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CURRENT SCENARIO OF TUBERCULOSIS IN INDIA WITH REFERENCE TO HEALTH GEOGRAPHY

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Abstract – Tuberculosis is an infectious disease that can cause death. India has been suffering from a vast number of cases of TB. Since ancient times, TB has remained a lethal disease due to its high morbidity as well as the high mortality rate in the country. Over the period, many efforts have been made since the independence towards Tuberculosis diagnosis. All actions aim to engage every segment of Indian society in fighting to end tuberculosis. Various tuberculosis elimination programs like NTEP, NSP, and End TB programs have been introduced, which help India do better to fight the existing epidemic. The published annual TB report shows a high notification rate of TB and new TB cases detected frequently, which were stopped or less, earlier due to COVID-19. This review paper aims to open up the current scenario of TB, which spread over India as an epidemic. Due to inadequate or failing TB control programs, multidrug-resistant tuberculosis (MDR-TB) is another emerging threat to the eradication of tuberculosis as well as TB, with HIV cases increasing every year need to diagnose. The current trend in tuberculosis diagnosis under the NTEP program has to detect the cases as much as for diagnosis to better the epidemic conditions.

Keywords- TB, HIV with TB, MDR-TB, Health Geography.

INTRODUCTION – Mycobacterium tuberculosis is a type of contagious disease. In virtually all parts of the world, Mycobacterium tuberculosis is a major human pathogen [1]. Although it usually affects the lungs, pulmonary tuberculosis (TB) can potentially affect other body organs [2]. Tuberculosis can lie dormant in any person for decades and it may be reactivated later, leading to widespread systemic symptoms [3]. One illness that can spread through the air is pulmonary tuberculosis. Chest X-rays, sputum, and other tests can be used to diagnose tuberculosis. Antibiotic combinations are prescribed for longer than six months as a kind of treatment. The BCG (bacille-calmette-guerin) vaccine, early diagnosis and identification, appropriate and comprehensive treatment, awareness, and other measures can reduce the TB burden. Tuberculosis is a social disease that's also an impediment to the welfare of society. Several other factors, such as poor housing, overcrowding, large families, lack of education, malnutrition, smoking patterns, poverty, etc., are also included in social factors. The occurrence and spread of tuberculosis are made possible by all these factors and are associated with both undernourishment and latent tuberculosis infection [4]. The most widely used vaccination to prevent tuberculosis is BCG. While it does provide some protection against severe types of tuberculosis in children, that protection diminishes with age [5]. A significant concern with the elderly population is latent tuberculosis.

In 1962, India launched the "National TB Elimination Program". The District TB Centre approach aimed to combat tuberculosis, a severe public health issue, by providing the BCG vaccine and TB treatment. Based on the widely approved Directly Observed Treatment Short-course (DOTS) method, the "Revised National Tuberculosis Control Programme" (RNTCP) was introduced in 1997 and had been extended throughout the nation by 2006 [6]. The RNTCP aligns with other global health sector programs and goals, including the United Nations' Sustainable Development Goals (SDGs), the World Health Organization's (WHO) "End TB Strategy," and the "National Health Policy 2017".

National strategic plan (2017-2025)-

The MoHFW, Government of India, a draught of the new National Strategic Plan (NSP) for the Elimination of TB 2017–2025, was released by the RNTCP in February 2017 [7]. It outlines the government's planned strategy to eradicate tuberculosis in India and details the initiatives and actions that will significantly improve the disease's incidence, prevalence, and death rate. This is on top of the previously learned material [6].
The goals under NSP (2017-2025):

- Improving and increasing drug resistance testing for tuberculosis and early detection of TB.
- Treating tuberculosis (TB) appropriately will stop drug resistance from developing and break the chain of transmission.
- Building capacity for continuous surveillance.
- Preventing the emergence of TB and Latent tuberculosis infection (LTBI)
- Ending TB infection in India.

National strategic plan (2020-2025)-

Whatever the Government of India (GoI) presently believes is required to eradicate tuberculosis in India by 2025 is outlined in the TB National Strategic Plan (NSP) 2020–2025. This National Strategic Plan 2020–2025 "refreshes" and replaces the National Strategic Plan 2017–2025. It offers a fresh set of objectives that, if fulfilled, will see the end of tuberculosis in India by 2025. The new NSP aims to quicken the country's reaction to tuberculosis. In certain places, the NSP 2020–2025 also reviews the first three-year period of the now-outdated NSP 2017–2025 [8].
The recommended actions included:

- Launching a TB eradication campaign motivated by the knowledge acquired from the polio eradication.
- Bringing in additional workers to supplement the existing ones immediately.
- Increasing the involvement of private providers.
- Move from passive community engagement to full community participation and ownership.
- spending on TB surveillance staff and supplies to provide timely, accurate, and comprehensive information.
- Introducing new instruments for precise diagnosis.
- providing patients with total support during their course of treatment;
- revising and focusing on active case finding.
- Implement and examine ambitious plans to use new, shorter regimens to treat children, PLHIV, household members, and other locally identified "high-risk" groups for TB prevention.

Pradhan Mantri TB Mukt Bharat Abhiyaan-

MoHFW has launched "Community Support to TB Patients—Pradhan Mantri TB Mukt Bharat Abhiyaan" to effectively engage the community towards ending TB in India. The community and societal institutions can be vital in addressing social factors and filling in gaps, which will help achieve the national goal, even though government efforts are producing notable results [9].
Objectives of the initiatives:

- Increase patient support to help TB patients receive better treatment results.
- Increase community participation in fulfilling India's 2025 commitment to eradicate tuberculosis
- Utilize initiatives related to corporate social responsibility (CSR)

WHO-India is also preparing to implement Project GATIMAN to improve technical assistance in the areas of public-private partnership, TB surveillance, knowledge management, research on execution, drug-resistant TB, laboratories, TB infection management, campaigns, and communications across states and UTs to attain the ultimate goal of a TB Mukt Bharat (TB-free India). In addition to these initiatives, WHO India has chosen to eradicate tuberculosis in 100 hard-to-reach and marginalized districts in India [8].

METHODOLOGY-

India is a country situated in the northern part of the world to the earth's equatorial line. The country's longitude is from 8o 04' to 37o 06' North, and longitudes are 68o 07' to 97o 25' East. These grid values show that the southern part of the country falls in the tropic region, and the northern part lies in the sub-tropical region or the warm temperate zone, as per the geographic study. The country is bounded on the east by the Bay of Bengal, and some parts of the land area are with the Myanmar border; China determines the northern region, the western part is bounded by the water body of the Arabian Sea, and Pakistan on the land border and the southern part is bounded by the Indian Ocean [10]. The current scenario of tuberculosis in India is assessed in this study. This review study is based on secondary data from national reports, information systems, and related government sites. Concerned data and attributes were also gathered from the official India TB websites. From the India Annual TB Report - 2023, data on health infrastructure and human resources were collected.

CURRENT SCENARIO-

1. **Structure-**

In line with the goal of the NTEP and TB Mukt Bharat Abhiyaan to eliminate TB by 2025 [11], the RNTCP introduced a draft of a new National Strategic Plan (2020–2025) for TB Elimination [12]. The Ministry of Health and Family Welfare publishes an annual TB report. The report highlights the progress and updates achieved during the whole year. Figure 1 shows the organogram of the NTEP program.

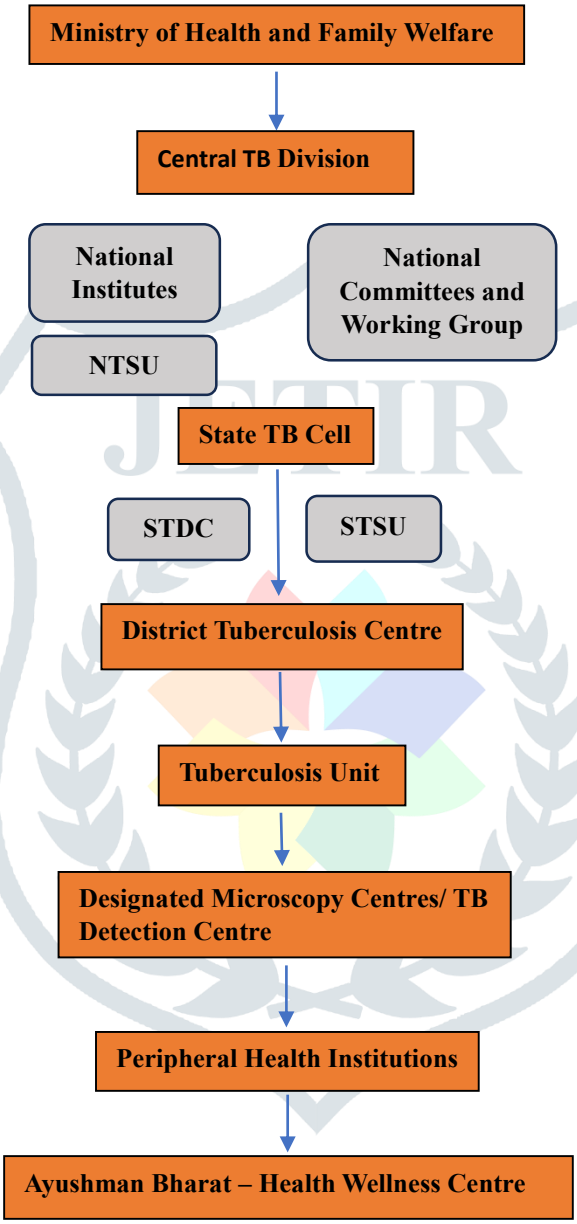

Figure 1: Structure of National Tuberculosis Elimination Program.

2. **Disease Burden-**

According to India TB Report 2023, 2022 marks a pivotal year for tuberculosis surveillance efforts in India, with a prevalence record of 24.2 lakh cases, an increase of more than 13% compared to 2021 [11]. Total TB case notifications for India in 2019 were close to 24 lakhs. In 2022, it has been extended to more than 24 lakh case notifications; this shows how the country has increased the notification Numbers that have crossed pre-COVID-19 levels and are surging ahead to reach the goal. The presumptive TB examination rate in India has increased to 1281 from 763 in 2021 per lakh population [13].

3. **Geographic Distribution of tuberculosis-**

The average annual reported incidence rate of pulmonary TB is 172 (per 100000 population). The highest average yearly reported incidence rates in states were in Delhi (546 per lakh population) and the lowest among states in Kerala (67 per lakh population). From

2019 to 2021, the prevalence of all forms of TB was estimated to be 312 per lakh population. Figure 2 shows the case notification rate of all the states of India.

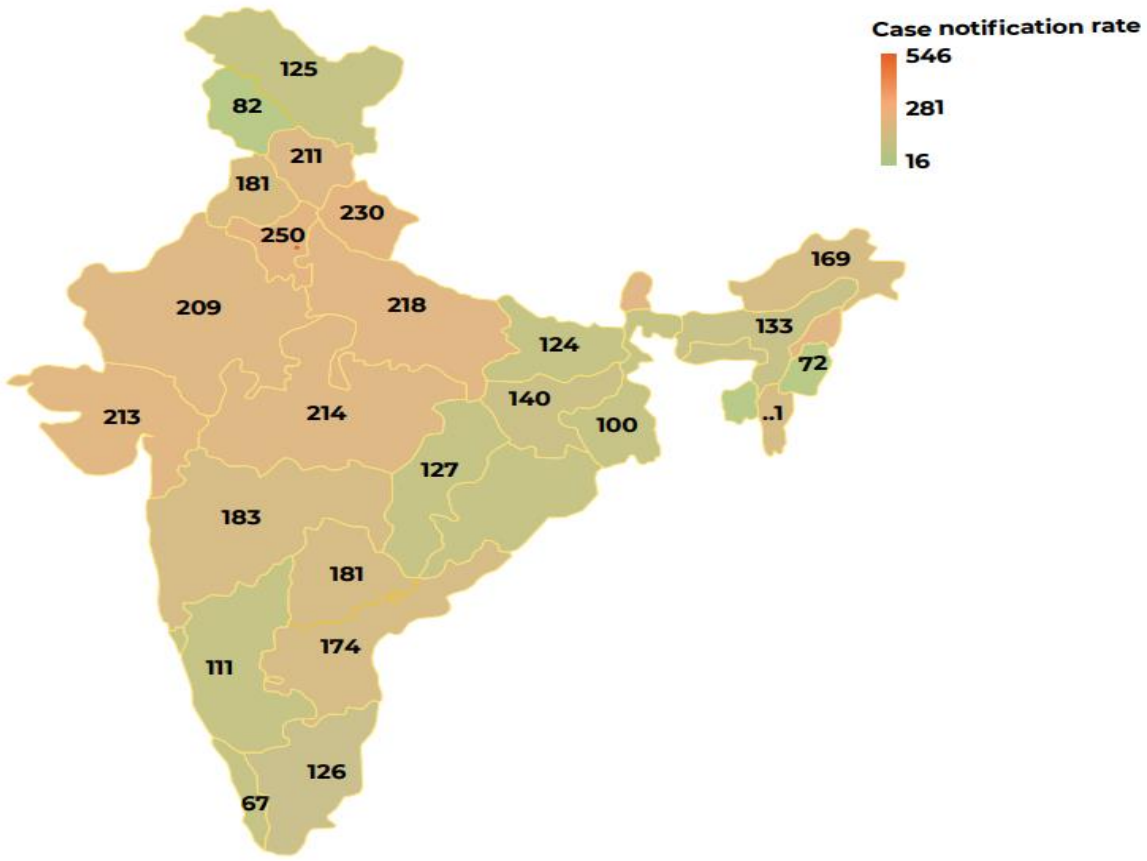

Figure 2: Case notification rate in Indian states, 2022.

MDR-TB –

Multidrug-resistant tuberculosis (MDR-TB) strains are those that are resistant to both of the most effective anti-TB medications, isoniazid and rifampicin [14]. Extensively drug-resistant tuberculosis (XDR-TB) is a kind of tuberculosis caused by bacteria that are immune to amikacin, kanamycin, or capreomycin, as well as to any fluoroquinolone and isoniazid and rifampicin (also known as MDR-TB). It can take up to two years or longer to treat these types of TB using medications that are less effective, more toxic, and significantly more expensive. These forms of TB also do not respond to the typical six-month medication with first-line anti-TB therapies [15]. The year 2022 saw an increase of 32% in the number of MDR/RR-TB cases detected under NTEP compared to 2021. The MDR-TB total number of patients diagnosed in the year 2022 is 63,801 [7]. Patients who have only already received first-line TB medications are advised to undergo empirical treatment according to a standardized treatment regimen as part of the current MDR-TB protocol. A combination of second-line drugs, such as aminoglycosides (kanamycin, amikacin, capreomycin), thioamides (ethionamide, prothionamide), fluoroquinolones (ofloxacin, ciprofloxacin), cyclopenrine/terizidone, and para-aminosalicylic acid, are included in the standard regimen. Essential medications include streptomycin, pyrazinamide, ethambutol, and thioacetazone. If a patient has resistant bacilli, or is most likely resistant, to all but two or three relatively mild medications, surgery should be considered [14,16].

TB With HIV-

The two most common infectious diseases in nations with minimal resources are tuberculosis and HIV/AIDS (acquired immunodeficiency syndrome). Both HIV and Mycobacterium tuberculosis magnify one another in a single host, hastening the decline of immune system capabilities and, in the event that treatment is not received, causing early mortality [17]. The number of patients with TB and HIV co-infection in 2022 is estimated by NACP to be 37,578. Field workers from the NTEP and NACP are working together to oversee the management of these instances [13].

CONCLUSION-

Although it is an ancient disease that has affected humanity for centuries, tuberculosis remains a significant public health challenge worldwide. The reported incidence of contagious diseases reflects the impact of conditions on human health and their distribution. In addition, this ratio also reflects the reporting performance of health and medical organizations. In the absence of factors such as underreporting, reported reductions in disease incidence can be used to evaluate the soundness and effectiveness of current policies in infectious disease prevention and control. However, progress against TB has been slow in recent years, particularly in low- and middle-income countries, due to gaps in TB program coverage and other factors. Risk factors for transmission and progression of tuberculosis. Therefore, it is primary need to understand the trajectory of the tuberculosis epidemic and further evaluate whether India's tuberculosis prevention and control plan can achieve the WHO target on time. As an outcome, dealing with structural, macrosocial, and political challenges at both the national and international levels is crucial for the elimination of TB as addressing how it interacts with different illnesses such as diabetes 25 and HIV 24 in various sociocultural and communal environments.

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