



## REVIEW ARTICLE

## Battle against Two Pandemics New One (Covid-19) and Existing One (Tuberculosis)

Ch Pachouri\*, S Tripathi, S Shukla and A Pandey

Department of Chemistry, Dr. Harisingh Gour Central University, Sagar (MP), India



\*Corresponding authors: Ch Pachouri, Department of Chemistry, Dr. Harisingh Gour Central University, Sagar (MP), India

### Abstract

Tuberculosis (TB) is a preventable and curable disease, and its control is a highly cost-effective health intervention. However, diagnostic delay and inadequate treatment contribute to the severity and mortality of the disease as well as the risk of transmission and development of drug resistance. Despite the fact that TB disproportionately impacts low- and middle-income countries, it does not spare any country in the world including those in the European Union/European Economic Area where more than 4,000 of people still die for the disease every year. The recent epidemic of COVID-19 highlights how a rapid spread of a serious epidemic could severely affect healthcare systems in the world. Shortages of Personal Protective Devices, mechanical ventilators, and worse, beds in intensive care units are a serious sign that health system cannot adapt rapidly to a health emergency. Risk factors associated with COVID-19, the viral pneumonia originating in Wuhan, China, in Dec 2019, require clarification so that medical resources can be prioritized for those at highest risk of severe COVID-19 complications. Infection with *M. tuberculosis* (MTB), the pathogen that causes TB and latently infects ~ 25% of the global population, may be a risk factor for SARS-CoV-2 infection and severe COVID-19 pneumonia. On the contrary, TB is a 'silent' epidemic. In this review both pandemics are compared to ensure that while tackling the new one (covid-19) we should not forget the existing one (tuberculosis).

### Keywords

Epidemic, Covid -19, Tuberculosis

### Aims and Background

A pandemic is characterized as an infection that spreads across entire nations or the entire world. Tuberculosis and COVID-19 are the two pandemics that show continuous, supported network transmission across mainlands. Undoubtedly, no nation is without tubercu-

losis and this is probably going to be the situation soon for COVID-19 [1,2].

COVID-19, the viral pneumonia that rose in Wuhan, China, in December 2019, has spread all through China and to 85 different nations. COVID-19 represents a significant danger to worldwide wellbeing and was announced a 'general wellbeing crisis of global worry' by the WHO on 30 Jan 2020 [3,4]. While most SARS-CoV-2 diseases in everyone bring about just gentle manifestations, people with hidden co morbidities, especially the older, are progressively defenseless against SARS-CoV-2 contamination and require extra care [5-7]. It is imperative to increase an away from of hazard factors related with this new popular respiratory disease so as to allot fitting clinical assets to forestall the advancement of serious or basic types of COVID-19 in those viewed as at higher hazard. Here, we think about how conceivable it is that contamination with *Mycobacterium tuberculosis*, the pathogen that causes tuberculosis (TB), the top reason for death because of an irresistible malady, may incline to SARS-CoV disease and the more fast advancement of side effects and extreme COVID-19 pneumonia.

### Background of COVID-19

Human pathogenic subtypes of CoV are associated with mild clinical symptoms. However, severe acute respiratory syndrome related corona virus (SARS-CoV) and Middle East respiratory syndrome corona virus (MERS-CoV) are the two notable exceptions. In 2012, MERS-CoV was first detected in Saudi Arabia. It was responsible for 2,494 confirmed cases, which led to 858 fatalities [8]. In 2002, a subtype of the beta-COV rapidly spread across Guangdong, China. This outbreak result-

ed in 8,000 infections and 774 fatalities in 37 countries [9]. The outbreak in 2020 has presented in the form of pneumonia. Initially, this virus was designated as 2019-nCoV. However, the International Committee on Taxonomy of Viruses designated it as the SARS-CoV-2 virus [10,11].

## Similarities between Tuberculosis and COVID-19

**Symptomatic causes:** Individuals sick with COVID-19 and TB show comparable manifestations, for example, hack, fever and trouble relaxing. The two sicknesses assault principally the lungs and albeit both organic specialists transmit for the most part through close contact, the brooding time frame from presentation to illness in TB is longer, frequently with a moderate onset [12].

**Mortality:** Both cause major infection-related morbidity and mortality around the world. Tuberculosis was the leading cause of mortality from an infectious disease worldwide in 2018, causing 1.2 million deaths. 1) COVID-19 has infected more than 300,000 people and caused over 13,000 deaths in the first quarter of 2020 alone. 2) Both COVID-19 and tuberculosis can present with respiratory symptoms, and diagnosis and treatment of people with tuberculosis, or tuberculosis and COVID-19 co-infection, are likely to be compromised during the COVID-19 pandemic [13].

**Need fast conclusion and open mindfulness:** One more similarity is the importance of timely and rapid diagnosis and public awareness for infectious disease control. Long-standing struggles in TB diagnosis represent one of the main reasons for on-going disease transmission in many settings [14,15]. One more similarity is the importance of timely and rapid diagnosis and public awareness for infectious disease control. Long-standing struggles in TB diagnosis represent one of the main reasons for on-going disease transmission in many settings [16,17].

**Lead to social disgrace:** A third similitude is that the two ailments convey a detectable social disgrace. On one side, TB is a 'model' of shame due to its relationship with migration from different nations, low social class, HIV, tranquilises use, liquor misuse and neediness.

**Lack of information on individual susceptibility:** A fourth comparability is the constrained information on person's defenselessness to contamination. Unmistakably, to improve avoidance and control of irresistible illnesses, it is basic to comprehend why a few people are helpless to irresistible maladies while others, procuring a similar pathogen, stay asymptomatic. In TB, hereditary and non-hereditary components of both host and pathogens assume a significant job in the advancement of the infection [18].

**Lack of information sharing platform:** There is a significant absence of information sharing stages that quicken cooperative research disclosure. Concerning

TB, COVID-19, is still portrayed by an interwoven of divided information with absence of coordination at national and universal level which makes obstructions to assemble enlightening datasets helpful to shape preventive and control gauges just as encourage research [19].

**Other similarities:** COVID-19, similar to tuberculosis, will more likely than not be related with the clinical destitution trap, in which more unfortunate individuals have a higher probability of contamination, sickness, and unfriendly results. In addition, jobless populaces and casual or purported zero-hours contractors will encounter further impoverishment, which expands danger of tuberculosis [20].

## Transmission of TB and COVID-19

Both spread by close contact between individuals. The specific method of transmission contrasts, clarifying a few contrasts in disease control measures to moderate the two conditions. TB bacilli stay suspended noticeable all around in bead cores for a few hours after a TB persistent hacks, sniffles, yells, or sings, and individuals who breathe in them can get contaminated. The size of these bead cores is a key factor deciding their irresistibility. Their fixation diminishes with ventilation and introduction to coordinate daylight. COVID-19 transmission has principally been ascribed to the immediate breathing of beads ousted by somebody with COVID-19 (individuals might be irresistible before clinical highlights gotten obvious). Beads delivered by hacking, sniffing, and breathing out and talking may arrive on articles and surfaces, and contacts can get contaminated with COVID-19 by contacting them and afterward contacting their eyes, nose or mouth. Hand-washing, notwithstanding respiratory precautionary measures, are subsequently significant in the control of COVID-19. Emergency clinic methodology that create pressurized canned products incline to disease of the two conditions and should just be led inside suggested shields [21,22].

## Diagnostic Methods for TB and COVID-19

The diagnostic methods for TB and COVID-19 are quite distinct and individuals being evaluated for both conditions require specimens which are commonly different. Sputum, as well as many other biological specimens, can be used to diagnose TB using culture or molecular techniques. Tests for COVID-19 are done most commonly by nasopharyngeal or pharyngeal swab or wash in ambulatory patients, but sputum or end tracheal aspirate or bronchoalveolar lavage may be used in patients with severe respiratory disease [23].

## Impact of COVID-19 on Tuberculosis

The overview did by the Global Coalition of TB discovered serious, and comparative effect of the COVID-19 circumstance on TB reaction and individuals Activists (GCTA) through networks, common society and individ-

uals influenced by TB with TB.

- Lack of access to testing because of no entrance to open vehicle to arrive at offices, dread of COVID-19 because of absence of any individual defensive measures, lab staff excessively occupied with COVID-19 testing.
- Lack of drugs by patients under treatment because of compulsory check in time with no an ideal opportunity to get ready ahead of time, absence of transportation implies and no open vehicle, open clinics in stock out.
- Interruption of dietary help.
- People with TB are attempting to obtain food as the majority of them are day by day waging laborers and purchase food consistently.
- False data being flowed in networks.

### Impact on TB Notification

While it is too soon to acknowledge or gauge the genuine effect of COVID-19 on the endeavors to forestall and fix Tuberculosis, primer appraisal unmistakably shows a declining pattern in new recorded cases in India as COVID-19 pandemic compounded. In February 2020, an aggregate of 209,649 cases were recorded while in March the quantity of cases tumbled to only 156,205 which further dropped to just 64,415 in April, a decrease of 69% among February and April. The complete number of cases told among March and April (220,620) this year is practically 50% of what was accounted for (434,609) for a similar period a year ago.

The main five high TB trouble states in India have enrolled enormous decreases in the event that notices (UP 85.6%, Maharashtra 68.7%, Rajasthan 74.3%, MP 77.2%, Gujarat 68.6%) for the time of the lockdown (March 25-May 7 2020) when contrasted with a similar period the earlier year. By chance, every one of these states are additionally battling with noteworthy COVID-19 case-load [24].

### Impact of Latent or Active TB on Susceptibility to SARS-COV-19 Infection and Disease Severity

Our information recommends that MTB disease could be a more significant hazard factor than the co-morbidities generally revealed in epidemiological examinations, for example, diabetes and hypertension. COVID-19 and TB are both respiratory ailments. It is maybe to be expected that ceaseless respiratory sicknesses, for example, Chronic Obstructive Pulmonary Disease (COPD), and to be sure dynamic TB, could incline defenselessness to SARS-CoV-2. Insights from other detailed investigations, notwithstanding, recommend that the recurrence of these co-morbidities is a lot of lower than that of MTB contamination in this examination (COPD: 1% of 1099 COVID-19 cases interminable respiratory illness: 2.4% of 72,314 COVID-19 cases). The quality of this find-

ing, nonetheless, is constrained by the moderately low number of cases associated with this investigation and requires further validation [25].

### Battle against COVID-19 and Tuberculosis in High Burden Countries

TB administrations have halted in certain territories, due to overburdened medical clinics and wellbeing laborer deficiencies, said Jeff Carl Estioco, national TB program nurture organizer for Metro Manila. Various wellbeing staffs responsible for giving TB benefits in the capital have been approached to help in COVID-19 isolate offices, while others, presented to the infection, have needed to go sunder isolate.

A few clinics in Manila that used to take into account an enormous number of TB patients have likewise become COVID-19 referral places. Various clinical research facilities that used to process TB examples have additionally halted activities.

India has the most elevated weight of TB cases at over 2.3 million per year, and numerous TB medicate providers and assembling locales are situated in India. Because of the lockdown in the nation since March 24, creation limit has been influenced, prompting a deficiency of flexibly to the National TB Elimination Program. Be that as it may, this likewise has an all-inclusive.

### Economical Crisis

The economic impact of the 2020 corona virus pandemic in India has been largely disruptive. The World Bank and rating agencies had initially downgraded India's growth for fiscal year 2021 with the lowest figures India has seen in three decades since India's economic liberalization in the 1990s. However after the announcement of the economic package in mid-May, India's GDP estimates were downgraded even more to negative figures, signaling a deep recession. On 26 May, CRISIL announced that this will perhaps be India's worst recession since independence. State Bank of India research estimates a contraction of over 40% in the GDP in Q1 FY21. Within a month, unemployment rose from 6.7% on 15 March to 26% on 19 April. During the lockdown, an estimated 14 crore (140 million) people lost employment [26]. More than 45% of households across the nation have reported an income drop as compared to the previous year [27]. The Indian economy was expected to lose over ₹32,000 crore (US\$4.5 billion) every day during the first 21-days of complete lockdown, which was declared following the corona virus outbreak [28,29]. Under complete lockdown, less than a quarter of India's \$2.8 trillion economic movement was functional [30]. Up to 53% of businesses in the country were projected to be significantly affected [31]. Supply chains have been put under stress with the lockdown restrictions in place; initially, there was a lack of clarity in streamlining what an "essential" is and what is not [32].

Those in the informal sectors and daily wage groups are the most at risk [33]. A large number of farmers around the country who grow perishables are also facing uncertainty. Various businesses such as hotels and airlines, are cutting salaries and laying off employees [34].

## Social Impact

Because of the lockdown, every day wage laborers (the urban poor and transient workers) were left with no work. Simultaneously, the lockdown limitations put a stop on the development of transports and prepares. Huge quantities of vagrant laborers wound up strolling back to their villages [35,36]. Lockdown has also forced many migrant workers to return to their homes, leading to treatment interruption. Many health facilities are turning to the use of digital platforms in an attempt to make medical care accessible in difficult to reach areas [37].

The current scenario may lead to a loss of earnings and malnutrition, and also lead to an increased incidence of TB. However, measures to prevent airborne infection and general cleanliness for COVID-19 may mitigate this and reduce the transmission of TB.

The transient laborers, effectively helpless against TB disease because of their poor nourishment, living and working conditions, went under extra hazard because of the lockdown. The unexpected declaration of lockdown constrained many, including those experiencing TB treatment, to stroll back to their home states while scores of others were housed in isolate offices, frequently without adequate medications.

Papers have cited situations where TB patients who, in light of the loss of their employment, have not had the option to manage the cost of an appropriate eating routine. Wholesome status is firmly identified with TB helplessness and treatment result.

## Tuberculosis Versus COVID-19

The wellspring of COVID-19 is believed to be an animal, which makes it zoonotic and still consider as non-reparable while tuberculosis is brought about by mycobacteris microscopic organisms.

Of course, there are additionally contrasts between the two scourges. For TB, the long-standing shortage of interests in the observation framework and the absence of an uniform strategy on TB control implemented in all locales of Italy has prompted frail announcing of the national TB information to the European Center for Disease Control (ECDC) and WHO with lacking comprehension on the weight of TB in the nation. Interestingly, a quick and phenomenal activation of assets to contain the COVID-19 plague is prompting an organized national reconnaissance framework ready to screen pandemic force, the effect on the populace and social insurance framework and survey quantifies set up.

At long last, COVID-19 and TB have an extra significant contrast. COVID-19's future may move into two unmistakable headings: Either SARS-CoV-2 is destroyed, just like the instance of SARS in 2003, or mankind should coincide with it until an immunization is opens up. Simultaneously, TB stays a long-standing general medical issue creating in excess of 10 new cases and more than one demise each day in Italy [38]. Its end cannot be accomplished until nations resolve to actualize successful observation frameworks and other center measures [39]. The absence of steady arrangements is a significant Achilles' heel rendering Italy (and different nations) powerless against those TB episodes that normally happen (regularly ignored by the media and the populace), in schools, emergency clinics and other consideration offices. Thus, these flare-ups will continue preferring *M. tuberculosis* transmission in the network rendering out of reach the accomplishments of the UN Sustainable Development Goals (SDG).

## Summary and Conclusion

While rigid COVID-19 reactions may just a months ago, they would lastingly affect TB in high-trouble settings, through their impact for the most part on TB conclusion and treatment.

Globally, a 3-month lockdown and extended 10-month reclamation could prompt an extra 6.3 million instances of TB somewhere in the range of 2020 and 2025, and an extra 1.4 million TB passing during this time.

As such, worldwide TB rate and passing in 2021 would increment to levels last observed in the middle of 2013 and 2016 separately - inferring a misfortune of at any rate 5 to 8 years in the battle against TB, because of the COVID-19 pandemic.

Long-term results can be emphatically impacted by the pace of transient recuperation. Each month taken to come back to ordinary TB administrations would cause, in India, an extra 40,685 passing's somewhere in the range of 2020 and 2025; in Kenya, an extra 1,157 passings; and in Ukraine, an extra 137 passing's over this period.

To recoup the additions put forth over a years ago through expanded attempts and interests in TB, it is essential to have valuable measures and assets to decrease the collected pool of undetected individuals with TB. Such measures may incorporate sloped up dynamic case-finding, nearby concentrated network commitment and contact following to keep up consciousness of the significance of perceiving and reacting to indications reminiscent of TB, utilising advanced innovation and different apparatuses. Tying down access to a continuous flexibly of value guaranteed treatment and care for everyone with TB will be basic. Notices will give an accommodating way to deal with observing the advancement

of such valuable endeavors. While severe COVID-19 reactions may just a months ago, they would lastingly affect TB in high-trouble settings, through their impact for the most part on TB determination and treatment. Globally, a 3-month lockdown and an extended 10-month reclamation could prompt an extra 6.3 million instances of TB somewhere in the range of 2020 and 2025, and an extra 1.4 million TB passing's during this time.

As such, worldwide TB frequency and passing's in 2021 would increment to levels last observed in the middle of 2013 and 2016 individually - suggesting a difficulty of in any event 5 to 8 years in the battle against TB, because of the COVID-19 pandemic.

COVID-19 is a reminder to a wellbeing framework that was at that point underfunded, overburdened, inadequately staffed, inefficient, and gave care of faulty quality. The exercises from the Ebola flare-up have instructed us that without a powerful and responsive wellbeing framework, we can neither want to wipe out TB nor climate the COVID-19 tempest.

Fortifying the wellbeing framework all in all requires endeavors past the wellbeing segment. To end the worldwide TB scourge WHO End TB methodology imagines associations across various segments, for example, social insurance, work, movement, and equity. Essentially, in the current emergency, enlargement of social defensive measures for the powerless, financial help to the destitute, centering of wellbeing in all strategy and expanded spending on the general wellbeing framework can be measures that will go far in guaranteeing a superior wellbeing.

## References

- WHO (2020) Global tuberculosis report 2019.
- (2020) Coronavirus COVID-19 Global cases by the center for systems science and engineering (CSSE) at Johns Hopkins University (JHU).
- WHO (2020) Coronavirus disease 2019 (COVID-19) situation report - 45.
- WHO (2020) Coronavirus disease 2019 (COVID-19) situation Report - 10.
- Zhang JJ, Dong X, Cao YY, Yuan YD, Yang YB, et al. (2020) Clinical characteristics of 140 patients infected with SARS-CoV-2 in Wuhan, China. *Allergy* 75: 1730-1741.
- Huang C, Wang Y, Li X, Ren Lili, Zhao Jianping, et al. (2020) Clinical features of patients infected with 2019 novel corona virus in Wuhan, China. *Lancet* 395: 497-506.
- Wu Z, McGowan JM (2020) Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) Outbreak in china: Summary of a report of 72314 cases from the chinese center for disease control and prevention. *JAMA* 323: 1239-1242.
- <https://www.drugtargetreview.com/news/56895/scientists-demonstrate-how-covid-19-infectshuman-cells/>
- Lisheng Wang, Yiru Wang, Dawei Ye, Qingquan Liu (2020) Review of the 2019 novel coronavirus (SARS-CoV-2) based on current evidence. *Int J Antimicrob Agents* 55: 105948.
- Roli Jain, Archana Panday, Nimesh Singh, Sandeep Shukla (2020) A Review: Strong immune system and nutraceutical ingredient as a preventive mechanism against Covid-19. *Alochana Chakra Journal* 9: 3290-3300.
- Singh N, Suthar B, Mehta A, Nema N, Pandey A (2020) Corona virus: An immunological perspective review. *Int J Immunol Immunotherapy* 7: 050.
- Singh N, Pandey A (2020) Blood plasma from survivors of COVID-19: A novel and next frontier approach to fight against pandemic coronavirus. *Int J Immunol Immunother* 7: 045.
- The novel coronavirus pneumonia emergency response epidemiology team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus disease (COVID-19) in China.
- Temesgen Z, Cirillo DM, Raviglione MC (2019) Precision medicine and public health interventions: Tuberculosis as a model? *Lancet Public Health* 4: e374.
- Migliori GB, Nardell E, Yedilbayev A, D'Ambrosio L, Centis R, et al. (2019) Reducing tuberculosis transmission: A consensus document from the World Health Organization Regional Office for Europe. *Eur Respir J* 53: 1900391.
- Walker TM, Merker M, Knoblauch AM, Helbling P, Schoch OD, et al. (2018) A cluster of multidrug-resistant Mycobacterium tuberculosis among patients arriving in Europe from the Horn of Africa: A molecular epidemiological study. *Lancet Infect Dis* 18: 431-440.
- Yi Y, Lagniton PNP, Ye S, Li E, Xu RH (2020) Covid-19: What has been learned and to be learned about the novel coronavirus disease. *Int J Biol Sci* 16: 1753-1766.
- Storr J, Twyman A, Zingg W, Damani N, Kilpatrick C, et al. (2020) Core components for effective infection prevention and control programmes: New WHO evidence-based recommendations. *Antimicrob Resist Infect Control* 6: 6.
- Parvati Sai Arun PV, Miryala SK, Rana A, Kurukuti S, Akhter Y, et al. (2018) System-wide coordinates of higher order functions in host-pathogen environment upon Mycobacterium tuberculosis infection. *Sci Rep* 8: 5079.
- Math SB, Moirangthem S, Kumar CN (2020) Public health perspectives in cross system practice: Past, present and future. *Ind J Medical Ethics*, 12.
- WHO (2020) Preparedness, prevention and control of COVID-19 in prisons and other places of detention.
- WHO (2020) Infection prevention and control guidance for long-term care facilities in the context of COVID-19: Interim guidance, 21 March 2020.
- WHO (2020) Implementing tuberculosis diagnostics: A policy framework.
- (2020) The potential impact of the covid-19 response on tuberculosis in high-burden countries: A modeling analysis. *Stop TB Partnership*, Geneva, Switzerland.
- Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, et al. (2020) Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med* 382: 1708-1720.
- Vyas Mahesh (2020) Unemployment rate touches 26%. *Centre for Monitoring Indian Economy (CMIE)*.
- (2020) Podcast: How has India's lockdown impacted unemployment rates and income levels? *Centre for Policy Research*.
- (2020) Covid-19 lockdown estimated to cost India \$4.5 billion a day: *Acuité Ratings*. *Business Line*.

29. (2020) Experts peg India's cost of corona virus lockdown at USD 120 bn. Business Line.
30. (2020) Lockdown relaxation - more than half of India's economy may reopen from Monday, says Nomura. Business Insider.
31. Biman Mukherji (2020) Coronavirus impact: Indian industry seeks relief measures to aid economy. Mint.
32. Das Goutam (2020) 136 million jobs at risk in post-corona India. Mint.
33. Goyal Malini (2020) Covid-19: How the deadly virus hints at a looming financial crisis. The Economic Times.
34. Rautray Samanwaya (2020) SC says no action for now against employers who don't pay full wages during lockdown. The Economic Times.
35. Sharma Mihir (2020) Coronavirus exposes India's official callousness. Bloomberg.
36. International Union Against Tuberculosis and Lung Disease (2020) COVID-19 and TB: Frequently asked questions. Paris, France: The Union, 2020.
37. (2020) National Strategic Plan 2017-2025 for TB Elimination in India. Central TB Division, Ministry of Health and Family Welfare, Government of India.
38. (2019) Tuberculosis surveillance and monitoring in Europe, 2019.
39. Lonnoth K, Migliori GB, Abubakar I, D'Ambrosio L, de Vries G, et al. (2015) Towards tuberculosis elimination: An action framework for low-incidence countries. Eur Respir J 45: 928-952.