	NA	NO	NON-PROVISION
178	REKHA ALLIMATH	SHARANAYYA ALLIMATH	MDRTB	72699610	9686849007	4/24/2024	45	F	167	49.7	17.82	UNDERWEIGHT	NONE	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
179	GEETA KACHAPUR	LINGARAJ KACHAPUR	MDRTB	42430259	9972100015	8/4/2023	36	F	152	56.1	24.28	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
180	GOURI HADAPAD	SANTOSH HADAPAD	DSTR	64807997	7957586515	12/27/2023	33	F	158	47.2	18.9	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
181	SIDDARTH HADAPAD	SANTOSH HADAPAD	DSTR	64807997	7957586515	12/27/2023	18	M	153	45.6	19.48	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
182	AISHWARYA HADAPAD	SANTOSH HADAPAD	DSTR	64807997	7957586515	12/27/2023	16	F	147	43.1	19.95	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
183	SANJEEV AGASAR	VITHAL AGASAR	DSTR	89054812	9980021972	10/18/2024	23	M	178	79.3	25.03	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	YES	NA	YES	INCOMPLETE
184	PRABHAKAR GAJAKOSH	SHIVANAND GAJAKOSH	MDRTB	20752245	6362878469	8/30/2024	38	M	166	41.7	15.13	UNDERWEIGHT	NONE	SMOKER	PRESENT	YES	MULTIPLE FIBROCAVITATORY LESIONS	POSITIVE	POSITIVE	ACTIVE TUBERCULOSIS	NA	NA	NA	NA
185	SUJUDHANA D	SHIVANAND GAJAKOSH	MDRTB	20752245	6362878469	8/30/2024	60	F	150	52.8	23.47	NORMAL	DIABETES	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA
186	JAVAHAR D	SHIVANAND GAJAKOSH	MDRTB	20752245	6362878469	8/30/2024	65	M	159	50.3	19.90	NORMAL	NONE	SMOKER, TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NO TB	NO	MISCONCEPTION	NO	NA

187	SHALA ADDONAGI	KALLAPPA ADDONAGI	KORTA	3676289	9845681098	7/24/2013	40	F	153	61.1	26.19	OVERWEIGHT	HYPOTHYROIDISM	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
188	DAUNDAPPA PUJARI	SHRIDEVI PUJARI	KORTA	7041110	9845301369	3/14/2014	40	M	168	71.1	25.26	OVERWEIGHT	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
189	MAHADEVI PUJARI	SHRIDEVI PUJARI	KORTA	7041110	9845301369	3/14/2014	35	F	160	56.2	21.95	NORMAL	NONE	NONE	NO	YES	ALVEOLAR INFILTRATES	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
190	DUNDAPPA ROLLI	SHARDABAI MANTAGOD	DSTB	4501181	9148424405	11/15/2013	59	M	156	50.6	20.61	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
191	APPANNA P ROLLI	SHARDABAI MANTAGOD	DSTB	4501181	9148424405	11/15/2013	53	M	163	55.6	20.93	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
192	SAVITRI A ROLLI	SHARDABAI MANTAGOD	DSTB	4501181	9148424405	11/15/2013	51	F	157	38.7	15.70	UNDERWEIGHT	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
193	GANGAMMA HALABHAVI	MAGAPPA HALABHAVI	DSTB	9199930	8088974151	11/21/2014	30	M	169	69.1	24.19	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
194	BHARATI SHIVANAND KABADE	ROHIT KABADE	MORTA	3680702	9342669513	5/23/2013	19	F	154	57.3	24.16	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
195	SUMIT SHIVANAND KABADE	ROHIT KABADE	MORTA	3680702	9342669513	5/23/2013	19	M	146	30.5	14.31	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
196	ARCHI KABADE	ROHIT KABADE	MORTA	3680702	7738761168	5/23/2013	12	F	128	32.4	19.78	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
197	HALAPPA KABADE	ROHIT KABADE	MORTA	3680702	7738761168	5/23/2013	56	M	167	69.6	24.96	NORMAL	DIABETES	NONE	PRESENT	YES	CONSOLIDATION	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
198	RAHUL VAJYANAVAR	ROHIT KABADE	MORTA	3680702	7738761168	5/23/2013	31	M	176	55.8	18.01	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
199	HALAPPA VAJYANAVAR	ROHIT KABADE	MORTA	3680702	7738761168	5/23/2013	67	M	168	70.1	24.84	NORMAL	DIABETES	SMOKER	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
200	REKHA KABADE	ROHIT KABADE	MORTA	3680702	7738761168	5/23/2013	45	F	160	59.3	23.17	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	COMPLETED
201	SHAKUNTALA VAJYANAVAR	ROHIT KABADE	MORTA	3680702	9901553225	5/23/2013	57	F	156	63.8	26.22	OVERWEIGHT	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
202	SWETA HOGERAHAR	ROHIT KABADE	MORTA	3680702	9113289557	5/23/2013	22	F	155	36.2	15.07	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
203	BABU HOGERAHAR	ROHIT KABADE	MORTA	3680702	9113289557	5/23/2013	33	M	159	59.7	23.61	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
204	RAJASHEKAR RATHOD	ROHIT KABADE	MORTA	3680702	9901553225	5/23/2013	50	M	163	67	31.74	OBESITY	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
205	SADASHIV WAGHMORE	ANJALI WAGHMORE	MORTA	6067488	8749008583	11/18/2013	33	M	165	70.2	26.72	OVERWEIGHT	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
206	SHIVANI WAGHMORE	ANJALI WAGHMORE	MORTA	6067488	8749008583	11/18/2013	41	F	159	63.5	25.12	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
207	BHIMAPPA VADDAR	SHANTABAI BHIMAPPA	DSTB	7561397	8861357930	6/18/2014	45	M	178	72.6	22.91	NORMAL	DIABETES	SMOKER	NO	YES	NORMAL	NEGATIVE	NA	NOTBI	YES	NA	YES	INCOMPLETE
208	VALLUBAI PAWAR	BHIMABAD PAWAR	DSTB	7974979	9611800769	7/20/2014	35	F	156	60.3	24.78	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
209	VIBISHA PAWAR	BHIMABAD PAWAR	DSTB	7974979	9611800769	7/20/2014	11	F	121	25.1	19.68	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
210	DIPISHA PAWAR	BHIMABAD PAWAR	DSTB	7974979	9611800769	7/20/2014	9	F	109	22.5	18.94	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
211	RANNA PATTAR	GANGADHAR PATTAR	DSTB	7103404	9606628614	3/25/2014	28	M	159	67.9	26.86	OVERWEIGHT	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
212	KAMALAGH PATTAR	GANGADHAR PATTAR	DSTB	7103404	9606628614	3/25/2014	45	F	148	53.3	23.88	NORMAL	DIABETES	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
213	SHASHIKALA PATTAR	GANGADHAR PATTAR	DSTB	7103404	9606628614	3/25/2014	25	M	157	61	24.75	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
214	SHASHIKALA TALASADAR	SUSHILABAI TALASADAR	DSTB	7217610	9916380211	4/17/2014	44	F	153	56.2	24.32	NORMAL	NONE	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
215	GURU TALASADAR	SUSHILABAI TALASADAR	DSTB	7217610	9916380211	4/17/2014	50	M	170	70.7	24.46	NORMAL	HYPERTENSION	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
216	VISHWANATH TALASADAR	SUSHILABAI TALASADAR	DSTB	7217610	9916380211	4/17/2014	21	M	167	59.6	18.14	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
217	HARSHINI TALASADAR	SUSHILABAI TALASADAR	DSTB	7217610	9916380211	4/17/2014	18	F	153	47.8	20.41	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
218	MALLIKARJUN TALASADAR	SUSHILABAI TALASADAR	DSTB	7217610	9916380211	4/17/2014	12	M	146	42.1	19.75	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
219	GANGADAR HIREMATH	SUSUBAI SARANGAMATH	DSTB	10890486	9743167123	1/21/2015	72	M	163	75.7	28.49	OVERWEIGHT	DIABETES, HYPERTENSION	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
220	PRABHAKAR BANSODE	SHANKAR BANSODE	MORTA	8113458	7259715382	8/14/2014	34	M	171	58.3	19.94	NORMAL	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	NO	MISCONCEPTION	NO	NA
221	KOMAL BANSODE	SHANKAR BANSODE	MORTA	8113458	7259715382	8/14/2014	26	F	161	39.3	15.16	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
222	DAYAVVA BANSODE	SHANKAR BANSODE	MORTA	8113458	7259715382	8/14/2014	48	F	162	58.6	19.28	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
223	HUSEN BANSODE	SHANKAR BANSODE	MORTA	8113458	7259715382	8/14/2014	24	M	169	52.7	18.45	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
224	PARSHURAM MURAL	MUDAPPA MURAL	MORTA	4593266	8296806202	10/4/2013	25	M	164	69.3	25.77	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
225	CHANAMMA MURAL	MUDAPPA MURAL	MORTA	4593266	8296806202	10/4/2013	45	F	156	48.6	19.97	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
226	LAKSHMIBAI MURAL	MUDAPPA MURAL	MORTA	4593266	8296806202	10/4/2013	60	F	160	62.8	24.53	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
227	NAGESH GUNAPUR	SHANTAVVA MADAR	DSTB	9626704	9964397819	1/8/2015	32	M	167	61.5	22.05	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
228	MAHADEVI ANACHAGI	DEVENDRAPPA ANACHAGI	DSTB	4489344	9900559417	9/22/2013	40	F	161	47.3	18.25	UNDERWEIGHT	HYPERTENSION	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
229	YAMANAPPA ANACHAGI	DEVENDRAPPA ANACHAGI	DSTB	4489344	9900559417	9/22/2013	26	M	169	53.8	18.49	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
230	ALYAPPA ANACHAGI	DEVENDRAPPA ANACHAGI	DSTB	4489344	9900559417	9/25/2013	25	M	167	63.9	22.91	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
231	LAXMIBAI NAIKODI	VENCHAPPA NAIKODI	DSTB	6721707	9742171557	1/24/2014	57	F	158	45.9	18.38	UNDERWEIGHT	NONE	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
232	KASHIBAI GANGANGOUDA	AMARAPPA GANGANGOUDA	MORTA	6758596	7483056283	1/29/2014	66	F	154	51.5	21.72	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	NO	MISCONCEPTION	NO	NA
233	BASAPPA BAPAGOND	REKHA BAPAGOND	DSTB	8162204	9449711781	6/21/2014	59	M	172	79.1	26.74	OVERWEIGHT	DIABETES	TOBACCO CHEWER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
234	SHANTA BAPAGOND	REKHA BAPAGOND	DSTB	8162204	9449711781	6/21/2014	49	F	165	69.3	30.69	OBESITY	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
235	CHANDRAKANT BASAPPA	TANEN AALINAGI	MORTA	6332910	7349599483	12/14/2013	25	M	161	50.3	19.41	NORMAL	HYPOTHYROIDISM	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	NO	NON-PROVISION
236	MOUBA BASANAL	MARAYDDA BASANAL	DSTB	6240186	9901387189	11/13/2015	50	F	149	52.9	23.83	NORMAL	DIABETES, HYPERTENSION	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
237	KAMALA WALIKAR	BALAPPA WALIKAR	DSTB	7563485	9008985701	6/5/2014	53	F	157	59.1	23.98	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NA	NOTBI	NO	MISCONCEPTION	NO	NA
238	BASAVARAJ BACHAVATTI	MAGAMMA BACHAVATTI	DSTB	9539889	9148708225	1/8/2015	42	M	177	57.3	18.29	UNDERWEIGHT	NONE	SMOKER,TOBACCO CHEWER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
239	ASHOK KORI	VIDYASHREE BADIGER	DSTB	9210146	9686157509	12/3/2014	35	M	165	62.7	23.03	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
240	NEELAMMA JAMBANAL	SIDDAPPA JAMBANAL	MORTA	9427899	9740491598	12/7/2014	36	F	150	49.3	21.91	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
241	FAROQ MULLA	PAKULA MULLA	DSTB	9963856	9108465689	1/9/2015	32	M	159	68.4	27.06	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
242	MAHADEVI GANACHARI	SWAYAM GANACHARI	DSTB	7437310	9902174411	5/13/2014	46	M	173	76.5	25.56	OVERWEIGHT	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NA	NOTBI	NO	MISCONCEPTION	NO	NA
243	SHANTAVVA BILAGI	BASAVANTAPPA BILAGI	MORTA	11413803	7406568572	2/19/2015	69	F	148	49.1	22.46	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	NO	MISCONCEPTION	NO	NA
244	BHARGHAV BIRADAR	BHAGWANTH BIRADAR	DSTB	7684378	8105186169	7/24/2014	19	M	155	59.1	24.60	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
245	SHASHIKALA SULAKHE	MANOHAR SULAKHE	DSTB	6150415	8749098340	10/31/2015	56	F	161	62.3	24.03	NORMAL	DIABETES	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
246	SANTOSH SULAKHE	MANOHAR SULAKHE	DSTB	6150415	8749098340	10/31/2015	28	M	167	51.2	18.36	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
247	PRAGATI SULAKHE	MANOHAR SULAKHE	DSTB	6150415	8749098340	10/31/2015	23	F	159	46	18.20	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
248	SUJATA KUMBAR	PRAKASH KUMBAR	DSTB	7693799	6366635548	8/18/2014	37	F	158	56.7	22.71	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
249	VIJAYLAXMI KUMBAR	PRAKASH KUMBAR	DSTB	7693799	6366635548	8/18/2014	18	F	147	43.8	20.27	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
250	REVATI KUMBAR	PRAKASH KUMBAR	DSTB	7693799	6366635548	8/18/2014	16	F	135	30.2	21.51	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
251	SAMARTH KUMBAR	PRAKASH KUMBAR	DSTB	7693799	6366635548	8/18/2014	14	M	149	34.4	17.55	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
252	GANGAVVA BIRADAR	TAMANANA BIRADAR	MORTA	6052655	8762142754	12/12/2015	54	F	158	52.8	21.15	NORMAL	HYPERTENSION	TOBACCO CHEWER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	NO	NON-PROVISION
253	MALLIKARJUNA BIRADAR	APPARAY BIRADAR	DSTB	6086893	7760070449	12/2/2013	42	M	161	53.1	20.48	NORMAL	NONE	NONE	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
254	SHARANU BIRADAR	APPARAY BIRADAR	DSTB	6086893	7760070449	12/2/2013	33	M	165	49.5	18.18	UNDERWEIGHT	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
255	LAXMI BIRADAR	APPARAY BIRADAR	DSTB	6086893	7760070449	12/2/2013	38	F	157	42.8	17.36	UNDERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
256	KASHIBAI BIRADAR	APPARAY BIRADAR	DSTB	6086893	7760070449	12/2/2013	29	F	160	56	21.87	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
257	PREMSING RATHOD	SANDEEP RATHOD	DSTB	7058691	9686218179	3/14/2014	55	M	163	54.8	20.63	NORMAL	NONE	SMOKER	PRESENT	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
258	SHARADABAI RATHOD	SANDEEP RATHOD	DSTB	7058691	9686218179	3/14/2014	40	F	152	49.6	21.47	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	POSITIVE	LTBI	YES	NA	YES	INCOMPLETE
259	DILIP RATHOD	SANDEEP RATHOD	DSTB	7058691	9686218179	3/14/2014	24	M	159	61.9	24.48	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	INCOMPLETE
260	MANOHARI MATHAPATI	VISHWANATH MATHAPATI	MORTA	8122369	6363595369	6/23/2014	20	F	145	41.7	19.83	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
261	ABHISHEK MATHAPATI	VISHWANATH MATHAPATI	MORTA	8122369	6363595369	6/23/2014	17	M	150	62.7	27.87	OVERWEIGHT	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
262	BORAMMA MATHAPATI	VISHWANATH MATHAPATI	MORTA	8122369	6363595369	6/23/2014	37	F	148	78.5	35.84	OBESITY	NONE	NONE	NO	YES	CALCIFICATIONS	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
263	SUCHI KUMATAGI	NAGAPPA KUMATAGI	DSTB	7126359	8951388594	3/18/2014	22	F	156	59.2	24.32	NORMAL	NONE	NONE	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED
264	CHANDRU KUMATAGI	NAGAPPA KUMATAGI	DSTB	7126359	8951388594	3/18/2014	26	M	168	67.6	23.95	NORMAL	NONE	SMOKER	NO	YES	NORMAL	NEGATIVE	NEGATIVE	NOTBI	YES	NA	YES	COMPLETED