Detection of pulmonary tuberculosis in the republic of Tajikistan

Abstract

Objective: To study the dynamics and main reasons for the significant detection of pulmonary tuberculosis with a negative sputum test result in the Republic of Tajikistan over the past 5 years.

Material and methods: An analysis of the estimated data of the WHO, as well as official statistics on TB incidence using the National TB Data Registry for 2019-2023, was carried out. Definitions of clinically established cases of pulmonary TB are noted. Information is presented on the introduction of the express PCR method of bacteriological verification of TB diagnosis in all regions of the country.

Results: Over the past 5 years (2019-2023), WHO estimates on TB incidence in the Republic of Tajikistan have significantly decreased, indicating improved accessibility of the population to specialized anti-TB services. At the same time, during the COVID period (2019-2020), the prognosis was more unfavorable due to deteriorating accessibility to medical and social services than in the post-COVID period (2021-2023). At the same time, official statistics on the detection of new TB cases indicate the opposite dynamics: during the COVID period, the number of TB patients sharply decreased from 5976 to 4299 cases that is, by 1677 cases (more than 28%) and began to gradually increase in subsequent years, but has not yet reached the pre-COVID level. At the same time, in proportion to the indicated data, the number of clinically established cases of pulmonary TB decreased during the COVID period from 1422 to 720 cases (2019-2021), that is, almost twofold, and in the following years (2022-2023) began to gradually increase, still not reaching the pre-COVID period.

Conclusion: Thus, despite the active introduction of new innovative methods for verifying the diagnosis of TB and improving the population's access to diagnostic services, including molecular genetic methods for rapid diagnostics of both sensitive and drug-resistant forms of TB, the proportion of clinically established cases of pulmonary TB remains high (34% of all pulmonary forms of TB) and tends to increase.

Keywords: tuberculosis, estimate incidence rate, notification cases, clinical confirmed, bacteriologically confirmed

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Introduction

An estimated two billion people (a quarter of the world's population) are infected with Mycobacterium tuberculosis (MBT). In 2022, an estimated 7.5 million people fell ill with tuberculosis (TB) and 1.5 million died.[1] Timely diagnosis of active TB facilitates timely therapeutic intervention and minimizes community transmission.[2,3] For many decades, the diagnosis of pulmonary TB was based on the search for acid-fast bacilli (AFB) in sputum smears, a procedure with a sensitivity of only 50–60%.[4–6] In the last decade, MBT has been detected by molecular genetic methods using the GeneXpert machines.[7–9] Cases of pulmonary TB with a negative sputum smear and GeneXpert tests are interpreted as clinically established cases.[10] It is well known that the number of clinically diagnosed cases of TB should decrease with the introduction of new methods of disease verification.[11] A clinically detected case of pulmonary TB is defined, according to WHO, as a case with clinical symptoms of TB with a negative result of MBT detection on GeneXpert; with a history of contact with a patient with active TB; a positive result of intradermal testing with tuberculin; radiographic abnormalities consistent with active pulmonary TB; lack of clinical and radiographic improvement with treatment with broad-spectrum antibiotics (if the case is HIV-negative) and a decision to treat the case as pulmonary TB.[10] It should be noted that in recent years, new ULTRA cartridges for testing on the GeneXpert device have been introduced and made available for practical use in the Republic of Tajikistan. Moreover, with the support of development partners, new XDR cartridges have become available for practical use, allowing bacteriological confirmation of TB and identification of the spectrum of drug resistance of MBT in less than two hours.[2] However, the impact of these innovative introductions into healthcare practice on the patterns of detection of various forms of TB has not been studied. Understanding these trends can help inform important decisions to reduce clinically diagnosed and increase bacteriologically confirmed TB cases by implementing new approaches to disease verification.

Objective of the study: To study the dynamics and main reasons for the significant detection of pulmonary tuberculosis with a negative sputum test result in the Republic of Tajikistan over the past 5 years.

Material and methods

An analysis of the estimated data of the WHO, as well as official statistics on TB incidence using the National TB Data Registry for 2019-2023, was carried out. Definitions of clinically established cases of pulmonary TB are noted. Information is presented on the introduction of the express PCR method of bacteriological verification of TB diagnosis in all regions of the country. In statistical data processing, differences were considered significant at $p < 0.05$. Quantitative indicators were expressed in absolute numbers, relative values - as a percentage.

Results and discussion

According to WHO estimates, in the Republic of Tajikistan, the incidence rate of TB in 2023 was 72 cases per 100 thousand population (absolute number 7200 cases / year). Moreover, in the country in 2023, the absolute number of cases detected was 4,540 cases, 75% of which were pulmonary TB (3,397 cases), 63% of which were bacteriologically confirmed (2,147 cases), and the remaining 1,143 cases were clinically established cases of pulmonary TB.[2,10] In 2022, the WHO TB incidence rate in the Republic of Tajikistan was higher and amounted to 78 cases per 100 thousand population (absolute number 7800 cases/year). At the same time, in the country in 2022, the absolute number of detected cases was 119 cases higher and amounted to 4421, 72% of which were pulmonary TB (3183 cases), 65% of which were bacteriologically confirmed (2069 cases), and the remaining 1114 cases were clinically detected cases of pulmonary TB.[2,10]

In 2021, the WHO TB incidence rate in the Republic of Tajikistan was even higher than in 2022 and amounted to 88 cases per 100 thousand population (absolute number 8600 cases/year). In 2021, a total of 4,299 cases of TB were detected, which is 122 cases less than in 2022, 67% of which were pulmonary TB (2,880 cases), which is 303 cases less than in 2022. Of these, 75% were bacteriologically confirmed (2,160 cases), which is 91 cases more than in 2022. In other words, clinically confirmed cases of pulmonary TB in 2021 were 720 cases, which is 394 cases less than in 2022.[2,10] In 2020, the WHO TB incidence rate in the Republic of Tajikistan was 84 cases per 100 thousand population (absolute number of 8,000 cases/year). In 2020, a total of 4,316 cases of TB were detected, which is 17 cases more than in 2021, 67% of which were pulmonary TB (2,892 cases), which is 12 cases less than in 2021. Of these, 68% were bacteriologically confirmed (1,967 cases), which is 193 cases less than in 2021 or clinically confirmed cases of pulmonary TB in 2020 were 925 cases, which is 205 cases more than in 2021.[2,10] In 2019, the WHO TB incidence rate in the Republic of Tajikistan was 83 cases per 100 thousand population (absolute number 7,700 cases/year). In 2019, a total of 5,976 cases of TB were detected, which is 1,660 cases more than in 2020, 70% of which were pulmonary TB (4,183 cases), which is 1,291 cases more than in 2020. Of these, 66% were bacteriologically confirmed (2,761 cases), which is 794 cases more than in 2020 or clinically confirmed cases of pulmonary TB in 2019 were 1,422 cases, which is 497 cases more than in 2020.[2,10] This dynamics is more clearly seen in Figure 1.
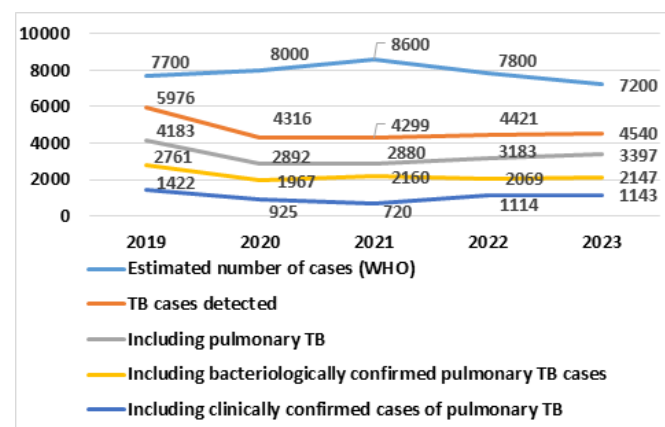

Figure 1 Dynamics of the estimated and detected number of cases, including pulmonary, bacteriologically confirmed and clinically established cases of tuberculosis in the Republic of Tajikistan for 2019-2023.

As can be seen from this figure, over the past 5 years (2019-2023), WHO estimates on TB incidence in the Republic of Tajikistan have significantly decreased, indicating improved accessibility of the population to specialized anti-TB services. At the same time, during the COVID period (2019-2020), the prognosis was more unfavorable due to deteriorating accessibility to medical and social services than in the post-COVID period (2021-2023). At the same time, official statistics on the detection of new TB cases indicate the opposite dynamics: during the COVID period, the number of TB patients sharply decreased from 5976 to 4299 cases that is, by 1677 cases (more than 28%) and began to gradually increase in subsequent years, but has not yet reached the pre-COVID level. At the same time, in proportion to the indicated data, the number of clinically established cases of pulmonary TB decreased during the COVID period from 1422 to 720 cases (2019-2021), that is, almost twofold, and in the following years (2022-2023) began to gradually increase, still not reaching the pre-COVID period.

Conclusion

Thus, despite the active introduction of new innovative methods for verifying the diagnosis of TB and improving the population's access to diagnostic services, including molecular genetic methods for rapid diagnostics of both sensitive and drug-resistant forms of TB, the proportion of clinically established cases of pulmonary TB remains high (34% of all pulmonary forms of TB) and tends to increase.

Acknowledgments

Conflicts of interest

The authors declared that there are no conflicts of interest.

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