



TUBERCULOSIS ELIMINATION EFFORTS IN KERALA: SUCCESSES, CHALLENGES, AND THE WAY FORWARD

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Abstract:

This article discusses the efforts and achievements of Kerala, a state in the south of India, in the fight against Tuberculosis (TB). Despite being the highest TB burden country in the world, India has made significant progress towards TB elimination, with Kerala leading the way. The state has implemented various innovative strategies, including involving local governments, establishing successful public-private partnerships, improving case management, and rolling out TB preventive therapy. However, challenges such as high mortality rates, a high percentage of extra-pulmonary TB cases, and limited diagnostic capacity remain. Overall, Kerala is well-positioned to achieve TB elimination, but continued efforts and interventions are needed to address the remaining challenges.

Introduction:

India is the highest Tuberculosis (TB) burden country in the world, accounting for more than one-fourth of the estimated incidence, mortality and multi-drug resistant (MDR) TB. WHO estimates that there were 2.8 million incident cases of TB in India in 2022, including 110,000 cases of MDR TB. There were an estimated 342,000 deaths due to TB in India in 2022, as per WHO estimates [1]. India is committed to the END TB strategy and aims to eliminate TB. The national TB program of India, now named the National TB Elimination Program (NTEP), aims to achieve the 2030 targets of the END TB strategy by 2025.

Kerala state, in the south of India, with a population of about 35 million, is known for its achievements in the health sector. The model of good performance in various indicators despite a low resource setting is known all over the world as the "Kerala model of Health" [2]. The infant mortality rate, under-5 mortality rate, and life expectancy are comparable to those of developed countries despite the low health expenditure per capita.

The state is also known for its achievements in the TB program. It was one of the states which took part in the pilot study for the Revised National TB Control Program (RNTCP) in 1992-93.

It was one of the first states to implement the RNTCP in all districts of the state in 2000. Many other "newer" initiatives of the RNTCP / NTEP were initially implemented in Kerala, including various private-public partnership schemes, diabetes-TB cross referral mechanisms, TB preventive therapy, etc. Kerala has one of the lowest notification rates for TB in India, at 67/100,000 compared to the National notification rate of 172/100,000, indicating a lower incidence of TB compared to the rest of the country.

TB Elimination Efforts in Kerala

The Kerala government was the first in India to formulate strategies for TB elimination. This was part of the state's overall efforts to achieve the SDG targets for all diseases. The state devised a strategy in 2017, the Aardram mission, with the objective to completely transform the public health sector in the backdrop of the Sustainable Development Goals (SDGs) 2030 [3]. During the same time, the state came out with its strategy document for TB elimination, the guidance document for the people's movement against Tuberculosis in Kerala: "Kerala TB Elimination Mission" [4].

The document emphasises on how the difference in demographics and disease conditions in Kerala necessitates a different strategy for TB elimination in Kerala as opposed to the rest of the country. Kerala state has an older population, higher life expectancy, and a high proportion of non-communicable diseases, particularly diabetes, in the community. The proportion of TB patients in the "older" age groups, already higher when compared to the rest of the country, is further increasing. The proportion of TB patients in the 0-14 years and 15 – 24 years reduced by 20% and 33%, respectively, between 2004 and 2014, whereas the proportion in the 55 – 64 years and >65 years increased by 17% and 9% respectively in the same period. The state also notified a low proportion of HIV coinfection and a low proportion of MDR TB among newly diagnosed cases.

The core principles listed in the Kerala TB Elimination Mission document included: 1) Stopping new TB infections; 2) Preventing the active breakdown of disease among the infected; 3) Diagnosing TB early and completely, mainly through mapping TB vulnerable individuals in the community and actively searching for TB among vulnerable; 4) Treating TB correctly and completely, particularly with Drug Susceptibility Testing (DST) guided regimens; 5) Prevent the emergence of resistance, particularly by judicious use of anti-TB drugs and regimen. Further strategies were listed (ten in number) on how these principles would be achieved.

Activities undertaken in Kerala for TB Elimination

After the formulation of the strategy for TB elimination strategy for the state, the state moved forward towards implementing some of the strategies.

One of the main successes in the state was the involvement of the local government in TB elimination efforts. The state already had an empowered local governance system, with decentralization of power and finances, including health care institutions. This advantage was used to take TB elimination efforts to local government levels much more decentralized than what was conceived at the National level at that time (the then central government document spoke of district-level TB task forces, whereas in Kerala, it was done at the Panchayat level).

The local government stewardship in TB elimination is documented elsewhere [5]. While the attempts at involving local government in TB control in Kerala started in 2003, they were done systematically after the TB elimination strategy was formulated as a joint initiative of the health and the local government departments. 98.1% of all LG heads were formally sensitised about the TB Elimination Mission. A single overriding communication objective of "My TB Free Panchayat" was used. Decentralised surveillance data of case-finding and outcomes were captured LG-wise, analysed and presented as maps for easy understanding. The state government honoured those LGs which had zero TB among those aged <5 years (561 in number), those who had zero lost to follow-up during treatment of TB (688 in number) and those who had zero drug-resistant TB (709 in number) in 2019.

These activities had initial results regarding presumptive TB testing, which increased from 1,105/100,000 in 2015 to 1,461/100,000 in 2019. TB notifications went up in 2018 and 2019. LGs provided a leadership role for periodic active case-finding by mobilising volunteers and ensuring acceptance of the interventions in the community. They also strengthened TB diagnostic infrastructures by establishing 127 new TB diagnostic laboratories based on local needs and enhancing screening in populations which previously had poor accessibility. Over 22 million "vulnerable individuals" at risk of developing TB were mapped by a task force under the LG. The total loss to follow-up rate among diagnosed TB patients fell in the state to 2% in 2020 from 4.5% in 2015. LGs also helped ensure continuity of services during the pandemic and lockdowns by extending social support to TB patients [5].

Private sector involvement

Kerala was at the forefront of Private Public partnership (PPP) schemes in TB. The initial Kannur and Punalur PPM models, initiated in 2000-2003, were proven to be successful in improving case finding. The IMA-RNTCP project for the involvement of the doctors of the state started in 2005 and later became the model for the National project [6]. The projects for private sector involvement kept evolving as per the needs and the priorities of the National program, and Kerala was at the forefront of such projects. The latest model in Kerala, the STEPS model, has also been a success and replicated in other states of India [7]. One of the significant factors for the success of various PPP schemes in Kerala has been the willingness of private practitioners, including TB specialists, to work closely with the program.

Activities for improving case management

The TB program in Kerala has also implemented various innovations to improve case holding and case management. These include decentralised care of DS and DR TB, involvement of patient groups and communities for case holding, and clinical care at the PHC level, including support for the management of comorbidities, particularly diabetes and COPD.

One of the successes has been screening for risk factors and early detection of adverse effects (ADR). For example, while the NTEP does not include a liver function test in the pretreatment evaluation of DS TB, this is done for all patients in Kerala. Patients also undergo screening for ocular toxicity, given increased reporting of adverse visual effects. One of the major successes has been decentralised care for DR TB. From the onset of the PMDT services in Kerala in 2008, pretreatment evaluation was done at the district level, and treatment initiation began at the district level. This model was later replicated in other states of India. The state was quick in implementing new regimes and the use of newer drugs like Bedaquiline (BDQ) and Delamanid as soon as they were available. The state is prepared to take up the newer, shorter regimes, the WHO-approved six-month regimes for DR TB (BPaL and BPaLM), as and when the regimes are made available. These activities have resulted in high success rates for DR TB in Kerala. The success rate for the regime for INH resistance was 82% that for the shorter DR TB regime (9-11 months BDQ containing regime) was 78%, and that of longer DR TB regimes (18-20 months BDQ containing regime) was 76%. This is higher than the national average success rates for these regimes. The success rate in XDR TB, though small numbers were there, was 89% (16/18).

TB preventive therapy

Kerala was the first state in India to roll out TB preventive therapy. In fact, the services were initiated even before the national guidelines were formulated. Kerala initiated TB preventive therapy with a "test and treat" strategy, using Interferon Gamma Release Assays (IGRA) for testing for TB infection, wherever indicated. The regime for children and adolescents selected was 3HR (INH and Rifampicin, daily for three months), whereas that for adults and other high-risk groups was 3HP (3 months of weekly INH and Rifapentine), while HIV patients continued on 6H (6 months of daily INH). Kerala was the only state in India to use the 3HR regime, and the success of the same led to the rollout of the regime in some other states, too. Kerala was one of the first states to use Rifapentine for TB preventive therapy.

Challenges for the TB program in Kerala

Despite the successes of the TB program in Kerala, there are multiple challenges as well. The mortality rate for notified TB cases in Kerala is 8.1% (2021 cohort), which is much higher than the national average [8]. About 33% of TB patients have diabetes, and patients are much older in Kerala, with other comorbidities also being common. About 34% of notified TB patients had extra-pulmonary TB, requiring a different diagnostic algorithm and greater access to tests other than sputum examination [8]. The capacity for mycobacterial culture in the state needs to improve, with only two state reference laboratories offering MGIT services. These issues need to be addressed urgently if the state has to make a successful plan to eliminate TB.

Epidemiology of TB in Kerala, in the context of TB elimination

Kerala had the lowest prevalence of TB as per the National TB prevalence survey report [9]. The estimated prevalence of microbiologically pulmonary TB in Kerala was 115 / 100,000, compared to the national average of 316 / 100,000. However, the prevalence-to-notification ratio was a poor 3.3, worse than the national average of 2.84. The state had 54% of people with symptoms of TB consulting a doctor when they developed symptoms, which is much higher than the national average of 36%, indicating better health-seeking behaviour. The report shows that Kerala is best placed among the states of India in achieving TB elimination.

Conclusion

Kerala state is best placed among the states of India to achieve TB elimination. Significant innovations and success stories have been made for the TB program in Kerala, including decentralised care of TB, local government involvement, strong PPP models, etc. However, there are newer challenges which need to be addressed, including a high mortality rate, a high proportion of EP TB and diagnostic capacity for EP TB and a high proportion of comorbidities, particularly diabetes, in an ageing population.

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