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A Narrative Review on the Evolution of Public Health Polices for Tuberculosis Control

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A B S T R A C T

Tuberculosis (TB) stays a massive worldwide health danger, no matter a long time of manipulate efforts. This narrative evaluate traces the evolution of public fitness regulations for TB manage from the pre-antibiotic era to the modern-day-day End TB Strategy. Using 35 peer-reviewed articles and policy documents, we thematically analyze shifts in TB coverage across key milestones: sanatorium care, chemotherapy introduction, the DOTS strategy, emergence of MDR-TB, integration of digital diagnostics, and India's transition to NTEP. Findings highlight the critical position of political dedication, technological innovation, public-personal partnerships, and social determinants. The evaluation underscores the importance of holistic, patient-focused procedures and intersectoral techniques for sustainable TB elimination

Keywords: Tuberculosis, public fitness policy, DOTS, End TB Strategy, India, MDR-TB, UHC

Introduction

Tuberculosis (TB) remains one of the top 10 reasons of loss of life globally and the leading motive of dying from a unmarried infectious agent, ranking above HIV/AIDS (35). Despite being each preventable and curable, the disease maintains to actual a heavy toll, especially in low- and center-income international locations [6]. In 2022 by myself, an expected 10.6 million human beings fell unwell with TB, and 1.Three million died, reflecting ongoing transmission, delayed prognosis, and health gadget weaknesses [35].

Historically, TB coverage has developed along biomedical, social, and political advances. From its early management in the pre-antibiotic generation through sanatoria, isolation, and rudimentary public fitness campaigns [4, 5], TB have become treatable with the discovery of streptomycin, ionized, and rifampicin in the mid-20th century.

National TB programs have been then evolved to roll out mass BCG vaccination and drug treatment, which includes in India, which released its first NTP in 1962 [19, 13]. The advent of the WHO's Directly Observed Treatment, Short-route (DOTS) method in the 1990s represented a pivotal policy innovation. It standardized remedy throughout countries, ensuring quality-assured capsules, supervision, and tracking structures, especially as multidrug-resistant TB (MDR-TB) emerged as a new danger [33, 10].

India’s Revised National TB Control Programme (RNTCP), launched in 1997, scaled up DOTS with huge success [26]. However, the early 2000s saw the emergence of MDR-TB and XDR-TB, necessitating programmatic management strategies, rapid diagnostics like GeneXpert, and second-line remedy regimens [9, 2].

Technological improvements, consisting of virtual adherence gear together with 99DOTS and the Nikshay surveillance portal, further transformed TB manage strategies [16, 29]. In 2015, the WHO End TB Strategy aligned TB removal with the Sustainable Development Goals (SDGs), specializing in incorporated patient-centered care, social protection, and everyday health insurance [34, 21]. In response, India restructured its TB software into the National TB Elimination Programme (NTEP) in 2020, aiming to eliminate TB by 2025. Key factors encompass private zone engagement, dietary aid via the Nikshay Poshan Yojana, and community-based treatment assist [8, 1, 20].

Nonetheless, chronic challenges such as poverty, stigma, malnutrition, and fitness inequities retain to undermine TB control efforts [18, 7]. This assessment explores the historical and present day evolution of TB policies globally and in India, organized thematically across fundamental eras of policy innovation, with a view toward informing stronger, greater integrated techniques to obtain global TB removal.

Objective

To examine how TB control policies have evolved and identify strategies to strengthen future TB elimination efforts.

Methodology

Search Strategy

Databases searched: PubMed, Scopus, Web of science, Google Scholar and WHO repositories.

Search Terms: “India NTEP,” and “MDR-TB policy.”

• “tuberculosis control policy,”

• “DOTS strategy,” “End TB Strategy,”

MeSH terms:

“Tuberculosis control policy” OR “DOTS strategy” OR “End TB Strategy” OR “TB elimination” OR “NTEP India”

Date Range: January 2024 – May 2024

Languages: English

Inclusion: Studies - Studies focused on national or global TB control policies - WHO and Indian TB policy documents - Articles between 1950–2024 - English language only

Exclusion: Non-policy-focused studies - Case reports, clinical trials without policy relevance - Non-English or duplicate records

Review search strategy and study selection process.

Component	**Details**
Review Type	Narrative Review
Databases Searched	PubMed, Scopus, Web of Science, Google Scholar, WHO Global Health Observatory
Search Period	January 1950 – May 2024
Search Date Range	Articles searched between January 2024 and May 2024
Search Terms Used	“tuberculosis control policy” OR “DOTS strategy” OR “End TB Strategy” OR “TB elimination” OR “NTEP India”
Boolean Operators Used	AND, OR
Filters Applied	English language, Full-text availability, Human studies
Study Designs Included	Policy analyses, reviews, program evaluations, WHO/government strategy documents, health systems research
Inclusion Criteria	- Studies focused on national or global TB control policies - WHO and Indian TB policy documents - Articles between 1950–2024 - English language only
Exclusion Criteria	- Non-policy-focused studies - Case reports, clinical trials without policy relevance - Non-English or duplicate records
Initial Records Identified	316 records
Duplicates Removed	92
Records Screened (Title/Abstract)	224
Full-Text Articles Reviewed	72

Component	Details
Articles Included in Final Review	35 (30 peer-reviewed articles + 5 WHO/government policy documents)

Results

The 35 included studies revealed Eight major categories of Evolution: 1) Historical Context and Pre-Antibiotic Approaches, 2) Chemotherapy Era and National TB Programs, 3) DOTS Strategy and Global Standardization, 4) Drug-Resistant TB and Programmatic Management (2000s-Present), and 5) END TB Strategy and SDG Era (Post-2015), 6) Diagnostic innovation and digital health tools, 7) India's transition from RNTCP to NTEP, and 8) Health Systems, Social Determinants & Global Integration. Each theme was supported by multiple studies and described in detail.

Theme 1: Historical Context and Pre-Antibiotic Approaches

Tuberculosis (TB) has humankind for centuries, earning the identify "The White Plague" because of its devastating mortality and lengthy affiliation with poverty and industrialization. In the pre-antibiotic technology, TB manages relied heavily on sanatoriums, dietary aid, rest, and isolationist rules. Public health strategies covered network training campaigns to restriction transmission, yet these efforts were largely useless in controlling TB due to the dearth of a curative therapy [8, 4].

During this time, the stigma related to TB changed into profound, frequently ensuing in social exclusion. The improvement of the Bacillus Calmette-Guerin (BCG) vaccine in the early 20th century offered a preventive approach, but its variable efficacy throughout populations confined its everyday adoption [6, 7].

Theme 2: Chemotherapy Era and National TB Programs (1950s–1980s)

The mid-20th century saw the improvement of effective anti-TB chemotherapy, specially streptomycin, para-aminosalicylic acid (PAS), and ionized. These tablets laid the inspiration for curative TB treatment. Countries began to implement established National Tuberculosis Programs (NTPs), which targeted on mass BCG vaccination and intermittent chemotherapy regimens [19, 30].

India released its National TB Programme in 1962, one of the earliest large-scale countrywide efforts geared toward TB manage. Despite the ambition, poor implementation, lack of follow-up, and irregular drug supplies hindered success [13]. These limitations would eventually pave the way for the adoption of the DOTS strategy decades later.

Theme 3: DOTS Strategy and Global Standardization (1990s–2010s)

In 1994, the World Health Organization (WHO) launched the Directly Observed Treatment, Short-course, widely known as DOTS. This approach aimed to bring a more structured and globally unified system for tuberculosis control. It marked a transformative moment in TB control. The DOTS approach was built on five pillars: political commitment, case detection via sputum smear microscopy, standardized treatment regimens, effective drug supply, and systematic monitoring [33, 10].

India adopted DOTS through its Revised National Tuberculosis Control Programme (RNTCP) in 1997, resulting in significant improvement in treatment outcomes. The policy emphasis shifted toward outpatient care, reducing reliance on hospitalization [26].

Theme 4: Drug-Resistant TB and Programmatic Management (2000s–Present)

As multidrug-resistant (MDR) and extensively drug-resistant (XDR) tuberculosis began to emerge more prominently in the early 2000s, there was a pressing need to rethink existing TB control strategies. This led to the development of the Programmatic Management of Drug-resistant TB (PMDT), which focused on the use of second-line medications, tailored treatment plans for individual patients, and the integration of advanced diagnostic tools such as GeneXpert.

Theme 5: End TB Strategy and the SDG Era (Post-2015)

The End TB Strategy launched by WHO in 2015 aligned TB elimination goals with the Sustainable Development Goals (SDGs). It emphasized integrated, patient-centered care, robust health systems, and intensified research and innovation [34, 21].

The approach introduced broader social and structural interventions like social protection, nutritional support, and universal health coverage [27, 12]. Countries like India embedded these principles in the National Strategic Plan 2017–2025 [6].

Theme 6: Diagnostic Innovation and Digital Health Tools

Rapid diagnostic tools such as GeneXpert MTB/RIF and Truenat considerably reduced delays in diagnosis. Digital tools like 99DOTS and Nikshay in India improved adherence tracking and facts reporting [16, 22]. These gears had been instrumental in aligning TB control with actual-time facts structures and patient-centric provider transport [29].

Theme 7: India's Transition from RNTCP to NTEP

India's transition from RNTCP to the National Tuberculosis Elimination Programme (NTEP) in 2020 aimed to put off TB by 2025. Major reforms covered digital case-based notification (Nikshay), network engagement, and personal provider incentives [5, 1].

Nutritional support thru the Nikshay Poshan Yojana and extended political dedication reflected a shift in the direction of affected person-focused, incorporated TB care [20, 31].

Theme 8: Health Systems, Social Determinants & Global Integration

TB stays tightly linked with poverty, malnutrition, and social inequities. Effective TB coverage requires intersectoral coordination, integration with number one health care, and social protection mechanisms [18, 3].

Additional consciousness on HIV-TB co-infection, energetic case-locating, and network-primarily based tactics is critical to reducing transmission [11, 15]. Global techniques preserve to emphasize fairness and inclusion to attain TB removal [35].

Discussion

This assessment illustrates that TB control has transitioned through multiple paradigms, every knowledgeable by prevailing medical expertise, sociopolitical context, and financial assets. Early TB manipulates relied heavily on isolation and public fitness campaigns with minimum success due to the absence of effective treatment [8, 4]. The creation of antibiotics inside the Fifties initiated the chemotherapy technology, which created optimism for TB eradication.

However, implementation of National TB Programs (NTPs) in many countries, including India, confronted operational barriers including inadequate infrastructure, restrained human resources, and irregular drug substances [19, 13]. The advent of the WHO-endorsed DOTS strategy inside the 1990s was a landmark in worldwide TB coverage [33, 10].

In India, the Revised National TB Control Programme (RNTCP) done substantial remedy fulfillment, demonstrating how global frameworks can be adapted to countrywide contexts [26]. However, the upward push of drug-resistant TB posed new challenges, requiring a shift to Programmatic Management of Drug-resistant TB (PMDT) and adoption of molecular diagnostics [9, 12].

India's response evolved thru the Revised National Tuberculosis Control Programme (RNTCP) and later the National TB Elimination Programme (NTEP), aiming to take away TB through 2025. The use of digital adherence equipment like 99DOTS, integration of personal area care, and dietary assist underneath Nikshay Poshan Yojana spotlight recent innovations [16, 1, 20].

Globally, the WHO's End TB Strategy and the Sustainable Development Goals emphasize multisectoral collaboration, common health coverage, and studies [34, 21]. Despite this, TB control remains undermined by poverty, malnutrition, stigma, and inadequate health systems [18, 3].

However, funding gaps, political commitment, and weak implementation mechanisms often impede progress. The COVID-19 pandemic further disrupted TB services worldwide, leading to diagnostic delays, treatment interruptions, and increased transmission [6].

The role of communities in TB control has gained increasing recognition. Community-based screening, peer support models, and civil society engagement can reduce stigma, promote early diagnosis, and ensure treatment completion [15, 11]. Similarly, integrating TB programs with HIV, non-communicable diseases (NCDs), and maternal-child health services could enhance service delivery and improve patient outcomes [35, 12].

Conclusion

The evolution of TB policy reflects a continuous process of adaptation and innovation in response to emerging scientific, social, and economic realities. While considerable progress has been made—particularly through DOTS, digital health, and national strategy reform—TB elimination remains distant without tackling structural determinants and health system gaps. Future policy must integrate universal health coverage, social protection, community engagement, and technological advancement to meet global End TB targets.

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