Indian J Med Res 157, February and March 2023, pp 163-167
DOI: 10.4103/ijmr.ijmr_2128_22

Quick Response Code:

Perspective

Burden of tuberculosis & malaria among tribal populations & implications for disease elimination in India

Tuberculosis (TB) and malaria are diseases of poverty which contribute to inequity and social injustice in the society[1]. Although preventable and curable, these diseases take a heavy toll of the most disadvantaged sections of the society, in particular the tribal populations in India. The two conditions disproportionately affect the tribals, in terms of morbidity and mortality.

The government of India has set a target of elimination of TB by 2025 and malaria by 2027[2,3]. Although considerable progress has been made in both areas, the goal is unlikely to be achieved without rapidly scaling up the effective interventions among vulnerable population, in particular tribals. Adequately and effectively addressing the problems among tribals is both an ethical, programmatic and human development imperative.

Tribals constituting 8.4 per cent population of India are spread across 30 States, live mostly in remote and geographically inaccessible areas[4,5]. They are poor and marginalized in society, hence highly vulnerable to disease and death, yet most resilient in the planet. TB and malaria are the contributor as well as the consequence of their poverty.

Burden of tuberculosis (TB) & malaria among tribal populations

The burden of TB and malaria in tribal populations is unduly heavy. For example, TB prevalence among tribal population according to a recent Indian Council of Medical Research (ICMR) study was 432 per 100,000 population compared to 296 in general population[6]. A quarter of the total self-reported TB cases[7] and nine per cent of all TB-notified patients are from tribal communities[8]. In 63 per cent of 170 tribal districts - TB prevalence is more than the national average (NFHS-4, 2015-2016).

One stark example of TB burden is among Saharia community, a particularly vulnerable tribal group, in Madhya Pradesh and Rajasthan, which has the highest prevalence in the country; pulmonary TB incidence is 1504 per 100,000 population in Saharia tribe as compared to the national average of 217 per 100,000 population[9].

Over half of all active TB cases in India were attributable to undernutrition, most prominently in rural areas and among scheduled castes and tribes, as well as in the central and western regions of the country[10,11]. Majority of the tribals, when sick, do not seek evidence based care and rather rely upon traditional medicines, and there is poor awareness about TB symptoms and transmission which are partially linked to widespread illiteracy.

The National TB Programme has prioritized this subgroup of population through the Tribal Action Plan since 2005. Furthermore, under the Tribal Support Scheme, a one-time financial incentive of ₹ 750 is provided to the notified TB patients residing in tribal areas. Recently, a direct benefit transfer of ₹ 500 per month is made available during the course of treatment to all TB patients in the country[12]. However, access, availability and utilization of TB care services for these communities are hindered by geographical barriers, poor state of social determinants, high impact of malnutrition, insufficient community involvement, pervasive myths and stigmas around the disease, health system constraints including lack of trained human resources, and cultural and communication gaps between the care provider and the community.

Once nearly eradicated, malaria made a spectacular comeback in 1970s, due in part to emergence of drug resistance and programmatic complacency. Despite a continuous decrease in cases and deaths thereafter, malaria still remains today a major public

health problem. At present, about 95 per cent of the Indian population live in malaria-endemic areas and 5.6 million cases are estimated to occur each year, mostly among tribal populations[13].

The burden of malaria among tribal population is indeed compelling; a district-wise survey carried out by the National Vector Borne Disease Control Programme (NVBDCP) showed that tribals, although comprise about 8 per cent country's population, contribute 47 per cent of total malaria cases, 70 per cent of falciparum malaria cases and 46 per cent of malaria-related deaths in India[14]. Of the reported cases, more than 90 per cent occur in eight States, which have significant tribal population[15]. These include Odisha, Jharkhand, Chhattisgarh, Meghalaya, Arunachal Pradesh, Mizoram as well as tribal districts of Madhya Pradesh and Maharashtra.

Malaria is one of the most common health problems faced by tribal populations. Moreover, the predominant parasite species that are found in tribal areas is *Plasmodium falciparum*, which causes severe disease, contributing to high mortality, if not treated on time.

The distribution of malaria is primarily determined by environmental and climatic factors that influence the local vector bionomics and breeding pattern as well as malaria parasite proliferation. Social determinants of health are at the root cause of disease distribution as well as response capacity. A comprehensive analysis of these factors is a prerequisite for initiating effective control/elimination interventions. The ICMR can take a lead in this aspect of disease control.

In November 2015, the Prime Minister of India along with 17 other Asia Pacific leaders endorsed a plan and roadmap to eliminate malaria throughout the region by 2030[2]. India further pledged to achieve this goal by 2027 – three years ahead of the regional and global target and thereafter, launched the National Framework for Malaria Elimination and a strategic plan to eliminate malaria, 2017-2023, which apart from other facets highlight the importance of malaria in tribal areas[16,17].

Challenges & implications for disease elimination

There are several challenges that are needed to be addressed for the aforementioned ambitious goals to be achieved. Indeed, to meet the national goals of malaria and TB elimination as committed by India's Prime Minister, it is imperative to work closely with tribal populations. Tribal populations mostly live in geographically remote, forested areas far away from mainstream, where road infrastructure and facilities are not fully developed and opportunities for economic and educational advancements are limited. As a result, they remain poor and marginalized and hence vulnerable to disease and death. Poor infrastructure in tribal districts has significantly undermined their capacity to respond effectively to various health emergencies. For example, the prevailing social, economic and environmental determinants or risk factors such as poor housing, illiteracy, inadequate clothing, sleeping outdoors, proximity to forest areas and health-seeking behaviours present a major challenge to malaria elimination.

Studies indicate lack of awareness and knowledge among tribal population regarding symptoms of TB and how it is transmitted, which result in poor health-seeking behaviour[18,19]. For centuries, tribals have relied on the traditional healers, which have for long established a rapport with the community and are trusted in the absence of any viable alternative. Except for government health facilities, which are sole providers of healthcare, there is no private medical practitioners in most tribal areas.

The critical health system barriers exist and influence negatively in terms of access and quality. In most tribal areas, the health infrastructure is abysmal and has not improved much since independence jeopardizing the quest for a universal health coverage (UHC), including TB and malaria prevention and treatment services. The poor quality of health services is also the reason why local population prefers traditional healers who are available, and accessible near their home. Improving access to evidence-based medical care and public health interventions is therefore essential to combat both malaria and TB in tribals.

More importantly, these steps are in consonance with guiding principles of UHC that commits access to quality and affordable healthcare to all citizens. According to the World Health Organization, UHC means that all people have access to the health services they need, when and where they need them, without financial hardship. It includes the full range of essential health services, from health promotion to prevention, treatment, rehabilitation and palliative care[20].

The way forward

In view of these challenges, it is difficult to surmise that India can achieve national elimination without adequately and effectively addressing problems in tribal areas. Given the complexity, size and scale of

the tribal health challenges in India, there is a need for a focused and holistic prevention management, care and support programme for TB and malaria, targeted towards the tribal population.

Here are a few suggestions:

First, accord elimination of TB and malaria in tribal populations a high priority in terms of policy and focussed approach placing the tribal population at the heart of this endeavour. Interventions must be tailored to the needs of the tribal populations, and implemented with full cooperation and ownership of local tribal population.

In TB, there is an urgent need for vulnerability mapping, active case finding (ACF) and TB vulnerability reduction through TB preventive therapy, specific to tribal areas, as outlined in the National Strategic Plan for TB Elimination[12]. The malaria strategic plan (2017-2022) too emphasizes the need for focussing on tribal areas to achieve elimination.

For example, the Ministry of Tribal Affairs (MoTA) and the Ministry of Health and Family Welfare in collaboration with all stakeholders released Joint Action Plan in year 2020[21] and initiated a dedicated programme 'Tribal TB Initiative' last year[22]. It is encouraging to note that, under this flagship initiative, *Aashwasan campaign* (100 days ACF) was carried out across all 174 tribal districts resulting in yield of additional ~10,000 TB cases[23]. The national and State authorities need to carry out such campaigns regularly for the next two years to find out all hidden cases in the community and further prevent TB disease transmission. This initiative is an excellent example of community engagement in ACF of TB as acknowledged recently by the Hon'ble President of India[24].

Second, intensify rapid scale-up aimed at universal coverage of malaria and TB services targeting tribal-dominated districts, including through the use of digital technology and local innovation. This should be accompanied by a massive communication and public awareness campaign engaging local talent and folk media and using health educational messages that are understood by the population. The use of drone to bolster TB and malaria diagnosis and treatment in hard-to-reach areas by delivering samples quickly to laboratories for testing is one good technology example which can help State government improving services in remote and hilly areas[25].

Third, improve surveillance and research among tribes to generate data essential for evidence-based policymaking or monitoring progress. Availability of reliable health data in tribal geography is, however, limited for various reasons. Filling this gap is a need identified by all actors working in this area, and thus, all organizations interested in tribal health should contribute to conducting formative research into the high-priority areas such as qualitative studies on the barriers to accessing NTEP/NVBDCP services among tribal populations, evaluation of IEC materials available in local languages and of case detection and treatment outcomes through activities like ACF in tribal populations. Surveillance can help quickly detect cases through active and passive case finding, investigate outbreaks and eliminate transmission foci or reservoirs of infection with appropriate preventive measures and stop further transmission as soon as possible.

Research and development such as social and behavioural studies relating to health-related knowledge, attitude and practices of tribal populations, assessing acceptability of long-lasting insecticide treated bed-nets and indoor residual spray, and to determine how to better implement elimination programmes in terms of rapidly scale-up effective interventions are needed to support elimination programmes. An intervention project in Mandla tribal-dominated district in Madhya Pradesh showed 91 per cent reduction in indigenous cases of malaria through robust surveillance, case management, vector control, health education and capacity building through continuous evaluation and training over a three-year period[26]. Similar field research is needed in other areas as well.

Fourth, encourage community engagement and leadership to ensure acceptability and scale-up of TB and malaria services by encouraging tribal ownership and capacity building. Asset mapping in the community to identify and harness institutions such as Panchayat Raj Institutions (PRIs), traditional healers, faith-based leaders and ashram schoolteachers has been cited as an important strategy to contain infectious diseases by playing a role in surveillance, awareness, promotion and expediting research[27].

There is a need to reach out to traditional healers for conveying prevention messages and for referral of cases to the public health system. This should be taken as a win-win approach where both sides and patients benefit.

Fifth, improve health system, particularly in tribal districts, in terms of primary healthcare delivery

through provision of adequate staffing, capacity building in programme management and training and supportive supervision. Health and wellness centres could play an important role. Building partnerships with other medical practitioners, community health workers, accredited social health activists and PRIs can help enhance case finding and adherence to treatment regimens, thereby overcoming challenges in the way of disease elimination.

And finally, as most risk factors for malaria and TB transmission lie outside of health sector, working with and across various government and non-governmental sectors is essential. Therefore, addressing socioeconomic factors in the long term through a multi-sectorial approach such as MoTA, home, Ayush, agriculture and education and environment is the need of the hour.

***Financial support & sponsorship*:** None.

***Conflicts of Interest*:** None.

Jai Prakash Narain[1*], Amar N. Shah[2] & Rajesh Bhatia[1]

[1]Former Director, WHO Regional Office for South-East Asia, New Delhi 110 002 & [2]United States Agency for International Development India, American Embassy, New Delhi 110 021, India

[*]*For correspondence:* narainjp88@gmail.com

Received October 6, 2022

References

1. The Global Fund. *WHO and global fund warn inequalities block progress towards ending AIDS, TB and Malaria*. Available from: *https://www.theglobalfund.org/en/news/2021/2021-12-08-who-and-global-fund-warn-inequalities-block-progress-to wards-ending-aids-tb-and-malaria/*, accessed on October 4, 2022.
2. Press Information Bureau. Ministry of Health and Family Welfare, Government of India. *Prime minister inaugurates 'The Delhi end TB summit' launches TB free India campaign 2025; 13 March, 2018*. Available from: *https://pib.gov.in/newsite/PrintRelease.aspx?relid=177354*, accessed on October 5, 2022.
3. The Hans India. *India stands with Asia Pacific nations in drive for malaria-free region*. Available from: *https://www.thehansindia.com/posts/index/Health/2015-11-25/India-stands-with-Asia-Pacific-nations-in-drive-for-malariafree-region/188773*, accessed on October 3, 2022.
4. Office of Registrar General & Census Commissioner India. Ministry of Home Affairs, Government of India. *CensusInfo; 2011*. Available from: *http://www.censusindia.gov.in/2011census/HLO/HH14.html*, accessed on September 28, 2022.
5. Ministry of Tribal Affairs, Government of India. *Statistical profile of scheduled tribes in India 2013*. Available from: *https://www.tribal.nic.in/ST/StatisticalProfileofSTs2013.pdf,* accessed on September 30, 2022.
6. Thomas BE, Thiruvengadam K, Vedhachalam C, Srividya A, Rao VG, Vijayachari P, *et al.* Prevalence of pulmonary tuberculosis among the tribal populations in India. *PLoS One* 2021; *16* : e0251519.
7. Mazumdar S, Satyanarayana S, Pai M. Self-reported tuberculosis in India: Evidence from NFHS-4. *BMJ Glob Health* 2019; *4* : e001371.
8. Central TB Division, Ministry of Health and Family Welfare, Government of India. *National tuberculosis elimination program: Annual report 2022*. Available from: *https://tbcindia.gov.in/WriteReadData/IndiaTBReport2022/TBAnnaulReport2022.pdf*, accessed on October 3, 2022.
9. Bhat J, Yadav R, Sharma RK, Muniyaandi M, Rao VG. High incidence of pulmonary tuberculosis in an indigenous Saharia tribe in Madhya Pradesh, central India – A prospective cohort study. *PLOS Digital Health* 2022. Doi:10.1371/journal.pgph.0000039.
10. Bhargava A, Benedetti A, Oxlade O, Pai M, Menzies D. Undernutrition and the incidence of tuberculosis in India: National and subnational estimates of the population-attributable fraction related to undernutrition. *Natl Med J India* 2014; *27* : 128-33.
11. Dutta M, Selvamani Y, Singh P, Prashad L. The double burden of malnutrition among adults in India: Evidence from the National Family Health Survey-4 (2015-16). *Epidemiol Health* 2019; *41* : e2019050.
12. Central TB Division, Ministry of Family Health and Welfare, Government of India. *National strategic plan for tuberculosis elimination 2017-2025; March, 2017*. Available from: *https://tbcindia.gov.in/WriteReadData/NSP%20Draft%2020.02.2017%201.pdf.*
13. World Health Organization. *World malaria report 2020: 20 years of global progress and challenges*. Geneva: WHO; 2020.
14. Sharma RK, Thakor HG, Saha KB, Sonal GS, Dhariwal AC, Singh N. Malaria situation in India with special reference to tribal areas. *Indian J Med Res* 2015; *141* : 537-45.
15. ETHealthWorld. *Malaria Elimination from the Tribes of India: The final frontier; August 19, 2022*. Available from: *https://health.economictimes.indiatimes.com/news/industry/malaria-elimination-from-the-tribes-of-india-the-final-frontier/93629034*, accessed on October 3, 2022.
16. National Vector Borne Disease Control Programme. *National framework for malaria elimination in India – 2016-2030*. Available from: *https://nvbdcp.gov.in/WriteReadData/l892s/National-framework-for-malaria-elimination-in-India-2016–2030.pdf*, accessed on September 30, 2022.

17. National Vector Borne Disease Control Programme. *National strategic plan 2017-22*. Available from: *https://nvbdcp.gov.in/WriteReadData/l892s/nsp_2017-2022.pdf*, accessed on October 4, 2022.

18. Thomas BE, Thiruvengadam K, Raghavi S, Rani S, Vetrivel S, Gangadhar Rao V, *et al.* Understanding health care-seeking behaviour of the tribal population in India among those with presumptive TB symptoms. *PLoS One* 2021; *16* : e0250971.

19. Singh MP, Saha KB, Chand SK, Anvikar A. Factors associated with treatment seeking for malaria in Madhya Pradesh, India. *Trop Med Int Health* 2017; *22* : 1377-84.

20. World Health Organization. *Universal health coverage*. Available from: *https://www.who.int/health-topics/universal-health-coverage#tab=tab_1*, accessed on October 4, 2022.

21. Ministry of Tribal Affairs & Ministry of Family Health and Welfare, Government of India. *Joint action plan for TB elimination; October, 2020*. Available from: *https://tbcindia.gov.in/showfile.php?lid=3596*, accessed on October 3, 2022.

22. Ministry of Tribal Affairs & Ministry of Family Health and Welfare, Government of India. *Tribal TB initiative*. Available from: *https://tbcindia.gov.in/WriteReadData/l892s/5883826004Tribal%20TB%20Initiative.pdf*, accessed on October 3, 2022.

23. Ministry of Tribal Affairs, Ministry of Health and Family Welfare, Government of India. *Ministry of Tribal Affairs and Ministry of Health and Family Welfare conduct door-to-door screening for TB in more than 68,000 villages under Aashwasan campaign: Over 1 crore persons screened under the initiative*. Available from: *https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1854617*, accessed on October 3, 2022.

24. The Hon'Able President of India Smt. Droupadi Murmu's Speech during Launch of Pradhan Mantri TB Mukt Bharat Abhiyaan; September 9, 2022. Available from: *https://presidentofindia.gov.in/writereaddata/Portal/Speech/Document/950/1_sph090922_1.pdf*, accessed on October 5, 2022.

25. Span Magazine. *Drones help diagnose TB patients in remote areas*. Available from: *https://spanmag.com/drones-help-diagnose-tb-patients-in-remote-areas/*, accessed on October 5, 2022.

26. Bharti PK, Rajvanshi H, Nisar S, Jayswar H, Saha KB, Shukla MM, *et al.* Demonstration of indigenous malaria elimination through Track-Test-Treat-Track (T4) strategy in a Malaria Elimination Demonstration Project in Mandla, Madhya Pradesh. *Malar J* 2020; *19* : 339.

27. Thompson AG. An untapped resource in addressing emerging infectious diseases: Traditional healers. *Indiana J Glob Leg Stud* 1998; *6* : 257-80.