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Impact of COVID-19 on tuberculosis and HIV health services delivery in Ghana: qualitative evidence from the perspectives of healthcare providers

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Abstract

Introduction The COVID-19 burden, coupled with unprecedented control measures including physical distancing, travel bans, and lockdowns in cities, has undoubtedly far-reaching consequences on healthcare services and has affected human immunodeficiency virus (HIV) and tuberculosis (TB) health services in both low- and high-income countries. This study, therefore, explored the perspective of HIV and TB health service providers to better understand how the pandemic impacted health service delivery in Ghana.

Method This qualitative explorative study was conducted among HIV and TB healthcare providers ($n=30$) in six districts of Ghana from March to May 2021 using in-depth interviews. Face-to-face interviews were conducted to explore the challenges faced with HIV and TB diagnosis, treatment, and strategies implemented to mitigate the impact. Participants were also asked to recommend remedial actions. Data were analysed thematically.

Results The study demonstrated that while patients' access to health facilities and service provision was hindered due to factors such as lockdowns and mandatory wearing of masks, the fear of COVID-19 infection and stigma, repurposing resources for COVID-19 response, and shortage of personal protective equipment and HIV drugs affected TB and HIV health services. However, specific guidelines and measures, including home visits, awareness campaigns, bidirectional COVID-19 and TB testing, and running a staff shift system were implemented to maintain the continuation of routine TB and HIV services during the pandemic. Participants recommended the need to strengthen TB and HIV, as well as COVID-19 diagnostic services by ensuring the availability of logistics and supplies.

Conclusion This study identified a myriad of factors, ranging from governmental to individual-level factors due to the COVID-19 pandemic, that impeded TB and HIV healthcare services in Ghana. This highlights the need to prioritize routine TB and HIV service delivery, continuous health education, and an uninterrupted supply of drugs and commodities to ensure that TB and HIV services are more resilient against the effects of the ongoing COVID-19 and any future pandemic.

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Background

The COVID-19 disease burden, coupled with unprecedented measures such as social distancing, restriction of human mobility, travel bans, and lockdowns implemented to curtail the spread of the virus, has in no doubt far-reaching aftereffects on other diseases, poverty, food security, and economic growth of both high-income countries (HICs) and low-income countries (LICs) [1]. In LICs, a particular worry is the potential impact on two major health priorities, specifically, human immunodeficiency virus (HIV) and tuberculosis (TB), as a consequence of possible disruption to health services. Many LICs and middle-income countries (MICs) have high burdens of these diseases, and society relies largely on programmes for their control and prevention [2, 3].

Considerable progress has been made in the fight against HIV and TB in recent years. For instance, the number of people treated for TB has increased globally, with more than 14 million people receiving TB care in 2018 and 2019. The number of people provided with TB preventive treatment has quadrupled since 2015, from 1 million in 2015 to more than 4 million in 2019 [4]. The estimated 1.7 million people who acquired HIV worldwide in 2019 represent a 23% decline in new HIV infections since 2010, the lowest annual number of new infections since 1989. About 12.1 million AID-related deaths have been averted since 2010 due to increased access to antiretroviral therapy [5].

Ambitious targets have been set for attaining very low levels of the disease burden by 2030, which forms part of the Sustainable Development Goals (SDGs) [6]. Interruptions to control programmes could, however, lead to major setbacks, aggravating the direct impact of COVID-19. A recent study, for instance, has suggested that incident cases of TB and deaths may rise by approximately 6.3 million and 1.4 million, respectively, in the next 5 years as a result of COVID-19-related measures that prevent national TB programmes from functioning effectively [5]. Available evidence from many high TB burden countries, such as Indonesia, India, Sierra Leone, and South Africa, shows that there were significant declines in the monthly TB cases reported in 2020 due to the COVID-19 pandemic [7]. Furthermore, there are reports from many countries that access to routine HIV testing has declined due to COVID-19-associated response measures, which may have negative consequences on the implementation of the United Nations Programme of AIDS (UNAIDS) target of having 90% of all people living with HIV know their status [8]. A survey among 64 low- and middle-income countries reported that over 40% of stakeholders asserted that it was either impossible or very difficult for TB and HIV patients to access healthcare facilities due to COVID-19, stating a fear of becoming infected with SARS-CoV-2, transport interruptions, and movement restrictions as the main reasons [9].

Despite the impact the pandemic has had on healthcare service delivery across the globe, empirical evidence from healthcare service providers on the impact of the pandemic on TB and HIV health services is scarce, particularly in Ghana. With this survey, we sought to capture the experiences of healthcare providers who work in HIV- and TB-related services in six selected districts of Ghana to describe the impact of the COVID-19 pandemic on routine HIV and TB healthcare services in the country. We also sought to determine which measures were put in place to mitigate the effects of the pandemic on the control programmes for the two diseases. The study may help provide insight into how lifesaving TB and HIV programmes and health service continuity have been impacted by COVID-19 in Ghana. This information may assist policymakers in adopting adaptive measures to counter the effect of the pandemic on these two disease control programmes to ensure continuous delivery of lifesaving health services for people suspected and or diagnosed with TB and HIV in Ghana and beyond. Findings from the study may also assist health managers in strategizing and preparing adequately for any future health threat to minimize their effect on disease control programmes.

Methods

Study design

This study was a qualitative exploratory study conducted among health providers working in HIV and TB-related services in six districts of Ghana to explore their experiences with health services delivery during the COVID-19 pandemic. The development and reporting of this study conformed with the standard guidelines of the Consolidated Criteria for Reporting Qualitative Studies (COREQ) [10]. This guideline provides a checklist for explicit and comprehensive reporting of qualitative studies which helps researchers to report important aspects of their research methods, context, analysis and interpretations, and findings [10].

Study setting

This study was conducted in six districts selected from three regions of Ghana. Located in the west of the African continent, just north of the equator, Ghana is divided into sixteen administrative regions and 261 metropolitan, municipal, and district assemblies with approximately 32 million inhabitants. The diagnosis and treatment of

TB and HIV/AIDS in Ghana are the responsibility of the National Tuberculosis Control Programme (NTP) and National AIDS Control Programme (NACP), respectively. Currently, TB control is integrated into the Ghana Health Service (GHS) structure at all levels of health care, where TB diagnostic and treatment services are provided free of charge. Each region, district, or health facility has a team of health workers responsible for implementing TB control activities at that level. There is also a TB focal person at each of the levels who supervises the daily activities of the TB control programme. HIV testing and counselling are institutionalized in public health facilities in Ghana, and the approaches used currently include provider-initiated testing and counselling, client-initiated testing and counselling, routine antenatal testing, community-based testing and counselling, assisted partner notification and other index case-based testing [11, 12], which are all provided free of charge. HIV testing is performed according to national and international guidelines. HIV test results are recorded, and those diagnosed as HIV-positive are referred for immediate ART services [12].

Study population and sampling

The study population included healthcare providers who work in HIV- and TB-related services at the district and hospital levels of the selected districts. These health providers included nurses in charge of TB directly observed treatment short-course (DOTS) centres and HIV clinics (also referred to as institutional TB and HIV coordinators, respectively), laboratory officers, and pharmacists of district hospitals of the participating districts. Others included TB and HIV control programme focal persons of the selected districts. These health officials were purposively sampled for the survey because they form the core team of TB and HIV control at the district and hospital levels, who could provide in-depth information regarding their experiences and perspectives on the effect of the COVID-19 pandemic on TB and HIV health services in their respective districts and health facilities.

A multistage sampling method was used to select participants. First, the 16 regions of the country were stratified into three groups according to the intensity of COVID-19 transmission using data from the Ghana Health Services as of December 31, 2020. Regions with cumulative confirmed COVID-19 cases exceeding 5,000 were classified as high transmission; those havingbetween 2,000 and 5,000 recorded cases were considered intermediate regions, while those with less than 2,000 recorded cases were grouped as low transmission regions. A simple random sampling method was then used to select one region from each stratum. In each selected region, one district with the highest recorded COVID-19 cases and another with the lowest case count were purposely selected to participate in the study to give a broader picture of the impact of the pandemic from districts with varying degrees of COVID-19 transmission. Overall, six districts (Sunyani Municipal and Banda District-Bono region; Bolgatanga Municipal and Bongo district - Upper East region; Ho and Hohoe Municipal-Volta region) were included in the survey (Fig. 1). In each district, HIV and TB frontline health providers and managers who were likely to experience the phenomenon under study were purposefully sampled and interviewed.

Three of the six participating districts had the same person serving as the focal person for TB and HIV control, and one district did not have an institutional TB coordinator. One laboratory officer and one institutional HIV coordinator from different districts refused to participate in the study when approached by the research team, with the excuse that they were too busy to make time for the interviews. This resulted in 30 health officials participating in the study.

Data collection

Six health workers with at least a first degree and who had considerable experience in the conduct of qualitative interviews were recruited to collect data. Data collectors were trained for two days to acquaint them with the research instrument. In-depth interviews were used to capture data. Four in-depth interview guides (IDIs) were used to capture data, one for HIV coordinators, one for TB coordinators, and one each for laboratory officers and pharmacists. Each guide had four sections: A-D. Section A captured the background information of the participants. Section B explored the effects of the COVID-19 pandemic on HIV and TB health services. Section C focused on mitigating strategies implemented, while Section D asked participants to provide recommendations to mitigate the effect of the pandemic. The interview guides used has been attached as a supplementary material. Interviewers booked appointments with selected health providers at a convenient time and place where a third party could not listen to the discussions. All interviews were conducted face-to-face in the English Language and were audio-recorded using voice recorders on the smartphones of interviewers and shared with the study's field coordinator immediately at the end of each interview. Handwritten notes were taken for each interview to serve as backups for the recordings. Each interview lasted for approximately 45 min. Saturation was reached after the 19th health worker was interviewed. Saturation in qualitative research is commonly taken to indicate that, based on the data collected hitherto, further data collection is unnecessary [13]. Some researchers have claimed that saturation guarantees rigor in qualitative research and failure to reach saturation impacts negatively on the quality of the research [14, 15].

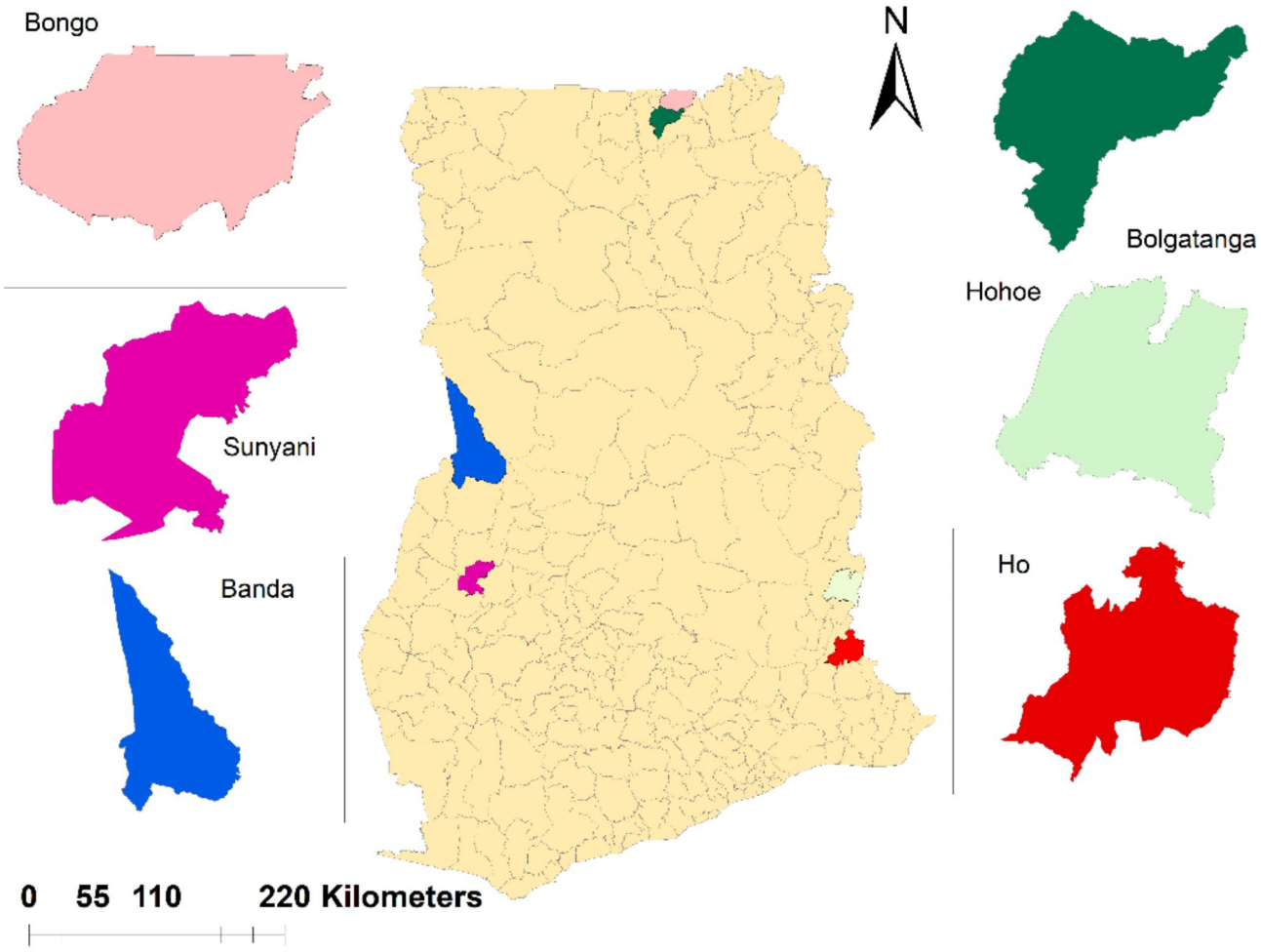

Fig. 1 Map of Ghana showing participating districts. Location of the selected districts (Banda, Bolgatanga, Bongo, Ho, Hohoe, and Sunyani). The light black lines in the yellow area represent the administrative boundaries of Ghana separating different districts. The figure was created with ArcGIS software version 10.8, an open-source Geographic Information System (GIS)

Pilot interviews

Before the main data collection, pilot in-depth interviews were conducted in the districts adjacent to the participating districts to assess the proficiency of the interviewers and to correct errors in the interview guide. One district health staff member and one hospital staff member were interviewed for the pilot study. Feedback was shared, and some of the questions were reframed to make them clearer.

Data analysis

In-depth interview audio files were converted to Microsoft Word transcriptions, edited, proofread, and assembled into a single file for analysis. Transcriptions were checked against written notes and edited while listening to audio recordings to reduce errors. Data were manually analysed using thematic network analysis. The coding and theme generation were performed by EO. To ensure inter-coding reliability, HA performed independent confirmatory coding of the data. First, a codebook was made. From the participants' responses, the initial codes were determined along with the corresponding frequencies. Basic themes representing similar issues were pulled together to produce organizing themes. The global themes comprised several organizing themes to present an argument on a specific issue (Additional file 1). ATLAS-ti version 7.5.7 was used for data coding.

Ethical issues

The study was approved by the Yonsei University Health Systems' Severance Hospital Institutional Review Board (ID: 4–2021-1355) and the Ghana Health Service Ethics Review Committee (ID: GHS-ERC: 012/12/21) before data collection. Written informed consent was obtained from participants before they were enrolled in the study.

Table 1 Sociodemographic characteristics of in-depth interview participants

Variable	Frequency ($n=30$)	%
Age group (years)		
>30	2	6.7
30–39	13	43.3
40–49	11	36.7
50+	4	13.3
Sex		
Male	22	73.3
Female	8	26.7
Highest educational level attained		
Certificate	2	6.7
Diploma	8	26.7
Undergraduate degree	16	53.3
Postgraduate degree	4	13.3
Role in service delivery		
District TB Coordinator	6	20.0
Institutional TB Coordinator	4	13.3
District HIV Coordinator	6	20.0
Institutional HIV Coordinator	5	16.7
Pharmacist	5	16.7
Laboratory Officer	4	13.3
Professional work experience (years)		
1–5	3	10.0
6–10	8	26.7
11–15	9	30.0
16–20	4	13.3
< 20	6	20.0
Work experience at the current facility (years)		
> 5	7	23.3
5–9	13	43.3
10–14	8	26.7
15+	2	6.7

Results

Background characteristics of participants

Table 1 presents results on the sociodemographic characteristics of the participants. Of the 30 in-depth interviews conducted, 5 each were from Banda, Bolgatanga, Bongo, Ho, Hohoe, and Sunyani Districts. The majority (43.3%) of the participants were in their 30s with a mean (standard deviation) age of 41 ± 8.3. Males constituted 73.3%, and approximately 90% had more than 6 years of working experience (Table 1).

Thematic results

Using thematic network analysis, the findings from this study were categorized into four intertwined global themes. These are general reductions in clinic attendance, the impact of COVID-19 on HIV and TB health services, mitigating strategies implemented, and recommendations by health providers to reduce the impact of COVID-19 (additional file).

General reductions in clinic attendance

Reductions in clinic attendance were reported by most healthcare workers interviewed with participants relating it to a combination of fear among the general public of being infected with COVID-19 if they attended the facility and COVID-19 prevention measures such as the mandatory wearing of nose masks in public places and restrictions of movement of the people, leading to reduced capacity of health facilities and thus access to care. In some instances, health workers stayed at home without going to work, or in other instances refused to attend to patients who visited the facility with symptoms related to COVID-19. Some participants also cited the inability to afford a mask by some people as the reason for not accessing the clinics.

> *Some patients were not coming [to the clinic] because it was mandatory to wear a mask when they visited the clinic, and since they could not buy the mask, they refused to come.*
> (Institutional HIV Coordinator, Female)

> *Everybody was afraid to come to the hospital probably because many people think COVID was planted in the hospital, so nobody wanted to come.*
> (Institutional TB Coordinator, Male)

> *..., I even knew a friend of mine [health worker] who wanted to leave work simply because he was afraid that he might contract the disease... others took their annual leave just to go and relax and come back after the pandemic is over.*
> (District TB and HIV coordinator, Male).

Impact of COVID-19 on HIV and TB health services

Throughout the pandemic, there have been numerous instances of stigmatizing medical personnel, COVID-19 patients, and survivors. The WHO also revealed that "some healthcare workers may regrettably experience avoidance by their family or community due to stigma or fear". This could significantly worsen an already challenging situation. In this study, the challenge of stigmatization was cited by some of the participants as a reason for patients not attending health facilities to access health care. In some instances, healthcare workers run away from patients who attended the clinic presenting with coughs. In other instances, healthcare workers themselves stigmatized their colleagues involved in COVID-19 management.

> *Any time somebody comes to the hospital with symptoms of let's say cough, headache, and other things [symptoms] then eermm staff or service will*

be running away from the patients. Therefore, most patients with such symptoms do not want to come to the hospital.
(Institutional TB coordinator, Female)

Even sometimes as a health professional when you get to a community to do any investigation [of a COVID-19 case] and you return, the staff themselves will also be running away from you because they think you might have also brought COVID or you're bringing COVID to them.
(Institutional TB coordinator, Male)

The resemblance of symptoms (both cough and fever) between COVID-19 and TB scares patients presenting with cough and fever to the clinic. Patients with these symptoms were reportedly afraid of being tested for COVID-19 if they visited the health facilities to access healthcare because of the similarities of the symptoms.

…you know one of the symptoms of COVID is coughing and one of the symptoms of TB is also coughing and those times when you are coughing you are afraid to go to the health facility because you will be diagnosed [of] COVID….
(Pharmacist, Male)

It [COVID-19 pandemic] has affected us a lot because the symptoms of COVID-19 are just the same as those of TB. We do check people at the OPD by asking them a few questions like, are you coughing? However, because of COVID-19, even if the person is coughing, he or she will say no because he or she is afraid of being quarantined or will be kept for a long time at the isolation unit.
(District TB and HIV coordinator, Male)

Furthermore, some TB healthcare workers stated that the test sample [sputum] used for TB diagnosis was also used to test for COVID-19; hence, people with presumptive TB hid themselves from seeking health care because they were afraid of being diagnosed with COVID-19.

…because the same sample [for TB test] is being taken for COVID and the symptoms [of TB and COVID-19] are almost similar, it was not easy getting sample [from presumptive TB clients].
(Laboratory Officer, Male)

Apprehension among the TB healthcare workers themselves, coupled with shortages in personal protective equipment (PPEs), made them unwilling to attend to any patient presenting with cough, resulting from the similarity of symptoms.

When it happened [first case of COVID-19 in the facility], all staff knew we were all at risk because there were not enough PPEs…so getting close to a patient with cough was a problem since they [presumptive TB cases] have the same symptoms of COVID-19.
(Institutional HIV coordinator, Female)

Some of the cartridges to run the [TB] test run out because everyone was concentrating on COVID and some of the sputum containers that were to be used for TB were diverted to collect samples for COVID… so it got to a point in time we had sputum alright, but we did not have cartridges to do the tests, but things are better now.
(District TB and HIV coordinator, Male)

…the second stage of the [HIV] test is you have to open the person's [client's] mouth and take the swab and another alternative is to take the whole blood, but most of the people [health workers] don't know how to use the whole blood, so they were afraid to use the oral test.
(Institutional HIV coordinator, Male)

…there is a lot of pressure on the health facility. It came to a time when even PPE was not forthcoming because there was a lot of pressure…, it even got to a time we did not have gloves and other things. If it happens like that you cannot attend to cases, but we were doing our best.
(Laboratory Officer, Male)

Healthcare workers interviewed, cited that there was diverted attention from pre-COVID-19 activities. The healthcare workforce redirected their attention and resources to stem the spread of COVID-19 as an imported factor that impacted TB and HIV services. Some of them had these to say:

…like COVID came and everything came to a standstill for both HIV and TB. In addition, our focus was more of…there was a new priority and attention so these two [TB and HIV] were neglected.
(Laboratory Officer, Male)

The lab also at a point in time focused much on the COVID cases more than other cases such as TB and it even got to a time, they [Lab officers] have to use the same machine to test for both COVID and TB, so it truly affects our results.
(Institutional TB coordinator, Female)

There were mixed views regarding the disruption of HIV treatment services. Participants in some districts reported a disruption in HIV treatment, which was linked to the unwillingness of patients to visit clinics for their medications due to fear of COVID-19 contagion and shortages in some of the HIV first-line drugs.

> *…even HIV clients refused to come to the ART unit for their medications simply because they are afraid that they might contract the disease [COVID-19].*
> (District TB and HIV coordinator, Male)

> *The biggest challenge is that people's attention was on COVID-19, so some of the drugs for HIV patients were out of stock, so we had to wait for some time for our drugs to come.*
> (District TB and HIV coordinator, Male)

> *I remember those [COVID-19] days, Nevirapine suspension and zidovudine suspension, as we normally give to new-born babies, we run out of stock entirely and when we probed further to national, it was like errhm, orders have been placed but because of the COVID….*
> (Pharmacist, Male)

The phenomenon of drug shortages, however, was not common, as most of the participants stated that they did not experience any challenges regarding drug supply.

> *…, we normally used the direct last-mile distribution process from the regional medical store. Therefore, commodities are requested online, and the truck delivers to us. Therefore, the only medication we had a shortage of is the drug for HIV prophylaxis but we [were] able to quickly get some from our neighbouring districts. Therefore, it [COVID-19] did not affect drug supply and treatment.*
> (District HIV coordinator, Male)

> *…, we always have the [HIV] drug available and those clients that are coming from far, we identify the health worker from their community, and we liaise with them and send the drug to them so they can give to the patients….*
> (Institutional HIV coordinator, Female)

Mitigating strategies implemented

Study participants reported that, specific guidelines were issued regarding maintaining the continuation of routine TB and HIV screening, diagnosis, prevention, and treatment services during the pandemic. Among the measures and policies implemented to ensure the continuation of services included ensuring a regular supply of drugs, home visits, awareness campaigns, and running a shift system.

> *…, if there is a shortage of drugs, we do not sit down, but we find ways to get them for the patient. We call something emergency requisition we do so that we can get the drugs quickly to serve our clients.*
> (Pharmacist, Male)

> *Erhm because of the numbers in [OPD] attendance, we agreed that we will run a double shift system. We divided the staff into two groups. A group works for one week, they go home and rest, then the other group will come. The idea was to avoid much contact.*
> (Pharmacist, Male)

> *…previously, we used to have clinic days which were on Tuesdays, Thursdays, and Fridays and because of the challenges that we were facing, we made it a point that every day should be a clinic day.*
> (Institutional HIV coordinator, Female)

> *Since most of the clients do not want to come to the facility, we have to send the drugs to them in their homes by ourselves.*
> (District TB and HIV coordinator, Male)

> *We conduct education services to them [pubic] on the radio stations and at the OPD to talk to them and encourage them to come for the [TB and HIV] tests and drugs.*
> (District TB and HIV coordinator, Male)

Additionally, the participants noted that there were guidelines for integrating TB and COVID-19 diagnostic services.

> *The national introduced a strategy that we call bidirectional testing. Everybody who is suspected of COVID must also be tested for TB. When we started, we realized that cases that were suspected of upper respiratory infection or COVID were rather TB, so bidirectional testing has helped in fishing out the TB cases that were hiding in the communities.*
> (District TB coordinator, Female)

> *It [COVID-19 pandemic] has given us the chance to do a bidirectional test, so any COVID case that is suspected means that you have to also test for TB because of the presence of cough and vice versa.*
> (Institutional TB coordinator, Male)

Recommendations made by participants

Study participants recommended ways to mitigate the impact of the COVID-19 pandemic on TB and HIV that can ensure the continuation of health services during the pandemic period. Prominent among the actions recommended was the need to strengthen TB and HIV as well as COVID-19 diagnostic services by ensuring the availability of logistics and tools.

> *…Sometimes it is very sad when a small test that can be done has to be taken outside [to a higher laboratory]. Therefore, if there is anything, I would wish diagnostic services should be well-equipped.*
> (Laboratory officer, Male)

> *We need more PPE, we need N95 nose masks, and we need sanitizers that could help us render service to patients.*
> (Institutional TB coordinator, Male)

> *In terms of TB, I can say that testing is all about logistics, so one thing that can have an impact is if there is any way that the district can be supported with testing materials. Currently, we have a few of the cartridges that we are using for our testing for now for TB, but as I speak with you now, we do not have that for COVID. Therefore, if we can get the materials, it will go a long way to help the services that we deliver in the facility.*
> (Laboratory officer, Male)

The need for a regular supply of funds for TB and HIV health services was also emphasized, as cited by one participant:

> *Unfortunately, the funding for the control of these conditions [TB and HIV] has gone down… the funding should come, it is the funds that run the programmes. If we have the funds, we can do a lot of community screening and education and contact tracing.*
> (District TB and HIV coordinator, Male)

Another suggestion highlighted by the participants was the need for close-to-client health services, as stated by one participant:

> *We need to get service delivery at the doorsteps of clients to prevent the fear of coming to the facility. Therefore, we need to identify these clients and then try to reach them at home and counsel them.*
> (District HIV coordinator, Male)

The need for increased health education to inform people about TB, HIV and the possibility that their chronic cough may not just be COVID was also emphasized.

> *We need to educate more of our clients to let them know what COVID-19 is and let them understand that cough is not always COVID so that they come for screening and take their medications regularly to boost their immune system to defend them against COVID.*
> (Pharmacist, Male)

> *…we should not relent on the education side, especially with the preventive measures and the [COVID-19] vaccination as well. There should be more education to sensitize the people who just getting vaccinated doesn't end there. The fact that you are vaccinated doesn't mean you can't get infected [with COVID-19].*
> (Laboratory Officer, Male)

> *There should be routine sensitization of the population on the radio station because the municipality will wait until World AIDS Day before they go and give one show talk, it should be part of other public health activities so that the municipality [population] will be aware of the [HIV] condition.*
> (Institutional HIV coordinator, Male)

Discussion

This qualitative study explored the perspective of health providers on the impact of the pandemic on TB and HIV services in Ghana. Several observations emerged from the study. Some health services were disrupted by the COVID-19 pandemic and the measures implemented by the government to contain it. For instance, the utilization of general outpatient healthcare services declined during the early stages of the pandemic. This finding corroborates that of other findings from other settings, such as the WHO's surveys of 105 countries in 2020 [16] and other country-specific studies in Kenya [17] and South Africa [18]. The combination of fear among the general population of being infected with COVID-19 if they attended the facilities and government-promoted COVID-19 control measures such as the mandatory wearing of nose masks in public places and lockdowns of major cities and towns reduced the capacity of the health facilities and thus access to care.

The study also found that at the beginning of the COVID-19 pandemic, health workers were apprehensive and reluctant to attend to patients who were perceived as sources of COVID-19 infection. The expression

of apprehension among the health workers was due to the anticipated risk of infecting themselves and their immediate families. Several other studies have reported the challenges of healthcare workers in the fight against COVID-19, including fear of contracting the disease and inadequate personal protective equipment [19–21]. The reaction of health workers may not be baseless, as evidence from Ghana shows that more than 8 in 10 healthcare workers in Ghanaian hospitals were at risk of COVID-19 infection [19].

Stigma, associated with infectious diseases, is a well-known phenomenon in the African setting, with HIV, TB, and leprosy being historical models. Survivors of the recent Ebola outbreak in the Western part of Africa were faced with stigmatization when they returned to their communities [22]. The fear of being identified as a COVID-19 patient in this region of the world is therefore not surprising. This study showed that TB diagnosis and detection were particularly impacted due to stigmatization. In one instance, as a result of being stigmatized for COVID-19 diagnosis, many people were afraid to visit clinics even if they had symptoms of TB. In other instances, health providers themselves stigmatized their colleague frontline workers and were reluctant to get closer to them. This finding is supported by a systematic review that identified stigma and discrimination as a significant barrier to accessing healthcare services during pandemics [23]. A previous study in Ghana also reported that the fear of being stigmatized as a COVID-19 patient or survivor has led to a reluctance to seek healthcare services, including TB and HIV health services [24]. This is a concerning situation that requires immediate and practical action to resolve since the negative ramifications for TB control efforts and individual health cannot be underestimated. Stigmatization could result in people being unwilling to visit health facilities for care or testing when they have symptoms related to COVID-19 that may result from TB, which may lead to underreporting of cases [25].

The study further demonstrated that TB testing and notification were particularly impacted due to the similarities in the clinical presentation of TB and COVID-19. In early 2021, the Stop TB partnership and the US Agency for International Development (USAID) recommended the "simultaneous, integrated approach to testing for TB and COVID-19 in countries with a high burden of TB," which means that diagnostic tests for both TB and COVID-19 should be performed at the same time [26]. The Global Fund issued a briefing note guiding testing for TB and COVID-19 in late 2020 [27]. Ghana, similar to some other countries, launched this integrated testing approach and offered COVID-19 screening for all diagnosed TB patients and TB screening for all COVID-19-positive patients. The TB service providers indicated that due to this intervention, persons with symptoms of TB were unwilling to visit health facilities for TB diagnosis due to fear of COVID-19 diagnosis and potential isolation. A report from a previous study in Ghana observed a significant reduction in the number of patients attending HIV clinics during the pandemic, leading to disruption in HIV treatment [28]. Similarly, Nartey and colleagues [29] found that the COVID-19 pandemic had a significant impact on tuberculosis control in Ghana, with a reduction in the number of TB cases diagnosed during the pandemic.

The reprioritization and diversion of health workers, financing, and medical supplies from TB programmes to the COVID-19 response have been reported in many countries, as both diseases share similar symptoms and call for comparable infrastructure, skills, and expertise for their diagnosis and management [30–32]. A survey by Stop TB Partnership of 20 high-burdened TB countries, for instance, observed that at least 40% of national TB programmes were using facilities and resources meant for TB programmes for the COVID-19 response [31]. Health workers interviewed in this study expressed a similar opinion, indicating that health personnel and other resources such as diagnostics were repurposed for the COVID-19 response. As a result, health facilities were less able to continuously provide services such as TB contact tracing and diagnosis, which may affect TB case detection [33].

All the above disruption factors can have negative consequences on TB and HIV transmission and treatment. For instance, delays in TB diagnosis and treatment initiation may increase the risk of TB transmission, particularly in the household, because people were ordered to stay at home [34]. Similarly, TB diagnosis and treatment delays can also increase the risk of adverse treatment outcomes such as death and the development of drug-resistant TB. For example, evidence from mathematical modelling in three high-burden TB countries (India, Kenya, and Ukraine) suggested that a 3-month interruption in TB services followed by a prolonged 10-month return to normal could result in an additional 6.3 million cases and 1.4 million deaths worldwide between 2020 and 2025 [35]. Furthermore, the shortfall of HIV testing and treatment may threaten the gains made in controlling HIV in the country and could worsen the HIV epidemic. The consequence of a late or delayed HIV diagnosis is that it can result in much higher odds of increased morbidity and mortality [36]. Testing is the only way to achieve early diagnosis since HIV infection may remain symptomless for several years, allowing for early referral for a continuum of care and support, including ART initiation, resulting in improved prognosis [37, 38].

To mitigate the impact of COVID-19 and ensure the continuation of services, however, specific guidelines and measures were implemented. Among these measures were running a staff shift system, the continual opening

of clinics during the pandemic period and increasing the clinic opening times, and simultaneous and integrated COVID-19 and TB testing.

This study's participants made valuable recommendations that could contribute to mitigate the effect of the pandemic on TB and HIV health services delivery. Among these was the need to strengthen diagnostic services by equipping the laboratories with the needed supplies.

The laboratory has always been essential to the diagnosis and treatment monitoring of TB and HIV [39]. The effectiveness of disease control programmes is often directly reflected in the strength of the laboratory network. However, the laboratory networks are not being well managed and supported in many developing countries, which is impeding the disease's progress [39, 40]. It is important to acknowledge that laboratories are systems that need quality standards, suitable human resources, and attention to safety in addition to supplies and equipment in order to adopt new ideas and resources to increase laboratory capacity and implement quick and innovative diagnostic tests.

Progress in reducing the burden of tuberculosis TB and HIV infection requires adequate funding sustained over many years. However, funding available for TB and HIV prevention, diagnostic and treatment services in LMICs falls far short of the globally estimated need [41]. This was evident in this study as health providers who participated in the study recommend need to provide funding support for effective programme implementation. Reasons for the dwindling financial support may include the reallocation of resources to the COVID-19 response [41]. In addition to the need to generate more resources to finance TB and HIV services, the need to efficiently use existing resources should be highlighted.

Strengths and limitations

This was the first study that aimed to understand from healthcare providers' perspectives the impact of the COVID-19 pandemic on TB and HIV health services together in Ghana in one study due to the synergy between the two disease control programmes. Although data were collected from six districts, the study has a national scope in that the districts were selected at random; hence, the views and experiences of the service providers can represent those of all providers in the country. The use of in-depth interviews could have introduced response and social desirability biases.

Conclusion

COVID-19 has had a significant impact on TB and HIV health service delivery in Ghana. The disruptions in service delivery were mainly due to fear, stigma, and shortages in personal protective equipment. However, specific measures and policies were implemented to ensure the continuation of services, which were successful in maintaining the delivery of essential TB and HIV health services during the pandemic. Further research is needed to investigate the long-term impact of the COVID-19 pandemic on TB and HIV health services in Ghana and other low-income countries.

Abbreviations

AIDS	Acquire Immune Deficiency Syndrome
ART	Anti-retroviral Therapy
CDC	Centre for Disease Control
GHS	Ghana Health Service
HIC	High-Income Country
HIV	Human Immunodeficiency Virus
IDI	In-dept Interview
LIC	Low-Income Country
NACP	National AIDS control Programme
NTP	National Tuberculosis control Programme
OPD	Out-patient Department
TB	Tuberculosis

Supplementary Information

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Supplementary Material 1.

Supplementary Material 2.

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Authors' contributions

E.O conceived and implemented the study under the supervision of F.N.B and S.Y.K. Acquisition of data and interpretation of data was done by G.K.D, H.A, M.P.K, and E.D. E.O instruct the study design data cleaning and analysis and drafted the manuscript, and all authors have a substantial contribution in revising and finalizing the manuscript. All authors read and approved the final manuscript.

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Data availability

Full data set and materials pertaining to this study can be obtained from corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethics approval (approval number IRB/1163/2020) was obtained from the Yonsei University College of Medicine and health science's institution review board. Informed written consent was obtained from the participants after thoroughly discussing the study's objectives. Participants were also assured that the confidentiality of the information they provided would be maintained. All methods were carried out following the relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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