Available online at www.medicinescience.org

ORIGINAL ARTICLE

Medicine Science International Medical Journal

Medicine Science 2023;12(3):890-5

Effects of COVID-19 pandemic on tuberculosıs control: Evaluation of studies of tuberculosis units

Leyla Uces Harmanogullari, Tuba Duygu Yilmaz

Mersin Provincial Health Directorate, Mersin, Türkiye

Received 07 June 2023; Accepted 10 August 2023
Available online 30.08.2023 with doi: 10.5455/medscience.2023.06.085

Abstract

In this study, it was aimed to evaluate the studies carried out in tuberculosis units and the effects of the COVID-19 pandemic on tuberculosis control in Mersin in 2018-2021 years. In this way, deficiencies in tuberculosis units during the pandemic will be determined and solution proposals will be presented. This descriptive study was conducted in Mersin between December 2021 and May 2022. The records of Mersin Provincial Health Directorate tuberculosis units for the years 2018-2019-2020-2021 were included in the study. In the study, the examination, contact examination, organized community scans, BCG vaccinations, tuberculin skin tests, bacteriological and radiological examinations, treated patients and preventive treatment practices in tuberculosis units in Mersin were evaluated. Descriptive statistics were used in summarizing the data. 14029 examinations were performed in 2018, 12097 in 2019, 7601 in 2020 and 7849 in 2021 in the tuberculosis units in Mersin province. The number of radiological examinations in tuberculosis units in 2018, 2019, 2020 and 2021 are; 8148, 7951, 2885, 3278, respectively. The number of bacteriological examinations performed are 2701, 2107, 921, 709. According to the years, the number of people who received treatment was determined as 214, 189, 165, 174. In the years before and after the pandemic, when 2019 and 2020 were compared, 37.2% decrease in the total number of examinations and a 12.7% decrease in the number of patients treated were determined in Mersin. In the years after the onset of the pandemic, there was a decrease in all services in tuberculosis units compared to the years before the pandemic.

Keywords: COVID-19 pandemic, healthcare, tuberculosis

Introduction

Tuberculosis is an infection of the lungs caused by the bacterium Mycobacterium Tuberculosis [1]. Every year, 10 million people are diagnosed with tuberculosis. Despite the fact that tuberculosis is a preventable and treatable disease, 1.5 million people die from it each year. Although tuberculosis exists worldwide, it is most prevalent in low-income countries [2,3]. Tuberculosis is a social disease as well. Tuberculosis risk factors include poverty, malnutrition, and living in a crowded environment [4].

In 2020 and 2021, the COVID-19 pandemic had massive health, social, and economic consequences. The number of notifications of people diagnosed with tuberculosis is a widely available indicator that can be used to assess the impact of disruptions caused by the COVID-19 pandemic on basic tuberculosis services at the national level. Following large increases in the annual number of tuberculosis case notifications between 2017 and 2019, global data analysis shows that notifications fell from 7.1 million to 5.8 million, a significant 18% decrease between 2019 and 2020 [2].

Interruptions in tuberculosis control health services have occurred as a result of the COVID-19 pandemic measures, as have interruptions in all health services [5-8]. The number of applications to tuberculosis treatment units decreased with the

CITATION
Uces Harmanogullari L, Yilmaz TD. Effects of COVID-19 pandemic on tuberculosıs control: evaluation of studies of tuberculosis units. Med Science. 2023;12(3):890-5.

Corresponding Author: Leyla Uces Harmanogullari,Mersin Provincial Health Directorate, Mersin, Türkiye
Email: leylaharman@yahoo.com.tr

DOI: 10.5455/medscience.2023.06.085

pandemic, according to regional studies [9,10]. The number of tuberculosis notifications decreased as a result of a decrease in applications to units providing tuberculosis service [11-13]. Delayed diagnostic services and increased transmission result in an increase in cases in the subsequent period [14-16]. Delays in treatment services increase the likelihood of treatment failure [17,18]. According to studies, interruptions in diagnosis and treatment services will result in increased morbidity and mortality [19-21].

Globally, disruptions in tuberculosis diagnosis and treatment services caused by the COVID-19 pandemic are estimated to have resulted in an additional 100.000 tuberculosis deaths between 2019 and 2020. Going to health centers that provide tuberculosis-related services posed risks during the pandemic. Differences in the time of first impact from the COVID-19 pandemic, the severity of the impact, the extent to which restrictions are applied, compliance with restrictions, and the capacity and resilience of health systems are among the reasons for regional differences in tuberculosis reporting trends in 2019 and 2020 [2].

According to the 2020 Türkiye Tuberculosis Control Report, the estimated tuberculosis incidence rate of Türkiye in 2018 is 16 per hundred thousand and the estimated mortality rate is 0.51 per hundred thousand. Although the estimated tuberculosis incidence rates in 2016 were 18 per 100.000 and 17 per 100.000 in 2018, the incidence in 2016-2017-2018 tends to decrease as the years progress [22].

The registration and reporting system is critical in the fight against tuberculosis. Tuberculosis units plan and supervise the treatment of tuberculosis patients and contacts enrolled in preventive treatment [23]. The National Tuberculosis System (NTS) was developed as a module within the Public Health Management System (PHMS) to ensure accurate national and international reporting in Türkiye [24]. Furthermore, activities performed by tuberculosis units such as examination, radiology, bacteriology, protection, tuberculin skin test (TDT), and BCG vaccination are included in the Basic Health Statistics Module (TSIM) as monthly work information [24].

When tuberculosis is not treated, approximately half of the patients die within two years. Recovery is almost always achieved with medication [3]. In terms of being a common and preventable disease in the society, it is necessary to ensure the continuity of the services provided in tuberculosis units. The results of these studies are important in terms of detecting the changes in service delivery during the pandemic period. In order to prevent the negative effects of the pandemic, it is important to strengthen the treatment of patients diagnosed and other surveillance studies.

In this study, it was aimed to evaluate the studies of tuberculosis units in Mersin province in Türkiye in 2018-2019-2020-2021 and the effects of the COVID-19 pandemic on tuberculosis control.

Material and Methods

This descriptive study was carried out in Mersin city between December 2021 and May 2022.

Ethics committee approval and other permissions

The General Directorate of Health Services, the Mersin Provincial Health Directorate, and the Ministry of Health all granted the study the necessary permissions. The Toros University Scientific Research and Publication Ethics Committee granted the study's ethical approval (Date:25.02.2022, Issue:44).

Data collection process

Research data were collected by researchers between 01.04.2022 and 14.04.2022. The records of tuberculosis units of Mersin Provincial Health Directorate for the years 2018-2019-2020-2021 were obtained.Records from the National Tuberculosis System (UTS) and the Basic Health Statistics Module provided the data (TSIM). In order to accurately and timely notify tuberculosis patients, create appropriate national and international reports, and manage the public health management system, UTS was created as a module in 2018. A monthly worksheet in TSIM is used to record information on the tasks completed by the tuberculosis units, including examination, radiology, bacteriology, protection, tuberculin skin testing, and BCG vaccination [24].

Mersin province has four tuberculosis units: Toroslar (Center), Tarsus, Silifke, and Anamur districts. The purpose of the study was to assess the examination, contact examination, organized community scans, BCG vaccinations, tuberculin skin tests, bacteriological and radiological examinations, patients treated, and preventive treatment practices in tuberculosis units in the province of Mersin. To summarize the data, descriptive statistics were used.

Research hypotheses

- The number of radiological, bacteriological, and total examinations performed in tuberculosis units decreased in 2020 and 2021 due to the pandemic in 2020 and 2021, compared to 2018 and 2019.
- In 2020 and 2021, the number of patients treated for tuberculosis and the number of those receiving preventive treatment decreased compared to 2018 and 2019.

Results

In the tuberculosis units in Mersin province, 14.029, 12.097, 7.601 and 7.849 examinations were performed in 2018, 2019, 2020 and 2021, respectively (Figure 1).

The total number of contact examinations conducted in these years was 1.442, 1.191, 544, and 438, respectively (Figure 2).

In 2018, 254 individuals were screened as part of an organized community screening, but no screenings were conducted between 2019-2021.

In tuberculosis units, there were 3.513, 3.944, 1.730, and 1.558

DOI: 10.5455/medscience.2023.06.085

tuberculin skin tests performed, and there were 600, 226. 187, and 77 recipients of the BCG vaccine, respectively (Figure 3).

The total number of films shot in tuberculosis units in 2018, 2019, 2020 and 2021 was 8.148, 7.951, 2.885, and 3.278, respectively, and the number of bacteriological examinations was 2.701, 2.107, 921, and 709 (Figure 4).

The number of individuals who received protection treatment was determined to be 563, 503, 304, 316, while the number of people who received treatment by years was determined to be 214, 189, 165, and 174. (Figure 5).

When the service studies of Tuberculosis units in 2019, which is the first year after the pandemic started, and 2020, which is the first year after the pandemic, are evaluated, a 37.2% decrease in the total number of examinations and a 12.7% decrease in the number of individuals who received treatment were determined (Table 1).

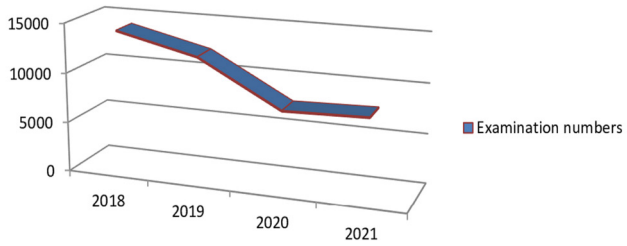

Figure 1. Total number of examinations in tuberculosis units by years

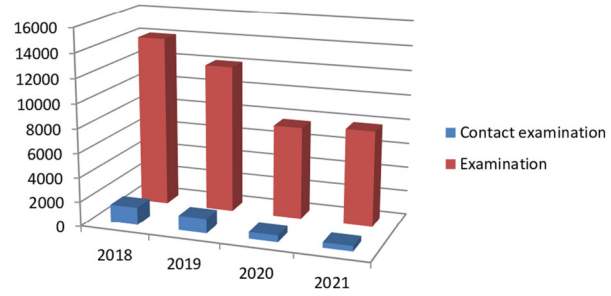

Figure 2. Number of total examination and contact examinations of tuberculosis units by years

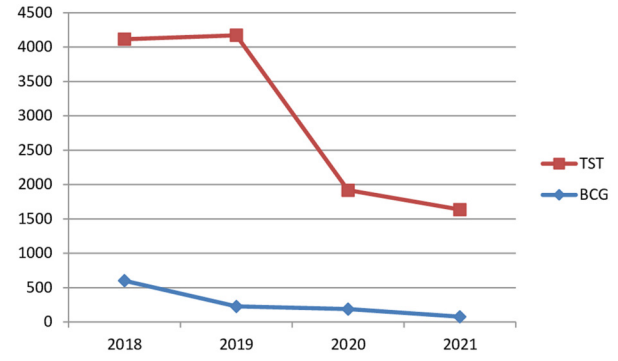

Figure 3. Number of TST and BCG vaccines of tuberculosis units by years

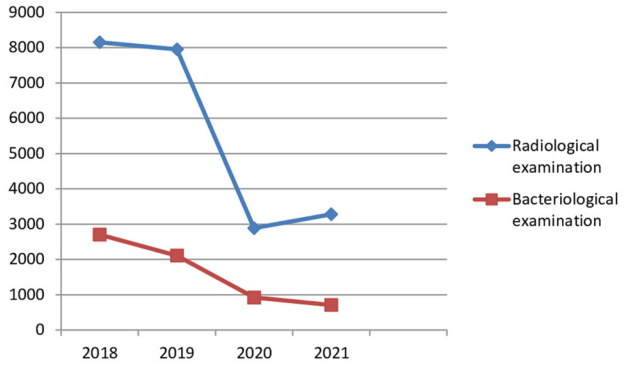

Figure 4. Number of radiological and bacteriological examinations of tuberculosis units by years

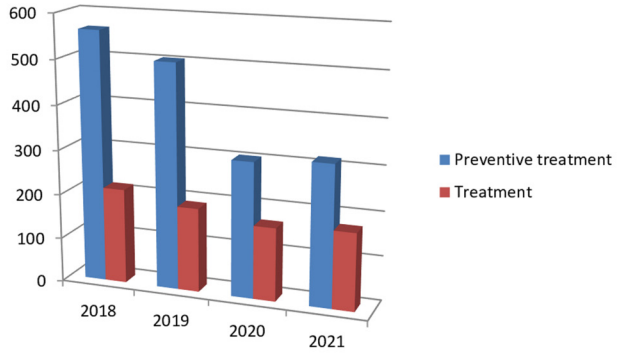

Figure 5. Number of patients receiving treatment and preventive treatment in tuberculosis units by years

Table 1. Change rates in services received from tuberculosis units in the pre- and post-pandemic period

Tuberculosis unit service	Year		Change
	2019	2020	%
Total inspection	12097	7601	37.2↓
Contact inspection	1191	544	54.3↓
Tuberculin skin test	3944	1730	56.1↓
BCG vaccination	226	187	17.3↓
Radiological examination	7951	2885	63.7↓
Bacteriological examination	2107	921	56.3↓
Number of people treated	189	165	12.7↓
Preventive therapy	503	304	39.6↓

Discussion

The total number of examinations performed in tuberculosis units decreased by roughly two-fifths in 2020, the start of the pandemic period, compared to 2019. The number of contact examinations, tuberculin skin tests, radiological and bacteriological examinations decreased by more than half in the same years. As with all health services, the pandemic has had an impact on the health services provided in tuberculosis units.

DOI: 10.5455/medscience.2023.06.085

Following the onset of the pandemic, the number of patients treated in 2020 fell by approximately one-eighth compared to 2019. As the number of patients decreased, so did the number of radiological and bacteriological examinations. Furthermore, during the pandemic, organized community screening was not possible. This situation is linked to the rapid deterioration of the COVID-19 pandemic, insufficient health-system preparedness, and the postponement of all health problems except emergency health services. The interruption of health services caused by the pandemic has also impacted the provision of tuberculosis health services.

In our study, it was determined that 14.029, 12.097, 7.601 and 7.849 examinations were performed in tuberculosis units in 2018, 2019, 2020 and 2021, respectively. The number of films shot in tuberculosis units is 8.148, 7.951, 2.885, 3.278, respectively, the number of tuberculin skin tests applied is 3.513, 3.944, 1.730, 1.558, and the number of individuals who received BCG vaccine is 600, 226, 187, 77, respectively. According to Elbek et al. [25], there were 18.930 applications in tuberculosis units in 2004, as well as 10.943 radiological examinations, 5.845 BCG immunizations, and 1.943 tuberculin skin tests. According to the study conducted by Uskun et al. [26], there were 2.980 applications to the tuberculosis unit and 145 contact examinations during one year. The lower frequency of total examination, radiological examination, and BCG immunization in our study could be attributed to the fact that Elbek et al. [25] conducted their study prior to the pandemic. The variation in the total number of exams and contact exams between studies is due to regional differences.

In our study, the number of individuals treated by years was 214, 189, 165, and 174, and the number of cases in the post-pandemic period was found to be lower than in the pre-pandemic period. According to the Report of the Tuberculosis Battle in Turkey 2021, there was a general tendency to decrease over the years in the number of examinations, radiological examinations, direct microscopy, and total tuberculosis cases performed in tuberculosis units in our country between 2005 and 2019 [22]. In the study of Armstrong et al. [27], it was determined that the number of tuberculosis cases in the USA decreased over the years between 1993 and 2017. According to a study conducted by Aksu et al. [28] in Turkey, the number of polyclinic examinations, sputum examinations, and x-rays decreased from 2011 to 2014, and the number of cases in 2013-2014 was less than in 2011-2012. Similarly, the number of cases, which tended to decrease over the years in studies, may be due to the tuberculosis control measures applied on a global basis.

The definitive case reports in our study for 2018-2020 are 214, 189, 165, and 174, respectively. In 2019-2020, the total number of examinations decreased by 37.2%, while the number of patients treated decreased by 12.7% in Mersin province. With the pandemic, there have been fewer conclusive case reports. The number of patients treated in the pandemic's first year has, however, decreased more dramatically. The number of cases in the second year of the pandemic was lower than it was in the year before, but there was a slight increase from the year before (2020). According to the study by Arega et al. [29] conducted in Ethiopia, there was a decline in tuberculosis notifications during the pandemic. In the study of Arentezi et al. [30] in India, it was emphasized that case reports decreased with the pandemic. In the study of Caren et al. [5], it was determined that the reports on which tuberculosis diagnosis and treatment services were adversely affected decreased by 21% during the pandemic period. It was highlighted in the study by Dara et al. [31] that there was a 35.5% decrease in the number of patients with tuberculosis diagnoses during the pandemic period in the World Health Organization's European region (WHO). In their investigation in China, Fei et al. [32] discovered that tuberculosis reports decreased during the pandemic. Gennori et al. [33] found a 43% decrease in the study in which they compared the case reports before and after the pandemic in Italy. Husein et al. [34] found a serious decrease of 80% in India with the pandemic. Mbithi et al. [35] determined that tuberculosis suspected case reports decreased by 31.2% in Kenya. Odume et al. [36] examined 4-week data in their study in Nigeria and discovered a decrease in the number of scans and possible TB case reports. According to the study conducted by Saka et al. [37], there was a 35.9% decrease in notifications.

In the study, it was determined that the services in the tuberculosis units were negatively affected with the pandemic. In this context, social awareness and training activities and in-service training of health personnel are carried out in order to improve diagnostic services in our province. Patients are followed by tuberculosis units with directly obsreved terapy and video supperted treatment. In addition, contact studies, vaccination studies, social assistance studies and other surveillance studies are carried out.

The main limitation of the study is that the data obtained in the study is specific to the region where the study was conducted.

Conclusion

Every aspect of healthcare has been impacted by the COVID-19 pandemic. Health applications decreased as a result of the pandemic measures. The provision of services for tuberculosis is also adversely impacted by the allocation of resources to pandemics. According to our study, all services provided in tuberculosis units decreased after the pandemic. Disruptions in diagnosis and treatment services cause an increase in morbidity and mortality in the upcoming period. In order to reduce the negative effects of the COVID-19 pandemic on tuberculosis control, it is necessary to develop studies in tuberculosis units and to increase studies for patients, contacts and risk groups. Providing the necessary funding for the studies related to the tuberculosis control program and providing all resources, including logistical support such as staff, training, and medication for tuberculosis units are crucial in terms of combating the pandemic's negative effects.

Conflict of Interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
The authors declare that they have received no financial support for the study.

Ethical Approval
The General Directorate of Health Services, the Mersin Provincial Health Directorate, and the Ministry of Health all granted the study the necessary permissions. The Toros University Scientific Research and Publication Ethics Committee granted the study's ethical approval (Date:25.02.2022, Issue:44).

References

1. T.C. Sağlık Bakanlığı. Tüberküloz tanı ve tedavi rehberi. https://hsgm.saglik.gov.tr/depo/birimler/tuberkuloz-db/Dokumanlar/Rehberler/Tuberkuloz_Tani_ve_Tedavi_Rehberi.pdf accessed date: 16.12.2021.
2. World Health Organization (WHO). Global tuberculosis report. https://www.who.int/publications/digital/global-tuberculosis-report-2021 accessed date: 20.12.2021.
3. World Health Organization (WHO). Tuberculosis. https://www.who.int/health-topics/tuberculosis#tab=tab_1 accessed date: 20.12.2021.
4. Kara Ş, Aslan D. Tuberculosis in the globalized world: updated assessment with public health perspective. Sağlık ve Toplum 2021;31:3-22.
5. Caren GJ, Iskandar D, Pitaloka DAE, et al. COVID-19 pandemic disruption on the management of tuberculosis treatment in Indonesia. J Multidiscip Healthc. 2022;15:175-83.
6. Bhargava A, Shewade HD. The potential impact of the COVID-19 response related lockdown on TB incidence and mortality in India. Indian J Tuberc. 2020;67:139-46.
7. Cilloni L, Fua H, Vesgaa JF, et al. The potential impact of the COVID-19 pandemic on the tuberculosis epidemic a modelling analysis. EClinicalMedicine. 2020;28:100603.
8. Crisan-Dabija R, Grigorescu C, Pavel C, et al. Tuberculosis and COVID-19: lessons from the past viral outbreaks and possible future outcomes. Can Respir J. 2020;2020:1401053.
9. Zimmer AJ, Klinton JS, Oga-Omenka C, et al. Tuberculosis in times of COVID-19. J Epidemiol Community Health. 2022;76:310-6.
10. Visca D, Ong CWM, Tiberi S, et al. Tuberculosis and COVID-19 interaction: a review of biological, clinical and public health effects. Pulmonology. 2021;27:151-65.
11. Comella-del-Barrioa P, De Souza-Galvão ML, Prat-Aymericha C, et al. Impact of COVID-19 on tuberculosis control. Arch Bronconeumol. 2021;57:5-6.
12. Behera D. TB control in India in the COVID era. Indian J Tuberc. 2021;68:128-33.
13. Dookie N, Padayatchi N, Naidoo K. Tuberculosis elimination in the era of coronavirus disease 2019 (COVID-19): a moving target. Clin Infect Dis. 2022;74:509-10.
14. Oga-Omenka C, Tseja-Akinrin A, Boffa J, et al. Commentary: lessons from the COVID-19 global health response to inform TB case finding. Healthc (Amst). 2021;9:100487.
15. Rodrigues I, Aguiar A, Migliorid GB, Duarte R. Impact of the COVID-19 pandemic on tuberculosis services. Pulmonology. 2022;28:210-9.
16. Yang H, Lu S. COVID-19 and tuberculosis. J Transl Int Med. 2020;2:59-65.
17. Alene KA, Wangdi K, Clements ACA. Impact of the COVID-19 pandemic on tuberculosis control: an overview. Trop Med Infect Dis. 2020;24;5:123.
18. Amimo F, Lambert B, Magit A. What does the COVID-19 pandemic mean for HIV, tuberculosis, and malaria control?. Trop Med Health. 2020;48:32.
19. Dheda K, Perumal T, Moultrie H, et al. The intersecting pandemics of tuberculosis and COVID-19: population-level and patient-level impact, clinical presentation, and corrective interventions. Lancet Respir Med. 2022;10:603-22.
20. Nikolayevskyy V, Holicka Y, van Soolingen D, et al. Impact of the COVID-19 pandemic on tuberculosis laboratory services in Europe. Eur Respir J. 2021;57:2003890.
21. Bhatia V, Mandal PP, Satyanarayana S, et al. Mitigating the impact of the COVID-19 pandemic on progress towards ending tuberculosis in the WHO SouthEast Asia Region. WHO South-East Asia Journal of Public Health. 2020;9:95-9.
22. T.C. Sağlık Bakanlığı. Türkiye'de verem savaşı 2020 raporu. https://hsgm.saglik.gov.tr/depo/birimler/tuberkuloz-db/Dokumanlar/Raporlar/Turkiyede_Verem_Savasi_2020_Raporu.pdf accessed date: 20.12.2021.
23. T.C. Sağlık Bakanlığı. Tüberküloz kontrol faaliyetleri saha uygulama kılavuzu. https://hsgm.saglik.gov.tr/depo/birimler/tuberkuloz-db/Dokumanlar/Rehberler/Tberkloz_Kontrol_F_Ek_809af975-ae5a-405f-8829-35954e46d1fe.pdf accessed date: 20.12.2021.
24. T.C. Sağlık Bakanlığı. Verem savaşı dispanserleri kayıt ve raporlama sistemi rehberi. https://hsgm.saglik.gov.tr/depo/birimler/tuberkuloz-db/Dokumanlar/Rehberler/VSD_Kayit_ve_Raporlama_Sistemi_Rehberi-2021.pdf accessed date: 20.12.2021.
25. Elbek O, Yardı AD, Uyar M, et al. The results of patients follow up at Gaziantep Number II Dispensary of tuberculosis control in the year 2004. Tüberküloz ve Toraks. 2006;54:341-8.
26. Uskun E, Öztürk M, Kişioğlu AN, et al. Isparta ili verem savaş dispanseri'ne başvuran hastaların değerlendirilmesi. S.D.Ü. Tıp Fak. Derg. 2005;12:1-5.
27. Armstrong LR, Winston CA, Stewart B, et al. Changes in tuberculosis epidemiology, United States, 1993–2017. Int J Tuberc Lung Dis. 2019;23:797-804.
28. Aksu MC, Togay A, Yılmaz TD. Tüberküloz olgularında doğrudan gözetimli tedavi uygulamalarına retrospektif bakış. Mersin Univ Sağlık Bilim Derg. 2017;10:45-53.
29. Arega B, Negesso A, Taye B, et al. Impact of COVID-19 pandemic on TB prevention and care in Addis Ababa, Ethiopia: a retrospective database study. BMJ Open. 2022;12:e053290.
30. Arentz M, Ma J, Zheng P, et al. The impact of the COVID-19 pandemic and associated suppression measures on the burden of tuberculosis in India. BMC Infect Dis. 2022;22:92.
31. Dara M, Kuchukhidze G, Yedilbayev A, et al. Early COVID-19 pandemic's toll on tuberculosis services, WHO European Region, January to June 2020. Euro Surveill. 2021;26:pii=2100231.
32. Fei H, Yinyina X, Hui C, et al. The impact of the COVID-19 epidemic on tuberculosis control in China. Lancet Reg Health West Pac. 2020;3:100032.
33. Di Gennaro F, Gualano G, Timelli L, et al. Increase in tuberculosis diagnostic delay during first wave of the COVID-19 pandemic: data from an Italian infectious disease referral hospital. Antibiotics (Basel). 2021;10:272.
34. Husain AA, Monaghan TM, Kashyap RS. Impact of COVID-19 pandemic on tuberculosis care in India. Clin Microbiol Infect. 2021;27:293-4.

DOI: 10.5455/medscience.2023.06.085

35. Mbithi I, Thekkur P, Chakaya JM, et al. Assessing the real-time impact of COVID-19 on TB and HIV services: the experience and response from selected health facilities in Nairobi, Kenya. Trop Med Infect Dis. 2021;6:74.

36. Odume B, Falokun V, Chukwuogo O, et al. Impact of COVID-19 on TB active case finding in Nigeria. PHA 2020;10:157-62.

37. Soko RN, Burke RM, Feasey HRA, et al. Effects of coronavirus disease pandemic on tuberculosis notifi cations, Malawi. Emerg Infect Dis. 2021;27:1831-9.