Original Article

Impact of COVID-19 pandemic on tuberculosis notification and outcome in a district of South Gujarat

Meera Maniya[1], Shashank Patel[2], Rahul Damor[3], Monank Patel[1]

[1]Assistant Professor, Department of Community Medicine, National Institute of Medical Sciences and Research, Jaipur, Rajasthan, India, [2]Assistant Professor, Department of Community Medicine, Gujarat Medical Education Research and Society, Valsad, Gujarat, India, [3]Assistant Professor, Department of Community Medicine, Baroda Medical College, Vadodara, Gujarat, India

Abstract

Context/Background: The COVID-19 pandemic affected the health care services worldwide, with the target of END TB 2025; it was important to make sure that the TB notification and linkage services were not hampered. The current study aims to document the overall impact of COVID-19 on TB notification and treatment services. **Aims/Objectives:** To document the impact of COVID-19 on notification and comparison of their outcome between pre-COVID-19 and COVID-19 era. **Methodology:** Programmatic data of 9893 notified TB cases reported from Surat rural between 2019 and 2021 were collected from Nikshay portal through DTO Surat. Detailed comparison of pre- and COVID-19 era was performed using stratified analysis. **Results:** There was a significant ($P = 0.02$) 29% decline in cases reported in 2020 as compared to the cases reported in the previous year. The impact of COVID-19 was also seen on mortality of the reported cases (18% increase). The overall proportion of treatment failure was increased (28%), whereas difference of 20% was seen in cases where treatment regimen was required to be changed. **Conclusions:** Despite the overall impact of COVID-19 on TB services (2020), the health department has proactively countered and bounce back in 2021 with an overall increase in notification and treatment services.

Keywords: COVID-19, Nikshay, notification, tuberculosis

Introduction

On March 24, 2020, India started the phase of a lockdown in response to the COVID-19 pandemic.[1]

India was fighting with a tuberculosis (TB), which was a global pandemic before COVID-19 with a target of eliminating TB by 2025. In 2019, it killed close to 450 000 individuals in India and afflicted 2.64 million people.[2] Between 2020 and 2021, the incidence of drug-resistant tuberculosis increased by 3%, with 450 000 incident cases of rifampicin-resistant tuberculosis being reported in 2021.[3] India has the largest prevalence of both drug-sensitive and drug-resistant tuberculosis in the world.[4]

The Rapid Response Plan developed by the National Tuberculosis Elimination Programme in India is an important step toward maintaining TB services while responding effectively to the challenges posed by the COVID-19 pandemic. The plan includes a range of strategies, including bidirectional TB-COVID-19 screening, intensified case finding, and the use of digital technologies to support treatment adherence. These approaches can help to ensure that TB patients continue to receive essential care and treatment during this challenging time.[5] However, the modelling suggests that a global reduction of 25% in expected TB detection for 3 months could lead to a 13% increase in TB deaths and undermine the progress made in TB control efforts until now.[6]

Address for correspondence: Dr. Meera Maniya, 87, Shantivan Part 2, Near to OM Residency, Sarthana Jakatanaka, Sarthana – 395 013, Gujarat, India.
E-mail: Meeramaniya7196@gmail.com

Received: 14-03-2024 **Revised:** 30-04-2024
Accepted: 14-05-2024 **Published:** 18-11-2024

Access this article online

Quick Response Code:

Website: http://journals.lww.com/JFMPC

DOI: 10.4103/jfmpc.jfmpc_428_24

How to cite this article: Maniya M, Patel S, Damor R, Patel M. Impact of COVID-19 pandemic on tuberculosis notification and outcome in a district of South Gujarat. J Family Med Prim Care 2024;13:4861-5.

According to estimates, the COVID-19 pandemic could cause an additional 1.4 million TB deaths to be reported between 2020 and 2025.[7] It was important to make sure that the TB notification and linkage services were not hampered.

The current study aims to document the overall impact of COVID-19 on TB notification and treatment services. This study has been conducted for Rural Area of Surat District of South Gujarat, which includes Bardoli, Choryasi, Kamrej, Mahuva, Mandavi, Mangrol, Olpad, Palsana, and Umarpada.

A research paper on the correlation between TB and COVID-19 would be beneficial to primary care physicians for several reasons as it will increase awareness, provide diagnostic guidance, treatment strategies, preventive measures, and patient's education. It also has public health implications as research on the correlation between TB and COVID-19 may inform policymakers about the importance of coordinated efforts to control both diseases, allocate resources effectively, and develop targeted interventions for at-risk population.

Objective: To document the impact of COVID-19 on notification of TB cases and comparison of their outcome between pre-COVID-19 and COVID-19 era.

Methodology

After obtaining the permission for data collection from DTO, data were collected from District TB centre Surat.

Study type: Cross-sectional study by programmatic data analysis of secondary data from NIKSHAY portal.

Sample size: Total notified TB cases between 2019 and 2021 of Surat Rural reported at District TB Centre Surat were collected from Nikshay portal.

Patient selection criteria: All patients registered in District TB Office from public and private sector of Surat Rural between years 2019 and 2021 were selected.

Missing or incomplete entered data were excluded according to the variable.

Variables included are sociodemographic data (age group, sex, block-wise distribution), TB cases notification, universal drug sensitivity testing (UDST), contact tracing, notification in both (private/public) sector, cartridge-based nucleic acid amplification test (CBNAAT), chest X-ray and microbiologically confirmed case, and outcome of the tuberculosis patient.

Analysis: Analysis was conducted by frequencies and percentages. Detailed comparison of three years data from 2019 to 2021 including cases reported from various sectors (government/private), diagnostic modalities (microbiologically confirmed test, chest X-ray, and CBNAAT), and their outcome by using Paired *t*-test and Chi-square test was done. It was secondary data, it was exempted from the ethical approval.

Observations: In this study, we compared 3 years of data from 2019 to 2021, 1 year before and 1 year after lockdown.

Out of all, total female population was 2488 (32.8%), whereas male proportion was 5104 (67.2%), and the majority of (30%) population were belonging from 21 to 30 year age group, and the least commonly affected age group was from 81 to 90 years. Notification rate was highest decreased in Choryasi taluka and its lowest decreased in Umparpada taluka.

There were 3893 cases reported in 2019, whereas 2363 cases were reported in 2020 and 3637 cases in 2021 reported. There was a significant ($P = 0.0019$) 29% decline in reported cases in 2020 as compared to the cases reported in the previous year and 32% cases rise again in 2021 as compared to 2020 (2019–2020, 37.8 ± 324.4, *P* value **0.0019**) (2020–2021, 108.3 ± 196.9, *P* value **0.02**) (2019–2021, 94.2 ± 303.1, *P* value 0.4782) [Figure 1].

Private facilities had shown decrease notification trend, which got decrease by 12.51% in 2020 as compared to previous year [Figure 2].

Overall, the diagnostic modality predominantly used was microbiological methods. Out of all diagnostic modalities, 62.1% were diagnosed by microbiological tests (sputum examination), representing a 25% reduction from the previous year.

Table 1 depicts that CBNAAT or TRUNAAT diagnostic modality was decreased by 39%, whereas chest X-ray was decreased by 21.5%. There was a statically significant difference in 3 years of CBNAAT or TRUNAAT and chest X-ray, but chest X-ray was again normal as per before lockdown.

Table 2 depicts that year-wise difference of UDST and contact tracing significantly reduced the universal drug sensitivity test (*P* value <0.0001) and contact tracing (<0.0001) during the 2020 (during lockdown). There was UDST testing in 2021; there were 2201 cases (30.8% of the total), which is higher than the number of cases in 2020 (30.5%) and about contact tracing in

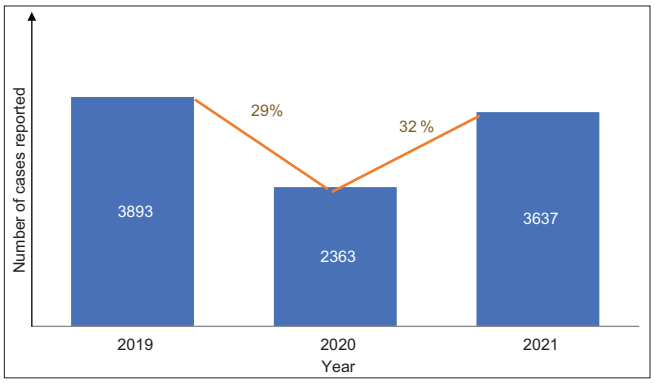

Figure 1: Year wise differences in Number of notified cases reported

Table 1: Comparison of 3-year data according to basis of diagnosis was used

Treatment outcome	2019	2020	2021	Chi-square test	*P*
CBNAAT/TRUNAT	441 (11.6%)	269 (9.6%)	297 (8.1%)	25.13	0.000003
	3367 (88.4%)	2532 (91.4%)	3352 (91.9%)		
Chest X-ray	1028 (27.0%)	806 (28.8%)	1340 (36.7%)	91.43	<0.0000001
	2780 (73%)	2002 (71.2%)	2309 (63.3%)		
Total					

Table 2: Comparison of 3-year data according to universal drug sensitivity testing (UDST) and contact tracing

Variable	2019	2020	2021	Chi-square test	*P*
UDST					
Yes	2771 (38.7%)	2185 (30.5%)	2201 (30.8)	260.9	0.0001
No	1037 (33.4%)	616 (19.9%)	1448 (46.7%)		
Contact tracing					
Yes	3138 (33.4%)	2676 (28.5%)	3578 (38.1%)	669.7	0.0001
No	670 (77.4%)	125 (14.4%)	71 (8.2%)		

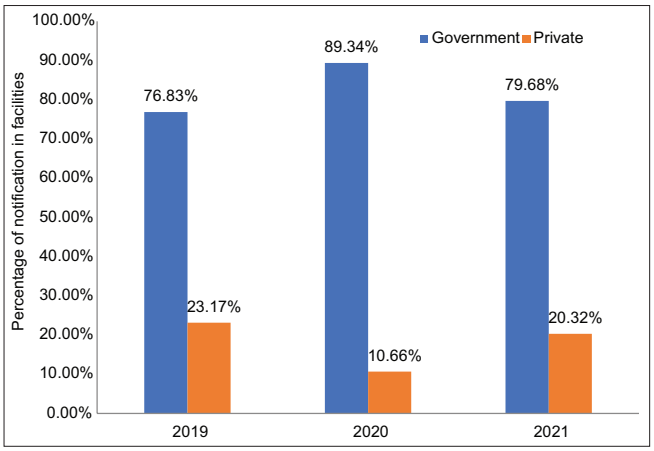

Figure 2: Notification in Government & Private facilities

2021; and there were 3578 cases (38.1% of the total), which is higher than the number of cases in 2020 (2676 cases, 28.5%).

Table 3 depicts that the percentage of cases that were cured decreased by 32% between 2020 and 2021; this indicates that the proportion of successfully treated cases decreased from 88.3% in 2020 to 82.9% in 2021. The percentage of deaths increased by 18% between 2020 and 2021; this suggests that the proportion of patients who unfortunately passed away increased from 6.5% in 2020 to 10.5% in 2021. The percentage of cases lost to follow-up decreased by 1% between 2020 and 2021; this indicates a slight reduction in the number of cases that were lost to follow-up during treatment. The percentage of treatment failures decreased by 16% between 2020 and 2021; this means that the proportion of cases categorized as treatment failures decreased from 0.9% in 2020 to 1.1% in 2021. The percentage of cases with a changed treatment regime increased by 16% between 2020 and 2021; this suggests that a higher proportion of cases had their treatment regimens changed in 2021 compared to 2020.

HIV and TB coinfection proportions were seen in 2019, 2020, and 2021, respectively, 6.1%, 4.6%, and 3.6%. Hence, it is in decreasing trend. In 2019, the sputum test at the end of intensive phase was seen in 1464 patients; out of all, 63 (4.3%) were positive, and among them, only 9 (0.6%) were positive at their continuation phase. In 2020, the sputum test at the end of intensive phase was seen in 1340 patients; out of all, 52 (3.8%) were positive, and among them, 6 (0.4%) were positive at their continuation phase. In 2021, the sputum test was conducted in 817 patients; out of all, 34 (4.1%) were positive, and only 6 (0.7%) were positive among them. Hence, there is not much significant deference has been observed in this regard.

Discussion

The COVID-19 pandemic has had a significant impact on TB control efforts globally, with many countries reporting a decline in TB case detection and treatment due to disruptions in health services and the diversion of resources to COVID-19 response activities. In India, the lockdown measures imposed in March 2020 to control the spread of COVID-19 led to the interruption in the health services, the suspension of community-based TB activities, and the interruption of TB services, including diagnosis and treatment.[1]

In the present study, there was a 29% decline in cases reported in 2020 as compared to the previous year. Similar result was found in one study conducted by Nakwon Kwak *et al.*[8] and was revealed that the number of TB notifications decreased by 24% both before and after the COVID-19 epidemic started. A similar result was found by Piyush Kumar *et al.*[9] that there was a significant reduction of tuberculosis cases by 24.29% as compared to the previous year (2019).

In our study, there was a significant reduction in public sector notification in 2020 year as compared to 2019 year, but during 2021, it is again same as before covid year (2019). In central TB division report, there was a reduction in the number of TB cases notified from both the private and public sectors during the months of lockdown in India as compared to before. As of April 27, 2020, the number of TB cases diagnosed in government healthcare centres saw a significant fall to 34,342 compared to 1,56,000 cases in the same month in 2019, representing a decrease of 78%.[4] It may be due to health seeking behaviour of community toward the public sector and fear of getting Covid as well as many private practitioners denied for the treatment and referring them toward the government hospitals.

Table 3: Comparison of 3-year data according to outcome of tuberculosis cases

Treatment outcome	2019	2020	2021	Change during 2020-2021 (percentage)
Cured	1665 (80.6%)	3019 (88.3%)	2068 (82.9%)	-32%
Died	243 (11.8%)	223 (6.5%)	263 (10.5%)	18%
Lost to follow-up	86 (4.2%)	90 (2.6%)	89 (3.6%)	-1%
Treatment failure	25 (1.2%)	32 (0.9%)	27 (1.1%)	-16%
Treatment regime changed	46 (2.2%)	55 (1.6%)	46 (7.3%)	-16%

In this study statistically significant reduction of CBNAAT or TRUNAAT during 2020 by 39%, it was similar result to the study done by Hymn Parikh *et al.*[10] in which significant reduction of CBNAAT testing at one of the districts of Gujarat (Amreli).

In the present study during 2021, the cured rate was decreased by 32%, overall proportion of treatment failure was increased (16%), whereas difference of 16% was seen in cases where treatment regimen was required to be changed and mortality was also increased (18%). Contrasting result was found from the study conducted by Kirti Garg *et al.*[11] which showed that the cured rate was decreased from 21.2% to 7.2% and the mortality rate was decreased from 4% to 2.1%. This result due to fear of contracting COVID-19 has led many people to avoid seeking medical care, including TB diagnosis, treatment, and prevention services. In addition, people with TB may face stigma and discrimination, which can further discourage them from seeking care.

India has developed a national strategic plan 2017–2025 for rapidly decline TB incidence and mortality by 2025, 5 years ahead of the global end TB targets and Sustainable Development Goals to attain the vision of a TB-free India. To complete the target, prompt and precise TB notification, diagnostic modality, and treatment initiation are necessary.

Conclusion

COVID-19 has significantly affected TB services and health seeking behaviours of patients. Despite the overall impact of COVID-19 on TB services (2020), the health department has proactively countered and bounce back in 2021 with an overall increase in notification and treatment services.

This research paper would be beneficial to primary care physicians for several reasons.

Increased Awareness: Primary care physicians need to stay updated on the latest research findings to provide the best care to their patients. If there is a correlation between TB and COVID-19, understanding this relationship helps physicians anticipate potential complications and comorbidities in their patients.

Diagnostic Guidance: Research findings can provide guidance on diagnostic criteria and testing strategies. For instance, if the paper highlights specific symptoms or risk factors associated with both TB and COVID-19, physicians can be more vigilant in their diagnostic approach.

Treatment Strategies: Knowing how TB and COVID-19 interact can inform treatment strategies. It may impact medication choices, treatment duration, and monitoring protocols. For example, if certain TB medications affect COVID-19 outcomes or vice versa, physicians can adjust treatment plans accordingly.

Preventive Measures: Understanding the correlation between TB and COVID-19 can inform preventive measures. This might include vaccination strategies, infection control protocols in healthcare settings, or advising patients on lifestyle changes to reduce their risk of contracting either disease.

Patient Education: Physicians can use research findings to educate their patients about the risks associated with TB and COVID-19, especially if they have underlying conditions or risk factors. This empowers patients to take proactive steps to protect their health and seek timely medical care if needed.

Public Health Implications: Research on the correlation between TB and COVID-19 can have broader public health implications. It may inform policymakers about the importance of coordinated efforts to control both diseases, allocate resources effectively, and develop targeted interventions for at-risk populations.

In summary, a research paper on the correlation between TB and COVID-19 can significantly benefit primary care physicians by providing insights into diagnosis, treatment, prevention, and patient education, ultimately improving patient care and public health outcomes.

Recommendations

It is important to learn from past experiences and take proactive measures to ensure that TB services will not be disrupted during future epidemics or pandemics. One of the suggested measures is to establish and utilize a state epidemiological intelligence unit,[12] which can help in forecasting epidemics and pandemics and giving lead time to prepare for the same.

Monitoring mechanism to identify missing cases and immediate retrieval mechanism needs to be strengthened to reduce treatment failure. Still, notification among private sector is not up to the mark. Hence, continuous sensitization of private practitioners through CME needs to be carried out.

Acknowledgements

We would likely to acknowledge the Head of the Department of Community Medicine of Surat for providing us guidance and support.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. World Health Organisation. Global Health Report of Tuberculosis, 2020. 2020.
2. Shrinivasan R, Rane S, Pai M. India's syndemic of tuberculosis and COVID-19. BMJ Glob Heal 2020;5:1-5.
3. Bagcchi S. WHO's Global tuberculosis report 2022. Lancet Microbe 2023;4:e20.
4. Central TB Division. Indian TB Report 2020. Ministry of Health and Family Welfare; 2020.
5. GOI (Government of India) Rapid response plan to mitigate impact of COVID-19 pandemic on TB epidemic and National TB Elimination Program (NTEP) activities in India Objectives 2020.
6. Glaziou P. Predicted impact of the COVID-19 pandemic on global tuberculosis deaths in 2020. medRxiv 2021;66:2020.04.28.20079582. doi: https://doi.org/10.1101/2020.04.28.20079582.
7. Stop TB Partnership. The potential impact of the Covid-19 response on tuberculosis in high-burden countries: A modelling analysis. Developed by Stop TB Partnership in collaboration with Imperial College, Avenir Health, Johns Hopkins University and USAID. 2020. p. 1–7. Available from: http://www.stoptb.org/assets/documents/news/Modeling Report_1 May 2020_FINAL.pdf
8. Kwak N, Hwang S, Yim J. Effect of COVID-19 on tuberculosis notification, South Korea. Emerg Infect Dis 2020;26:2506–8.
9. Kumar P, Anupama A, Alok A, Singh H, Verma P, Sinha A. The COVID-19 impact on tuberculosis incidence notification in India- A comparative study (2017-2022). doi: 10.32388/RE73XI.
10. Parikh H, Savani N. Effect of COVID-19 on tuberculosis care in a District of Western Gujarat. Indian J Respir Care 2022;11:369-72.
11. Garg K, Bahurupi Y, Aggarwal P, Badola M. Impact of COVID-19 on the national tuberculosis elimination program in uttarakhand, India: A mixed-methods research study. Infect Prev Pract 2023;5:100269.
12. Kosambiya JK. Establishment of state epidemic intelligence unit: From thought to action. Healthline 2022;13:3–5.