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Lessons for Strengthening a Resilient Health System from the View of Health Facilities During the COVID-19 Pandemic: A Qualitative Study

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Background: Coronavirus disease 2019 caused significant negative damage to the health status of populations and health systems globally. In Uganda, our previous study revealed that the strict Public Health and Social measures (PHSMs) and the closure of Entebbe Regional Referral Hospital (ERRH) led to missed healthcare access among the citizens in the Entebbe municipality. Limited studies, however, exist on the impact of the response measures on the local health systems. This study aims to explore the impacts of these measures on the local health service provision from the views of health facilities in Entebbe.

Methods: We used a thematic framework method, grounded by the health systems resilience framework consisting of five components: (1) health service delivery; (2) medical products and technology; (3) health workforce; (4) public health functions; and (5) governance and financing. Key informant interviews with eight representatives from four private hospitals and four health centers were conducted from September to October 2022.

Results: Fifteen themes and 25 subthemes were identified. With the closure of the ERRH and the strict PHSMs, the citizens faced various difficulties in accessing the needed health services. The facilities received an overwhelming number of patients and faced various challenges, such as a lack of medicine, healthcare workers, facility capacity, and no means to transfer patients. Nevertheless, the facilities made efforts to maintain the required services. Moreover, mobilizing vertical and horizontal actors through a flexible network, from the district health office to community health volunteers, helped to coordinate the medicines, transportation for both patients and healthcare workers, conduct patient tracking, etc.

Conclusion: Our study suggested the importance of an integrated system of public health and health service delivery systems, the formalization of a vertical cooperative mechanism, and the introduction of public health insurance for strengthening resilient health systems. These insights may benefit other sub-Saharan cities.

Keywords: public health and social measures, private hospital, health center, resilient health systems, universal health coverage, sub-Saharan Africa

Introduction

The coronavirus disease 2019 (COVID-19) pandemic left a huge scar on society and the health systems as a whole.[1] The strict implementation of Public Health and Social Measures (PHSMs), such as travel restrictions and extensive social distancing, contributed to reducing the pandemic spread. However, it also negatively impacted the social, economic, health, and psychological well-being of people worldwide.[2–4] Various studies have explored how to foster resilient health systems for potential future crises based on our experiences with COVID-19.[5–7]

In Uganda, the government enacted multiple PHSMs[8] on March 20, 2020, the day before the first case was announced.[8] Public transportation services were suspended from March 25 to June 4, including mini-bus and motorcycle

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taxis, which are the most popular means of traveling among the Ugandan people. Furthermore, a curfew from 7:00 pm to 5:00 am was put in place and it was even extended to start from 5:00 pm on March 30.[8] Traveling across districts was completely suspended until mid-June 2020.[8] Through these measures, people were strictly confined to their homes in the early part of the pandemic.

The Ministry of Health (MOH) of Uganda made efforts to aid in the prevention and treatment of COVID-19, including reallocating the funds for running health service delivery system. Entebbe Regional Referral Hospital (ERRH) in the Entebbe municipality in the Wakiso district was transformed into a COVID-19 treatment center, and all other regular services were suspended. This shift affected both the service demand side and the service delivery side in Entebbe municipality.

Our previous study revealed that the ERRH service disruption and travel ban led to nearly 20% of ERRH registered patients with both communicable and non-communicable diseases (NCDs) being unable to receive their necessary health care.[9] Almost 90% of the patients reported a worsening of their health condition.[9] The most common alternative health care was nonprescription medicines at drug shops, used by nearly 30% of the respondents, followed by private hospitals and then public health centers (HCs).

Given this situation, we anticipated that private hospitals and HCs in the catchment area of ERRH would thus become full of new patients and fall into a state of chaos. To strengthen the resilient health systems for delivering essential health services in urban cities in Uganda during a health emergency, it is considered to be valuable to review the experiences and challenges faced by the health facilities surrounding the closure of the core hospital and extract lessons that can be used and applied to any future crises. Our conceptual framework is grounded in the health system resilience framework for managing the COVID-19 pandemic, developed by the World Health Organization (WHO) independent panel, to analyze the real challenges and extract lessons which will help us to respond to future crises.

Therefore, this study aims to assess the impact of the ERRH closure and the government PHSMs toward the COVID-19 response on other health facilities and the citizens in order to identify lessons learned to both strengthen resilient health systems and to avoid confusion during any future crises.

Materials and Methods

Study Design

We used a thematic framework method combining the inductive-deductive contents approach.[10–13] This method enabled us to explore any unexpected impacts of the ERRH closure and PHSMs on health facilities which surround the ERRH during new infectious disease crises, such as COVID-19. Combining the inductive-deductive approach enables us to directly extract suggestions regarding policies for multi-disciplinary subjects by means of a framework of analysis.[14] We conducted key informant interviews with persons who held positions as operational managers as well as healthcare providers. The use of the interview guide allows the interviewees to speak freely based on his or her own perspectives, interests, and experiences.

Study Setting

The study was conducted in the Entebbe municipality of the Wakiso district,[15] located about 36 km southwest of Kampala, the capital city. It had a population of 70,214 in 2014 with its southern end bordering Lake Victoria.[16] The municipality includes Entebbe International Airport, the largest civilian and military airport in Uganda.

In Uganda, the total number of health facilities is 6,937.[17] Of these, 45.2% (3,133) are public, 14.4% (1,002) private-not-for-profit, 40.3% (2,795) private-for-profit, and 0.1% community-owned facilities in 2022.[17] The Uganda public health service delivery system is classified into seven levels based on the service level and catchment area. In addition, there are 62 general hospitals at the district level, 17 regional referral hospitals at the regional level, four national referral hospitals, and five specialized hospitals. Many private clinics/hospitals are operating under the MOH's registration and supervision. The ERRH covers the Wakiso and Mpigi districts, the Entebbe municipality, and the neighboring islands in Lake Victoria. From March 2020 to March 2022, the ERRH was designated as a COVID-19 specialized hospital for the whole country, and it stopped offering other health services.

Study Participants

We adopted the concept of "information power" in determining the sample size and considered it in light of the aim of the study, sample specificity, and the quality of dialogue.[18] Since this study aimed to explore the health care delivery system in Entebbe, the health facilities in Entebbe should have been selected. In addition, given the objective of measuring the impact of the closure of the ERRH, public HCs III and IV, located in catchment areas that could receive ERRH patients, as well as private hospitals that could provide a higher level of health care services, were considered appropriate due to the sample specificity. Since there are four HCs in the Entebbe municipality and four private-for-profit hospitals in the catchment area of the ERRH, we considered these selections appropriate. In addition, in terms of the quality of the dialogue, two interviewees had previously interviewed hospital administrators and health care providers in five regional referral hospitals, including the ERRH, regarding the response to COVID-19 and the impact of PHSMs, and thus had comprehensive knowledge of the impact of COVID-19. Therefore, it was expected that high information power would be obtained. Therefore, four HCs and four private hospitals in Entebbe municipality were included in the study. In addition, we asked the facilities to select informants who had been involved in the management at each facility and who provided front-line services during the pandemic period (March 2020-March 2022) to collect various experiences of institutional responses, challenges, and innovations. This was also considered to increase the information power. The inclusion criteria for the interviewees were healthcare persons, simultaneously those who had responses to facility management and were working on the front line during the COVID-19 pandemic. The exclusion criteria were persons who did not have much experience during the target period or who were not available during the study period. Based on the above, we selected the eight individuals shown in Table 1.

Data Collection

Two researchers (JN, RS) conducted the KIIs together at the respective health facilities from September to October 2022. They had experienced the interviews at the five regional referral hospitals, including ERRH, regarding COVID-19 responses and the impacts and had received training on this study. We created an interview guide, which included questions on (1) the participants' basic characteristics, (2) current work situation at the facility, (3) the impacts of the ERRH closure on their work and their service provision, (4) what was the biggest challenge during the COVID-19 period, and (5) suggestions or comments about preparation for future pandemics. All interviews were conducted in English. Data saturation, here defined as no new codes, was determined during the interview.[19] Participants were informed that they

Table 1 Characteristics of the Facilities and Participants (n=8)

	Facilities			Participants		
	Type of Facility	**Distance from ERRH (Time by Vehicle)**	**Number of Beds for Inpatients (Number of Healthcare Workers)**	**Responsibility at the Facility**	**Gender**	**Age**
H1	Private hospital	1.9 (6 min)	25 (45)	Management/Medical personnel	M	34
H2	Private hospital	3.7 (12 min)	7 (10)	Management/Medical personnel	M	33
H3	Private hospital	2.0 (5 min)	10 (17)	Management/Medical personnel	M	58
H4	Private hospital	2.2 (4 min)	22 (17)	Medical personnel	M	31
C1	HC III	1.9 (8 min)	8 (15)	Management/Medical personnel	F	36
C2	HC III	3.5 (8 min)	8 (13)	Medical personnel	M	29
C3	HC III	2.8 (7 min)	5 (10)	Co-medical personnel	F	48
C4	HC IV	24 (32 min)	20 (37)	Medical personnel	F	40

Abbreviations: ERRH, Entebbe regional referral hospital; HC, health center.

have full right to refuse participation or withdraw any time from the research and the participants informed consent included publication of anonymized responses before taking part in the survey.

Data Analysis

All interviews were recorded in an audio format and then were transcribed verbatim. The data analysis process included reviewing existing materials, familiarizing oneself with the text, coding, and indexing for subsequent interpretation. The transcripts were read repeatedly by two researchers (MK, KS) until they were fully familiarized with the contents. In addition, once MK, a principal researcher, found any points that needed to be confirmed, MK asked the researchers to follow up on them. Codes and themes were extracted independently by two researchers (MK, KS) using the NVivo software program version 1.6.1. (QSR International). Then, MK, JN, RS and CN made content-wide clarifications. We identified 15 themes and 23 subthemes. During the stage of reviewing the identified themes, we recognized the framework for health system resilience through the COVID-19 response which was deemed to be applicable for further analysis. The framework was proposed by the members of the World Health Organization independent panel,[10,11] consisting of five components: (1) health service delivery; (2) medical products and technology; (3) health workforce; (4) public health functions; and (5) governance and financing. We applied the themes derived by induction to this framework and evaluated them deductively.

Results

The characteristics of the study facilities and the participants are summarized in Table 1. Six facilities are located within a 10-minute drive of the ERRH. Two private hospitals had more than 20 beds at the time of the survey, and one HC also had more than 20 beds. The number of healthcare workers (HCWs) ranged from 10 to 45, with H1 having the highest number of HCWs. Among the participants, five were male and three were female. Two of them were in positions more focused on facility management than others.

Table 2 summarizes the identified themes and subthemes based on the health system resilience framework, consisting of five components. The health service delivery component had the highest number of themes and subthemes. Positive changes were identified in the health service delivery and the medical products and technology components.

Table 2 Summary of the Identified Themes and Subthemes

Components	Themes	Subthemes
Health service delivery	Surge of patients	Increased number of patient
		Not able to afford private hospitals
		Maintained patient numbers after resumption of ERRH operations
	Impacts on reproductive Health	Significant impacts on maternal and child care
		Unintended pregnancies
	Losing patient tracking	Lost contacts with registered patients
	Challenges with stigma	Stigma of COVID-19 by non-COVID patients
		Stigma of ART patients, hesitation of receiving outreach service in their community
	Increased mortality	Increased mortality
	Positive changes	Increased number of staff, beds, medical equipment, theaters
		Accepted COVID-19 patients after securing infection prevention and control measures
		Established a home-based care system for COVID-19 patients and suspected infected persons by following the Ministry of Health policy

(*Continued*)

Table 2 (Continued).

Components	Themes	Subthemes
Medical products and technology	Shortage of drugs and oxygen	Shortage of drugs for patients with TB, HIV, hypertension, diabetes, heart disease, etc.
		No medicine deficiency for ART patients
		Severe shortage of oxygen
	Positive change	Improved the drug supply system from the central store to lower-level HCs
Health workforce	Shortage of health staff	Due to the travel ban, blockade at district borders, lack of transportation means, etc.
		Lack of personnel due to the death of staff members caused by COVID-19
Public health functions	Vertical health system with other sectors	Established a home-based care system for COVID-19 patients and suspected infected persons by following the Ministry of Health policy
		Collaborating among health facilities, health offices and policies
	Securing transportation means	Secured transportation for patients and health staff
Governance and financing	Government decision concerning the ERRH closure	Closure of ERRH
	Risk communication	Early and widespread announcement of ERRH closure
	Health insurance	Universal health insurance introduced
	Crisis preparedness by individuals	Raised public awareness about securing medical expenses in normal times

Abbreviations: ERRH, Entebbe Regional Referral Hospital; COVID-19, coronavirus disease 2019; TB, tuberculosis; HIV, human immunodeficiency virus; ART, antiretroviral therapy; HC, health center.

Health Service Delivery

Surge of Patients

Most facilities faced a surge of patients due to the COVID-19 pandemic, especially after the closure of ERRH. For example, at C4, the number of patients tripled; at H4, the number of participants increased by about 2.5 times; and at H1, the number increased from 60% to 70% of full capacity to almost 100%. C2 also saw a fivefold increase in the number of deliveries.

> Due to the pandemic and the ERRH's closure, we experienced a surge of patients unlike any we had seen before. Patients flocked to this facility, so we were overwhelmed. (H4)

> We experienced an increase in the number of patients we received at the facility. The ERRH was the only hospital in our area. When it closed, all of the patients who used to go to the ERRH had to look for alternative health facilities. That was also a period of lockdown when people had limited funds to use for health care at private facilities, so a majority of them turned to government health facilities such as us. (C2)

At the same time, most participants from private hospitals reported that a substantial percentage of patients who usually used public health facilities were unaware of the high price of medication and could not afford to pay at their facilities. The private hospitals were sometimes forced to refuse patients who were in critical condition at their doorstep because the patients could not pay, as they faced a situation where they could not collect medical fees from the patients even after providing treatment (H2, H3, H4).

> Another problem is serving patients who don't pay. Convincing people who don't have money to pay was a big problem. The patients came here, as they needed help, and we had to deal with the fear that, if we did not help them, it was the same as not doing our mission. (H4)

These increased patient numbers were maintained at both HCs and hospitals even after the resumption of the ERRH operations (C2, C4, H3, H4). This is partially due to ERRH being unable to manage the same patient load as it had been able to pre-closure. At the same time, the patients learned they could obtain services similar to those at ERRH near their homes.

> Our numbers of [the patients] had maintained when the ERRH was reopened. They [ERRH] had a backup of staff who had come to support in Covid-19 and they [extra staff] all disappeared suddenly…. Staffing is still a big issue. (C4)

> The patients have also learned which services we offer, so they come to our facility for those services. We have been getting many new patients….the number of patients we have now was what ERRH was managing previously. (C4)

Significant Impacts on Maternal and Child Care

Many participants described serious cases involving pregnant women during the ERRH closure and travel restriction period. According to the H2 informant, due to the closure of the ERRH, the government's strict lockdown policy, and a lack of affordable transportation, many pregnant mothers who were unable to receive their free regular antennal care, resulting in abnormalities being overlooked. Consequently, many mothers reached health facilities at the very last minute or in a severe condition, necessitating transfer to higher-level hospitals located further away, such as those in Kampala. Under these circumstances, many mothers lost their babies (H1, H2). For example, H2 experienced 15 neonatal deaths. There are also suspicions that numerous pregnant women may have died while being transferred to other higher-level facilities; however, such maternal and child deaths occurring between facilities were apparently underreported (C2).

> Due to the ban on movement, patients had not continued their antenatal care only rushing to the hospital at the last minute. In most of them, we would find that they had a complication such as an issue with the umbilical cord or the position of the baby is not being okay. (H2)

> In some cases, pregnant mothers visited after several days of no fetal movement and found that their fetus had already died. (H1)

> There were a number of cases reported in the community, although some may not have actually been true. Like we had a new born who needed oxygen and died while being referred., so the incident may not have been recorded. It may not be recorded on one side and or the other side. Sometimes they would stop on the way, so a lot of data was not captured. However, the numbers are most certainly very high. (C2)

Losing Patients Tracking

Regarding chronic disease, several participants mentioned that they lost contact with registered patients with tuberculosis (TB), human immunodeficiency virus (HIV), or mental health illness and thus could not follow them up. Due to economic hardships during the pandemic, those patients were unable to return to their homes or move to other districts without notifying their designated health persons. As a result, many of them discontinued treatment (C4). Efforts by HC personnel to track down those patients were performed on a voluntary basis (C2, C3, C4). According to C2 and C3, antiretroviral therapy (ART) clinics conducted telephone follow-up and/or drug delivery for HIV patients. C4 made efforts to exchange information on their previous patients or patients newly admitted from other facilities. Among the various diseases, TB patients had a high likelihood of discontinuing treatment or withdrawing from registered health facilities.

> For HIV patients, we offer home visits and deliveries of drug to those who cannot come in person. So, we have challenges of patients who drop-out. They [the HIV patients] just leave without going to any other health facility… Even the phone numbers they gave us are wrong in some case, or some don't have phone at all. They stay on the move, and then we lose track of them. (C1)

> TB patients are stubborn. They got lost so we had to ask village health teams [VHTs] to engage tracing the TB patients in filed. Our work is just voluntary work. We would attach TB patients to VHT to not get lost. (C4)

Challenges with Stigma

Various causes hindered people's access to health services. One factor was the stigma associated with COVID-19, while another was the stigma faced by people living with HIV. The H4 staff shared a story about a health center on an island

where numerous mothers sought refuge at H4 due to the associated COVID-19 stigma, leading to the closure of the health center. Additionally, three respondents highlighted cases related to the stigma associated with HIV/AIDS.

> The health center IV in Kalangala [in the island of Lake Victoria], …. they were no longer working, so pregnant mothers come here. One of the patients told me a story that some patients died there they were suspected to have covid, so mothers there couldn't go there [HC], people feared the HC. (H4)

> We carried out outreaches especially among ART Clients. We would take for them their medicines at their homes …. But some refused [because they don't want their neighbors to know they are HIV patients]. (C3)

Increased Mortality

The majority of respondents witnessed increased mortalities in their community. The factors related to deaths were attributed to the ERRH closure, no access to affordable medical care, no transportation means available or no money to get transportation, thus resulting in delayed access to necessary health services.

> Because of the closure of Entebbe [ERRH], many people have missed necessary services. So many people developed complications. Some lives were lost that probably could have been saved. (C2)

> It was like a disservice to them, patients were used to getting quicker services from there [the ERRH] but now there was no option for those with no money, so some of them died. People with critical illnesses; blood pressure issues, hypertension, and sickle cells diseases faced challenges securing their medication, and some even lost their lives…We would have been able to manage them, but some came to visit too late. (H4)

Positive Changes

Even in the midst of the COVID-19 crisis, various efforts were made at each facility, such as increasing the number of staff, beds, and equipment; securing an oxygen supply (H4, C2); and opening obstetric theaters (H4, C4). Later on, the hospitals themselves or the local government helped provide transportation for commuting staff (H3, C1, C4).

> The number of maternity patients have also increased. We began admitting those who are not critically ill. We also have X-ray [ultra sound] equipment in maternity ward which had previously been in another building. Even the number of staff has increased. (H4)

> We also talked to the municipal health officer and got a fourth midwife to help us. (C2)

> The good news is that at least they were finally able to establish an operating theatre while it took some time to open it. (C4)

> There are so many changes. For example we had to secure oxygen cylinders for surgeries. Then we had a surgical room which we are now going to equip. We also had to recruit another two midwives. (H4)

In addition, two hospitals accepted COVID-19 patients (H1, H3) as the outbreak spread, although in the beginning they hesitated to accept them because many patients feared becoming infected at their facilities. Both hospitals explained that they had established a system to prevent nosocomial infections by separating entrances or floors and conducting thorough polymerase chain reaction (PCR) testing at the entrances.

Medical Products and Technology

Shortage of Medicine

Medicine shortages were a fundamental issue at the study facilities. As the number of outpatients with chronic diseases increased at the participant facilities, a shortage of drugs to treat patients with TB, HIV, hypertension, diabetes, and heart disease became evident (C1). The most widely affected disease was TB (C4, H1), since the government changed its treatment policy, limiting TB treatment provision to government institutions only, so no private hospitals were able to administer TB drugs. Furthermore, cases requiring special medications, including multidrug resistance or sickle cell disease, were available only at higher-level hospitals after the closure of the ERRH, such as Mulago National Hospital in Kampala (C2, C4).

> We always stock outs of drugs, including drugs for hypertension and diabetes, plus mental illnesses. They [the government] always don't give us enough drugs for them. Those people who are vulnerable cannot work are not afford. (C1)

> We had an increment in the number of HIV and TB clients during that very period of time, and we did not have enough medicine in stock for these patients. In cases where patients could not access their drugs from their original facilities, the number also increased. (C2)

Regarding ART, the medicine deficiency differed by facility. Private hospitals tended not to face medicine shortages, while lower-level HCs, such as HC II, faced frequent medicine shortages.

Positive Change in the Drug Supply Chain

A positive change in the drug supply was also found. C2 was not part of the normal National Medical Store (NMS) supply chain since they opened 6 years ago and frequently suffered from a shortage of medicines. The staff had to visit other facilities, including public and private facilities, to negotiate the sharing of their excess drugs. During the COVID-19 period, they persistently and successfully lobbied the NMS in collaboration with the municipality health office and the Wakiso district health office to eliminate this glitch.

> The municipal officer at the health office together with our facility-in-charge, they have worked hard to obtain the approval for receiving drugs directly from National Medical Store (NMS). So currently, the Wakiso District is supporting us to receive drugs on the list of the normal drugs. (C2)

Shortage of Oxygen

The demand for medical oxygen for the treatment of COVID-19 patients increased, and oxygen shortages became a major challenge. However, oxygen is also needed for normal obstetric care, neonatal care, and operating rooms in addition to COVID-19 treatment, and oxygen shortages in those wards also became a major issue. One informant emphasized that the government should take responsibility for securing the supply by constructing oxygen plants in each district to prepare for future health emergencies (H1).

> The oxygen which we used to last for a month, but it could last only two days. We had to go back to Kampala to collect other cylinders of oxygen. (H3)

> Oxygen is not needed for covid only. It's needed in maternity ward, for HIV, TB patients… So, I would urge the government at least to put up oxygen plants. I think if it's possible every district to have at least two plants of oxygen. (H1)

Health Workforce

All facilities faced a shortage of health staff to cope with the drastically increased number of patients. The reduction in staff numbers was attributed to blockades at district borders or a lack of transportation (C3). One participant mentioned that they lost colleagues due to COVID-19. Such shortage of health staff led to an enormous burden on HCWs. To mitigate their mental and physical fatigue and maintain their motivation to work, various kinds of strategies should be employed (H1).

> [Performing 100-150 deliveries a month by 3 midwives], was really overwhelming; the midwives would not take breaks and this was a period where some health workers could not access the facility [Note: due to lockdown or public transportation movement restriction]. …One midwife worked day and night without rest, it was really a lot of work for them. (C2)

> I (who live in Kampala) used to be here almost a full month because we didn't move back to Kampala…. Others stayed here for 3 months. Many of us camped here, apart from those who came in on foot. (H3)

> Some of these health workers worked tirelessly during that time, but they would think, either in the governmental facilities or private facilities, "but why am I getting tired or why am I getting strained like this? My children are even hungry, let me also stay home [for them]." So, the government should look at healthcare workers' salaries and motivations! (H1)

Public Health Functions

Vertical Health System with Other Sectors

When the government converted COVID-19 care from facility-based to home-based programs in September 2021, HCs also became responsible for providing such care. The C4 participant described this system, which illustrated a vertical health service system, including ERRH, HCs, and community health workers (VHTs). In addition, government administrations at various levels and the police collaborated together for surveillance and patient referrals while also providing health personnel transportation (C4).

> We encouraged VHTs [community health workers] to follow up the patients. We called them for help. Usually the ERRH would help us get an ambulance to take the patient there. They [VHTs] would do surveillance in the communities when called upon. Sometimes, we worked with our community authorities, even police. They would help us pick patients from the community and bring them to here [C4] for screening and isolation. (C4)

To ensure that patients remain in contact with the facility where they were registered, the health facility side followed ups or coordinated among the health facilities (C1).

> We can facilitate those people [who tend to loss follow-up], who can bring those services nearer to them, it would be better. We offer them advice, for referral or transfer [them] to another facility nearer to their location, helping them get drugs near where they are. (C1)

Securing Transportation

Securing transportation both for referred patients and commuting staff was a key issue during the lockdown. The HC staff asked the government to provide systematic support for transportation.

> We had some on referral. A new born needed oxygen and then it was a death on referral before getting there…. Sometimes they would stop on the way, so a lot of data was not captured. (C2)

> Maybe if the government is able or in case of any help, they can avail the ambulances for the health facilities to help transportation patients in emergencies, like may be level HC IIIs, as we are mostly dealing with people who affected [by the lockdown]. (C1)

> Later on, we were sent a van from Kampala Capital City Authority [the KCCA]. They helped us transport staff. (C4)

Governance and Financing

Government Decision Concerning the ERRH Closure

The present study examined the impact of the Ugandan government's PHSMs policy lockdown and the decision to convert the ERRH into a COVID-19 hospital as a precondition, while evaluating the impact of these decisions. Although there were relatively few comments on the direct governance perspective, there were some comments on the ERRH closure and communication between the government and citizens. Not all participants agreed with the complete closure of essential services at a core hospital like the ERRH. The prevailing sentiment was that the hospital should operate partially, with a particular emphasis on maintaining maternal and gynecological services, along with an isolation ward for COVID-19 patients within the facility.

> We were not happy with the government regarding the closing of the whole Entebbe hospital. It caused a lot of problems….The ERRH serves people far beyond the islands…, maybe he or she had a complication and hired a boat to reach to Entebbe. Then, they were told it was closed. Some mothers had to deliver at the gate of the ERRH. (C4)

Risk Communication

Effective risk communication by the government is crucial during crises. The participants emphasized the importance of the government providing advance notice of the ERRH closure and designating alternative health facilities (H4, C4).

Many patients, especially those living far from the hospital, including on the islands of Lake Victoria, were unaware of the ERRH closure. As a result, they arrived at the ERRH during emergencies only to find that no services were available.

> The ERRH serves people far beyond the islands there, so somebody has struggled to come to the mainland, maybe he has a complication. They have hired a boat reaching Entebbe, they were told it is closed. Some mothers had to deliver at the gate there. (C4)

Health Insurance

There is no public health insurance system in place in Uganda at present. One informant strongly advocated for the introduction of a public health insurance system for the entire population (H3). This suggestion involved the adoption of a parish model, where individuals contribute to the system based on their financial capacities, and all members can receive benefits according to their needs. Once the public health insurance system is established and the budget secured, then the government can offer additional financial incentives to HCWs who bore a significant physical and mental burden during the pandemic (H1).

> Every Ugandan should be having health insurance. If we had that program, the medications in Entebbe could be managed all who go to ERRH…. If you prepare very well,…if we can absorb all citizens in that program it will work. (H3)

Discussion

This study highlighted the impact of the COVID-19 response from the health facility staff's view and identified the lessons learned to prepare for future crises based on the health resilient framework. The health facilities in the Entebbe municipality faced various challenges from the ERRH closure and the implementation of strict PHSMs. In response to the rapid increase in the number of patients in each health facility, the health facility took the necessary measures to maintain the required health service delivery. The significant efforts were increasing staff, expanding their facility capacity, and procuring essential medicine and other resources by mobilizing the vertical and horizontal actors across the municipality. Although the participants in this study were health personnel with managerial responsibility stationed at a single health facility, their experiences during the COVID-19 responses revealed both challenges and opportunities for building a resilient community health system. This section discusses the challenges and opportunities that emerged, following a resilient health system framework with five components.[14]

Health Service Delivery

Reconfiguring existing medical facilities to provide care for infectious patients and travel restrictions are common strategies for managing pandemics, particularly in resource-limited settings.[14,20] A 2021 survey in Uganda found that 43% of those who needed healthcare missed or suffered delayed access, and 21% stated this was due to health facility disruption.[21] Our study revealed that the citizens of Entebbe wandered in search of needed healthcare services and were often unable to receive treatment due to a lack of transportation or an inability to afford it. As a result, an increase in fetal deaths was reported and an increase in maternal deaths was suggested, although detailed statistics were absent as has been observed in other similar countries.[22]

Patients with chronic disease who had been seen at ERRH were also negatively affected. Patients requiring special treatment, such as those with ongoing TB treatment or multidrug-resistant tuberculosis patients, were unable to receive treatment at HCs or private hospitals. In addition, the disruption of communication for registered patients with chronic diseases requiring continuous care (eg diabetes, tuberculosis, and mental illness) was also found. Usually, efforts are made to follow these patients regularly from medical facilities to encourage continued care. Still, contact was lost when patients moved to other districts due to financial hardship, changed or lost their cell phone, etc. These treatment interruptions are also expected to be a major problem in the future.[23–25] Stigma and fear against COVID-19 and prejudice against HIV/AIDS patients that persist in society were also noted as obstacles to accessing necessary healthcare, similar to other countries.[26] The Ghana study suggested that disseminating correct information through local leaders is therefore important and effective.[26]

However, our study also identified some positive changes in the service delivery. Some patients recognized that they can access certain services at nearby health facilities without the need to visit the ERRH. This indicates that they began to follow the established referral system. Regarding the supply side, private hospitals, which initially hesitated to accept COVID-19 patients due to the stigma attached to the unknown infectious disease, eventually began to accept these patients, having developed adequate infectious disease control measures in light of the saturation of capacity at public institutions. In addition, maternity operating rooms, radiological equipment, and medical staff were upgraded to accommodate the increased number of patients due to the interruption of ERRH services. In response to the government's policy concerning home-based care for COVID-19 patients, HCs established a follow-up system for home-based patients involving VHTs at the bottom of the healthcare delivery ladder in Uganda.[27] The ERRH made efforts to reach registered patients with TB, HIV/AIDS, by outreach service.[9] Especially with regard to ART services for HIV/AIDS patients, it appears that outreach services supported by the United States President's Emergency Plan for AIDS Relief (PEPFAR) were continued,[28] and the impact of the closure of the ERRH and travel blockade was limited.[9,29]

With regard to collaboration with other sectors, some cases were reported in which local governments and police assisted in transporting suspected COVID-19 patients or taking cured patients back home and also providing transportation for staff at medical institutions. These proactive efforts showed the potential for fostering a resilient health system in Uganda.

Medical Products and Technology

Access to necessary medicines in low- and middle-income countries has been a major issue since before COVID-19.[30,31] The pandemic has exacerbated the general vulnerability in ensuring access to drugs, vaccines, and health technologies, as well as by establishing an effective supply chain in sub-Saharan African countries.[31,32] Medicines for TB multi-drug resistant cases and sickle cell disease were unavailable at health facilities other than the ERRH. Therefore, such patients had to be transferred out of the municipality even under conditions of strict travel restriction.[9] If these medications had been available in other health facilities, then the impact on these patients' access to needed medical care would have been lower. However, we found one positive example of change. One HC succeeded in upgrading the routine drug procurement systems during the crisis. In this case, the head of a lower-level HC, the municipal health office, and the district health office worked together to lobby the central government, which resulted in the direct distribution of medicines from the central medical dispensary. As a result, treatment for NCDs, which previously could not be provided by HCs, became available. This also greatly reduced the burden on the HC staff, who had been seeking medicines from other institutions through personal efforts.

Globally, e-health received significant attention during the COVID-19 pandemic as a way to provide health services, such as remote-counseling and drug-delivery.[33] In our previous study, it was reported that counseling by telephone and drug-delivery were in place as part of their outreach program.[9] Although no formal e-health system has been established, its function suggests the possibility of successfully developing telemedicine in Uganda in the future. The expansion of e-health utilization is required along with strengthening the information technology infrastructure.[33]

Health Workforce

During the pandemic, the health workforce faced various challenges, including pathogen exposure, long working hours, fatigue, shortage of personnel protective equipment, insufficient training, and social discrimination.[14,34–36] At the same time, it was essential to secure a healthy environment for HCWs in both physical and psychological aspects in order to maintain routine healthcare service provision.[14,37,38]

In the present study, HCWs at the study facilities faced rapid and excessive surges in the number of patients due to the ERRH closure. With the staff further limited due to transportation restrictions, HCWs had to endure long working hours with multiple tasks and a poor mental condition due to having few chances to see their own families. Although our preliminary study at four regional referral hospitals in Uganda found that the regional referral hospitals received additional health personnel from the Ugandan MOH,[39] no such benefits were extended to private hospitals or the HCs in Entebbe from the central government. On the other hand, we observed that the management of private hospitals or local authorities made efforts to expand the workforce in order to mitigate facilities being overwhelmed by patient surges.

Our study also suggested the need to improve the compensation and motivation of HCWs for their physical and mental workload especially in the early stage of novel pandemic. A United States study proposed an innovative payment model, such as pay-for-performance mechanisms,[5] while another study argued that financial incentives should be carefully incorporated to avoid unnecessary enthusiastic non-target services.[30] There are no reports of an incentive framework for the health workforce from either public or private organizations regarding the pandemic responses in Uganda, and research on this topic thus needs to be urgently discussed.

Public Health Functions

Most previous studies discussed the public health function from the viewpoints for infection prevention and control in communities, such as testing, contact tracing, surveillance, isolation, lockdown, and social measures.[14,40,41] Haldane V. and et al, however, pointed out the importance of integrating the two systems, the public health system and the health service delivery system.[14] A study in Japan also emphasized the importance of coordination between public health mechanisms and health service delivery to tackle pandemics, including sharing all available resources among health facilities (ie personnel, money and products), patient referral coordination, technical advice, and securing isolation facilities within cities or across countries.[36] In our study, a few primitive practices could be found, such as ad-hoc coordination with sharing medicines or oxygen, transferring suspicious COVID-19 patients from community to the hospital, transferring patients between facilities, and keeping tracing and securing service provision for chronic disease patients, so on.

Our study also indicated the importance of establishing a vertical coordination mechanism from the district level to the community level, including the district health office, the municipal health office, hospitals and HCs, and VHTs. The need for outreach services to deliver services to locations near patients and to strengthen the follow-up system for chronic disease patients also emerged during the transportation restriction period. In Uganda, community mechanisms, especially VHTs, should be activated and empowered for the vertical health system.[27,42] The experiences in Entebbe presented an opportunity to integrate urban Uganda's public health and health service delivery systems for a sustainable health function.[43] Eventually, these systems can help to achieve universal health coverage.

Governance and Financing

The governance of health systems and financing are the cornerstone of quality health outcomes.[43] In the COVID-19 pandemic, such governance has functioned as the axis of pandemic control, including the government's PHSMs decision and reallocation of health resources.

In our study, a few contents emerged related to both governance and financing. The pros and cons of closing the ERRH were a major point of contention. The voice of the majority, which was greatly affected in the field, was that the ERRH should not have been closed altogether. On the other hand, in our previous study, two-thirds of the patients suggested that the government should offer alternative facilities in the event of the reallocation of health resources.[9]

To absorb the health shocks, adequate financing, besides the integrated health system and secured health workforce, is considered to be essential based on the previous experiences.[44] Our study demonstrated that many citizens were unprepared for the cost of emergency medical services and faced difficulties paying for medical care at private hospitals in an emergency. These results highlighted the importance of public education on basic knowledge concerning the uptake of healthcare services, the responsibilities of all citizens to contribute to a sustainable health system, and how to save money during emergencies. In addition, our findings shed light on the need to introduce universal health insurance. The government budget could not adequately provide for emergencies in a situation where the necessary health resources were not available in the first place. This manifested in problems such as securing the necessary isolation facilities, medical supplies, supplemental human resources, and the lack of emergency vehicles during the pandemic. Less than 1% of the Ugandan population was covered by private insurance in 2022.[45] Through this experience, it is time to start working toward enhancing a universal healthcare coverage system. There is one good example to advance the public health insurance system in Senegal, beginning in 2013.[46] Their strategy was to set-up a community-based health insurance scheme in each local unit and gradually integrate them into a single universal scheme. This approach had the advantage of reaching people in informal sectors or those without incomes, many of whom were uninsured before 2013. Uganda needs to consider establishing a universal health insurance scheme to

ensure a sustainable and resilient health system for future health crises and to eventually achieve universal health coverage like in other countries.[23]

Limitations

The present study is associated with several limitations. First, the interviews were conducted only at eight health facilities and only one person was interviewed from each facility. This may limit the variety of experiences in service provision and facility operation, perceptions toward such experiences and thus make it difficult to conclude definitive recommendations for the health system as a whole. Second, the interviews were conducted 31 months after the onset of the pandemic in Uganda. At that time, the majority of people's awareness of COVID-19 had already faded from memory and it was already thought of as a thing of the past. Together with some recall bias, the contents we gathered may need to take such potential bias into consideration. Third, this study lacks direct evidence confirming the impacts of policies and the ERRH closure on changes or incidents. Further research using in-depth qualitative or quantitative approaches is required to achieve more conclusive results. However, despite these limitations, to our knowledge, this is the first study to illustrate the actual situations at the health service delivery points and extracted practical recommendations from the field in Uganda during the COVID-19 pandemic.

Conclusions

This study illustrated the diverse impacts of the COVID-19 response on health facilities from the views of health personnel at health facilities in Entebbe. Through the five lenses of the health system resilience framework, this study extracted recommendations for strengthening health system resilience in the future. With the closure of the ERRH and the strict PHSMs, the citizens of Entebbe faced various difficulties in accessing needed health services. Meanwhile, the other health facilities received such swelling waves of patients fall turmoil. Despite such situations, the facilities made their best efforts to increase staff and expand their facility capacities to maintain the required services. Mobilizing vertical and horizontal actors through a flexible network, from the district to the community, including the police, while coordinating the necessary medicines, transportation, patient tracking, and so on. These experiences revealed components that can be addressed to strengthen resilient health systems during peacetime. These include a coordinated system of public health and health service delivery systems, and the formalization of a vertical coordination system. In addition, the introduction of a health insurance system in which all citizens pay their share of the cost remains an urgent issue. The recommendations derived from this study may be applicable not only to other cities in Uganda but also to similar cities in sub-Saharan countries in order to establish resilient health systems.

Abbreviations

COVID-19, coronavirus disease 2019; PHSMs, public health and social measures; MOH: Ministry of Health; ERRH: Entebbe Regional Referral Hospital; HCs, health centers; KIIs, key informant interviews; TB, tuberculosis; HIV, human immunodeficiency virus; ART, antiretroviral therapy; VHTs, village health teams; PCR, polymerase chain reaction; NMS, national medical store; HIV/AIDS, human immunodeficiency virus/acquired immunodeficiency syndrome; HCW, healthcare worker.

Data Sharing Statement

All data generated and analyzed during this study are available from the corresponding author upon reasonable request.

Ethical Approval

This study was approved by the Ethical committee at JICA Ogata Sadako Research Institute for Peace and Development (approval reference JICADI202002070001), the Research Ethics Committee at the School of Biomedical Sciences, Makerere University (approval reference SBS-2022-201), the Review Committee at the National Council for Science and Technology in Uganda (approval reference SS1425ES). After obtaining permission from the MOH and the ERRH, informed voluntary, and written consent, was signed by the study participants. Confidentiality was maintained using codes instead of the participant's name. Participants were also informed that they had the full right to refuse participation or withdraw at any time from the research, and the participants informed consent included the publication of anonymized responses before taking part in the survey.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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