CURATIO INTERNATIONAL FOUNDATION

25 Years for Better Health Systems

How the tuberculosis program in Georgia adapted during the Covid-19 pandemic: Health system perspectives in tuberculosis detection and treatment

Study report

2022

Expressing gratitude

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Introduction

Description of the situation related to tuberculosis

Every year, 10 million people get sick with tuberculosis and 1.5 million people die, making it the world's leading infectious killer (World Health Organization, 2022). Despite the investment of significant resources, tuberculosis remains one of the major public health challenges.

Tuberculosis is an important public health problem in Georgia. Despite significant progress in TB control over the past decade, the country faces a number of significant challenges that require further intensified and well-organized efforts to implement effective control by ensuring universal access to prevention, diagnosis, and treatment of all forms of the disease. Effective management and integration of TB control measures into the health system are also important.

Until 2016, Georgia was a country with a high burden of multidrug-resistant tuberculosis, although the achievements of the program have improved significantly in recent years (World Health Organization Regional Office for Europe, 2018). As a result of the changes made in the direction of diagnosis and treatment of tuberculosis (in particular, the use of new drugs), in general, the incidence rate of tuberculosis decreased from 99 to 74 per 100,000 population in 2015-2019 (World Health Organization, 2016, 2020), including the number of new cases of multidrug-resistant tuberculosis. In 2020, drug-resistant tuberculosis (RR/MDR) was diagnosed in 202 patients, which was 10.7% and 26.8% of new and treated tuberculosis cases, respectively (National Center for Disease Control, 2020).

The main goal of the State Tuberculosis Management Program of Georgia is to reduce the spread of infection in society, within the framework of which tuberculosis diagnosis and treatment services are provided free of charge to patients. The program is implemented by the National Center for Tuberculosis and Lung Diseases. Service delivery is carried out by both private and state-owned institutions at the outpatient and hospital levels (Curatio International Foundation, 2017a; Government of Georgia, 2022).

The successes achieved within the framework of the tuberculosis program can be seen in several directions (National Center for Disease Control, 2020):

- With the help of the Global Fund, Georgia managed to introduce a new, effective treatment for both sensitive and MDR patients recommended by WHO.

- The country has ensured universal access to both first-line and second-line medicines. New anti-tuberculosis medications are available under the state program.
- In order to improve the geographic accessibility of the patient, a video observation (VOT) program was launched in Tbilisi, through which 387 patients receive medicine (2020).
- The methodological recommendation for the study of contacts of the index patient of tuberculosis was updated, which aims to improve the study of contacts.
- The country introduced modern diagnostic methods recommended by WHO: culture on liquid medium, GeneXpert MTB/RIF systems for rapid diagnosis of TB, and MDR-TB.

The TB epidemic may be exacerbated by the new corona virus. Studies conducted in different countries have shown that the detection of tuberculosis has significantly decreased as a result of the pandemic caused by Covid-19 and the restrictions imposed (Magro et al., 2020; Meneguim et al., 2020; Pang, Liu, Du, Gao, & Li, 2020). According to the same studies, the main reasons for the decrease in detection were: a) access to medical services of patients due to the restriction of movement and the reorganization of the service in order to avoid the risk of spreading the COVID19 infection; b) patients were postponing the use of the service due to fear of being infected with Covid (Magro et al., 2020; Meneguim et al., 2020; Pang et al., 2020).

Like other countries, Georgia was also affected by the Covid-19 pandemic. The first case of Covid-19 was detected at the end of February 2020. At the initial stage of the epidemic, point restrictions were imposed in certain geographical areas (eg: Kvemo Kartli). However, as the infection spread, the country soon imposed strict restrictions on movement across the country. The impact of the first phase of the regulations on the detection of tuberculosis cases was also reflected: according to the National Center for Tuberculosis and Lung Disease, which is responsible for national statistics, in the first quarter of 2020, the detection of tuberculosis cases decreased by about one third compared to the same period in 2019 (National Center for Tuberculosis and Lung Diseases, 2020).

According to experts, the significant impact of the pandemic in reducing the detection of new cases of tuberculosis may have a negative effect in the following years, which is reflected in the expected increase in late cases and increased rates of infection (Migliori et al., 2021). That is why we aimed to determine through this research what should be done in the future, in the conditions of a similar pandemic.

Aim of the Study

The aim of the present study is to study how the state tuberculosis program in Georgia adapted during the Covid-19 pandemic: what was the impact of the pandemic on tuberculosis detection and treatment rates. In particular, the study aims to answer the following two questions:

1. How have the restrictions caused by Covid-19 affected the response of the TB system during the pandemic.
2. What the TB program should do to reduce the negative impact of the Covid-19 epidemic on TB prevention and treatment services.

Methodology

The study was conducted using a mixed research method. To document the changes made to the National Tuberculosis Management Program in response to the COVID-19 program, we reviewed Government Decrees on the Approval of State Health Programs (2020 and 2021 Decrees) (Government of Georgia, 2020, 2022) and other statutory acts (Ministerial Orders). In order to assess the impact of the Covid epidemic on the detection of tuberculosis cases, the epidemiological data of the program were analyzed (the annual dynamics of the detection of new cases according to the types of tuberculosis over the last 10 years).

Within the framework of qualitative research, data was collected through in-depth interviews, semi-structured interviews, and focus group discussions (FGDs).

In-depth interviews were conducted:

- With field specialists (policymakers, health managers and other field specialists) to gather information on TB program change/adaptation during the covid pandemic. A total of 6 interviews were conducted.
- Semi-structured interviews with patients. People over the age of 18 took part in the research. (A total of 37 interviews were conducted).

  Patients were divided into the following groups:

- Patients with resistant tuberculosis (DR-TB) - 4 patients) and sensitive tuberculosis (DS-TB) - 5 patients) who were included in the national tuberculosis program in Georgia before the start of the covid pandemic.
- DR-TB (13 patients) and DS-TB (15 patients) patients who were included in the national tuberculosis program in Georgia after the start of the covid pandemic.

Patients were selected from Tbilisi, Kvemo Kartli, and Samegrelo-Zemo Svaneti regions. The purposeful selection of regions was based on the high prevalence of tuberculosis (all three regions), strict restrictions imposed at the beginning of the Covid pandemic (Kvemo Kartli), and the representativeness of the city, district, and rural population.

- With medical service providers: focus group discussions were held with DOT implementing nurses, who work in Tbilisi TB-cabinets, or provide services at the desired place for the patient - the so-called "Walking nurses". Ten nurses participated in focus group discussions.
- Due to the epidemiological situation, it was not possible to conduct focus group discussions with phthisis doctors, which were later replaced by in-depth interviews. In-depth interviews were conducted with phthisis physicians (four interviews) and physician-epidemiologists from public health centers who carry out epidemiological surveillance of the program and are involved in contact tracing (two interviews).

Respondent selection procedure

Service providers and patients were selected using purposive sampling. To select patients, service providers were given defined characteristics such as type of tuberculosis and duration of involvement in the program in relation to the Covid epidemic and asked to select a defined number of patients. All doctors were provided with a consent form for patient inclusion in the study, and only those patients who agreed to the survey were selected.

Data analysis

The information extracted from the interviews and discussion was analyzed in the qualitative research analysis program - NVivo-12. Initially, a thematic tree was constructed to code the data and to group and analyze key findings using a conceptual framework (see Figure 1.).

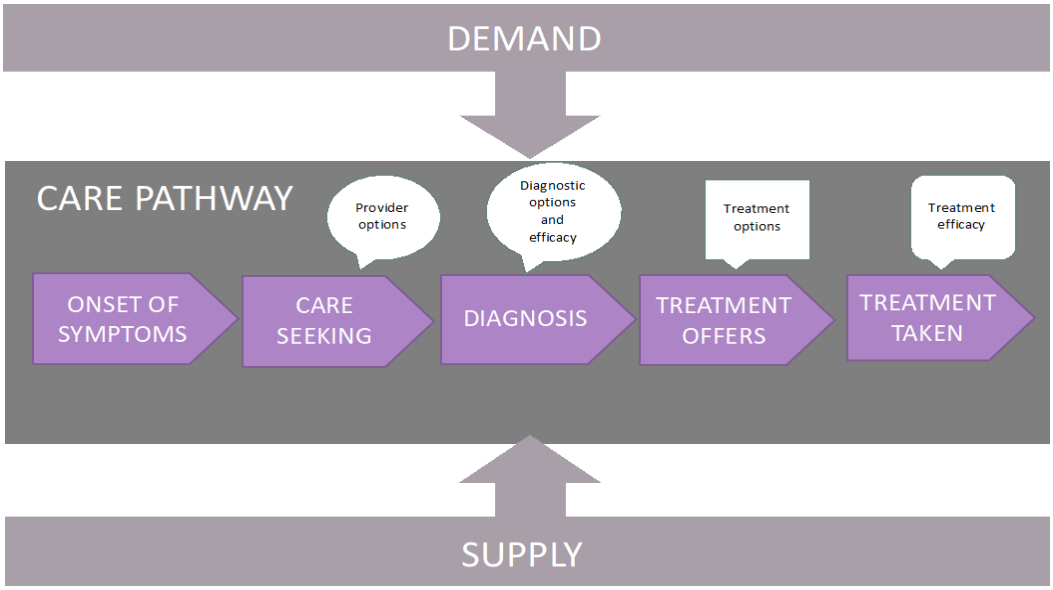
The interviews were recorded on a dictaphone with the consent of the respondent. Verbatim transcripts were prepared from the audio recordings by a research assistant, where respondents were assigned a serial number without assigning a personal identifier.

In order to construct a detailed coding tree, the team of researchers studied the interviews organized in the form of transcripts in depth. After constructing the tree, data coding and then analysis began. Two researchers coded the transcripts independently and then compared the results to reach a final agreement.

Conceptual framework of the study

The conceptual framework was based on the patient's movement through the system, namely how the Covid epidemic has affected the patient's use of services from symptom onset to treatment outcome. In the current study, we adapted the above-mentioned conceptual framework developed by Anna Vassall and colleagues, namely, the analytical framework focused only on the movement of the TB patient in the system and the factors affecting it, and we did not further study the impact of the TB patient's treatment outcomes on population health (Vassall, Mangham-Jefferies, Gomez, Pitt, & Foster, 2016).

Figure 1.Conceptual framework



Principles of ethics

The research was conducted in compliance with the basic ethical principles in accordance with the research protocol, which involves limiting the disclosure of the identification data of the research participants, their places of work or other personal, identity-related information.

The study protocol and tools were submitted to the National Board of Bioethics of the National Centers for Disease Control and Public Health, and we received approval to conduct the study from the National Board of Bioethics on May 31, 2021 (Protocol # 2021-045).

Respondents were informed that only the type of respondent would be referenced when quoting the respondent's response in the survey report.

In order to protect ethical issues, the respondents of the research were selected with special care, following the procedures described above.

Considering the covid pandemic and epidemiological situation, phone interviews were conducted with patients to avoid the risk of covid infection to patients and researchers.

Based on the consent of the respondent and focus group participants, an audio recording of the interview/discussion was prepared.

Results

A brief description of the tuberculosis program

Tuberculosis diagnosis and treatment services are provided free of charge to patients within the framework of the state tuberculosis management program, the design of which is determined by the Ministry of Labor, Health and Social Protection of Georgia and submitted annually to the Government of Georgia for approval. The program is implemented by the National Health Agency, which administers the institutions involved in the program. The main implementer of the program is JSC "National Center for Tuberculosis and Lung Diseases", which is responsible for proper and continuous implementation of diagnostics (including laboratory component) and patient treatment component (ambulatory and inpatient services). In addition to the National Tuberculosis Center, the outpatient treatment service for TB patients includes TB offices located at the district level and providing outpatient services to patients in the respective district (Curatio International Foundation, 2017b; Government of Georgia, 2020).

Since 2012, the National Center for Disease Control and Public Health has been entrusted with the function of tuberculosis epidemic surveillance, tracing contacts of persons suffering from tuberculosis, and working with persons lost from surveillance. Through the laboratory network of the National Centers for Disease Control and Public Health, sputum microscopy and transport from tube facilities (from tube cabinets to the laboratory) are formed (Curatio International Foundation, 2017b).

Regarding the provision of patients' access to anti-tuberculosis medicines, today the state buys all the first-line medicines (100%) and most of the second-line medicines (80%). And the purchase of the remaining part (20%) of the second-line medicines is provided by the financial support of the state-global fund (Government of Georgia, 2022).

The state shares modern approaches in the treatment of tuberculosis and follows the recommendations developed by the World Health Organization. One of the first recommendations related to the change in the tactics of outpatient treatment of patients, in particular, the treatment of patients with direct observation (Direct Observed Treatment - DOT). which started gradually from 1995 and reached full coverage in 1999. The frequency of DOT administration varies depending on the type of tuberculosis: for patients with a sensitive form of tuberculosis, DOT administration – is three times a week, and for patients with a resistant form - daily. During outpatient treatment, patients are monitored and drugs are dispensed by district-level TB clinics and rural

primary health care facilities for patients who live in rural areas and prefer to receive their TB medication at a rural outpatient clinic (Curatio International Foundation, 2017b). The National Tuberculosis Program to promote DOT and encourage patient adherence to treatment includes a patient financial incentive component, originally funded by the Global Fund. Since 2016, the state participates in financing the component of financial incentives for patients, and the share of co-financing increases every year (Government of Georgia, 2020, 2022).

Based on the review of the documents of the state health programs valid at the beginning of the covid-19 pandemic and approved the following year, in particular, the documents of the state tuberculosis management program, it was found that no changes were made in the content of the program in relation to the covid-19 pandemic. The only change related to less frequent DOT visits for patients during outpatient treatment is displayed on the website of the National Center for Tuberculosis and Lung Diseases. In particular, the news mentioned on the website on March 24, 2020, called for limiting visits by patients to TB treatment facilities in order to control the growth of the Covid-pandemic (National Center for Tuberculosis and Lung Disease, 2020a). On April 4, 2020, a WHO notice was published on the website, where it indicated in more detail about the provision of adequate amounts of medicines for patients in the apartment (National Center for Tuberculosis and Lung Disease, 2020b).

In addition to the above-mentioned changes, on March 24, 2021, the website of the National Health Agency highlighted the change made in the state program for tuberculosis management, according to which, in order to provide free quality and safe tuberculosis treatment to patients, a visit to the apartment of a doctor and, if necessary, a laboratory nurse, was added to the scope of outpatient services in special cases (e.g. : maximum prevention of the spread of coronavirus infection; the presence of an underlying or concomitant disease that limits the patient's mobility, etc.) (National Health Agency, 2021).

Restrictions related to the COVID-19 outbreak

The first case of coronavirus in Georgia was confirmed on February 26, 2020. On March 21, the government declared a state of emergency, closed borders and airports, restricted movement within the country, banned mass gatherings, and closed all schools, universities, and kindergartens. A nationwide curfew was declared and restrictive measures were imposed on March 31. To prevent the further spread of the virus in the community, the state of emergency was extended until May 22, including a ban on intercity travel (The Government of Georgia, 2020).

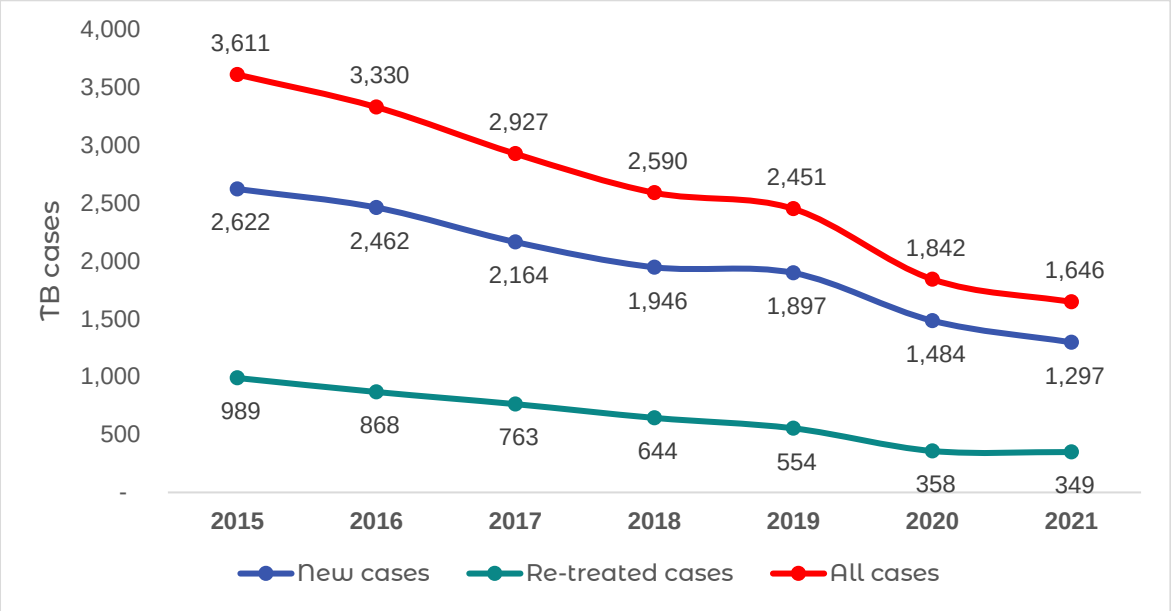
Due to temporary restrictions, the situation in the country was stable until the restrictions were eased (The Government of Georgia, 2020). Since September 2020, the virus has started to spread out of control (National Center for Disease

Control and Public Health, 2021b). In November 2020, the government of Georgia introduced restrictions that escalated to a total lockdown until January 31, 2021 (National Center for Disease Control and Public Health, 2021a). The measures included extending a nationwide curfew from 9:00 p.m. to 5:00 a.m. local time, and restricting vehicular and pedestrian movement (National Center for Disease Control and Public Health, 2021a).

An epidemiological review

In recent years, there is a trend of decreasing new cases in Georgia. The decline in TB case detection averaged 9% per year between 2015 and 2019 (National Center for Disease Control, 2020), and a 25% year-over-year decline in 2020 is expected, possibly related to the COVID-19 pandemic. In 2021, compared to 2020, an 11% decrease was recorded.

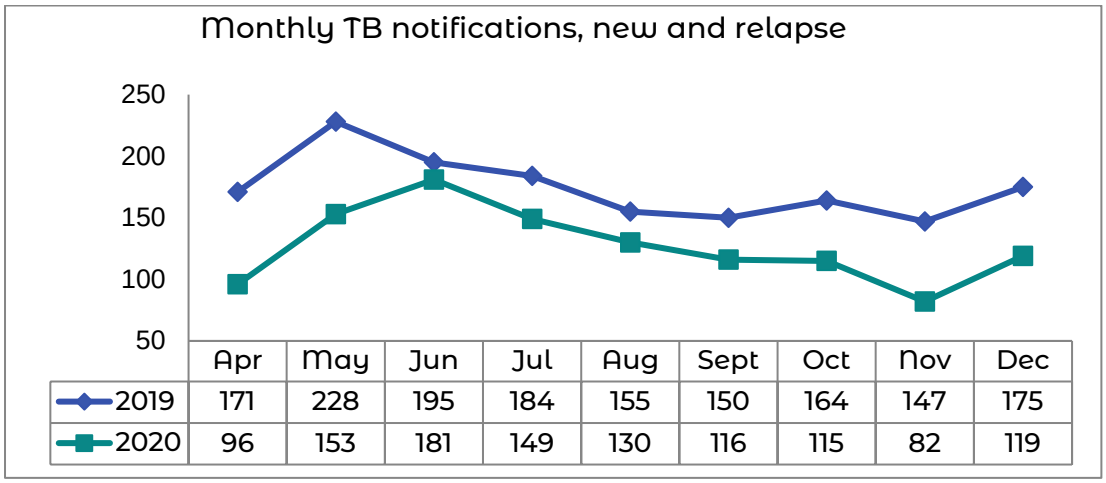
Figure 1: New and recurrent cases of tuberculosis in Georgia, 2015-2021



**Source: NCTLD data*

Comparison of 2019 and 2020 monthly TB report data shows interesting dynamics (see Figure 2)

Figure 2: Monthly tuberculosis referrals, new and repeated cases, Georgia 2019-2020



	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2019	171	228	195	184	155	150	164	147	175
2020	96	153	181	149	130	116	115	82	119

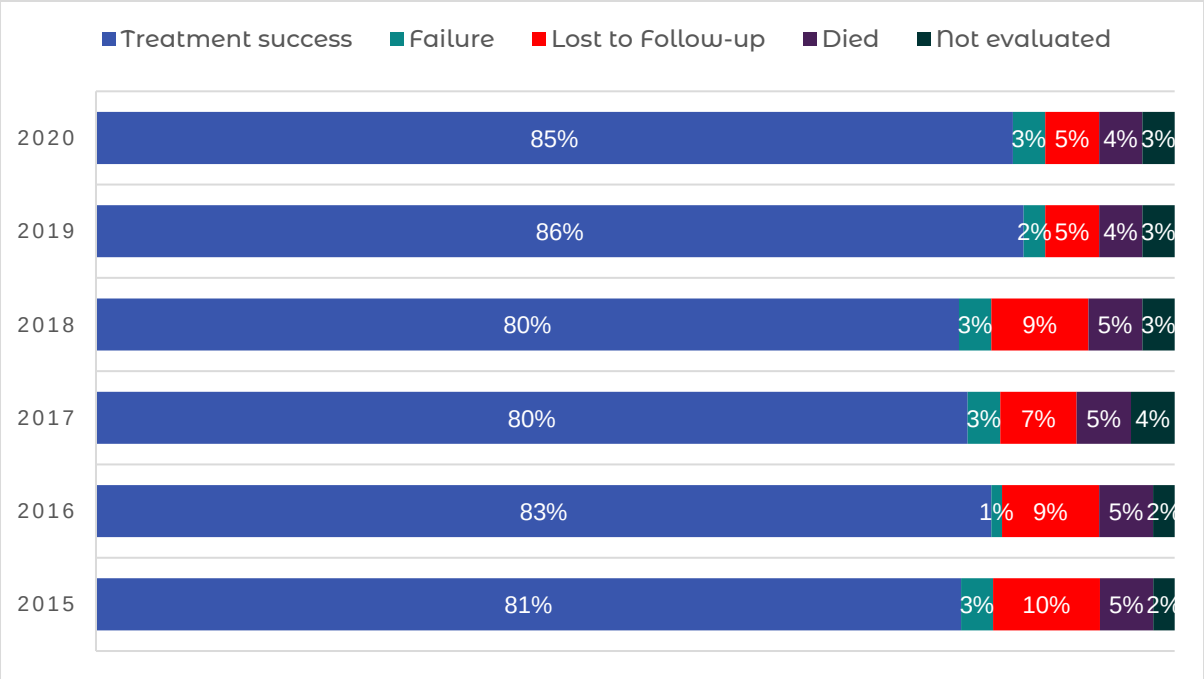
Source: National Center for Tuberculosis and Lung Disease (NCTLD) data

The dynamics of the detection of new cases of tuberculosis in 2020 shows that the decrease in the detection of new cases in the country in April-May and October-December coincides with the strict restrictions imposed against the spread of Covid-19. In particular, after preventive measures were introduced on March 31, 2020, an average of 28% fewer cases of tuberculosis were recorded compared to 2019. A maximum decrease of 44% was observed in April and November.

Tuberculosis treatment outcomes

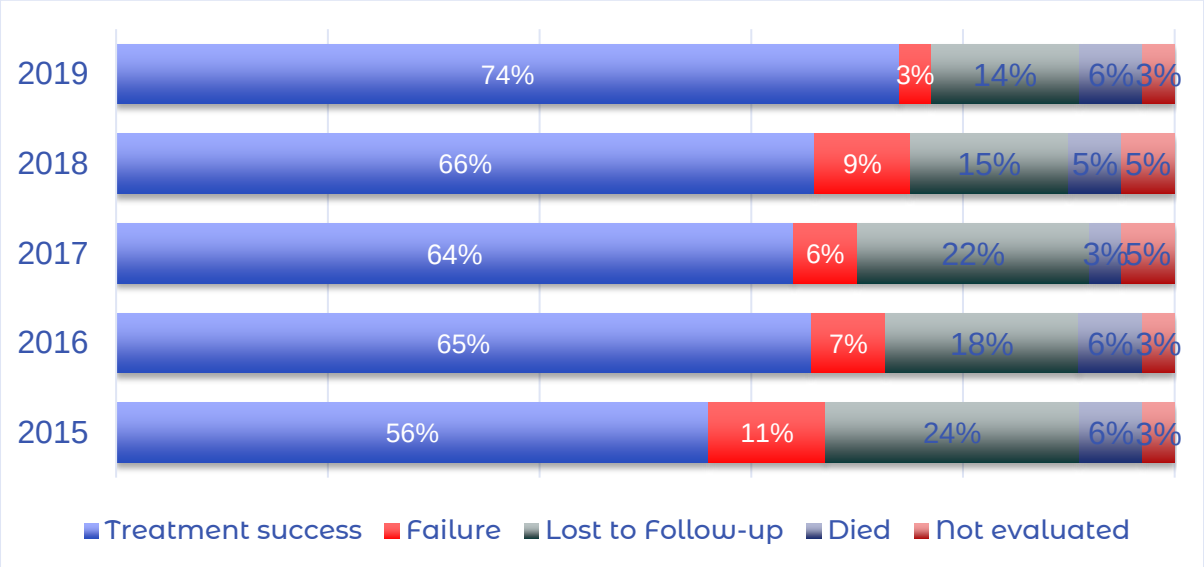
In Georgia, treatment outcomes for patients suffering from sensitive pulmonary tuberculosis have been improving since 2019, which was shown by an increase in the rate of successful treatment and a decrease in the rate of patients lost to follow-up. Figures from the 2020 cohort show that, as a result of program management changes implemented in response to the Covid pandemic, treatment rates for patients with susceptible TB have hardly worsened: only a 1% reduction in treatment success rates (see graph below).

Figure 3. Results of sensitive tuberculosis, Georgia 2015-2020



Regarding drug-resistant TB treatment outcomes, significant improvements in treatment success rates and loss-to-follow-up rates have been observed since 2019 (see Figure 4). The impact of the Covid pandemic on treatment outcomes in resistant patients is not yet known as the 2020 cohort has not been calculated.

Figure 4. Results of resistant tuberculosis, Georgia 2015-2019



According to the national tuberculosis strategy, a 25% decrease in tuberculosis mortality is predicted in the period 2015-2020 (from 5.0 to 3.75) (Ministry of IDPs from Occupied Territories Labor Health and Social Affairs of Georgia, 2015) according to the latest available source of WHO regional office for Europe, 2021) accordingly, the death rate from tuberculosis increased in the next 2 years after

2015 and reached its peak in 2017: 5.3 deaths per 100,000 inhabitants, although it decreased again in the following years, and the figure in 2019 equaled the initial mark of 2015. The same trend is described by the data calculated by the Institute for Health Metrics and Evaluation (IHME) of the University of Washington (see Table 1):

Table 1 TB Mortality Rate in Georgia (WHO regional office for Europe, 2021)

TB mortality rate	2015	2016	2017	2018	2019	2020
National TB Strategy targets	5,0 Baseline	4,8 Baseline			4,0	3,75
WHO-estimated	3,9	4,8	5,3	4	3,8	N/A
IHME-estimated	4,67	5,03	4,99	4,88	4,78	N/A

Source: WHO Global TB reports 2016-2020

Results of qualitative research

The sub-sections below detail the results of the qualitative research, which follows the conceptual framework of the study:

Referral to a medical institution

The survey of respondents shows that the majority of patients refer to a medical institution for diagnosis within a few months after the first symptoms appear, and a small part within about 2 weeks. The reason for this was mainly the non-serious perception of the symptoms, and among the 28 surveyed patients involved in treatment during the Covid pandemic, none of them mentioned postponing a visit to a medical institution due to the fear of being infected with Covid. At the same time, the interviewed medical staff mentions the restriction of movement due to covid-19 and the fear of being infected with covid-19 by the patients as possible reasons for the decrease in referrals.

> *"There is no job, movement is limited, and it's a psychological moment, they are locked in the house, the fight against Covid has not come to the fore, and tuberculosis has moved to a secondary level." Nurse focus group discussion*

Interviewed key informants also mention the prioritization of covid during the pandemic and referring patients to fever centers due to the similar symptoms of these two infections as one of the reasons.

> *"The pandemic has led to the fact that patients with respiratory complaints are examined in the direction of Covid. Then, if Covid is confirmed, it is clear that they are redirected to an outpatient clinic*

or hospital, but if Covid is not confirmed, then they seem to calm down, and if there is no Covid, that is, there are no respiratory pathologists and everything else is pushed to the background." Key informant

Individual patients name the financial barrier as a factor hindering referral for diagnosis, which the interviewed medical personnel also agree with, and they associate this with the requirement to conduct PCR testing before consulting the patient.

"When you go to the doctor, you want funds, there were not so many economical means, of course, the economic situation is the first thing," the patient

"Also, it was hindered by the fact that PCR tests were paid for in the first period, there was noise about this and they protested. Even so, they are financially limited, more than half of them do not work, and 40 GEL per patient is quite a large amount. This created a great commotion among the patients." Nurse focus group discussion

In specific regions of Georgia, changing the profile of tuberculosis offices to covid offices during the covid pandemic was named as one of the factors for the reduction of referrals.

"In other regions, there is a fifteen-twenty-six percent decrease, here there was a fifty percent decrease. We also connect this with Covid, because TB happened exactly in these two regions. Reprofiling cabinets as a Covid point." Key informant

Referral and diagnosis

Some of the patients, both before the Covid pandemic and during the Covid pandemic, noted that when they went to the family doctor, they could not be correctly diagnosed by the doctors. Also, at the diagnosis stage, family doctors suspected other conditions and delayed referral to a phthisiatrician.

"I went from the village doctor to the clinic in Marneuli, where I took an X-ray. They told me there that I had a tumor on my lung." The patient is involved before the covid pandemic

"I went to the hospital, examined my lungs, and was told that I had bronchitis from smoking." The patient is involved in the period of the Covid pandemic

Medical staff involved in the TB program participating in the study also reported difficulties with delayed and incorrect diagnoses. They emphasize that since the start of the Covid epidemic, the main focus has been on the detection of Covid,

and it is possible that such patients were seen in fever centers, where suspicion of tuberculosis was less likely.

> *"Today, family doctors work online and are focused on Covid. To tell the truth, they are also very busy with covid patients. Doctors not only from Tbilisi, but also from the regions are involved in the management of patients from Tbilisi. Therefore, it is also understandable that they don't have much time left for other patients." Key informant*

> *"There have been cases when the patient came to us late due to incorrect diagnosis." Nurse focus group discussion*

Engaging in treatment

The opinions of the interviewed respondents regarding the process from the diagnosis to the involvement in the treatment coincide with each other. Both patients and service providers reported that within two to three days of diagnosis, patients were enrolled in the National TB Program and provided medication, both before and during the Covid pandemic.

> *"The day after I was diagnosed with tuberculosis, I started treatment and started taking drugs." Patient*

> *“When I was diagnosed with [tuberculosis], I went to the hospital the very next day. I started treatment the next morning." Patient*

Some of the interviewed respondents started treatment in a hospital. In an interview, the service providers note that one of the four specialized institutions in Georgia has changed its profile and turned into a Covid hospital, however, according to them, this did not affect the inpatient treatment of patients.

> *"As for the hospitals, we have four inpatients, one of which was literally not functioning because it was converted into a covid inpatient, and referrals were made to other inpatients, but I can't say that we were affected by this. because in general, the number of patients has decreased". Key informant*

All interviewed patients reported that their family members were interviewed and screened for TB after diagnosis, regardless of when the patient was enrolled in the National TB Program, before or during the pandemic.

> *"The doctor informed me about this for the first time. The family members were examined, they came to the institution, all of them are negative, and we did not pay for this either." patient*

Outpatient treatment

The surveyed respondents noted that the most changes in service delivery were observed in the ambulatory treatment component after the start of the Covid pandemic and the restrictions implemented in the country. Most of them say that the practice of providing medicinal drugs has changed. In particular, video-monitored drug dispensing (VOT), which was only available to patients with drug-resistant TB before the Covid pandemic, has been expanded to patients with susceptible TB during the Covid pandemic.

> *"During the period of restriction of movement, I took a video and showed the nurse how to take the medicine." DS patient*

> *"By the way, this pandemic has shown us many things and revealed many opportunities, the organizational principles of outpatient treatment can be improved and simplified. For example, about ninety-five percent of patients may be switched to video monitoring, which greatly simplifies monitoring for staff and is comfortable for the patient as well." Key informant*

It was also revealed that, in addition to the change described above, the treatment service was changed according to the patient's needs, and for those patients who could not come to the medical facility, nurses delivered medicines on site. And for those patients who had barriers to moving and using the VOT service, they carried a one-month supply of medication.

> *"Responsibility towards sensitive patients has increased significantly. Nurses and a supervisor are on the phone with them twenty-four hours a day. It's one thing when a patient takes medicine under video surveillance, and it's another thing when you take the medicine, there is no video surveillance, but you monitor it over the phone, so the responsibility of each nurse and supervisor has increased a hundred times, and everyone coped exceptionally well - because there are no interruptions in treatment and there is control of patients." Medical service provider*

In addition to the delivery of medicines to the apartment, in some cases, in particular, in Tbilisi, the service introduced additional services, which meant conducting laboratory and instrumental studies at the apartment for patients with special needs.

> *"We try our best not to create discomfort for the patients, not to take them out of the house too much, so we have expanded the services to the apartment, be it the delivery of medicines or, in severe cases, the production of analyses. This video surveillance is one thing, but the daily and frequent visits to the doctor were still not possible in many cases as needed" Key informant*

Interviewed respondents noted a change in the frequency of patient monitoring visits. We are talking about telephone consultation instead of visiting a medical institution during the period of strict restrictions on movement related to Covid-19. Also, patients report that during treatment for tuberculosis, side effects were also managed by telephone consultation by their attending physician.

Key informants spoke about the issue of making decisions about program changes during the Covid pandemic, that there was no single decision to adopt the program.

> *"The decision was not taken independently, it was agreed with the Ministry. To give us the medicine once a month, we needed a green light from both the Ministry and the Global Fund, because the Global Fund will buy part of the drugs. When the pandemic started, the Global Fund itself offered to give us a month's worth of medicine. No one can make a single decision." Key informant*

Conclusion

As a result of the analysis of the data collected by the qualitative research method, it can be seen that the covid pandemic has not had a particularly negative impact on the services of identifying and treating patients (especially in the case of sensitive tuberculosis). It is likely that the same picture would be present in patients with drug-resistant tuberculosis, although in this section the triangulation of data extracted from qualitative research with treatment outcomes is not possible, as only the data from the 2019 cohort are available so far.

Interviews with both patients and medical staff and key informants revealed that the movement of patients through the system and the factors affecting it are almost identical for patients involved before and during the pandemic. Some of the important changes that have made it easier for them to access TB treatment services mainly concern the extension of video surveillance services as well as laboratory tests necessary for monitoring the disease in the patient's apartment.

Some of the important findings that emerged from the research are listed below:

Part of the surveyed respondents do not take the symptoms of tuberculosis seriously. which can be considered one of the main factors in the late detection of tuberculosis cases despite the pandemic.

As already mentioned, the majority of patients report that after showing suspicious symptoms of tuberculosis, the diagnosis cannot be made in time in

the primary health care ring or the suspicion of tuberculosis cannot be made in time, probably due to inadequate qualification of the staff at the level of the primary health care institution. Medical service providers also confirm this opinion. During the pandemic, the focus was mainly on covid, and in many cases, tuberculosis was neglected.

Regarding direct involvement in tuberculosis treatment, both groups of respondents (patients and service providers) note that after confirming the diagnosis, the patient is included in the program in about 2-3 days and starts treatment accordingly. This practice remains unchanged even in the conditions of the covid pandemic.

The study showed significant changes in the ambulatory care component before and during the pandemic. Patients who were on the DOT regimen before the Covid pandemic were switched to the VOT regimen at the beginning of the pandemic. The program dispensed medication to patients, while doctors and nurses managed patients via video surveillance or telephone consultations. It should be noted that during the pandemic in Tbilisi, laboratory and instrumental research services were added to the apartment for people with special needs. This is important and convenient for the patient on the one hand, and also reduces potential public health risks.

Based on the information available to us, there has been no adverse impact on the changes made to the outpatient component.

Adherence rates (the rate of patients lost to follow-up) allow us to make this conclusion. However, the final treatment outcomes in the above-mentioned cohort require further observation, and it is also desirable to study the cost-effectiveness of new approaches.

Based on the opinions of the interviewed respondents, we can note that during the period of the Covid pandemic, patients did not create a special barrier, both from a geographical and financial point of view. As they note, all necessary medicines and services, as well as financial incentives provided by the program, were delivered as smoothly as possible despite the pandemic situation. On the other hand, we can support this opinion because the number of missing patients did not increase during the pandemic.

The pandemic has shown that TB treatment can be even more tailored to the needs of the patient. The organizational principles of outpatient treatment may be simplified and improved, which will significantly simplify monitoring for staff and may improve the rate of adherence to treatment.

We would like to highlight the possibilities of introducing video DOT into the system. This approach has been introduced in Georgia since 2018, although the pandemic helped to expand it, as patients with susceptible tuberculosis were also included. If sensitive patients had to come to the institution three times a

week for DOT, with video surveillance they could already record video every day and the monitoring of DOT became closer. Although strict restrictions are no longer imposed, the number of patients on video DOT is increasing.

It is also worth noting that, based on the interviews of the respondents, in addition to the National Tuberculosis Center, various agencies contributed to the successful reorganization of the program, for example Tbilisi City Hall,

And here it is worth mentioning the support of the "Global Fund Against Tuberculosis, AIDS and Malaria" initiative of providing one month's supply of medical drugs.

To sum up, the program responded quickly to the challenges posed by Covid and quickly adapted to the needs of patients. It is desirable that other state programs during the next possible pandemic take into account the successful experience of the tuberculosis program and put it into practice in the future.

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