BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2021-056386
Article Type:	Original research
Date Submitted by the Author:	12-Aug-2021
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Keywords:	Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, HIV & AIDS < INFECTIOUS DISEASES, Public health < INFECTIOUS DISEASES, QUALITATIVE RESEARCH, PUBLIC HEALTH

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An explorative-descriptive study on the effects of COVID-19 on access to ART services in a Ghanaian Teaching Hospital

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Objective

To explore how the COVID-19 pandemic affected access to ART services from the perspective of the PLHIV.

Design

The study utilised an exploratory-descriptive qualitative design. In-depth interviews were employed as the technique for the data collection. Data analysis was done using conceptual content analysis, which follows the traditions of Elo and Kyngäs on deductive and Hsieh on inductive content analysis.

Setting

ART clinic, Cape Coast Teaching Hospital, Ghana.

Participants

Twelve participants who have at least one year of history of accessing ART care before the COVID-19 pandemic and at least one clinic visit during the pandemic were purposively sampled from the ART clinic.

Results

Five concepts of accessing health care were explored: Accessibility, Availability, Affordability, Accommodation and Acceptability. The ART unit in the study setting remained open for service delivery throughout the pandemic. However, the fear of contracting the virus while patronising the ART services affected the participants' decision to utilise the facility. Although all the participants in this study reportedly honoured all their refill appointments, they indicated knowledge of other PLHIV defaulting. With reference to the availability of resources, a shortage of ARVs was reported, affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the virus by instituting the stipulated COVID-protocols. The study found that some of the strategies impacted the acceptability

and affordability of the services as the cost of transportation increased. Varying levels of accessibility to health workers providing ART services in the study setting was also recorded.

Conclusion

Strategies were implemented to accommodate the effects of the pandemic on ART provision. However, these had deficiencies that must be addressed using appropriate DSD interventions. This will ensure continuous access to service delivery in the ongoing and any similar future occurrences.

Article Summary

Strengths and limitations of this study

- This is a novel study which explored the impact of COVID-19 on ART services in the Ghanaian setting.
- The explorative-descriptive approach allowed for in-depth study of the impact of the pandemic on access to ART services which has not been widely studied.
- The content analysis method employed allowed for cognitive mapping of findings.
- There is the possibility for social desirability bias.

Funding statement

The project was funded mainly by the individual authors.

Competing interest

The authors declare that they have no competing interests.

Authors' contribution

All authors have read and approved the final manuscript.

SAA and DOY designed the research, drafted and revised the manuscript; SAA, PFD and GOB collected, analysed the data and drafted the manuscript. EA and SA revised the manuscript.

Patient consent for publication

This is not applicable since this study does not include any clients' identification.

Data sharing statement

The data collected on this topic have been presented in this manuscript. However, any further details required can be available from the corresponding author on reasonable request.

Introduction

People Living with HIV (PLHIV) depend on an uninterrupted supply of antiretroviral (ARV), drugs and other health services to maintain their health. The outbreak of COVID in 2019, however, had a negative impact on global health systems, programs, and targets (1). The Centre for Disease Control (CDC) reported that the coronavirus was highly contagious and spread rapidly (2,3). Hence, social distancing, wearing face masks, and continual handwashing among others, were recommended to stop the transmission (4). In response, many countries, including Ghana locked down at various periods and introduced strict measures to reduce the spread of the virus (5,6).

The World Health Organization (WHO) has reported that in the wake of the persistent fear of infection, misinformation and restriction on movement globally, patients' uptake of health services, including those related to HIV/AIDS care, will be negatively affected by the COVID-19 pandemic (7). It was estimated that a six-month disruption in ART supply in sub-Saharan Africa during the pandemic would increase the rate of HIV-related death by half a million and roll back the gains made (8) towards the elimination of HIV by 2030. Ghana has a generalised HIV epidemic, and the national response has focused on attaining the 95 95 95 targets, which require increasing uptake of HIV screening, linkage to care and ensuring virologic suppression. Studies have looked at the impact of the pandemic on wellbeing, coping and other aspects of the life of Ghanaians (9,10), but none to our knowledge has addressed issues related to healthcare services for PLHIV. Since HIV services including antiretroviral therapy (ART) in Ghana, is still mainly facility-based, this study explored the impact of the COVID-19 pandemic on access to ART services from the perspectives of PLHIV.

Methodology

An exploratory-descriptive qualitative design was adopted to explore clients' experiences of accessing HIV care during the COVID-19 pandemic. Data collection took place between January and March 2021. The population is comprised of patients accessing ART services at the Cape Coast Teaching Hospital in Ghana. The hospital was selected because it provides care to the general public recording over 3000 patients. The Unit also serves as the referral centre for all HIV clinics in the region. Participants were sampled purposively based on eligibility criteria that required the patient to be at least 18 years at the time of the data collection, have at least one year history of accessing care in the ART unit before COVID-19, and at least one clinic visit during the pandemic. At enrolment, all

participants provided their socio-demographic data and clinical history. COVID-19 protocols such as social distancing and wearing of nose masks were maintained throughout the interviews.
In-depth interviews using a semi-structured guide were conducted in English and Fante (local Ghanaian language predominantly spoken in the region). The interviews were conducted and audio-recorded by two researchers independently. Each interview lasted between 35 and 45 minutes. Additionally, back translation was done for the interviews conducted in Fante to ensure the essence of the participants' experiences were not lost during translation.

Conceptual content analysis (11) was conducted. Both inductive and deductive analyses were done following the recommendations of Elo and Kyngäs (12) on deductive and Hsieh (13) on inductive content analysis. Each team member independently read the participants' responses in the verbatim transcripts to identify patterns. The deductive analysis was conducted using the five concepts of accessing health care proposed by Penchansky & Thomas (1981) as a lens to identify patterns:

Accessibility: refers to geographic accessibility, which is determined by how easily clients can reach health facilities.

Affordability: assesses the cost of accessing ART care.

Availability: measures the extent to which the provider has the requisite resources to meet the needs of the client.

Accommodation: reflects the extent to which the provider's operation is organised to meet the constraints and preferences of the client.

Acceptability: determines the extent to which the client is comfortable with the characteristics of the providers (14,15).

Texts corresponding to the concepts were highlighted and organised. Next, the texts in each category were read and coded inductively to identify sub-categories. We then developed a codebook comprising categories and sub-categories. The codebook was applied to the text to code all transcripts. The findings were then organised by themes and sub-themes derived from the deductive and inductive analysis, having in mind the research objectives. Subsequently, the team met to confirm the common themes and sub-themes.

Reliability and trustworthiness were maintained by establishing and following these decisions before the coding process; flexibility on the identification of all codes that had significant implications for the research question; and coding for the existence of a concept in a participant's transcript and not the frequency (the number of times it appears in a single transcript). Two researchers read the transcripts independently and conducted the initial open coding by labelling the meaningful units as codes to categorise the data. An audit trail was maintained throughout data collection and analysis.

Patients and public involvement:

The research instrument was finalised following clarifications and suggestions from PLHIV, who participated in the pre-test. Thereafter, the initial themes that emerged from the analysis were sent to the PLHIV who participated in the study for member checking and clarification before the findings were finalised.

Ethical approval was obtained from the Cape Coast Teaching Hospital Ethics Review Committee (CCTHERB/EC/2020/107). The study also complied with all the ethical considerations stipulated in the Declaration of Helsinki

Results

Sociodemographic characteristics

The majority of the participants were females (n=10/12), 40 years or older (n=9/12). The majority had a maximum of basic or no formal education (n=8/12). The person with the longest HIV diagnosis had lived with the condition for 18 years. The participants had an aggregated 121 years of living with HIV and accessing ART services.

Table 1: Sociodemographic characteristics of participants REDACTED – SEE PUBLISHED VERSION

Emergent Concepts

Five main concepts emerged from the data analysis: “Accessibility”, “Availability”, “Affordability”, “Accommodation” and “Acceptability” Subthemes were generated under each major concept. The concepts and sub-themes are organised in table 2 below.

Table 2: Emergent Concepts

Themes & Sub-themes	Participants											
	Ama	**Aku**	**Eko**	**Oye**	**Ben**	**Afi**	**Bob**	**Yaa**	**Aba**	**Esi**	**Pra**	**Abr**
A. Accessibility												
ART clinic never closed	x	x	x	x	x	x	x	x	x	x	x	x
Fear affected patronage of Services	x		x	x	x	x	x	x	x	x	x	x
Honouring appointment • *Never missed* • *A few defaulters*	x		x		x	x	x		x	x x		x x
B. Availability												
ARV availability		x	x	x	x	x			x	x	x	x
C. Affordability												
Acquiring PPEs & medication	x	x	x	x	x	x				x	x	x
Increased cost of transportation									x		x	x
D. Accommodation												
Implementation of Covid protocols in the HIV clinic			x	x	x	x			x	x		x
Increased education on Covid-19 protocols	x	x		x	x				x	x	x	
Adherence to safety protocols	x	x	x	x	x	x	x	x	x			
The Downsides • *Overcrowding* • *Long waiting time*	x x	x x		x x	x				x		x	
E. Acceptability												
Access to the healthcare professionals				x	x	x	x	x	X	x		x

Theme 1: Accessibility

- ***ART clinic remained open***

From the narratives, all twelve participants indicated that the ART clinic remained open for service delivery throughout the pandemic. A participant stated:

> "Even though the president said we should stay at home, they [health practitioners] were going to work… yes, so they were there [ART clinic]. (Ben, 18 years since HIV diagnosis)

Several of the participants said, they received notification that the ART clinic was opened and were encouraged to access care when the need arose despite the order to stay at home. An excerpt read:

> "After the outbreak of the disease, everybody was frightened, but where I was treated, they [health workers] will say 'you just come'." (Esi, 10 years since HIV diagnosis)

- ***Fear affected patronage of services***

Even though the ART clinic was opened during the pandemic, several of the narratives revealed that service patronage was initially curtailed. Several participants expressed initial misgivings about accessing the ART clinic because of fear of contracting the virus.

> "I sometimes get worried that if I do not take care, I will be infected here [health facility]." (Oye, 17 years since HIV diagnosis)

From the narratives, the participants' fear was heightened by knowing that they had a greater risk of contracting the virus because of their HIV positive status.

> "I feared that maybe I might contract the virus because of my sickness [HIV status]. (Eko, 10 years since HIV diagnosis)

Some participants' fear of contracting the virus indicated misinformation about the modes of transmission.

> "My only fear was the sweat of another person touching my skin. Like me, some patients did not come to the clinic because of the fear of getting the virus" (Aba, 17 years since HIV diagnosis)

Thus, few participants reported being uncomfortable accessing HIV care in the health facility, while some participants suggested service delivery at home to minimise their presence in the health facility. The fear was, however, minimised when they gathered the courage to attend the HIV clinic and realised that the COVID-19 protocols were being enforced.

"My fear of contracting the virus was reduced because of the things [protocols] put in place to prevent COVID-19." (Eko, 10 years since HIV diagnosis)

- ***Honouring appointments***

The narratives revealed that most participants did not default or miss a refill appointment during the pandemic. This was mainly attributed to a sense of duty and a need to preserve their health.

"I know for sure I should come because it's for my own benefit, no matter what the situation is" (Ben, 18 years since HIV diagnosis)

A participant explained that although she did not honour her refill appointment during the pandemic on the advice of her family, she did not default because arrangements were made to ensure continued access to treatment.

"I didn't come at all [to the health facility], because my Auntie was saying it is easy for us [PLHIV] to get the sickness [COVID-19]. She said as for me because of my situation [HIV status], if I get the disease, it will be easy for me to die. So, I have to stay home and she will go to the hospital." (Yaa, 13 years since HIV diagnosis)

Familial and healthcare worker support was an integral part of continued access to care during the pandemic.

"I sometimes leave the clinic and get some staff members to receive the drug on my behalf, after which I go for it at the individual's residence." (Aba, 17 years since HIV diagnosis)

The participants' commitment to access care in spite of their fears ran through most of the narratives.

- ***A few defaulters***

From the clients' perspective, HIV service utilisation decreased at the onset of the pandemic. One participant said:

"During the initial stages of the pandemic, you will come here [HIV clinic], and you won't meet anybody [clients], and it's like, where are they?" (Ama, 2 years since HIV diagnosis)

Some participants shared their awareness of some clients defaulting from HIV care during the pandemic, while others suggested the possibility of those clients accessing care in other facilities.

"I am from K [residence] and some of the patients I was coming to the ART clinic with, no longer come." (Afi, 10 years since HIV diagnosis)

However, as the months progressed and the pandemic did not wane, clients reported to the facility for treatment refill. This increased the number of participants attending the clinic.

"Yeah, I was shocked that huge numbers were coming." (Ben, 18 years since HIV diagnosis)

Theme 2: Availability

- ***ARV availability***

For clients who came to the clinic at the onset of the pandemic, they reported being supplied with the quantity of ARVs prescribed by the healthcare workers. Thus, these participants did not experience a shortage of drugs.

"Drugs were available… they were able to give me three (3) months stock." (Eko, 10 years since HIV diagnosis)

Some participants, however, narrated instances when they were informed of the shortage of some drugs at the HIV clinic. The shortage reportedly affected the quantity of ARVs supplied to the patients during their refill visits.

"Before the disease [COVID-19], I was usually given medications that lasted for four months or five months, but after the disease, I am being given two months. Recently, they said there is a shortage of the medications, so if you stay afar [residence], they give you a medication that will last for one month, but if you are near, they give you a medication that will last for two weeks or one week." (Oye, 17 years since HIV diagnosis)

Two participants intimated that their treatment regimen was changed during the COVID-19 pandemic.

"Some of my drugs were changed. They [healthcare professionals] said the drugs were changed because of the COVID." (Yaa, 13 years since HIV diagnosis)

Theme 3: Affordability

- *Unbudgeted Cost: Acquiring PPEs and medication*

From the participants, the increased cost of PPEs, which was a requirement for being allowed access to the facility, also hindered their utilisation of HIV services during the pandemic.

"You know sanitizers that we usually weren't using became so expensive. In this case, how do you expect a layman to buy? He won't buy, and that's a risk not to himself alone but to everybody." (Ama, 2 years since HIV diagnosis)

A few participants also indicated that they incurred costs in acquiring some medications that were not dispensed at the HIV clinic due to the pandemic. This, they purported, was not the case prior to the pandemic.

> "Sometimes when you come, there will be no Septrin so they will prescribe it for you to buy it outside. If you don't have money to buy you stop. The last time I came, I couldn't afford Septrin so I have not taken some till now. This COVID has really caused problems." (Esi, 10 years since HIV diagnosis)

From the narratives, under-utilisation of HIV services was attributed to patients being turned away from the health facility when they did not present in PPEs. A participant narrated:

> "They [health providers] weren't giving us the masks initially. So, if you come [hospital] and you don't have a mask, you will not be allowed to enter the hospital…. So, the nurses can't take care of you. So, go home." (Ama, 2 years since HIV diagnosis)

- ***The increased cost of transportation***

Few participants commented on the financial burden incurred while accessing HIV care during the pandemic. This cost was mainly attributed to the need to honour more refill appointments as a result of the shortage of ARVs and the limited amount dispensed at a time by the pharmacy.

> "That place [residence] is very far. Before COVID, they pharmacists] gave me quantities that would last for six months. If you don't get three months quantities, you have to be coming here [HIV clinic] every month. So, now that they want to give us the drug on a weekly basis, I have to come again. It has brought me a problem. I was thinking a lot so I came after my review date [defaulted on appointment date]." (Pra, 12 years since HIV diagnosis)

> "Sometimes when you are coming, you might not have money on you even for transport but you will try and come." (Esi, 10 years since HIV diagnosis)

Theme 4: Accommodation

Implementation of COVID protocols in the HIV clinic

According to the participants, the COVID-19 protocols were instituted in the HIV clinic and monitored to ensure that patients complied with the directives.

> "They were following the protocols that the president gave. They have provided Veronica Bucket at the entrance of the hospital, where you wash your hands. They use the thermometer gun to check your temperature. They are adhering to the safety protocols." (Ben, 18 years since HIV diagnosis)

> "Initially [before Covid-19], we used to sit close to each other at the clinic. But during the pandemic, we observe social distancing when we come to the clinic. The nurses ensure that you have washed your hands, sanitized and are in your nose mask." (Eko, 10 years since HIV diagnosis)

Increased education on Covid-19 protocols

The participants intimated there was increased education on COVID-19 and the safety protocols at the clinic.

> "They educate us on social distancing and COVID-19 prevention protocols… They tell us to wash our hands, and put on nose mask to prevent us from being infected." (Aku, 2 years since HIV diagnosis)

The education that participants received on COVID-19 empowered them to take responsibility for their own safety.

> "The only change is we protecting ourselves from being infected. The health care workers explained it to us." (Oye, 17 years since HIV diagnosis)

Adherence to safety protocols

Although, majority of the participants alluded to a general compliance to the protocols, some narratives revealed that there were instances of non-adherence to the protocols instituted to protect staff and patients from contracting COVID-19. This was attributed to a lack of understanding and limited education on the protocols.

> "They [healthcare professionals] were wearing their mask… and nobody talks to you [client] about your mask. For me, I feel the understanding wasn't there. They [healthcare professionals] say wear mask, so, when somebody [client] gets tired, he takes it off." (Ama, 2 years since HIV diagnosis)

Another participant intimated that the healthcare professionals did not adhere to some of the safety protocols they educated the clients on and suggested action should be taken to ensure that the health staff complied with the protocols.

> "Some don't put on the mask when working or the mask is on their chin. But they want you, the patient, to put on your mask. Talk to them to change their attitude because they can't tell us to put it on while theirs are not on." (Yaa, 13 years since HIV diagnosis)

- ***The Downsides***

For many of the participants, service delivery in the clinic was affected by the pandemic. These included reported issues of overcrowding and long waiting time.

Overcrowding

Participants indicated that as the pandemic waged on, the number of patients visiting the clinic increased. This resulted in congestion in the HIV unit, raising a source of concern for clients accessing care at the HIV clinic. To avoid the risk of getting infected with COVID-19, some participants, therefore, decided not to honour their refill appointments.

> "They [patients] really come in their numbers despite the pandemic." (Aku, 2 years since HIV diagnosis)

> "I will say that crowding in this particular era [COVID-19] isn't the best." (Ama, 2 years since HIV diagnosis)

Long waiting time

Participants indicated that the long waiting times increased their risk of contracting the virus. This was related to lack of clear pathways in service delivery to meet the needs of the various categories of patients.

> "The more the waiting time, the riskier. I am waiting here because I have to go for my vital signs, and then they [nurses] will decide if I have to see a doctor. I think it's time-wasting. At least they should speed after the usual check-up." (Ama, 2 years since HIV diagnosis)

For others also, delays were experienced at the pharmacy. This was attributed to few staff assigned to serve the drugs.

> "My only challenge had to do with the waiting time for the drugs. I spend more time to be served my drug. I suggest that management increases the number of people who distribute the drug at the pharmacy in order to reduce the waiting time" (Eko, 10 years since HIV diagnosis)

Some participants attributed the long waiting time to a reduction in the number of healthcare professionals providing services in the HIV clinic during the pandemic.

> "They have reduced in number. If they were six, they are now four." (Oye, 17 years since HIV diagnosis)

> "I know they said they were running shift, so it reduced the number of doctors and nurses available. The pharmacists reduced in number. I only saw two guys there… I think they should be faster in the activities because they delay us." (Ben, 18 years since HIV diagnosis)

Theme 5: Acceptability

Access to the healthcare professionals

From the narratives, most of the participants continued to have positive experiences with the healthcare workers even in the pandemic. Abi, a 65-year-old woman who had lived with HIV for three years said:

> "The doctors and the nurses come always, and when we meet their absence, they inform us that they were doing something elsewhere, so they will be with us shortly. For me, I come and meet them every day." (Abi, 3 years since HIV diagnosis)

Some participants, however, bemoaned the pandemic had affected access to the healthcare professionals in the HIV clinic and struggled to cope with the many changes.

> "It was really difficult because you may not get access to the nurses or doctors because the COVID-19 was really popping up and everything has been restricted here, the way you sit, everything has been changed." (Ben, 18 years since HIV diagnosis)

Discussion

Following exploration of the concept of availability of services, the study findings revealed that the ART clinic remained open during the pandemic. Thus, most of the participants in this study did not miss ART refill appointments or defaulted from care. Similar findings were reported in South Africa (16) and Malawi (17). For those who could not honour their appointments, alternative measures mainly

associated with a vibrant family support system, and a need to preserve their health ensured treatment was not interrupted. Although the services were available, there were instances of ARV stock-out, resulting in the pharmacy under-supplying the prescribed dosage. Several modelling studies projected disruption in ART supply and distribution during pandemics (18,19).

Regarding accessibility, the study found that instituting lockdown to curb the spread of the virus (6) affected geographical access to ART service. Although this was not a general phenomenon, several clients remained indoors to minimise the risk of contracting the virus. Some participants knew PLHIV, who defaulted during the pandemic. Similar findings were recorded in Kigali, Rwanda, where 52% of clients in an ART clinic missed refill appointments (20). These treatment interruptions can contribute to compromised immunologic and virologic outcomes and adherence failure once ART is reintroduced (21,22). This can further reverse the country's gains in achieving the second and third, 95-95-95 targets (23).

Furthermore, the study findings revealed that several strategies were implemented at the ART clinic during the pandemic. It was evident that reporting for refill appointments was an opportunity to receive education on COVID-19 safety protocols. Health education has been noted to positively impact health-seeking behaviour and improve patients' health literacy (17,24), which is especially necessary for PLHIV since they have a higher risk of getting infected with the coronavirus (25). Also, the study revealed strict adherence to some of the safety protocols clinic, such as handwashing and wearing of face masks at the ART clinic. This finding is in congruence with another study by Neuwirth, Mattner, & Otchwemah, (26) that reported significantly high adherence to COVID-19 protocols in a German hospital.

However, other protocols such as social distancing were not maintained as the findings indicated overcrowding at the unit on several occasions as the pandemic waged on and seemed to have become the new normal. Furthermore, ARV stock-out resulted in limited dispensing, changes in clients' treatment regimen and shorter refill appointments that required the patients to report to the clinic more frequently during the pandemic, increasing the financial cost of accessing care than they did previously. Although ART service delivery was structured to accommodate the challenges that the pandemic presented to the health system and the clients, there is the need to establish appropriate contingency strategies to ensure continuous access to ART care during future pandemics.

The study also recorded that the pandemic and protocols required to minimise the risk of infection impacted the patients' ability to access health workers providing ART services readily. For some

clients, the health workers continued to exhibit positive and welcoming attitudes. Similar studies conducted in Ghana before the pandemic reported that continuous access to health workers providing ART services positively impacted retention in care and adherence to treatment among PLHIV (27).

Differentiated Service Delivery (DSD) though initiated in Ghana in 2017, is still very much facility-based interventions including multi-months ART provision for stable clients (28). While previous study among clients of this same facility suggested that, this was preferred to community-based approaches (29), the COVID-19 pandemic has demonstrated the deficiencies in this strategy. Therefore, it is essential to identify DSD strategies that address these challenges to ensure continuity of services and adopt/adapt them in the Ghanaian context.

Limitation

The possibility of social desirability bias in highlighting participants' access to ART services could not be excluded as majority of the patients were long time clients of the clinic.

Conclusion

The pandemic affected access to ART service delivery in this study. Although, the service remained available, the national COVID-19 response affected some participants' geographic access and also the availability of ART and related services. Strategies were implemented to accommodate the effects of the pandemic on ART provision. However, these had deficiencies which must be addressed using appropriate DSD interventions. This will ensure continuous access to ART service delivery in the current and any similar situations in the future.

Data availability statement

Data are available upon reasonable request. The data underlying this article cannot be shared publicly because of the privacy of the participants. The data will therefore be shared upon reasonable request to the corresponding author.

Ethics statements

Patient consent for publication

Participants gave consent to publish the data after reading the information sheets that indicated the authors' intentions to publish.

Ethics approval

The Cape Coast Teaching Hospital Ethics Review Committee gave approval for the study (CCTHERB/EC/2020/107). The study also complied with all the ethical considerations stipulated in the Declaration of Helsinki. Each participant gave both oral and written informed consent to participate in the study.

Availability of data and materials

All data generated or analysed during this study are available from the corresponding author on reasonable request.

Acknowledgements

The authors are grateful to all the patients who participated in the study, health workers in the ART clinic who facilitated the recruitment of patients, and the management of the CCTH for granting the needed support to conduct the study.

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Footnotes

Contributors: All authors have read and approved the final manuscript.

SAA, DOY, EA, and SA designed the research and revised the manuscript; SAA, PFD and GOB collected, analysed the data and drafted the manuscript.

Funding: This is because the project was funded mainly by the individual authors.

Competing interests: The authors declare that they have no competing interests.

REPORTING CHECKLIST FOR QUALITATIVE STUDY BASED ON SRQR GUIDELINES

	REPORTING ITEM	PAGE NUMBER
Title	An explorative-descriptive study on the effects of COVID-19 on Access to ART services in a Ghanaian Teaching Hospital	1
Abstract	**Objective** To explore how the COVID-19 pandemic affected access to ART services from the perspective of the PLHIV. **Design** The study utilised an exploratory-descriptive qualitative design. In-depth interview was the technique employed during data collection. Data was analysed using conceptual content analysis following the traditions of Elo and Kyngäs on deductive and Hsieh on inductive content analysis. **Setting** ART clinic, Cape Coast Teaching Hospital, Ghana. **Participants** Twelve participants who have at least one year of history of accessing ART care before the COVID-19 pandemic and at least one clinic visit during the pandemic were purposively sampled from the ART clinic. **Results** Five concepts of accessing health care were explored: Accessibility, Availability, Affordability, Accommodation and Acceptability. The ART unit in the study setting remained open for service delivery throughout the pandemic. However, the fear of contracting the virus while patronising the ART services affected the participants' decision to utilise the facility. Although all the participants in this study reportedly honoured all their refill appointments, they indicated knowledge of other PLHIV defaulting. With reference to the availability of resources, a shortage of ARVs was reported, affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the virus by instituting the stipulated COVID-protocols. The study found that some of the strategies impacted the acceptability and affordability of the services as the cost	2-3

	of transportation increased. Varying levels of accessibility to health workers providing ART services in the study setting was also recorded. **Conclusion** Strategies were implemented to accommodate the effects of the pandemic on ART provision. However, these had deficiencies that must be addressed using appropriate DSD interventions. This will ensure continuous access to service delivery in the ongoing and any similar future occurrences.	
Introduction		
• Problem formulation	People Living with HIV (PLHIV) depend on an uninterrupted supply of antiretroviral (ARV), drugs and other health services to maintain their health. The outbreak of COVID in 2019, however, had a negative impact on global health systems, programs, and targets (1). The Centre for Disease Control (CDC) reported that the coronavirus was highly contagious and spread rapidly (2,3). Hence, social distancing, wearing face masks, and continual handwashing among others, were recommended to stop the transmission (4). In response, many countries, including Ghana locked down at various periods and introduced strict measures to reduce the spread of the virus (5,6). The World Health Organization (WHO) has reported that in the wake of the persistent fear of infection, misinformation and restriction on movement globally, patients' uptake of health services, including those related to HIV/AIDS care, will be negatively affected by the COVID-19 pandemic (7). It was estimated that a six-month disruption in ART supply in sub-Saharan Africa during the pandemic would increase the rate of HIV-related death by half a million and roll back the gains made (8) towards the elimination of HIV by 2030. Ghana has a generalised HIV epidemic, and the national response has focused on attaining the 95 95 95 targets, which require increasing uptake of HIV screening, linkage to care and ensuring virologic suppression. Studies have looked at the impact of the pandemic on wellbeing, coping and other aspects of the life of	4

	Ghanaians (9,10), but none to our knowledge has addressed issues related to healthcare services for PLHIV. Since HIV services including antiretroviral therapy (ART) in Ghana, is still mainly facility-based, this study explored the impact of the COVID-19 pandemic on ART services from the perspectives of PLHIV.	
• Purpose or research question	This study there aims to explores the influence of the COVID-19 pandemic on access to ART services from the perspective of PLHIV.	4
Methods		
• Qualitative approach and research paradigm	An exploratory-descriptive qualitative design. This design was suitable as it allowed investigation into an area which has not been extensively studied. The five concepts of accessing health care proposed by Penchansky & Thomas (1981) as a lens to identify patterns: *Accessibility:* refers to geographic accessibility which is determined by how easily clients can reach health facility. *Affordability:* assesses the cost of accessing ART care. *Availability:* measures the extent to which the provider has the requisite resources to meet the needs of the client. *Accommodation:* reflects the extent to which the provider's operation is organised to meet the constraints and preferences of the client. *Acceptability:* determines the extent to which the client is comfortable with the characteristics of the providers.	4/5
• Researcher characteristics and reflexivity	The researcher is a trained public health nurse who has worked in the PMTCT/ART clinic for eight years in addition to lecturing at the School of Nursing in the University of Cape Coast, Ghana. She has a PhD in Nursing and experience in qualitative and quantitative research	N/A
• Context	ART services at the Cape Coast Teaching Hospital in Ghana. The hospital was selected because it has adequate facilities and provides care to the general public recording and recording over 3000 patients. The Unit also serves as the referral centre for all HIV clinics in the region.	4/5
• Sampling strategy	Purposive sampling based on the eligibility criteria that required the patient to be at least 18 years at the	5

	time of the data collection, have at least one year history of accessing care in the ART unit before COVID-19, and at least one clinic visit during the pandemic.	
• Ethical issues pertaining to human subjects	The Cape Coast Teaching Hospital Ethics Review Committee gave approval for the study (CCTHERB/EC/2020/107). The study also complied with all the ethical considerations stipulated in the Declaration of Helsinki. Each participant gave both oral and written informed consent to participate in the study.	17
• Data collection methods	In-depth interviews were conducted in English and Fante (a local Ghanaian language predominantly spoken in the region. The interviews were conducted and audio-recorded by two researchers independently.	5
• Data collection instruments and technologies	Semi-structured interview guides were developed by the researchers based on the objectives of the study.	5
• Units of study	Each patient experience while accessing ART services during the COVID-19 pandemic was the unit of study. 12 participants experiences were explored and analysed.	5
• Data processing	Verbatim transcription of the interviews was conducted. Back translation was done for the interviews conducted in Fante to ensure the essence of the participants' experiences were not lost during translation. Pseudonyms were used to de-identify the participants.	5
• Data analysis	Conceptual content analysis (14) was conducted. Both inductive and deductive analyses were done following the recommendations of Elo and Kyngäs (15) on deductive and Hsieh (16) on inductive content analysis. . Each team member independently read the participants' responses in the verbatim transcripts to identify patterns. The deductive analysis was conducted using the five concepts of accessing health care proposed by Penchansky & Thomas (1981) as a lens to identify pattern.	5
• Techniques to enhance trustworthiness	Reliability and trustworthiness were maintained by establishing and following these decisions before the coding process; flexibility on the identification of all	6

	codes that had significant implication for the research question; and coding for the existence of a concept in a participant's transcript and not the frequency (the number of times it appears in a single transcript). Two researchers read the transcripts independently and conducted the initial open coding by labelling the meaningful units as codes to categorise the data. An audit trail was maintained throughout data collection and analysis.	
Results/findings		
• Syntheses and interpretation	Five main concepts emerged from the data analysis: "Accessibility", "Availability", "Affordability", "Accommodation" and "Acceptability" Subthemes were generated under each major concept. The ART unit in the study setting remained opened for service delivery throughout the pandemic. However, the fear of contracting the virus while patronising ART services affected the participants decision to utilise the facility. Although, all the participants in this study reportedly honoured all their refill appointments, they indicated knowledge of other PLHIV defaulted during the period. With reference to availability of resources, shortage of ARVs was reported affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the corona virus by instituting the stipulated COVID-protocol. The study found that some of the strategies impacted affordability of services as cost of transportation increased and also impacted acceptability of services. The study also found varied levels of accessibility to health workers providing ART services in the study setting during the pandemic.	2-3/7
• Links to empirical data	**Theme 1: Accessibility** • ***ART clinic remained open*** From the narratives, all twelve participants indicated that the ART clinic remained open for service delivery throughout the pandemic. A participant stated: "Even though the president said we should stay at home, they [health practitioners] were going	8-15

to work… yes, so they were there [ART clinic]. (Ben, 18 years since HIV diagnosis)

Several of the participants said, they received notification that the ART clinic was opened and were encouraged to access care when the need arose in spite of the order to stay at home. An excerpt read:

> "After the outbreak of the disease, everybody was frightened, but where I was treated, they [health workers] will say 'you just come'." (Esi, 10 years since HIV diagnosis)

- ***Fear affected patronage of services***

In spite of the fact that the ART clinic was opened during the pandemic, several of the narratives revealed that service patronage was initially curtailed. Several of the participants, expressed initial misgivings about accessing the ART clinic because of fear of contracting the virus.

> "I sometimes get worried that if I do not take care, I will be infected here [health facility]." (Oye, 17 years since HIV diagnosis)

From the narratives, the participants' fear was heightened by the knowledge that they had a greater risk of contracting the virus because of their HIV positive status.

> "My fear was that, maybe I might contract the virus because of my sickness [HIV status]. (Eko, 10 years since HIV diagnosis)

Some participants' fear of contracting the virus indicated misinformation about the modes of transmission.

> "My only fear was the sweat of another person touching my skin. Like me, some patients did not really come to the clinic because of the fear of getting the virus" (Aba, 17 years since HIV diagnosis)

Thus, few participants reported being uncomfortable accessing HIV care in the health facility, while some participants suggested service delivery at home to minimise their presence in the health facility.

The fear was however minimised when they gathered the courage to attend the HIV clinic and realised that the COVID-19 protocols were being enforced.

> "My fear of contracting the virus was reduced because of the things [protocols] put in place to prevent COVID-19." (Eko, 10 years since HIV diagnosis)

- ***Honouring appointments***

The narratives revealed that most of the participants did not default or miss a refill appointment during the pandemic. This was mainly attributed to a sense of duty and a need to preserve their health.

> "I know for sure I should come because it's for my own benefit, no matter what the situation is" (Ben, 18 years since HIV diagnosis)

A participant explained that although she personally did not honour her refill appointment during the pandemic on the advice of her family, she did not default because arrangements were made to ensure continued access to treatment.

> "I didn't come at all [to the health facility], because my Auntie was saying it is easy for us [PLHIV] to get the sickness [COVID-19]. She said as for me because of my situation [HIV status], if I get the disease, it will be easy for me to die. So, I have to stay home and she will go to the hospital." (Yaa, 13 years since HIV diagnosis)

Familial and healthcare worker support was an integral part of continued access to care during the pandemic.

> "I sometimes leave the clinic and get some staff members to receive the drug on my behalf, after which I go for it at the individual's residence." (Aba, 17 years since HIV diagnosis)

The participants commitment to access care in spite of their fears ran through most of the narratives.

- ***A few defaulters***

From the clients' perspective, HIV service utilisation decreased at the onset of the pandemic. One participant said:

> "During the initial stages of the pandemic, you will come here [HIV clinic] and you won't meet anybody [clients] and it's like, where are they?" (Ama, 2 years since HIV diagnosis)

Some participants shared their awareness of some clients defaulting from HIV care during the pandemic, while others suggested the possibility of those clients accessing care in other facilities

> "I am from K [residence] and some of the patients I was coming with [ART clinic], no longer come." (Afi, 10 years since HIV diagnosis)

However, as the months progressed and the pandemic did not wane, clients reported to the facility for treatment refill. This increased the number of participants attending the clinic.

> "Yeah, I was shocked that huge numbers were coming." (Ben, 18 years since HIV diagnosis)

Theme 2: Availability

- ***ARV availability***

For clients who came to the clinic at the onset of the pandemic, they reported being supplied with the quantity of ARVs prescribed by the healthcare workers. Thus, these participants did not experience shortage of drugs.

> "Drugs were available… they were able to give me three (3) months stock." (Eko, 10 years since HIV diagnosis)

Some participants however, narrated instances when they were informed of shortage of some drugs at the HIV clinic. The shortage reportedly affected the quantity of ARVs supplied to the patients during their refill visit.

> "Before the disease [COVID-19], I was usually given medications that lasted for 5 months or 4 months but after the disease, I am being given 2 months. Recently, they said there is shortage of the medications so if you stay afar [residence], they give you a medication that will last for 1 month but if you are near, they give you a medication that will last for two

weeks or 1 week." (Oye, 17 years since HIV diagnosis)

Two participants intimated that their treatment regimen was changed during the COVID-19 pandemic.

> "Some of my drugs were changed. They [healthcare professionals] said the drugs were changed because of the COVID." (Yaa, 13 years since HIV diagnosis)

Theme 3: Affordability

- *Unbudgeted Cost: Acquiring PPEs and medication*

From the participants, the increased cost of PPEs, which was a requirement for being allowed access to the facility, also hindered their utilisation of HIV services during the pandemic.

> "You know sanitizers that we usually weren't using became so expensive. In this case, how do you expect a layman to buy? He won't buy, and that's a risk not to himself alone but to everybody." (Ama, 2 years since HIV diagnosis)

A few participants also indicated that they incurred cost in acquiring some medications that were not dispensed at the HIV clinic due to the pandemic. This they purported was not the case prior to the pandemic.

> "Sometimes when you come, there will be no Septrin so they will prescribe it for you to buy it outside. If you don't have money to buy you stop. The last time I came, I couldn't afford Septrin so I have not taken some till now. This COVID has really caused problems." (Esi, 10 years since HIV diagnosis)

From the narratives, under-utilisation of HIV services was attributed to patients being turned away from the health facility when they did not present in PPEs. A participant narrated:

> "They [health providers] weren't giving us the masks initially. So, if you come [hospital] and you don't have a mask, you will not be allowed to enter the hospital…. So, the nurses can't take care of you. So, go home." (Ama, 2 years since HIV diagnosis)

- ***Increased cost of transportation***

Few participants commented on the financial burden incurred while accessing HIV care during the pandemic. This cost was mainly attributed to the need to honour more refill appointments as a result of shortage of ARVs and the limited amount dispensed at a time by the pharmacy.

> "That place [residence] is very far. Before COVID, they pharmacists] gave me quantities that would last for 6 months. If you don't get 3 months quantity, you have to be coming here [HIV clinic] every month? So, now that they want to give us the drug on weekly basis, I have to come again. It has brought me a problem. I was thinking a lot so I came after my review date [defaulted on appointment date]." (Pra, 12 years since HIV diagnosis)

> "Sometimes when you are coming you might not have money on you even for transport but you will try and come." (Esi, 10 years since HIV diagnosis)

Theme 4: Accommodation

Implementation of COVID protocols in the HIV clinic

According to the participants, the COVID-19 protocols were instituted in the HIV clinic and monitored to ensure that patients complied with the directives.

> "They were following the protocols that the president gave. They have provided Veronica Bucket at the entrance of the hospital, where you wash your hands. They use the thermometer gun to check your temperature. They are adhering to the safety protocols." (Ben, 18 years since HIV diagnosis)

> "Initially [before Covid-19], we used to sit very close to each other at the clinic. But during the pandemic, we observe social distancing when we come to the clinic. The nurses ensure that you have washed your hands, sanitized and are

	in your nose mask." (Eko, 10 years since HIV diagnosis) *Increased education on Covid-19 protocols* The participants intimated there was increased education on COVID-19 and the safety protocols at the clinic. "They educate us on social distancing and COVID-19 prevention protocols… They tell us to wash our hands, and put on nose mask to prevent us from being infected." (Aku, 2 years since HIV diagnosis) The education that participants received on COVID-19 empowered them to take responsibility of their own safety. "The only change is we protecting ourselves from being infected. The health care workers explained it to us." (Oye, 17 years since HIV diagnosis) *Adherence to safety protocols* Although, majority of the participants alluded to a general compliance to the protocols, some narratives revealed that there were instances of nonadherence to the protocols instituted to protect staff and patients from contracting COVID-19. This was attributed to lack of understanding and limited education on the protocols. "They [healthcare professionals] were wearing their mask… and nobody talks to you [client] about your mask. For me, I feel the understanding wasn't there. They [healthcare professionals] say wear mask, so, when somebody [client] gets tired, he takes it off." (Ama, 2 years since HIV diagnosis) Another participant intimated that the healthcare professionals did not adhere to some of the safety protocols they educated the clients on and suggested action should be taken to ensure that the health staff complied with the protocols.	

"Some don't put on the mask when working or the mask is on their chin. But they want you the patient to put on your mask. Talk to them to change their attitude because they can't tell us to put it on while theirs are not on." (Yaa, 13 years since HIV diagnosis)

- ***The Downsides***

For many of the participants, service delivery in the clinic was affected by the pandemic. These included reported issues of overcrowding and long waiting time.

Overcrowding

Participants indicated that as the pandemic waged on, the number of patients' visiting the clinic increased. This resulted in congestion in the HIV unit raising a source of concern for clients accessing care at the HIV clinic. To avoid the risk of getting infected with COVID-19, some participants therefore decided not to honour their refill appointments.

"They [patients] really come in their numbers despite the pandemic." (Aku, 2 years since HIV diagnosis)

"I will say that crowding in this particular era [COVID-19] isn't the best." (Ama, 2 years since HIV diagnosis)

Long waiting time

Participants indicated that the long waiting times increased their risk of contracting the virus. This related to lack of clear pathways in service delivery to meet the needs of the various categories of patients.

"The more the waiting time, the riskier. I am waiting here because I have to go for my vital signs and then they [nurses] will decide if I have to see a doctor. I think it's time wasting. At least they should speed after the usual check-up." (Ama, 2 years since HIV diagnosis)

For others also, delays were experienced at the pharmacy. This was attributed to few staff assigned to serve the drugs.

"My only challenge had to do with the waiting time for the drugs. I spend more time to be served my drug. I suggest that management

	increases the number people who distribute the drug at the pharmacy in order to reduce the waiting time" (Eko, 10 years since HIV diagnosis) Some participants attributed the long waiting time to a reduction in the number of healthcare professionals providing services in the HIV clinic during the pandemic. "They have reduced in number. If they were six, they are now four." (Oye, 17 years since HIV diagnosis) "I know they said they were running shift, so it reduced the number of doctors and nurses available. The pharmacists reduced in number. I only saw two guys there… I think they should be faster in the activities because they delay us." (Ben, 18 years since HIV diagnosis) A participant alluded to a decline in the quality of services received. "It [COVID-19] affected the quality of services [HIV] we have." (Bob, 7 years since HIV diagnosis) **Theme 5: Acceptability** *Access to the healthcare professionals* From the narratives, most of the participants continued to have positive experience with the healthcare workers even in the pandemic. Abi, a 65-year-old woman who had lived with HIV for three years said: "The doctors and the nurses come always and when we meet their absence, they inform us that they were doing something elsewhere so they will be with us shortly. For me, I come and meet them every day." (Abi, 3 years since HIV diagnosis) Some participants, however, bemoaned the pandemic had affected access to the healthcare professionals in the HIV clinic and struggled to cope with the many changes.	

	"It was really difficult because you may not get access to the nurses or doctors because the COVID-19 was really popping up and everything has been restricted here, the way you sit, everything has been changed." (Ben, 18 years since HIV diagnosis)	
Discussion		
Integration with prior work, implications, transferability and contribution(s) to the field	Following exploration of the concept of availability of services, the study findings revealed that the ART clinic remained open during the pandemic. Thus, most of the participants in this study did not miss ART refill appointments or defaulted from care. Similar findings were reported in South Africa (19) and Malawi (20). For those who could not honour their appointments, alternative measures mainly associated with a vibrant family support system, and a need to preserve their health ensured treatment was not interrupted. Although the services were available, there were instances of ARV stock-out, resulting in the pharmacy under-supplying the prescribed dosage. Several modelling studies projected disruption in ART supply and distribution during pandemics (21,22). Regarding accessibility, the study found that instituting lockdown to curb the spread of the virus (11) affected geographical access to ART service. Although, this was not a general phenomenon, several clients remained indoors to minimise the risk of contracting the virus. Some participants knew PLHIV who defaulted during the pandemic. Similar findings were recorded in Kigali, Rwanda where 52% of clients in an ART clinic missed refill appointments (23). These treatment interruptions can contribute to compromised immunologic and virologic outcomes, and adherence failure once ART is reintroduced (24,25). This can further reverse the country's gains in achieving the second and third, 90-90-90 targets (4). Hence the pandemic affected access to ART and measures such as case managers attending home visits to supply treatment during future pandemics can be explored to reduce the instances of treatment interruptions. Furthermore, the study findings revealed that several strategies were implemented at the ART clinic during the pandemic. It was evident that reporting for refill appointments was an opportunity to receive education	15-16

	on COVID-19 safety protocols. Health education has been noted to positively impact health-seeking behaviour and improve patients' health literacy (20,26), which is especially necessary for PLHIV since they have a higher risk of getting infected with the corona virus (27). Also, the study revealed strict adherence to some of the safety protocols clinic such as handwashing and wearing of face mask at the ART clinic. This finding is in congruence with another study by Neuwirth, Mattner, & Otchwemah, (28) that reported a significantly high adherence to COVID-19 protocols in a German hospital. However, other protocols such as social distancing was not maintained as the findings indicated overcrowding at the unit in several instances. Furthermore, ARV stock-out resulted in limited dispensing, changes in clients' treatment regimen and shorter refill appointments, that required the patients to report to the clinic more frequently during the pandemic; increasing the financial cost of accessing care than they did previously. Although ART service delivery was structured to accommodate the challenges that the pandemic presented to the health system and the clients, there is the need to establish appropriate contingency strategies to ensure continuous access to ART care during future pandemics. The study also recorded that the pandemic and protocols required to minimise the risk of infection impacted the patients' ability to readily access health workers providing ART services. For some clients, the health workers continued to exhibit positive and welcoming attitudes. Similar studies conducted in Ghana prior to the pandemic reported that PLHIV having continuous access to the health workers providing ART services positively impacted their retention in care and adherence to treatment (29). It is therefore important to identify strategies to enhance health worker-patient engagement in times when physical distance is required.	
Limitations	Possibility of social desirability bias in highlighting participants' access to ART services could not be excluded as majority of the patients were old patients of the clinic.	16
Other		

Conflicts of interest	The authors declare that they have no competing interests.	3
Funding	Funded by the individual researchers	3

BMJ Open

An explorative-descriptive study on the effects of COVID-19 on access to Antiretroviral Therapy services: The case of a Teaching Hospital in Ghana

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2021-056386.R1
Article Type:	Original research
Date Submitted by the Author:	27-Jan-2022
Complete List of Authors:	Abraham, Susanna Aba; University of Cape Coast, Department of Adult Health Doe, Patience ; University of Cape Coast, Department of Adult Health Osei Berchie, Gifty ; University of Cape Coast, Maternal and Child Health Department Agyare, Elizabeth; Cape Coast Teaching Hospital, Clinical Microbiology/Public Health Unit Ayisi Addo, Stephen ; National HIV/AIDS Control Programme, Programme Manager Obiri-Yeboah, Dorcas ; Cape Coast Teaching Hospital, Clinical Microbiology/Public Health Unit; University of Cape Coast, Directorate of Research Innovation and Consultancy,
Primary Subject Heading:	Public health
Secondary Subject Heading:	HIV/AIDS, Health services research, Qualitative research
Keywords:	Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, HIV & AIDS < INFECTIOUS DISEASES, Public health < INFECTIOUS DISEASES, QUALITATIVE RESEARCH, PUBLIC HEALTH

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An explorative-descriptive study on the effects of COVID-19 on access to Antiretroviral Therapy services: The case of a Teaching Hospital in Ghana

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Abstract

Objective

To explore how the Coronavirus disease of 2019 (COVID-19) pandemic affected access to Antiretroviral Therapy (ART) services from the perspective of the Persons Living with HIV (PLWH).

Design

The study adopted an exploratory-descriptive qualitative design that utilised in-depth interviews as the technique for the data collection. Data analysis was done using conceptual content analysis, following the traditions of Elo and Kyngäs on deductive and Hsieh on inductive content analysis.

Setting

ART clinic, Cape Coast Teaching Hospital, Ghana.

Participants

Twelve participants who had at least one year history of accessing ART care before the COVID-19 pandemic and at least one clinic visit during the pandemic were purposively sampled from the ART clinic.

Results

Five concepts of accessing healthcare proposed by Penchansky and Thomas were explored: Accessibility, Availability, Affordability, Accommodation and Acceptability. The ART unit in the study setting remained open for service delivery throughout the pandemic. However, fear of contracting the virus while patronising services affected the participants' decision to utilise the facility. Although all the participants in this study reportedly honoured their refill appointments, they indicated knowledge of other PLWH defaulting. With reference to the availability of resources, a shortage of ARVs was reported, affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the virus by instituting the stipulated COVID- 19 protocols. The study found that some of the strategies impacted the acceptability and affordability of the services as transportation costs increased. Varying levels of accessibility to health workers providing ART services in the study setting was also recorded.

Conclusion

Strategies were implemented to accommodate the effects of the pandemic on ART provision. However, these had deficiencies that must be addressed using appropriate Differentiated Service Delivery (DSD) interventions. That will ensure continuous access to service delivery in the ongoing and any similar future occurrences.

Article Summary

Strengths and limitations of this study

- This is a novel study which explored the impact of COVID-19 on ART services in the Ghanaian setting.
- The explorative-descriptive approach allowed for in-depth study of the impact of the pandemic on access to ART services which has not been widely studied.
- The content analysis method employed allowed for cognitive mapping of findings.
- There is the possibility for social desirability bias.
- Another limitation of this study was the exclusion of the health workers as study participants. Their involvement would have elicited their responses and perspectives to some of the comments of the patients and brought clarity to the findings.

Funding statement

The project was funded mainly by the individual authors.

Competing interest

The authors declare that they have no competing interests.

Authors' contribution

All authors have read and approved the final manuscript.

SAA and DOY designed the research, drafted and revised the manuscript; SAA, PFD and GOB collected, analysed the data and drafted the manuscript. EA and SA revised the manuscript.

Patient consent for publication

This is not applicable since this study does not include any clients' identification.

Data sharing statement

The data collected on this topic have been presented in this manuscript. However, any further details required can be available from the corresponding author on reasonable request.

Introduction

People Living with HIV (PLWH) depend on an uninterrupted supply of antiretroviral (ARV) drugs and other health services to maintain their health. However, the outbreak of COVID in 2019 negatively impacted global health systems, programs, and targets(1). The Centre for Disease Control and Prevention (CDC) has stated that persons with underlying medical conditions are more likely to be infected with COVID-19. This heightened risk is also associated with living with HIV and not being on treatment or having a low CD4 count (2). Other studies have also reported a more severe disease episode (3–5) as well as a 21 percent more likelihood of death among PLWH who are infected with COVID-19 than those without HIV (4).

CDC reported that the coronavirus is highly contagious and spread rapidly (6,7). Hence, social distancing, wearing face masks, and continual handwashing were recommended to stop the transmission (8). In response, many countries, including Ghana locked down at various periods and introduced strict measures to reduce the spread of the virus (9,10).

The World Health Organization (WHO) has reported that in the wake of the persistent fear of infection, misinformation and restriction on movement globally, patients' uptake of health services, including those related to HIV/AIDS care, will be negatively affected by the COVID-19 pandemic (11). It was estimated that a six-month disruption in ART supply in sub-Saharan Africa during the pandemic would increase the rate of HIV-related death by half a million and roll back the gains made (12) towards eliminating HIV by 2030.

Several studies estimated the impact of the pandemic on ART services in sub-Saharan countries (13,14). A decline in HIV testing was recorded during the pandemic in South Africa (13) and Malawi (14). However, these studies did not explore qualitatively the reasons underscoring the decline. Studies have also looked at the impact of the pandemic on wellbeing, coping and other aspects of the life of Ghanaians (15,16), but none to our knowledge has addressed issues related to access to healthcare services for PLWH. Since HIV services, including antiretroviral therapy (ART) in Ghana, is still mainly facility-based, it is essential to understand how the pandemic influenced access to ART services from the perspectives of PLWH and to unearth the reasons for which this affected access.

Objective

The study sought to explore how the COVID-19 pandemic affected access to Antiretroviral Therapy (ART) services from the perspective of Persons Living with HIV (PLWH).

Methodology

Study design

An exploratory-descriptive qualitative design was adopted to explore clients' experiences accessing HIV care during the COVID-19 pandemic.

Study setting

The target population was patients accessing ART services at the Cape Coast Teaching Hospital in Ghana. The hospital was selected because it provides care to the general public, recording over 3000 patients. The Unit also serves as the referral centre for all HIV clinics in the region.

Participants and sampling procedure

Participants were sampled purposively based on eligibility criteria that required the patient to be at least 18 years at the time of the data collection, have at least one-year history of accessing care in the ART unit before COVID-19, and at least one clinic visit during the pandemic. Purposive sampling was then applied in recruiting participants. To begin with, nurses who acted as gatekeepers in the clinic generated a list of eligible participants by reviewing patients' clinic records to determine those who met the eligibility criteria and had refill appointments during the study period. The nurses initially explained the study to them. After that, they invited the researchers to discuss the purpose of the study with those who had expressed interest using the information sheet as a guide while the necessary clarifications were given. Twelve participants who indicated a willingness to participate were recruited into the study as data saturation was observed to occur at this point and no new information was being collected. All participants were encouraged to choose a pseudonym at enrolment and provide their socio-demographic data and clinical history. The COVID-19 protocols such as social distancing and wearing of nose masks were maintained throughout the interviews.

Data collection

Data collection took place between January and March 2021. In-depth interviews using a semi-structured guide (attached as supplementary document A) were conducted in English and Fante (local Ghanaian language predominantly spoken in the region). The interview guide was developed following literature review and inputs by experts in HIV/AIDS care using the Penchansky & Thomas (17) as a guide. The guide was pretested in the HIV clinic at the Cape Coast Metropolitan Hospital, which has similar characteristics as the research setting. This resulted in the modification of the language of two questions that ensured clarity.

The interviews were conducted in an office allocated for research in the HIV clinic after the patient had accessed care.

Two researchers audio-recorded each interview independently and mostly lasted between 35 and 45 minutes. Additionally, back translation was done for the interviews conducted in Fante to ensure the essence of the participants' experiences were not lost during translation.

Data Analysis

Conceptual content analysis (18) was conducted. Both inductive and deductive analyses were done following the recommendations of Elo and Kyngäs (19) on deductive and Hsieh (20) on inductive content analysis.

The theory of accessing health care proposed by Penchansky & Thomas (17) was adopted as a theoretical framework in this study. The theory proposed five concepts that were adopted in the design of the instrument for data collection and applied as a lens during the deductive content analysis to identify patterns in the participants' narratives. This theory of access was a good fit for this study. The concepts outline the interaction of the key elements representing the patient's needs and the health system's ability to meet those needs even during the pandemic. The concepts include:

Accessibility: which refers to geographic accessibility and sought to determine by how easily PLWH can reach health facilities during the pandemic.

Affordability: assessed the cost of accessing ART care including cost of transportation and accessing drug refill.

Availability: measures the extent to which the provider has the requisite resources such as the ART drugs to meet the needs of the client.

Accommodation: reflects the extent to which the provider's operation is organised to meet the constraints and preferences of the client.

Acceptability: determines the extent to which the client is comfortable with the characteristics of the providers. This explores the participants' perception of staff attitude and the pandemic's influence on their interaction with the staff (21,22).

Texts corresponding to the concepts were highlighted and organised. Next, the texts in each category were read and coded inductively to identify sub-categories. Two researchers worked together to

develop a codebook after reaching a consensus on the categories and sub-categories. The team also confirmed the codebook. The codebook was then applied to the text to code all transcripts by one researcher. The findings were then organized into sub-categories derived from the deductive and inductive analysis, considering the research objectives. Subsequently, the team met to confirm the common findings.

Ensuring trustworthiness

Reliability and trustworthiness were maintained by establishing and following these decisions before the coding process; flexibility on the identification of all codes that had significant implications for the research question; and coding for the existence of a concept in a participant's transcript and not the frequency (the number of times it appears in a single transcript). Two researchers read the transcripts independently and conducted the initial open coding by labelling the meaningful units as codes to categorise the data. An audit trail was maintained throughout data collection and analysis.

Ethical Considerations

Ethical approval was obtained from the Cape Coast Teaching Hospital Ethics Review Committee (CCTHERB/EC/2020/107). The study also complied with all the ethical considerations stipulated in the Declaration of Helsinki. Both oral and written informed consents were obtained from the clients before data collection was initiated. A checklist that outlines the ethical considerations is attached as a supplementary document B.

Patients and public involvement:

The research instrument was finalised following clarifications and suggestions from PLWH, who participated in the pre-test. After that, the initial sub-categories that emerged from the analysis were sent back to the study participants for member checking and clarification before finalising the findings. For those who were not literate, the researcher translated emerging sub-categories to ensure they aligned with the shared experiences.

Results

Sociodemographic characteristics

The majority of the participants were females (n=10/12), 40 years or older (n=9/12). The majority had a maximum of basic or no formal education (n=8/12). The person with the longest HIV diagnosis had lived with the condition for 18 years. The participants aggregated 121 years of living with HIV and accessing ART services. Table 1 presents the Sociodemographic characteristics of participants.

Table 1: Sociodemographic characteristics of participants

Interview no.	Pseudonym	Age (range)	Sex	Years since HIV diagnosis
1.	Ama	40-49	Female	2
2.	Aku	50-59	Female	2
3.	Eko	30-39	Female	10
4.	Oye	40-49	Female	17
5.	Ben	>20-29	Male	18
6.	Afi	60-69	Female	10
7.	Bob	50-59	Male	7
8.	Yaa	20-29	Female	13
9.	Aba	40-49	Female	17
10.	Esi	40-49	Female	10
11.	Pra	40-49	Female	12
12.	Abi	60-69	Female	3

Emergent Concepts

The five concepts posited by Penchansky & Thomas (17) on health care access guided the data analysis: "Accessibility", "Availability", "Affordability", "Accommodation" and "Acceptability". Sub-categories were generated under each major concept. The concepts and sub-categories are organised in table 2.

Table 2: Emergent Concepts

Concepts & Sub-categories	Participants											
	Ama	**Aku**	**Eko**	**Oye**	**Ben**	**Afi**	**Bob**	**Yaa**	**Aba**	**Esi**	**Pra**	**Abi**
A. Accessibility												
ART clinic never closed	x	x	x	x	x	x	x	x	x	x	x	x
Fear affected patronage of Services	x		x	x	x	x	x	x	x	x	x	x
Honouring appointment • *Never missed* • *A few defaulters*	x		x		x	x	x		x	x x		x x
B. Availability												
ARV availability		x	x	x	x	x			x	x	x	x
C. Affordability												
Acquiring Personal protective equipment (PPEs) & medication	x	x	x	x	x	x				x	x	x
Increased cost of transportation									x		x	x
D. Accommodation												
Implementation of COVID-19 protocols in the HIV clinic			x	x	x	x			x	x		x
Increased education on COVID-19 protocols	x	x		x	x				x	x	x	
Adherence to safety protocols	x	x	x	x	x	x	x	x	x			
The Downsides • *Overcrowding* • *Long waiting time*	x x	x x		x x	x				x		x	
E. Acceptability												
Access to the healthcare professionals				x	x	x	x	x	x[1]	x		x

Theme 1: Accessibility

[1] "x" indicates that the participants alluded to those concepts in their interviews and transcripts.

- ***ART clinic remained open***

From the narratives, all twelve participants indicated that the ART clinic remained open for service delivery throughout the pandemic. A participant stated:

> "Even though the president said we should stay at home, they [health practitioners] were going to work… yes, so they were there [ART clinic]. (Ben, 18 years since HIV diagnosis)

Several participants said they received notification that the ART clinic was opened. They were encouraged to access care when the need arose despite the order to stay at home. An excerpt read:

> "After the outbreak of the disease, everybody was frightened, but where I was treated, they [health workers] will say 'you just come'." (Esi, 10 years since HIV diagnosis)

- ***Fear affected patronage of services***

Even though the ART clinic was opened during the pandemic, several narratives revealed that service patronage was initially curtailed. Several participants expressed initial misgivings about accessing the ART clinic because of fear of contracting the virus.

> "I sometimes get worried that if I do not take care, I will be infected here [health facility]." (Oye, 17 years since HIV diagnosis)

From the narratives, the participants' fear was heightened by knowing that they had a greater risk of contracting the virus because of their HIV positive status.

> "I feared that maybe I might contract the virus because of my sickness [HIV status]. (Eko, 10 years since HIV diagnosis)

Some participants' fear of contracting the virus indicated misinformation about the modes of transmission.

> "My only fear was the sweat of another person touching my skin. Like me, some patients did not come to the clinic because of the fear of getting the virus" (Aba, 17 years since HIV diagnosis)

Thus, few participants reported being uncomfortable accessing HIV care in the health facility, while some suggested service delivery at home to minimise their presence in the health facility.

However, the fear minimised when they gathered the courage to attend the HIV clinic and realised that there was an enforcement of the COVID-19 protocols.

"My fear of contracting the virus was reduced because of the things [protocols] put in place to prevent COVID-19." (Eko, 10 years since HIV diagnosis)

- ***Honouring appointments***

The narratives revealed that most participants did not default or miss a refill appointment during the pandemic. This was mainly attributed to a sense of duty and a need to preserve their health.

"I know for sure I should come because it's for my own benefit, no matter what the situation is" (Ben, 18 years since HIV diagnosis)

A participant explained that although she did not honour her refill appointment during the pandemic on the advice of her family, she did not default because arrangements were made to ensure continued access to treatment.

"I didn't come at all [to the health facility], because my Auntie was saying it is easy for us [PLWH] to get the sickness [COVID-19]. She said as for me because of my situation [HIV status], if I get the disease, it will be easy for me to die. So, I have to stay home and she will go to the hospital." (Yaa, 13 years since HIV diagnosis)

Familial and healthcare worker support was an integral part of continued access to care during the pandemic.

"I sometimes leave the clinic and get some staff members to receive the drug on my behalf, after which I go for it at the individual's residence." (Aba, 17 years since HIV diagnosis)

Despite their fears, the participants' commitment to access care ran through most of the narratives.

- ***A few defaulters***

From the clients' perspective, HIV service utilisation decreased at the onset of the pandemic. One participant said:

"During the initial stages of the pandemic, you will come here [HIV clinic], and you won't meet anybody [clients], and it's like, where are they?" (Ama, 2 years since HIV diagnosis)

Some participants shared their awareness of some clients defaulting from HIV care during the pandemic, while others suggested the possibility of those clients accessing care in other facilities.

> "I am from K [residence] and some of the patients I was coming to the ART clinic with, no longer come." (Afi, 10 years since HIV diagnosis)

However, as the months progressed and the pandemic did not wane, clients reported to the facility for treatment refill. That increased the number of participants attending the clinic.

> "Yeah, I was shocked that huge numbers were coming." (Ben, 18 years since HIV diagnosis)

Theme 2: Availability

- ***ARV availability***

Clients who came to the clinic at the onset of the pandemic reported receiving the prescribed quantity of ARVs. Thus, these participants did not experience a shortage of drugs.

> "Drugs were available… they were able to give me three (3) months stock." (Eko, 10 years since HIV diagnosis)

Some participants, however, narrated instances when they received information about the shortage of some drugs at the HIV clinic. The shortage reportedly affected the quantity of ARVs supplied to the patients during their refill visits

> "Before the disease [COVID-19], I was usually given medications that lasted for four months or five months, but after the disease, I am being given two months. Recently, they said there is a shortage of the medications, so if you stay afar [residence], they give you a medication that will last for one month, but if you are near, they give you a medication that will last for two weeks or one week." (Oye, 17 years since HIV diagnosis)

Two participants intimated a change in their treatment regimen during the height of the COVID-19 pandemic.

> "Some of my drugs were changed. They [healthcare professionals] said the drugs were changed because of the COVID-19." (Yaa, 13 years since HIV diagnosis)

Theme 3: Affordability

- *Unbudgeted Cost: Acquiring PPEs and medication*

The participants' increased cost of PPEs, which was a requirement for being allowed access to the facility, also hindered their utilisation of HIV services during the pandemic.

> "You know sanitizers that we usually weren't using became so expensive. In this case, how do you expect a layman to buy? He won't buy, and that's a risk not to himself alone but to everybody." (Ama, 2 years since HIV diagnosis)

A few participants also indicated that they incurred costs for acquiring medications that were not dispensed at the HIV clinic due to the pandemic. They purported that was not a usual phenomenon prior to the pandemic.

> "Sometimes when you come, there will be no Septrin so they will prescribe it for you to buy it outside. If you don't have money to buy you stop. The last time I came, I couldn't afford Septrin so I have not taken some till now. This COVID-19 has really caused problems." (Esi, 10 years since HIV diagnosis)

From the narratives, under-utilisation of HIV services was attributed to patients being turned away from the health facility when they did not present in PPEs. A participant narrated:

> "They [health providers] weren't giving us the masks initially. So, if you come [hospital] and you don't have a mask, you will not be allowed to enter the hospital…. So, the nurses can't take care of you. So, go home." (Ama, 2 years since HIV diagnosis)

- ***The increased cost of transportation***

Few participants commented on the financial burden incurred while accessing HIV care during the pandemic. This cost was mainly attributed to the need to honour more refill appointments due to the shortage of ARVs and the pharmacy's limited amount dispensed at a time.

> "That place [residence] is very far. Before COVID-19, they pharmacists] gave me quantities that would last for six months. If you don't get three months quantities, you have to be coming here [HIV clinic] every month. So, now that they want to give us the drug on a weekly basis, I have to come again. It has brought me a problem. I was thinking a lot so I came after my review date [defaulted on appointment date]." (Pra, 12 years since HIV diagnosis)

> "Sometimes when you are coming, you might not have money on you even for transport but you will try and come." (Esi, 10 years since HIV diagnosis)

Theme 4: Accommodation

- ***Implementation of COVID protocols in the HIV clinic***

According to the participants, the COVID-19 protocols were instituted in the HIV clinic and monitored to ensure that patients complied with the directives.

> "They were following the protocols that the president gave. They have provided Veronica Bucket[2] at the entrance of the hospital, where you wash your hands. They use the thermometer gun to check your temperature. They are adhering to the safety protocols." (Ben, 18 years since HIV diagnosis)

- ***Increased education on Covid-19 protocols***

The participants intimated there was increased education on COVID-19 and the safety protocols at the clinic.

> "They educate us on the … COVID-19 prevention protocols…" (Aku, 2 years since HIV diagnosis)

The education that participants received on COVID-19 empowered them to take responsibility for their own safety.

> "The only change is we protecting ourselves from being infected. The health care workers explained it to us." (Oye, 17 years since HIV diagnosis)

- ***Adherence to safety protocols***

Although most of the participants alluded to general compliance to the protocols, some narratives revealed instances of non-adherence to the protocols instituted to protect staff and patients from contracting COVID-19. This was attributed to a lack of understanding and limited education on the protocols.

> "They [healthcare professionals] were wearing their mask… and nobody talks to you [client] about your mask. For me, I feel the understanding wasn't there. They [healthcare professionals]

[2] An improvised plastic bucket which has a tap attached used as a hand washing facility in health facilities where access to continuous supply of portable water is not consistent.

say wear mask, so, when somebody [client] gets tired, he takes it off." (Ama, 2 years since HIV diagnosis)

Another participant intimated that the healthcare professionals did not adhere to some of the safety protocols they educated the clients on and suggested action should be taken to ensure that the health staff complied with the protocols.

> "Some don't put on the mask when working or the mask is on their chin. But they want you, the patient, to put on your mask. Talk to them to change their attitude because they can't tell us to put it on while theirs are not on." (Yaa, 13 years since HIV diagnosis)

- ***The Downsides***

For many of the participants, the pandemic affected service delivery in the clinic. These included reported issues of overcrowding and long waiting time.

Overcrowding

Participants indicated that the number of patients visiting the clinic increased as the pandemic waged on. This resulted in congestion in the HIV unit, raising a source of concern for clients accessing care at the HIV clinic. To avoid the risk of getting infected with COVID-19, some participants, therefore, decided not to honour their refill appointments.

> "I will say that crowding in this particular era [COVID-19] isn't the best." (Ama, 2 years since HIV diagnosis)

Long waiting time

Participants indicated that the long waiting times increased their risk of contracting the virus. This was related to the lack of clear pathways in service delivery to meet the needs of the various categories of patients.

> "The more the waiting time, the riskier. I am waiting here because I have to go for my vital signs, and then they [nurses] will decide if I have to see a doctor. I think it's time-wasting. At least they should speed after the usual check-up." (Ama, 2 years since HIV diagnosis)

For others also, delays were experienced at the pharmacy. This was attributed to the few staff assigned to serve the drugs.

> "My only challenge had to do with the waiting time for the drugs. I spend more time to be served my drug. I suggest that management increases the number of people who distribute the drug at the pharmacy in order to reduce the waiting time" (Eko, 10 years since HIV diagnosis)

Some participants attributed the long waiting time to a reduction in the number of healthcare professionals providing services in the HIV clinic during the pandemic.

> "I know they said they were running shift, so it reduced the number of doctors and nurses available. The pharmacists reduced in number. I only saw two guys there… I think they should be faster in the activities because they delay us." (Ben, 18 years since HIV diagnosis)

Theme 5: Acceptability

Access to the healthcare professionals

From the narratives, most of the participants continued to have positive experiences with the healthcare workers even in the pandemic. Abi, a 65-year-old woman who had lived with HIV for three years said:

> "The doctors and the nurses come always, and when we meet their absence, they inform us that they were doing something elsewhere, so they will be with us shortly. For me, I come and meet them every day." (Abi, 3 years since HIV diagnosis)

Some participants bemoaned that the pandemic affected access to the healthcare professionals in the HIV clinic and struggled to cope with the many changes.

> "It was really difficult because you may not get access to the nurses or doctors because the COVID-19 was really popping up and everything has been restricted here, the way you sit, everything has been changed." (Ben, 18 years since HIV diagnosis)

Discussion

Following exploration of the concept of availability of services proposed by Penchansky & Thomas (17), the study findings revealed that the ART clinic remained open during the pandemic. Thus, most of the participants in this study did not miss ART refill appointments or defaulted from care. Studies in South Africa (13) and Malawi (14) also indicated that clients had access to HIV testing services during the pandemic. Our findings further elucidate alternative strategies adopted to ensure a continuous supply of ART drugs to clients. They included having uninfected relatives pick up ART refills at the

pharmacy and scheduling appointments to decrease patient numbers at the clinic at any point time (refer to table 2). These measures were successful as a result of a vibrant family support system and a need to preserve their health.

Although the services were available, there were instances of ARV stock-out, resulting in the pharmacy under-supplying the prescribed dosage. Several modelling studies projected ART supply and distribution disruption during pandemics (23,24).

Regarding the concept of accessibility posited by Penchansky & Thomas (17), the study found that instituting lockdown to curb the spread of the virus (10) affected geographical access to ART service. Although this was not a general phenomenon, several clients remained indoors to minimise the risk of contracting the virus. Some participants knew PLWH, who defaulted during the pandemic. This findings corroborates observations recorded in Kigali, Rwanda, where 52% of clients in an ART clinic missed refill appointments (25). These treatment interruptions can contribute to compromised immunologic and virologic outcomes and adherence failure once ART is reintroduced (26,27). This can further reverse the country's gains in achieving the third and fourth 95-95-95 targets which seek seeks to ensure that 95% of PLHIV who know their status initiate treatment as well as 95% of those on treatment achieve viral suppression (28).

Furthermore, the study findings revealed that several strategies were implemented at the ART clinic during the pandemic. It was evident that reporting for refill appointments was an opportunity to receive education on COVID-19 safety protocols. Health education has been noted to positively impact health-seeking behaviour and improve patients' health literacy (14,29), which is especially necessary for PLWH since they have a higher risk of getting infected with the coronavirus (30).

Also, the study revealed strict adherence to some of the safety protocols clinics, such as handwashing and wearing of face masks at the ART clinic (refer to table 2). This finding is in congruence with another study by Neuwirth, Mattner, & Otchwemah, (31) that reported significantly high adherence to COVID-19 protocols in a German hospital.

However, other protocols such as social distancing were not maintained. The findings indicated overcrowding at the Unit on several occasions as the pandemic waged on and seemed to have become the new normal. Furthermore, ARV stock-out resulted in limited dispensing, changes in clients' treatment regimen and shorter refill appointments that required the patients to report to the clinic more frequently during the pandemic, increasing the financial cost of accessing care than they did previously.

Although ART service delivery was structured to accommodate the pandemic's challenges presented to the health system and the clients, there is the need to establish appropriate contingency strategies to ensure continuous access to ART care during future pandemics.

The Differentiated Service Delivery (DSD) model, which recommends that stable clients can receive their refill every three months without undergoing any clinical consultation (32), could be adopted as a strategy to ease the frequency of visit and waiting time identified in this study. Although the facility had initiated the DSD model of service delivery, ART service is still very much a facility-based intervention (33). While previous study among clients of this same facility suggested that this was preferred to community-based approaches (34), the COVID-19 pandemic has demonstrated the deficiencies in this strategy. Therefore, it is essential to identify DSD strategies that address these challenges to ensure continuity of services and adapt them in the Ghanaian context.

A previous study among clients of this same facility suggested that the facility-based intervention was preferred to community-based approaches (34),but the COVID-19 pandemic has demonstrated deficiencies in this strategy. Therefore, it is essential to educate their clients and employ drop-in centres facility-based intervention and community refill options to ease the burdens of clients (32).

On the issue of acceptability, the study also recorded that the pandemic and protocols required to minimise the risk of infection impacted the patients' ability to access health workers providing ART services readily. The health workers continued to exhibit positive and welcoming attitudes for some clients. Similar studies conducted in Ghana before the pandemic reported that continuous access to health workers providing ART services impacted positively on retention in care and adherence to treatment among PLWH (35).

Limitation and strengths

The possibility of social desirability bias in highlighting participants' access to ART services could not be excluded. That is because most of the patients were long-time clients of the clinic. Another limitation of this study was excluding the health workers as study participants. Their involvement would have elicited their responses and perspectives to some of the patients' comments and brought clarity to the findings.

The study's strength lies in the use of the qualitative explorative-descriptive approach as the design in the study of the influence of the pandemic on Access to ART services which has not been widely

studied in the Ghanaian and sub-Saharan settings. This study, therefore, adds to the knowledge base of ART services delivery. Using the conceptual framework by Penchansky & Thomas as a guide for the study also sets it apart from other works and contribute to the knowledge on access to care in the Ghanaian context.

Conclusion

The pandemic affected access to ART service delivery in this study. Although the service remained available, the national COVID-19 response affected some participants' geographic access and also the availability of ART and related services. Strategies were implemented to accommodate the effects of the pandemic on ART provision. However, these had deficiencies which must be addressed using appropriate DSD interventions. This will ensure continuous access to ART service delivery in the current and any similar situations in the future.

Data availability statement

Data are available upon reasonable request. The data underlying this article cannot be shared publicly because of the privacy of the participants. The data will therefore be shared upon reasonable request to the corresponding author.

Ethics statements

Patient consent for publication

Participants gave consent to publish the data after reading the information sheets that indicated the authors' intentions to publish.

Ethics approval

The Cape Coast Teaching Hospital Ethics Review Committee approved the study (CCTHERB/EC/2020/107). The study also complied with all the ethical considerations stipulated in the Declaration of Helsinki. Each participant gave oral and written informed consent to participate in the study.

Availability of data and materials

All data generated or analysed during this study are available from the corresponding author on reasonable request.

Acknowledgements

The authors are grateful to all the patients who participated in the study, health workers in the ART clinic who facilitated the recruitment of patients, and the management of the CCTH for granting the needed support to conduct the study.

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Footnotes

Contributors: All authors have read and approved the final manuscript.

SAA, DOY, EA, and SA designed the research and revised the manuscript; SAA, PFD and GOB collected, analysed the data and drafted the manuscript.

Funding: This is because the project was funded mainly by the individual authors.

Competing interests: The authors declare that they have no competing interests.

Appendix - Individual Semi-structured Interview Guide for Patients

Date and time of interview:

Introduction

Thank you for taking time out of your busy schedule to take part in this interview. Before we start, I would like to explain the focus of this interview. You were contacted because you have accessed care in the ART clinic for at least one year. In spite of the many challenges that happened during the covid-19 pandemic, you continued to patronise the ART clinic at CCTH. I would like to gain insight into your experiences while attending clinic during the period, the challenges you faced as well as the strategies you applied to ensure that you did not break treatment. Please, remember that your feedback is confidential.

Socio-demographic Characteristics	
Pseudonym	
Age	
Sex	
Educational qualification	No formal education [ ] Primary [ ] Secondary [ ] Tertiary [ ]
Religion	Christian [ ] Muslim [ ] ATR [ ] Other, specify
Clinical characteristics	
Years since diagnosis	
Years since treatment initiation of ART	

1. Can you tell me your experience of accessing ART services during the Covid-19 pandemic?
2. How was the experience of attending the ART service during the pandemic different from the period before that?
3. As a client, was there any point where you were concerned about your safety when accessing care at the ART clinic?
    a. How did it impact the decision to access care during the pandemic?
4. In your opinion, how did the pandemic affect service delivery at the ART clinic?
    a. Accessibility: geographical access and cost
    b. Availability: drugs and consumables
    c. Acceptability: The number of staff present to provide care and their interactions with you
    d. Accessibility: Patients' attendance and uptake of service
    e. Affordability: Cost of treatment & impact of service on transportation
    f. Patient safety
5. What were some of the challenges you experienced while accessing the ART service during the pandemic?
6. How did you manage the challenges you faced during the pandemic?
7. If you had the opportunity to contribute to service delivery as smooth as possible during a pandemic, which ones will you prioritise?

Thank you for participating in this study

REPORTING CHECKLIST FOR QUALITATIVE STUDY BASED ON SRQR GUIDELINES

	REPORTING ITEM	PAGE NUMBER
Title	An explorative-descriptive study on the effects of COVID-19 on Access to ART services in a Ghanaian Teaching Hospital	1
Abstract	**Objective** To explore how the COVID-19 pandemic affected access to ART services from the perspective of the PLWH. **Design** The study utilised an exploratory-descriptive qualitative design. In-depth interview was the technique employed during data collection. Data was analysed using conceptual content analysis following the traditions of Elo and Kyngäs on deductive and Hsieh on inductive content analysis. **Setting** ART clinic, Cape Coast Teaching Hospital, Ghana. **Participants** Twelve participants who have at least one year of history of accessing ART care before the COVID-19 pandemic and at least one clinic visit during the pandemic were purposively sampled from the ART clinic. **Results** Five concepts of accessing health care were explored: Accessibility, Availability, Affordability, Accommodation and Acceptability. The ART unit in the study setting remained open for service delivery throughout the pandemic. However, the fear of contracting the virus while patronising the ART services affected the participants' decision to utilise the facility. Although all the participants in this study reportedly honoured all their refill appointments, they indicated knowledge of other PLWH defaulting. With reference to the availability of resources, a shortage of ARVs was reported, affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the virus by instituting the stipulated COVID-protocols. The study found that some of the strategies impacted the acceptability and affordability of the services as the cost	2-3

	of transportation increased. Varying levels of accessibility to health workers providing ART services in the study setting was also recorded. **Conclusion** Strategies were implemented to accommodate the effects of the pandemic on ART provision. However, these had deficiencies that must be addressed using appropriate DSD interventions. This will ensure continuous access to service delivery in the ongoing and any similar future occurrences.	
Introduction		
• Problem formulation	People Living with HIV (PLWH) depend on an uninterrupted supply of antiretroviral (ARV), drugs and other health services to maintain their health. The outbreak of COVID in 2019, however, had a negative impact on global health systems, programs, and targets (1). The Centre for Disease Control (CDC) reported that the coronavirus was highly contagious and spread rapidly (2,3). Hence, social distancing, wearing face masks, and continual handwashing among others, were recommended to stop the transmission (4). In response, many countries, including Ghana locked down at various periods and introduced strict measures to reduce the spread of the virus (5,6). The World Health Organization (WHO) has reported that in the wake of the persistent fear of infection, misinformation and restriction on movement globally, patients' uptake of health services, including those related to HIV/AIDS care, will be negatively affected by the COVID-19 pandemic (7). It was estimated that a six-month disruption in ART supply in sub-Saharan Africa during the pandemic would increase the rate of HIV-related death by half a million and roll back the gains made (8) towards the elimination of HIV by 2030. Ghana has a generalised HIV epidemic, and the national response has focused on attaining the 95 95 95 targets, which require increasing uptake of HIV screening, linkage to care and ensuring virologic suppression. Studies have looked at the impact of the pandemic on wellbeing, coping and other aspects of the life of	4

	Ghanaians (9,10), but none to our knowledge has addressed issues related to healthcare services for PLWH. Since HIV services including antiretroviral therapy (ART) in Ghana, is still mainly facility-based, This study, therefore, aims to explore the influence of the COVID-19 pandemic on access to ART services from the perspective of PLWH.	
• Purpose or research question	This study there aims to explores the influence of the COVID-19 pandemic on access to ART services from the perspective of PLWH.	4
Methods		
• Qualitative approach and research paradigm	An exploratory-descriptive qualitative design. This design was suitable as it allowed investigation into an area which has not been extensively studied. The five concepts of accessing health care proposed by Penchansky & Thomas (1981) as a lens to identify patterns: *Accessibility:* refers to geographic accessibility which is determined by how easily clients can reach health facility. *Affordability:* assesses the cost of accessing ART care. *Availability:* measures the extent to which the provider has the requisite resources to meet the needs of the client. *Accommodation:* reflects the extent to which the provider's operation is organised to meet the constraints and preferences of the client. *Acceptability:* determines the extent to which the client is comfortable with the characteristics of the providers.	4/5
• Researcher characteristics and reflexivity	The researchers are all trained health professionals who have expertise and publications in qualitative research methods. They have all worked in various capacities in the PMTCT/ART clinic for a cumulative 45 years. The PI and four other co-authors are trained at the PhD level and were adequately equipped to undertake the study.	N/A
• Context	ART services at the Cape Coast Teaching Hospital in Ghana. The hospital was selected because it has adequate facilities and provides care to the general public recording and recording over 3000 patients. The Unit also serves as the referral centre for all HIV clinics in the region.	4/5

• Sampling strategy	Purposive sampling based on the eligibility criteria that required the patient to be at least 18 years at the time of the data collection, have at least one year history of accessing care in the ART unit before COVID-19, and at least one clinic visit during the pandemic.	5
• Ethical issues pertaining to human subjects	The Cape Coast Teaching Hospital Ethics Review Committee gave approval for the study (CCTHERB/EC/2020/107). The study also complied with all the ethical considerations stipulated in the Declaration of Helsinki. Each participant gave both oral and written informed consent to participate in the study.	17
• Data collection methods	In-depth interviews were conducted in English and Fante (a local Ghanaian language predominantly spoken in the region. The interviews were conducted and audio-recorded by two researchers independently.	5
• Data collection instruments and technologies	Semi-structured interview guides were developed by the researchers based on the objectives of the study.	5
• Units of study	Each patient experience while accessing ART services during the COVID-19 pandemic was the unit of study. 12 participants experiences were explored and analysed.	5
• Data processing	Verbatim transcription of the interviews was conducted. Back translation was done for the interviews conducted in Fante to ensure the essence of the participants' experiences were not lost during translation. Pseudonyms were used to de-identify the participants.	5
• Data analysis	Conceptual content analysis (14) was conducted. Both inductive and deductive analyses were done following the recommendations of Elo and Kyngäs (15) on deductive and Hsieh (16) on inductive content analysis. . Each team member independently read the participants' responses in the verbatim transcripts to identify patterns. The deductive analysis was conducted using the five concepts of accessing health care proposed by Penchansky & Thomas (1981) as a lens to identify pattern.	5

• Techniques to enhance trustworthiness	Reliability and trustworthiness were maintained by establishing and following these decisions before the coding process; flexibility on the identification of all codes that had significant implication for the research question; and coding for the existence of a concept in a participant's transcript and not the frequency (the number of times it appears in a single transcript). Two researchers read the transcripts independently and conducted the initial open coding by labelling the meaningful units as codes to categorise the data. An audit trail was maintained throughout data collection and analysis.	6
Results/findings		
• Syntheses and interpretation	Five main concepts emerged from the data analysis: "Accessibility", "Availability", "Affordability", "Accommodation" and "Acceptability" Subthemes were generated under each major concept. The ART unit in the study setting remained opened for service delivery throughout the pandemic. However, the fear of contracting the virus while patronising ART services affected the participants decision to utilise the facility. Although, all the participants in this study reportedly honoured all their refill appointments, they indicated knowledge of other PLWH defaulted during the period. With reference to availability of resources, shortage of ARVs was reported affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the corona virus by instituting the stipulated COVID-protocol. The study found that some of the strategies impacted affordability of services as cost of transportation increased and also impacted acceptability of services. The study also found varied levels of accessibility to health workers providing ART services in the study setting during the pandemic.	2-3/7
• Links to empirical data	**Theme 1: Accessibility** • ***ART clinic remained open*** From the narratives, all twelve participants indicated that the ART clinic remained open for service delivery throughout the pandemic. A participant stated:	8-15

> "Even though the president said we should stay at home, they [health practitioners] were going to work… yes, so they were there [ART clinic]. (Ben, 18 years since HIV diagnosis)

Several of the participants said, they received notification that the ART clinic was opened and were encouraged to access care when the need arose in spite of the order to stay at home. An excerpt read:

> "After the outbreak of the disease, everybody was frightened, but where I was treated, they [health workers] will say 'you just come'." (Esi, 10 years since HIV diagnosis)

- ***Fear affected patronage of services***

In spite of the fact that the ART clinic was opened during the pandemic, several of the narratives revealed that service patronage was initially curtailed. Several of the participants, expressed initial misgivings about accessing the ART clinic because of fear of contracting the virus.

> "I sometimes get worried that if I do not take care, I will be infected here [health facility]." (Oye, 17 years since HIV diagnosis)

From the narratives, the participants' fear was heightened by the knowledge that they had a greater risk of contracting the virus because of their HIV positive status.

> "My fear was that, maybe I might contract the virus because of my sickness [HIV status]. (Eko, 10 years since HIV diagnosis)

Some participants' fear of contracting the virus indicated misinformation about the modes of transmission.

> "My only fear was the sweat of another person touching my skin. Like me, some patients did not really come to the clinic because of the fear of getting the virus" (Aba, 17 years since HIV diagnosis)

Thus, few participants reported being uncomfortable accessing HIV care in the health facility, while some participants suggested service delivery at home to minimise their presence in the health facility.

The fear was however minimised when they gathered the courage to attend the HIV clinic and realised that the COVID-19 protocols were being enforced.

> "My fear of contracting the virus was reduced because of the things [protocols] put in place to prevent COVID-19." (Eko, 10 years since HIV diagnosis)

- ***Honouring appointments***

The narratives revealed that most of the participants did not default or miss a refill appointment during the pandemic. This was mainly attributed to a sense of duty and a need to preserve their health.

> "I know for sure I should come because it's for my own benefit, no matter what the situation is" (Ben, 18 years since HIV diagnosis)

A participant explained that although she personally did not honour her refill appointment during the pandemic on the advice of her family, she did not default because arrangements were made to ensure continued access to treatment.

> "I didn't come at all [to the health facility], because my Auntie was saying it is easy for us [PLWH] to get the sickness [COVID-19]. She said as for me because of my situation [HIV status], if I get the disease, it will be easy for me to die. So, I have to stay home and she will go to the hospital." (Yaa, 13 years since HIV diagnosis)

Familial and healthcare worker support was an integral part of continued access to care during the pandemic.

> "I sometimes leave the clinic and get some staff members to receive the drug on my behalf, after which I go for it at the individual's residence." (Aba, 17 years since HIV diagnosis)

The participants commitment to access care in spite of their fears ran through most of the narratives.

- ***A few defaulters***

From the clients' perspective, HIV service utilisation decreased at the onset of the pandemic. One participant said:

	"During the initial stages of the pandemic, you will come here [HIV clinic] and you won't meet anybody [clients] and it's like, where are they?" (Ama, 2 years since HIV diagnosis) Some participants shared their awareness of some clients defaulting from HIV care during the pandemic, while others suggested the possibility of those clients accessing care in other facilities "I am from K [residence] and some of the patients I was coming with [ART clinic], no longer come." (Afi, 10 years since HIV diagnosis) However, as the months progressed and the pandemic did not wane, clients reported to the facility for treatment refill. This increased the number of participants attending the clinic. "Yeah, I was shocked that huge numbers were coming." (Ben, 18 years since HIV diagnosis) **Theme 2: Availability** • ***ARV availability*** For clients who came to the clinic at the onset of the pandemic, they reported being supplied with the quantity of ARVs prescribed by the healthcare workers. Thus, these participants did not experience shortage of drugs. "Drugs were available… they were able to give me three (3) months stock." (Eko, 10 years since HIV diagnosis) Some participants however, narrated instances when they were informed of shortage of some drugs at the HIV clinic. The shortage reportedly affected the quantity of ARVs supplied to the patients during their refill visit. "Before the disease [COVID-19], I was usually given medications that lasted for 5 months or 4 months but after the disease, I am being given 2 months. Recently, they said there is shortage of the medications so if you stay afar [residence], they give you a medication that will last for 1 month but if you are near, they give you a medication that will last for two	

weeks or 1 week." (Oye, 17 years since HIV diagnosis)

Two participants intimated that their treatment regimen was changed during the COVID-19 pandemic.

> "Some of my drugs were changed. They [healthcare professionals] said the drugs were changed because of the COVID." (Yaa, 13 years since HIV diagnosis)

Theme 3: Affordability

- *Unbudgeted Cost: Acquiring PPEs and medication*

From the participants, the increased cost of PPEs, which was a requirement for being allowed access to the facility, also hindered their utilisation of HIV services during the pandemic.

> "You know sanitizers that we usually weren't using became so expensive. In this case, how do you expect a layman to buy? He won't buy, and that's a risk not to himself alone but to everybody." (Ama, 2 years since HIV diagnosis)

A few participants also indicated that they incurred cost in acquiring some medications that were not dispensed at the HIV clinic due to the pandemic. This they purported was not the case prior to the pandemic.

> "Sometimes when you come, there will be no Septrin so they will prescribe it for you to buy it outside. If you don't have money to buy you stop. The last time I came, I couldn't afford Septrin so I have not taken some till now. This COVID has really caused problems." (Esi, 10 years since HIV diagnosis)

From the narratives, under-utilisation of HIV services was attributed to patients being turned away from the health facility when they did not present in PPEs. A participant narrated:

> "They [health providers] weren't giving us the masks initially. So, if you come [hospital] and you don't have a mask, you will not be allowed to enter the hospital…. So, the nurses can't take care of you. So, go home." (Ama, 2 years since HIV diagnosis)

- ***Increased cost of transportation***

Few participants commented on the financial burden incurred while accessing HIV care during the pandemic. This cost was mainly attributed to the need to honour more refill appointments as a result of shortage of ARVs and the limited amount dispensed at a time by the pharmacy.

> "That place [residence] is very far. Before COVID, they pharmacists] gave me quantities that would last for 6 months. If you don't get 3 months quantity, you have to be coming here [HIV clinic] every month? So, now that they want to give us the drug on weekly basis, I have to come again. It has brought me a problem. I was thinking a lot so I came after my review date [defaulted on appointment date]." (Pra, 12 years since HIV diagnosis)

> "Sometimes when you are coming you might not have money on you even for transport but you will try and come." (Esi, 10 years since HIV diagnosis)

Theme 4: Accommodation

Implementation of COVID protocols in the HIV clinic

According to the participants, the COVID-19 protocols were instituted in the HIV clinic and monitored to ensure that patients complied with the directives.

> "They were following the protocols that the president gave. They have provided Veronica Bucket at the entrance of the hospital, where you wash your hands. They use the thermometer gun to check your temperature. They are adhering to the safety protocols." (Ben, 18 years since HIV diagnosis)

> "Initially [before Covid-19], we used to sit very close to each other at the clinic. But during the pandemic, we observe social distancing when we come to the clinic. The nurses ensure that you have washed your hands, sanitized and are

	in your nose mask." (Eko, 10 years since HIV diagnosis) *Increased education on Covid-19 protocols* The participants intimated there was increased education on COVID-19 and the safety protocols at the clinic. "They educate us on social distancing and COVID-19 prevention protocols… They tell us to wash our hands, and put on nose mask to prevent us from being infected." (Aku, 2 years since HIV diagnosis) The education that participants received on COVID-19 empowered them to take responsibility of their own safety. "The only change is we protecting ourselves from being infected. The health care workers explained it to us." (Oye, 17 years since HIV diagnosis) *Adherence to safety protocols* Although, majority of the participants alluded to a general compliance to the protocols, some narratives revealed that there were instances of nonadherence to the protocols instituted to protect staff and patients from contracting COVID-19. This was attributed to lack of understanding and limited education on the protocols. "They [healthcare professionals] were wearing their mask… and nobody talks to you [client] about your mask. For me, I feel the understanding wasn't there. They [healthcare professionals] say wear mask, so, when somebody [client] gets tired, he takes it off." (Ama, 2 years since HIV diagnosis) Another participant intimated that the healthcare professionals did not adhere to some of the safety protocols they educated the clients on and suggested action should be taken to ensure that the health staff complied with the protocols.	

"Some don't put on the mask when working or the mask is on their chin. But they want you the patient to put on your mask. Talk to them to change their attitude because they can't tell us to put it on while theirs are not on." (Yaa, 13 years since HIV diagnosis)

- ***The Downsides***

For many of the participants, service delivery in the clinic was affected by the pandemic. These included reported issues of overcrowding and long waiting time.

Overcrowding

Participants indicated that as the pandemic waged on, the number of patients' visiting the clinic increased. This resulted in congestion in the HIV unit raising a source of concern for clients accessing care at the HIV clinic. To avoid the risk of getting infected with COVID-19, some participants therefore decided not to honour their refill appointments.

"They [patients] really come in their numbers despite the pandemic." (Aku, 2 years since HIV diagnosis)

"I will say that crowding in this particular era [COVID-19] isn't the best." (Ama, 2 years since HIV diagnosis)

Long waiting time

Participants indicated that the long waiting times increased their risk of contracting the virus. This related to lack of clear pathways in service delivery to meet the needs of the various categories of patients.

"The more the waiting time, the riskier. I am waiting here because I have to go for my vital signs and then they [nurses] will decide if I have to see a doctor. I think it's time wasting. At least they should speed after the usual check-up." (Ama, 2 years since HIV diagnosis)

For others also, delays were experienced at the pharmacy. This was attributed to few staff assigned to serve the drugs.

"My only challenge had to do with the waiting time for the drugs. I spend more time to be served my drug. I suggest that management

increases the number people who distribute the drug at the pharmacy in order to reduce the waiting time" (Eko, 10 years since HIV diagnosis)

Some participants attributed the long waiting time to a reduction in the number of healthcare professionals providing services in the HIV clinic during the pandemic.

"They have reduced in number. If they were six, they are now four." (Oye, 17 years since HIV diagnosis)

"I know they said they were running shift, so it reduced the number of doctors and nurses available. The pharmacists reduced in number. I only saw two guys there… I think they should be faster in the activities because they delay us." (Ben, 18 years since HIV diagnosis)

A participant alluded to a decline in the quality of services received.

"It [COVID-19] affected the quality of services [HIV] we have." (Bob, 7 years since HIV diagnosis)

Theme 5: Acceptability

Access to the healthcare professionals

From the narratives, most of the participants continued to have positive experience with the healthcare workers even in the pandemic. Abi, a 65-year-old woman who had lived with HIV for three years said:

"The doctors and the nurses come always and when we meet their absence, they inform us that they were doing something elsewhere so they will be with us shortly. For me, I come and meet them every day." (Abi, 3 years since HIV diagnosis)

Some participants, however, bemoaned the pandemic had affected access to the healthcare professionals in the HIV clinic and struggled to cope with the many changes.

	"It was really difficult because you may not get access to the nurses or doctors because the COVID-19 was really popping up and everything has been restricted here, the way you sit, everything has been changed." (Ben, 18 years since HIV diagnosis)	
Discussion		
Integration with prior work, implications, transferability and contribution(s) to the field	Following exploration of the concept of availability of services, the study findings revealed that the ART clinic remained open during the pandemic. Thus, most of the participants in this study did not miss ART refill appointments or defaulted from care. Similar findings were reported in South Africa (19) and Malawi (20). For those who could not honour their appointments, alternative measures mainly associated with a vibrant family support system, and a need to preserve their health ensured treatment was not interrupted. Although the services were available, there were instances of ARV stock-out, resulting in the pharmacy under-supplying the prescribed dosage. Several modelling studies projected disruption in ART supply and distribution during pandemics (21,22). Regarding accessibility, the study found that instituting lockdown to curb the spread of the virus (11) affected geographical access to ART service. Although, this was not a general phenomenon, several clients remained indoors to minimise the risk of contracting the virus. Some participants knew PLWH who defaulted during the pandemic. Similar findings were recorded in Kigali, Rwanda where 52% of clients in an ART clinic missed refill appointments (23). These treatment interruptions can contribute to compromised immunologic and virologic outcomes, and adherence failure once ART is reintroduced (24,25). This can further reverse the country's gains in achieving the second and third, 90-90-90 targets (4). Hence the pandemic affected access to ART and measures such as case managers attending home visits to supply treatment during future pandemics can be explored to reduce the instances of treatment interruptions. Furthermore, the study findings revealed that several strategies were implemented at the ART clinic during the pandemic. It was evident that reporting for refill appointments was an opportunity to receive education	15-16

	on COVID-19 safety protocols. Health education has been noted to positively impact health-seeking behaviour and improve patients' health literacy (20,26), which is especially necessary for PLWH since they have a higher risk of getting infected with the corona virus (27). Also, the study revealed strict adherence to some of the safety protocols clinic such as handwashing and wearing of face mask at the ART clinic. This finding is in congruence with another study by Neuwirth, Mattner, & Otchwemah, (28) that reported a significantly high adherence to COVID-19 protocols in a German hospital. However, other protocols such as social distancing was not maintained as the findings indicated overcrowding at the unit in several instances. Furthermore, ARV stock-out resulted in limited dispensing, changes in clients' treatment regimen and shorter refill appointments, that required the patients to report to the clinic more frequently during the pandemic; increasing the financial cost of accessing care than they did previously. Although ART service delivery was structured to accommodate the challenges that the pandemic presented to the health system and the clients, there is the need to establish appropriate contingency strategies to ensure continuous access to ART care during future pandemics. The study also recorded that the pandemic and protocols required to minimise the risk of infection impacted the patients' ability to readily access health workers providing ART services. For some clients, the health workers continued to exhibit positive and welcoming attitudes. Similar studies conducted in Ghana prior to the pandemic reported that PLWH having continuous access to the health workers providing ART services positively impacted their retention in care and adherence to treatment (29). It is therefore important to identify strategies to enhance health worker-patient engagement in times when physical distance is required.	
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REPORTING CHECKLIST FOR QUALITATIVE STUDY BASED ON SRQR GUIDELINES

	REPORTING ITEM	PAGE NUMBER
Title	An explorative-descriptive study on the effects of COVID-19 on Access to ART services in a Ghanaian Teaching Hospital	1
Abstract	**Objective** To explore how the COVID-19 pandemic affected access to ART services from the perspective of the PLWH. **Design** The study utilised an exploratory-descriptive qualitative design. In-depth interview was the technique employed during data collection. Data was analysed using conceptual content analysis following the traditions of Elo and Kyngäs on deductive and Hsieh on inductive content analysis. **Setting** ART clinic, Cape Coast Teaching Hospital, Ghana. **Participants** Twelve participants who have at least one year of history of accessing ART care before the COVID-19 pandemic and at least one clinic visit during the pandemic were purposively sampled from the ART clinic. **Results** Five concepts of accessing health care were explored: Accessibility, Availability, Affordability, Accommodation and Acceptability. The ART unit in the study setting remained open for service delivery throughout the pandemic. However, the fear of contracting the virus while patronising the ART services affected the participants' decision to utilise the facility. Although all the participants in this study reportedly honoured all their refill appointments, they indicated knowledge of other PLWH defaulting. With reference to the availability of resources, a shortage of ARVs was reported, affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the virus by instituting the stipulated COVID-protocols. The study found that some of the strategies impacted the acceptability and affordability of the services as the cost	2-3

	of transportation increased. Varying levels of accessibility to health workers providing ART services in the study setting was also recorded. **Conclusion** Strategies were implemented to accommodate the effects of the pandemic on ART provision. However, these had deficiencies that must be addressed using appropriate DSD interventions. This will ensure continuous access to service delivery in the ongoing and any similar future occurrences.	
Introduction		
• Problem formulation	People Living with HIV (PLWH) depend on an uninterrupted supply of antiretroviral (ARV), drugs and other health services to maintain their health. The outbreak of COVID in 2019, however, had a negative impact on global health systems, programs, and targets (1). The Centre for Disease Control (CDC) reported that the coronavirus was highly contagious and spread rapidly (2,3). Hence, social distancing, wearing face masks, and continual handwashing among others, were recommended to stop the transmission (4). In response, many countries, including Ghana locked down at various periods and introduced strict measures to reduce the spread of the virus (5,6). The World Health Organization (WHO) has reported that in the wake of the persistent fear of infection, misinformation and restriction on movement globally, patients' uptake of health services, including those related to HIV/AIDS care, will be negatively affected by the COVID-19 pandemic (7). It was estimated that a six-month disruption in ART supply in sub-Saharan Africa during the pandemic would increase the rate of HIV-related death by half a million and roll back the gains made (8) towards the elimination of HIV by 2030. Ghana has a generalised HIV epidemic, and the national response has focused on attaining the 95 95 95 targets, which require increasing uptake of HIV screening, linkage to care and ensuring virologic suppression. Studies have looked at the impact of the pandemic on wellbeing, coping and other aspects of the life of	4

	Ghanaians (9,10), but none to our knowledge has addressed issues related to healthcare services for PLWH. Since HIV services including antiretroviral therapy (ART) in Ghana, is still mainly facility-based, This study, therefore, aims to explore the influence of the COVID-19 pandemic on access to ART services from the perspective of PLWH.	
• Purpose or research question	This study there aims to explores the influence of the COVID-19 pandemic on access to ART services from the perspective of PLWH.	4
Methods		
• Qualitative approach and research paradigm	An exploratory-descriptive qualitative design. This design was suitable as it allowed investigation into an area which has not been extensively studied. The five concepts of accessing health care proposed by Penchansky & Thomas (1981) as a lens to identify patterns: *Accessibility:* refers to geographic accessibility which is determined by how easily clients can reach health facility. *Affordability:* assesses the cost of accessing ART care. *Availability:* measures the extent to which the provider has the requisite resources to meet the needs of the client. *Accommodation:* reflects the extent to which the provider's operation is organised to meet the constraints and preferences of the client. *Acceptability:* determines the extent to which the client is comfortable with the characteristics of the providers.	4/5
• Researcher characteristics and reflexivity	The researchers are all trained health professionals who have expertise and publications in qualitative research methods. They have all worked in various capacities in the PMTCT/ART clinic for a cumulative 45 years. The PI and four other co-authors are trained at the PhD level and were adequately equipped to undertake the study.	N/A
• Context	ART services at the Cape Coast Teaching Hospital in Ghana. The hospital was selected because it has adequate facilities and provides care to the general public recording and recording over 3000 patients. The Unit also serves as the referral centre for all HIV clinics in the region.	4/5

• Sampling strategy	Purposive sampling based on the eligibility criteria that required the patient to be at least 18 years at the time of the data collection, have at least one year history of accessing care in the ART unit before COVID-19, and at least one clinic visit during the pandemic.	5
• Ethical issues pertaining to human subjects	The Cape Coast Teaching Hospital Ethics Review Committee gave approval for the study (CCTHERB/EC/2020/107). The study also complied with all the ethical considerations stipulated in the Declaration of Helsinki. Each participant gave both oral and written informed consent to participate in the study.	17
• Data collection methods	In-depth interviews were conducted in English and Fante (a local Ghanaian language predominantly spoken in the region. The interviews were conducted and audio-recorded by two researchers independently.	5
• Data collection instruments and technologies	Semi-structured interview guides were developed by the researchers based on the objectives of the study.	5
• Units of study	Each patient experience while accessing ART services during the COVID-19 pandemic was the unit of study. 12 participants experiences were explored and analysed.	5
• Data processing	Verbatim transcription of the interviews was conducted. Back translation was done for the interviews conducted in Fante to ensure the essence of the participants' experiences were not lost during translation. Pseudonyms were used to de-identify the participants.	5
• Data analysis	Conceptual content analysis (14) was conducted. Both inductive and deductive analyses were done following the recommendations of Elo and Kyngäs (15) on deductive and Hsieh (16) on inductive content analysis. . Each team member independently read the participants' responses in the verbatim transcripts to identify patterns. The deductive analysis was conducted using the five concepts of accessing health care proposed by Penchansky & Thomas (1981) as a lens to identify pattern.	5

• Techniques to enhance trustworthiness	Reliability and trustworthiness were maintained by establishing and following these decisions before the coding process; flexibility on the identification of all codes that had significant implication for the research question; and coding for the existence of a concept in a participant's transcript and not the frequency (the number of times it appears in a single transcript). Two researchers read the transcripts independently and conducted the initial open coding by labelling the meaningful units as codes to categorise the data. An audit trail was maintained throughout data collection and analysis.	6
Results/findings		
• Syntheses and interpretation	Five main concepts emerged from the data analysis: "Accessibility", "Availability", "Affordability", "Accommodation" and "Acceptability" Subthemes were generated under each major concept. The ART unit in the study setting remained opened for service delivery throughout the pandemic. However, the fear of contracting the virus while patronising ART services affected the participants decision to utilise the facility. Although, all the participants in this study reportedly honoured all their refill appointments, they indicated knowledge of other PLWH defaulted during the period. With reference to availability of resources, shortage of ARVs was reported affecting the refill appointment intervals. In spite of the challenges, several strategies were implemented to accommodate the patients' needs while protecting them from contracting the corona virus by instituting the stipulated COVID-protocol. The study found that some of the strategies impacted affordability of services as cost of transportation increased and also impacted acceptability of services. The study also found varied levels of accessibility to health workers providing ART services in the study setting during the pandemic.	2-3/7
• Links to empirical data	**Theme 1: Accessibility** • ***ART clinic remained open*** From the narratives, all twelve participants indicated that the ART clinic remained open for service delivery throughout the pandemic. A participant stated:	8-15

> "Even though the president said we should stay at home, they [health practitioners] were going to work… yes, so they were there [ART clinic]. (Ben, 18 years since HIV diagnosis)

Several of the participants said, they received notification that the ART clinic was opened and were encouraged to access care when the need arose in spite of the order to stay at home. An excerpt read:

> "After the outbreak of the disease, everybody was frightened, but where I was treated, they [health workers] will say 'you just come'." (Esi, 10 years since HIV diagnosis)

- ***Fear affected patronage of services***

In spite of the fact that the ART clinic was opened during the pandemic, several of the narratives revealed that service patronage was initially curtailed. Several of the participants, expressed initial misgivings about accessing the ART clinic because of fear of contracting the virus.

> "I sometimes get worried that if I do not take care, I will be infected here [health facility]." (Oye, 17 years since HIV diagnosis)

From the narratives, the participants' fear was heightened by the knowledge that they had a greater risk of contracting the virus because of their HIV positive status.

> "My fear was that, maybe I might contract the virus because of my sickness [HIV status]. (Eko, 10 years since HIV diagnosis)

Some participants' fear of contracting the virus indicated misinformation about the modes of transmission.

> "My only fear was the sweat of another person touching my skin. Like me, some patients did not really come to the clinic because of the fear of getting the virus" (Aba, 17 years since HIV diagnosis)

Thus, few participants reported being uncomfortable accessing HIV care in the health facility, while some participants suggested service delivery at home to minimise their presence in the health facility.

The fear was however minimised when they gathered the courage to attend the HIV clinic and realised that the COVID-19 protocols were being enforced.

> "My fear of contracting the virus was reduced because of the things [protocols] put in place to prevent COVID-19." (Eko, 10 years since HIV diagnosis)

- ***Honouring appointments***

The narratives revealed that most of the participants did not default or miss a refill appointment during the pandemic. This was mainly attributed to a sense of duty and a need to preserve their health.

> "I know for sure I should come because it's for my own benefit, no matter what the situation is" (Ben, 18 years since HIV diagnosis)

A participant explained that although she personally did not honour her refill appointment during the pandemic on the advice of her family, she did not default because arrangements were made to ensure continued access to treatment.

> "I didn't come at all [to the health facility], because my Auntie was saying it is easy for us [PLWH] to get the sickness [COVID-19]. She said as for me because of my situation [HIV status], if I get the disease, it will be easy for me to die. So, I have to stay home and she will go to the hospital." (Yaa, 13 years since HIV diagnosis)

Familial and healthcare worker support was an integral part of continued access to care during the pandemic.

> "I sometimes leave the clinic and get some staff members to receive the drug on my behalf, after which I go for it at the individual's residence." (Aba, 17 years since HIV diagnosis)

The participants commitment to access care in spite of their fears ran through most of the narratives.

- ***A few defaulters***

From the clients' perspective, HIV service utilisation decreased at the onset of the pandemic. One participant said:

	"During the initial stages of the pandemic, you will come here [HIV clinic] and you won't meet anybody [clients] and it's like, where are they?" (Ama, 2 years since HIV diagnosis) Some participants shared their awareness of some clients defaulting from HIV care during the pandemic, while others suggested the possibility of those clients accessing care in other facilities "I am from K [residence] and some of the patients I was coming with [ART clinic], no longer come." (Afi, 10 years since HIV diagnosis) However, as the months progressed and the pandemic did not wane, clients reported to the facility for treatment refill. This increased the number of participants attending the clinic. "Yeah, I was shocked that huge numbers were coming." (Ben, 18 years since HIV diagnosis) **Theme 2: Availability** • ***ARV availability*** For clients who came to the clinic at the onset of the pandemic, they reported being supplied with the quantity of ARVs prescribed by the healthcare workers. Thus, these participants did not experience shortage of drugs. "Drugs were available… they were able to give me three (3) months stock." (Eko, 10 years since HIV diagnosis) Some participants however, narrated instances when they were informed of shortage of some drugs at the HIV clinic. The shortage reportedly affected the quantity of ARVs supplied to the patients during their refill visit. "Before the disease [COVID-19], I was usually given medications that lasted for 5 months or 4 months but after the disease, I am being given 2 months. Recently, they said there is shortage of the medications so if you stay afar [residence], they give you a medication that will last for 1 month but if you are near, they give you a medication that will last for two	

weeks or 1 week." (Oye, 17 years since HIV diagnosis)

Two participants intimated that their treatment regimen was changed during the COVID-19 pandemic.

> "Some of my drugs were changed. They [healthcare professionals] said the drugs were changed because of the COVID." (Yaa, 13 years since HIV diagnosis)

Theme 3: Affordability

- *Unbudgeted Cost: Acquiring PPEs and medication*

From the participants, the increased cost of PPEs, which was a requirement for being allowed access to the facility, also hindered their utilisation of HIV services during the pandemic.

> "You know sanitizers that we usually weren't using became so expensive. In this case, how do you expect a layman to buy? He won't buy, and that's a risk not to himself alone but to everybody." (Ama, 2 years since HIV diagnosis)

A few participants also indicated that they incurred cost in acquiring some medications that were not dispensed at the HIV clinic due to the pandemic. This they purported was not the case prior to the pandemic.

> "Sometimes when you come, there will be no Septrin so they will prescribe it for you to buy it outside. If you don't have money to buy you stop. The last time I came, I couldn't afford Septrin so I have not taken some till now. This COVID has really caused problems." (Esi, 10 years since HIV diagnosis)

From the narratives, under-utilisation of HIV services was attributed to patients being turned away from the health facility when they did not present in PPEs. A participant narrated:

> "They [health providers] weren't giving us the masks initially. So, if you come [hospital] and you don't have a mask, you will not be allowed to enter the hospital.... So, the nurses can't take care of you. So, go home." (Ama, 2 years since HIV diagnosis)

- ***Increased cost of transportation***

Few participants commented on the financial burden incurred while accessing HIV care during the pandemic. This cost was mainly attributed to the need to honour more refill appointments as a result of shortage of ARVs and the limited amount dispensed at a time by the pharmacy.

> "That place [residence] is very far. Before COVID, they pharmacists] gave me quantities that would last for 6 months. If you don't get 3 months quantity, you have to be coming here [HIV clinic] every month? So, now that they want to give us the drug on weekly basis, I have to come again. It has brought me a problem. I was thinking a lot so I came after my review date [defaulted on appointment date]." (Pra, 12 years since HIV diagnosis)

> "Sometimes when you are coming you might not have money on you even for transport but you will try and come." (Esi, 10 years since HIV diagnosis)

Theme 4: Accommodation

Implementation of COVID protocols in the HIV clinic

According to the participants, the COVID-19 protocols were instituted in the HIV clinic and monitored to ensure that patients complied with the directives.

> "They were following the protocols that the president gave. They have provided Veronica Bucket at the entrance of the hospital, where you wash your hands. They use the thermometer gun to check your temperature. They are adhering to the safety protocols." (Ben, 18 years since HIV diagnosis)

> "Initially [before Covid-19], we used to sit very close to each other at the clinic. But during the pandemic, we observe social distancing when we come to the clinic. The nurses ensure that you have washed your hands, sanitized and are

in your nose mask." (Eko, 10 years since HIV diagnosis)

Increased education on Covid-19 protocols

The participants intimated there was increased education on COVID-19 and the safety protocols at the clinic.

> "They educate us on social distancing and COVID-19 prevention protocols… They tell us to wash our hands, and put on nose mask to prevent us from being infected." (Aku, 2 years since HIV diagnosis)

The education that participants received on COVID-19 empowered them to take responsibility of their own safety.

> "The only change is we protecting ourselves from being infected. The health care workers explained it to us." (Oye, 17 years since HIV diagnosis)

Adherence to safety protocols

Although, majority of the participants alluded to a general compliance to the protocols, some narratives revealed that there were instances of nonadherence to the protocols instituted to protect staff and patients from contracting COVID-19. This was attributed to lack of understanding and limited education on the protocols.

> "They [healthcare professionals] were wearing their mask… and nobody talks to you [client] about your mask. For me, I feel the understanding wasn't there. They [healthcare professionals] say wear mask, so, when somebody [client] gets tired, he takes it off." (Ama, 2 years since HIV diagnosis)

Another participant intimated that the healthcare professionals did not adhere to some of the safety protocols they educated the clients on and suggested action should be taken to ensure that the health staff complied with the protocols.

"Some don't put on the mask when working or the mask is on their chin. But they want you the patient to put on your mask. Talk to them to change their attitude because they can't tell us to put it on while theirs are not on." (Yaa, 13 years since HIV diagnosis)

- ***The Downsides***

For many of the participants, service delivery in the clinic was affected by the pandemic. These included reported issues of overcrowding and long waiting time.

Overcrowding

Participants indicated that as the pandemic waged on, the number of patients' visiting the clinic increased. This resulted in congestion in the HIV unit raising a source of concern for clients accessing care at the HIV clinic. To avoid the risk of getting infected with COVID-19, some participants therefore decided not to honour their refill appointments.

"They [patients] really come in their numbers despite the pandemic." (Aku, 2 years since HIV diagnosis)

"I will say that crowding in this particular era [COVID-19] isn't the best." (Ama, 2 years since HIV diagnosis)

Long waiting time

Participants indicated that the long waiting times increased their risk of contracting the virus. This related to lack of clear pathways in service delivery to meet the needs of the various categories of patients.

"The more the waiting time, the riskier. I am waiting here because I have to go for my vital signs and then they [nurses] will decide if I have to see a doctor. I think it's time wasting. At least they should speed after the usual check-up." (Ama, 2 years since HIV diagnosis)

For others also, delays were experienced at the pharmacy. This was attributed to few staff assigned to serve the drugs.

"My only challenge had to do with the waiting time for the drugs. I spend more time to be served my drug. I suggest that management

	increases the number people who distribute the drug at the pharmacy in order to reduce the waiting time" (Eko, 10 years since HIV diagnosis) Some participants attributed the long waiting time to a reduction in the number of healthcare professionals providing services in the HIV clinic during the pandemic. "They have reduced in number. If they were six, they are now four." (Oye, 17 years since HIV diagnosis) "I know they said they were running shift, so it reduced the number of doctors and nurses available. The pharmacists reduced in number. I only saw two guys there… I think they should be faster in the activities because they delay us." (Ben, 18 years since HIV diagnosis) A participant alluded to a decline in the quality of services received. "It [COVID-19] affected the quality of services [HIV] we have." (Bob, 7 years since HIV diagnosis) **Theme 5: Acceptability** *Access to the healthcare professionals* From the narratives, most of the participants continued to have positive experience with the healthcare workers even in the pandemic. Abi, a 65-year-old woman who had lived with HIV for three years said: "The doctors and the nurses come always and when we meet their absence, they inform us that they were doing something elsewhere so they will be with us shortly. For me, I come and meet them every day." (Abi, 3 years since HIV diagnosis) Some participants, however, bemoaned the pandemic had affected access to the healthcare professionals in the HIV clinic and struggled to cope with the many changes.	

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