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EPIDEMIOLOGY OF TUBERCULOSIS IN INDIA AND INTEGRATED APPROACH FOR NATIONAL LEVEL TUBERCULOSIS ELIMINATION STRATEGIES WITH A REVIEW ON THE CONTRIBUTION OF AYUSH SYSTEMS

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Abstract:
The latest data on tuberculosis (TB) in India highlights significant trends in case reporting and treatment. In 2023, a substantial portion—approximately 33%—of the 25.5 lakh TB cases reported came from the private sector, marking a notable increase from just 1.9 lakh cases reported in 2015. Despite this growth, government health centres remain the primary source of notifications.
There is slight rise to 27.8 lakh, up from 27.4 lakh the previous year, while the mortality rate remained steady at 3.2 lakh. It's worth noting that India's TB mortality decreased from 4.94 lakh in 2021 to 3.31 lakh in 2022, reflecting improvements in treatment and care. Crucially, India achieved its target for 2023 by initiating treatment for 95% of patients diagnosed with TB, underscoring the commitment to controlling and eventually eliminating the disease. The rise in multidrug-resistant tuberculosis (MDR-TB) is indeed a pressing concern, driven by several interrelated factors. Increased population density can lead to higher transmission rates, while global warming and pollution exacerbate health challenges, particularly in vulnerable communities.
Poverty and illiteracy contribute significantly to the TB burden, as they often hinder access to healthcare, education about disease prevention, and adherence to treatment protocols. Discontinuity in treatment—whether due to lack of resources, patient awareness, or healthcare infrastructure—further complicates efforts to control TB and can lead to the development of drug resistance.
Addressing these underlying issues is crucial for reducing the incidence of MDR-TB. This could involve implementing comprehensive public health strategies that focus on improving education, increasing access to healthcare, and ensuring consistent treatment. Enhanced community engagement and targeted interventions in high-risk populations will be vital in curbing the spread of MDR-TB and ultimately achieving TB elimination goals.
Achieving the target of eliminating tuberculosis (TB) from India by 2025 will indeed require significant efforts across the entire healthcare system. Currently, Allopath government institutions and public health centres play a major role in this initiative. However, to enhance the effectiveness of TB elimination efforts, it's essential to involve other organizations, particularly those in the AYUSH sector (Ayurveda, Yoga, Unani, Siddha, and Homeopathy). These institutions typically have the necessary infrastructure and manpower to support TB control initiatives. By implementing capacity-building programs, the government can equip these organizations to assist in early detection and treatment of TB cases. Additionally, incentivizing the reporting and management of

TB cases in both private and public AYUSH institutions could lead to improved case identification and patient outcomes.
Collaborative efforts, training, and resources directed toward these sectors could significantly bolster the overall strategy to combat TB, ultimately contributing to the goal of elimination by 2025. The review article explains the methodology to involve the existing system for early achievement of the elimination target. All systems of Healthcare in India should be involved for early achievement of elimination targets.

Key words: TB, AYUSH, Early detection, training, public health

INTRODUCTION:

The journey of the National Tuberculosis Control Program in India has evolved significantly since its inception.

Early Initiatives

India began addressing tuberculosis (TB) with the establishment of the **Tuberculosis Association of India** and the launch of the first TB control program in 1950s. The first national TB program was initiated, focusing on the **sanatorium treatment model in 1960**.

WHO Involvement and DOTS Strategy

The World Health Organization (WHO) recommended the **Directly Observed Treatment, Short-course (DOTS)** strategy in 1992, emphasizing supervised treatment to improve compliance and outcomes. India adopted the DOTS strategy in 1997, marking a pivotal shift towards a more effective and comprehensive approach to TB control. Literature reveals that Ayurveda treatment of PTB was in vogue in India before the introduction of ATD with limited success. Records show that 2766 patients of PTB were treated with Ayurveda drugs in a tertiary care hospital in Kolkata in the year 1933-1947.[1]

Revised National Tuberculosis Control Program (RNTCP)

The program was revamped and renamed the **Revised National Tuberculosis Control Program (RNTCP) in 2006**, incorporating advanced diagnostic tools and treatment regimens. Emphasis was placed on public-private partnerships, enhancing community involvement, and expanding access to care.[2]

Key Strategies and Achievements

- **Diagnosis & Treatment**: Introduction of rapid diagnostic tests like GeneXpert, improving TB detection rates.
- **Drug-Resistant TB**: Initiatives to manage multi-drug-resistant TB (MDR-TB) through specialized treatment protocols.
- **Integrated Approach**: Collaboration with the National Health Mission to integrate TB services with general healthcare.

Current Initiatives

The program aligned with the **Sustainable Development Goals (SDGs)** and the WHO's End TB Strategy in 2020, aiming for a significant reduction in TB incidence by 2030. The introduction of digital tools for monitoring and reporting, enhancing transparency and efficiency in service delivery. On-going public health campaigns to raise awareness and reduce stigma associated with TB.

Challenges and Future Directions

Despite significant progress, challenges such as the COVID-19 pandemic, drug resistance, and healthcare access disparities remain. Future strategies focus on:

- Strengthening community engagement.
- Expanding access to diagnostics and treatment in rural areas.
- Continued surveillance and research to combat emerging strains.

The journey of India's TB control program reflects a commitment to tackling one of the country's most pressing public health issues, with ongoing efforts to ensure effective diagnosis, treatment, and prevention. Although India has managed to scale up basic TB services in the public health system, treating more than 19 million TB patients under RNTCP, the rate of TB decline is too slow to meet the 2030 Sustainable Development Goals (SDG) and 2035 End TB targets. Although sufficient insight and expertise exists to inform TB programme decision-making, these resources have often been underutilized in terms of meeting the needs of policy makers for quantitative analysis and improvements in TB control policy and implementation.[3]

Weakness of TB program

i. TB programme structure unable to cope with the growing demands for ending TB
ii. Limited human resource at the central TB division which severely limits programme management at the National level.
iii. Private sector involvement in public health actions related to TB control is not commensurate to its size and dominance in TB care.

AIMS and Objectives:

1. Problem:

To reduce highest Burden of Tuberculosis & multi-drug-resistant TB (MDR-TB) and to achieve the elimination by 2025

2. Objectives:

TB-Free India with zero deaths & to achieve a rapid decline in burden of TB, morbidity, mortality for elimination of TB in India by 2025 by public health sector and involving additional Private AYUSH institution manpower

Methodology:

To counteract for Weaknesses of TB programme, the involvement of additional manpower, infrastructure and early detection, following strategies can be adopted. Government does not need to hire additional staff if we can utilize the existing staff of Government and private AYUSH institutions.

The integration of AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homoeopathy) into India's health strategy, as outlined in the 12th Five-Year Plan, represents a significant shift toward a more holistic and inclusive healthcare system.

a. AYUSH practitioner awareness

b. Establish partnerships between government & private AYUSH institutes- hospitals to share resources and expertise in conducting health surveys.

c. AYUSH Institutions involvement with existing infrastructure and manpower

d. AYUSH Protocol preparation with AYUSH intellectuals of concern departments (Pulmonary TB treatment protocols by Kayachikitsa department and extra-pulmonary TB treatment protocols by other departments)

e. Free Sputum collection centres in AYUSH Hospital labs

f. Use the data collected to identify health needs and plan preventive programs tailored to the community.

g. Research and Development

h. Undergraduate student competitions with AYUSH and Current TB program knowledge

a. AYUSH Practitioner Awareness and incentive scheme for positive TB Case detection:
Ayurveda Graduates are practising in villages, town, suburban areas, slum areas in huge quantity. First line of detection of TB cases can be observed at general practitioner level. AYUSH practitioners often have strong ties to their local communities, allowing them to raise awareness about TB symptoms and the importance of early detection.
AYUSH practitioners can play a vital role in the early detection of TB, which is essential for effective treatment and reducing transmission. Understanding the symptoms and diagnostic procedures allows practitioners to refer patients to appropriate healthcare facilities promptly. By working alongside conventional healthcare providers, AYUSH practitioners can facilitate referrals for diagnostic tests and follow-up care.
Organizing free training sessions for AYUSH practitioners by public health authorities to enhance their knowledge on TB symptoms, diagnosis, and treatment protocols will be useful. **TB positive referrals can be incentivised.** By leveraging their unique skills and community presence, AYUSH practitioners can contribute significantly to the early detection and management of TB.

b. Establish partnerships between government & private AYUSH institutes- hospitals to share resources and expertise in conducting health surveys.
Many colleges run outreach programs in local communities, providing education about TB prevention and facilitating screenings and referrals. By combining resources, expertise, and outreach capabilities, these collaborations can lead to improved health outcomes and a stronger response to TB and other public health challenges. This can be started with small population and can be motivated through free set up of institutional sputum collection centres and free DOTS medicine distribution centres. AYUSH colleges can organize events focused on TB awareness, bringing together students, practitioners, and community members to discuss prevention and treatment strategies.
National Commission for Indian System of Medicine can coordinate for such activities. Additional marks can be allotted such national program contribution for Medical Assessment and Rating Board for Indian System of Medicine (**MARBISM**) framework.

c. AYUSH Institution Infrastructure and manpower involvement:[4]
AYUSH hospitals and clinics can serve as additional centres for TB screening and treatment, especially in underserved areas.
Training of Community Health Officers from AYUSH backgrounds to assist in TB awareness, screening, and follow-ups will help in early detection of new cases. Multi-disciplinary Teams that include AYUSH practitioners, nurses, and public health officials need to be formed to enhance the management and treatment of TB cases.
Equip AYUSH practitioners and institutions (Government as well as private) with tools for data collection and reporting on TB cases, contributing to national TB surveillance efforts. Monitory benefits can be added for positive cases detection. Establish feedback loops for AYUSH practitioners to report challenges faced in diagnosis and treatment, aiding continuous improvement.

d. AYUSH Protocol preparation with AYUSH intellectuals of concern departments (Pulmonary TB treatment protocols by Kayachikitsa department and extra-pulmonary TB treatment protocols by other departments):
Departments in AYUSH institutions should be encouraged at national level to prepare protocols of supportive AYUSH treatments for intensive and latent phases of pulmonary and extra-pulmonary tuberculosis. Protocols for Respiratory exercises like pranayama etc. can be incorporated as a part of treatment.

e. Free Sputum collection centres in AYUSH Hospital labs- More than Five hundred AYUSH institutions should be equipped with free sputum collections centres which can be further linked

with District/ sub-District hospitals or medical college hospitals in nearby area for diagnosis. Collaborate with private AYUSH healthcare providers, NGOs, and community organizations to establish more collection centres, leveraging resources and expertise.

f. Use the data collected to identify health needs and plan preventive programs tailored to the community- All newly enrolled AYUSH institutions can be registered with Nikshay Portal for necessary data collection and further policy decisions.

g. Research and Development along with Policy Implications and Recommendations:
Sustainable Health Policies: Policymakers should create an enabling environment for AYUSH systems to thrive alongside conventional healthcare. This includes developing clear guidelines for collaboration between AYUSH and allopathic practitioners.[7]
Training and Capacity Building: Continuous training for AYUSH practitioners in disease management and preventive strategies will enhance their role within the healthcare system. Capacity building initiatives can foster better integration and cooperation among healthcare providers.
Research and Evidence Generation: Supporting research initiatives to evaluate the effectiveness of AYUSH interventions in preventing and managing communicable and non-communicable diseases is crucial. Evidence-based outcomes can help gain broader acceptance and support from the medical community**.**

Collaborative Research with ICMR and its allied organization will help AYUSH institutions to participate in research on TB, exploring the efficacy of traditional treatments and preventive measures. Promote innovation in TB management strategies that incorporate AYUSH methodologies. Several natural herbs and drugs have been revealed to have promising anti-tubercular action and have aided in the relief of the unpleasant symptoms of the disease while also serving as an immune booster, which may prove to have a significant impact on the world of allopathic drugs.[6]

h. Undergraduate student competitions:
State and national level Current TB knowledge and AYUSH concepts competitions can be arranged. Those students will be aware of Tuberculosis in their practice and it will benefit the program in long run. Graduates can influence TB-related health policies and programs at local, national, and global levels. At the same time, they will get increased employability in healthcare settings, NGOs, and international organizations focused on TB prevention and treatment.

Discussion:
AYUSH especially Ayurveda work in treatment of TB is not adequate.[5] Protocols for such treatment are also not defined adequately on national level. The subjects are ignored as the patients are well managed by public health workers and AYUSH institutes are not seeing such patients except for research purpose.
AYUSH therapies focus on enhancing immunity and overall health. Treatments may include herbal remedies, dietary recommendations, and lifestyle modifications. Yoga and breathing exercises are often recommended to support respiratory health.
To achieve TB Free India target by 2025, increase in manpower, infrastructure, sputum collection centres, laboratory set up is essential. AYUSH institutions are readily available with all those factors. Need for collaboration, capacity building, motivation by incentives is required by Government level. Role of Homoeopathy in TB Management:

Pre-emptive Action against TB: Homoeopathy aims to strengthen the body’s vital force and immunity, which can help prevent the onset of TB before the bacteria proliferate.

Immunomodulation during Chemotherapy: During standard TB treatment, which often involves chemotherapy, homoeopathy may assist in boosting the immune response. This could mitigate the adverse effects associated with chemotherapy, such as nausea and fatigue, thereby enhancing the patient's quality of life.

The mechanisms by which yoga improves autonomic functions primarily involve the suppression of sympathetic activity and the down-regulation of the hypothalamic–pituitary–adrenal axis. Through a combination of physical postures, controlled breathing, and mindfulness practices, yoga facilitates a shift toward parasympathetic dominance, enhancing relaxation, reducing stress hormone levels, and improving overall health. These changes not only contribute to better physiological outcomes but also promote mental and emotional well-being, demonstrating the comprehensive benefits of incorporating yoga into daily life.[8]

Conclusion:

Strengthening policy frameworks to incorporate AYUSH in the RNTCP can enhance the effectiveness of TB control efforts, ensuring a more comprehensive healthcare delivery model. By partnering with public health organizations, AYUSH colleges can contribute to national TB control strategies and campaigns, enhancing community awareness and access to care.

Continued research into the efficacy of AYUSH interventions can provide a scientific basis for their inclusion in TB management, fostering greater collaboration between AYUSH and allopathic systems.

The focus on lifestyle modification, nutritional support, and mental well-being through AYUSH practices addresses the multifaceted nature of TB, promoting better recovery and quality of life for patients. Integrating AYUSH practices, into TB management in India could serve as a sustainable strategy to enhance universal health coverage. By recognizing the value of medical pluralism, we can develop a more holistic approach to health that supports both prevention and treatment, ultimately improving health outcomes for TB patients.[9]

AYUSH complements conventional TB treatment by integrating traditional medicine, which can enhance patient adherence and overall health outcomes.

Further Steps:

Continued dialogue among stakeholders in healthcare, including AYUSH practitioners, allopathic doctors, policymakers, and patients, can foster a collaborative environment for tackling TB.

Encouraging research initiatives to investigate the efficacy of AYUSH in TB treatment will be crucial in establishing its credibility within the broader healthcare framework.

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