

# Current Evidence on The Burden of Multi-Drug Resistant Tuberculosis in India †

Krishna Mohan <sup>1</sup>, Aftab Alam <sup>2,\*</sup>, Ranjana Saxena Patnaik <sup>1</sup>

<sup>1</sup> Division of Clinical Research, Department of Biosciences, School of Basic and Applied Sciences, Galgotias University, Greater Noida, Uttar Pradesh, India; [krishna.mohan.85@gmail.com](mailto:krishna.mohan.85@gmail.com) (K.M.);

<sup>2</sup> Department of Pharmacy, School of Medical and Allied Sciences, Galgotias University, Greater Noida, Uttar Pradesh, India;

\* Correspondence: [aftab.alam@galgotiasuniversity.edu.in](mailto:aftab.alam@galgotiasuniversity.edu.in) (A.A.);

† International Conference on Advanced Materials for Next Generation Applications, 29th – 30th September, 2021 (AMNGA-2021)

**Received: 10.09.2021; Revised: 20.09.2021; Accepted: 21.09.2021; Published: 29.09.2021**

**Abstract:** Drug-resistant tuberculosis (DR-TB) is a public health problem in India, where a big portion of the world's TB burden is also seen, and disease control relies on strategic planning activities at the national level. The objective of this study was to assess the current reviews and surveys undertaken for estimating the drug-resistance burden. Systematic reviews and meta-analysis of smaller scale epidemiological studies are an important sources of evidence generation in the area of tuberculosis control. A large amount of data is available in the form of published studies present in various electronic databases like PubMed, Google Scholar, and major TB journals. We studied the epidemiological estimates from sources like meta-analysis, state-level surveys, as well as results from a national-level survey undertaken by the tuberculosis control program of India, available in the public domain. During different researches, multi-drug resistance (resistance to rifampicin and isoniazid together) was estimated to be between 3% to 4.8% in new and between 26.7% to 35% in previously treated cases respectively. A state-level survey in Gujarat (Ramachandran et al., 2009) reported the same in 2.4% in newly diagnosed and 17.4% in previously treated patients, whereas a nationwide survey published in 2018 reported the prevalence to be 2.84% in new and 11.60% in previously treated cases. Comprehensive and updated reviews on the existing literature are pivotal for decision making. To ensure programmatic success, continuous monitoring through robust surveillance systems also need to be set up that include extra-pulmonary cases, patients visiting private sector clinics. Further, the use of mathematical modeling and artificial intelligence systems that factor in transmission rate, mortality rate, risk of infection linked to each geographic region should be developed to control the spread.

**Keywords:** Multi-drug resistance; mathematical modeling; artificial intelligence (List three to ten pertinent keywords specific to the article; yet reasonably common within the subject discipline.)

© 2021 by the authors. This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

## Funding

This research received no external funding.

## Acknowledgments

This research has no acknowledgment.

## Conflicts of Interest

The authors declare no conflict of interest.