

# Experiences of HIV/AIDS medical and nursing service during COVID-19 among people living with HIV and health providers: a qualitative study in Thailand

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## Abstract

**Introduction:** COVID-19 has a global health impact on vulnerable populations, including people living with human immunodeficiency virus (PLHIV). Its restrictions have affected attendance and delivery of HIV health services in Thailand. The objectives of the current phenomenological qualitative study were to understand experiences of HIV healthcare service during COVID-19 among PLHIV and health-care providers. This study also explored the model of HIV healthcare during COVID-19.

**Material and methods:** Narrative interviews were conducted among 34 participants. We intentionally recruited the participants who had experiences related to HIV healthcare service during the pandemic. Participants (nurses, physicians, and PLHIV) in ART clinics were requested to describe their experiences related to HIV healthcare service. Each interview lasted between 30 and 40 min. A thematic content analysis was applied to analyze data.

**Results:** Three themes were considered: 1) new normal in HIV healthcare service; 2) participative management of HIV healthcare service; 3) factors contributing to the success of HIV healthcare delivery. Theme 1 included four sub-topics: 1) reducing HIV healthcare service step; 2) rotation of PLHIV group service; 3) using alternative methods to obtain medications; and 4) modification of HIV service environment. Theme 2 consisted of two sub-topics: 1) communication within the organization to reach mutual understanding; and 2) networking. Theme 3 included three sub-topics: 1) effort of team members to deliver excellent service; 2) administrator's support; and 3) awareness of self-management among patients.

**Conclusions:** This study provides a background for the implementation of nursing interventions, which will be designed to re-shape flexible HIV healthcare service for PLHIV during COVID-19.

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**Key words:** AIDS, PLHIV, COVID-19, medical and nursing service.

## Introduction

Thailand was one of the Asian countries, which were mostly impacted by human immunodeficiency virus (HIV)/

acquired immunodeficiency syndrome (AIDS) epidemic since the late 1980s. HIV/AIDS epidemic has become a public health concern, with globally estimated 38 million people

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affected by the disease, and 690,000 of them dying from AIDS-related illnesses [1]. In 2019, nearly 6 million people have been living with HIV (PLHIV) in the Asia-Pacific Region, and it has become clear that regrading HIV response, this region is falling behind all regions in Africa. In 2019, approximately 160,000 people have died due to AIDS-related illnesses in the Asia-Pacific Region [2]. In Thailand, a generalized HIV epidemic trajectory appears to be increasing, and as of 2019, there were 470,000 PLHIV in Thailand, with 14,000 AIDS-related deaths [3].

In the global and local efforts to end the HIV/AIDS epidemic, the novel 2019 coronavirus disease (COVID-19) has emerged. As a result (as of June 24, 2021), there were 179,928,730 cases of COVID-19 in over 200 countries, and 3,898,531 deaths, with a 2.17% case fatality rate [4]. Towards the end of June 2021, it was reported that Thailand had 232,647 cases of COVID-19 and 1,775 deaths, with a 0.76% case fatality rate. The median age of those infected was 40.75 years (range, 1 month – 97 years), with majority within working age (range, 31–49 years), 75.01% females, and 38.86% living with other diseases, such as hypertension, diabetes, and cardiovascular diseases [5].

To control the spread of COVID-19, Thailand has established the center for COVID-19 situation administration (CCSA) to manage and work with related sectors from the society. CCSA communicates daily with Thai people via Thai television channels, and reports on COVID-19 situation in Thailand [6]. The CCSA has advised the public to seriously take distancing, mask wearing, hand washing, temperature checking, and Thai Chana (DMHTT) application usage precautions to prevent COVID-19. The Thai government is also urging Thai people to avoid public gatherings and stay at home, except for emergency reasons [7]. Considering the threat of COVID-19 super-fast spread in Thailand, the Thai Ministry of Public Health (MOPH) has initiated surveillance at public and private hospitals across the country. Subsequently, the Thai government has announced a countrywide lockdown that came into effect from March 26, 2020, and involved all aspects of Thai society, including healthcare services.

Questions quickly emerged on how the COVID-19 outbreak would impact the efforts to maintain healthcare service for PLHIV. At individual level, while physical distance in theory can reduce transmission of COVID-19, HIV/AIDS healthcare follow-up is a significant factor of overall well-being for many PLHIV. How the COVID-19 pandemic would impact HIV/AIDS healthcare follow-up and treatment during times of physical distancing, and what medical and nursing service model would develop after physical distancing recommendations were applied, were unanswered questions. At health system level, HIV clinics were closing, reducing service, or transitioning to telemedicine to prevent the spread of COVID-19, thus potentially limiting the access to HIV healthcare service for some PLHIV.

Effective management and necessary measures to provide HIV healthcare service for PLHIV during the COVID-19 pandemic required serious support from all involved sectors.

Recent study conducted in India showed that PLHIV accessed HIV antibody testing using transportation arranged by community-based organizations after lockdowns eased. They also reported uninterrupted antiretroviral therapy (ART) refills and generally consistent adherence; however, there were experiences of delayed CD4 and HIV RNA testing. Participants shared appreciation for multi-month dispensing (MMD), as it saved time, money, and reduced exposure to COVID-19. Participants expressed gratitude for home deliveries that enabled ART access, yet shared concerns about home-based service causing confidentiality breaches with family and neighbors. Participants also voiced preferences for community-based service provision due to proximity, convenient hours, and welcoming environments compared with public hospitals [8]. Moreover, Qiao *et al.* [9] conducted a study among Chinese HIV care providers to assess HIV service delivery and impacts on patient care during COVID-19. The results showed that the prominent impacts of COVID-19 on patient care outcomes were “not being able to make follow-up visits on time”, “not being able to get ARV refills timely”, and “compromised ART adherence”. Patients’ care outcomes were significantly related to “not being able to go to work due to quarantine and traffic restriction”, “no overall arrangement”, “no guideline for HIV service”, “conflicts between HIV care and response to COVID-19”, and “clinics were overwhelmed by COVID-19 care”.

Overall health outcomes of PLHIV could be adversely affected by the potential interactions between COVID-19 and HIV as well as the impact of COVID-19 pandemic on quality of life [10]. The understanding of such impacts on HIV care of PLHIV could emphasize the need for appropriate or even different HIV care service, and online and offline support interventions.

Although recent literature contain studies on the impact of COVID-19 in many vulnerable groups, literature addressing HIV service delivery in the time of COVID-19 and experiences of HIV/AIDS service during the COVID-19 pandemic among PLHIV is limited. To our knowledge, HIV/AIDS service delivery during COVID-19 among PLHIV has not been yet investigated in Thailand. Therefore, the present study aimed to understand experiences of HIV/AIDS healthcare service during the COVID-19 pandemic among PLHIV and healthcare providers (physicians and nurses). Additionally, the current study explored medical and nursing service model of HIV/AIDS healthcare follow-up during the COVID-19 pandemic in Thailand.

## Material and methods

### Study design

This study used a qualitative research method. Qualitative research methods are useful for demonstrating people’s thoughts and views on complex social activities [11]. Also, qualitative methods can provide tools for discovering issues, which are not deeply understood. This study employed a phenomenological approach to comprehend the prob-

lem under analysis. To understand the social world and its phenomenological needs, the world must be described as rooted in the objective experiences of real people [12]. One of the assumptions and principles of empirical phenomenology is to have experience as the only way to describe one's lived experiences. Empirical phenomenology deduces common aspects of different lived experiences [13]. Moreover, purposive sampling is applied, if the size of original population is not pre-determined [14]. Purposive sampling has been designed to increase the understanding of individuals and groups [15], and is considered one of the most common sampling methods, in which the participating groups are selected based on pre-defined criteria for specific research questions [16]. Therefore, in purposive sampling method, the information of an informant is employed to select cases with particular purpose in mind [17].

### Study settings and participants

In April 2021, a number of participants (nurses, physicians, and PLHIV) were approached via short message service (SMS) and telephone, of whom 5 did not respond to SMS or declined the invitation. After receiving permission from potential participants, researchers contacted them over the phone and scheduled an interview. We intentionally recruited individuals who were experienced with COVID-19-related challenges, and who were more likely to underwent massive impacts or to explore a range of COVID-19 impacts. Participants included nurses, physicians, and PLHIV in ART clinics housed in the hospitals of the 5<sup>th</sup> health service region of Thailand.

### Ethical considerations

This study was approved by the Institutional Review Board (IRB) of College of Nursing in Thailand (IRB No.: 10/2564). A signed informed consent form was obtained from all participants, where issues of anonymity, confidentiality of responses, and voluntary nature of participation were ensured. PLHIV individuals were informed that refusal to participate in the study would not affect their care.

### Data collection

After signing an informed consent form, participants were invited for an individual interview, and were requested to describe their experiences with HIV/AIDS medical and nursing service. Each interview lasted for 30 to 40 min. Audio-recorded narrative interviews were conducted from May to August 2021, and data collection process continued until data saturation. This occurs when patterns in the data are repeated [17], and when further interviewing does not result in new findings or patterns.

Narrative interview was divided into four phases, as follows [18]:

1. Introduction and explanation of the study. Explaining the interview process; for instance, the interview will be audio-recorded, the researcher would like to hear the story told in their own words and gaining consent, etc. The interview will start with an open question: "Can you tell me when you first knew there was COVID-19 pandemic and that would impact your HIV care, and what has happened since then?"
2. Narrative phase. The interviewee starts telling the story; the interviewer uses non-verbal encouragement, such as smile or saying "hmm" to encourage the interviewee to talk freely. The interviewer avoids disturbing until there are clear signs that the interviewee finished the story.
3. Questioning phase (in a combined narrative/semi-structured interview). This is when the active listening by the interviewer becomes helpful, and the interviewer utilizes the participant's own language to fill in any gaps or to ask for more details about an issue of interest. The interviewer asks questions, such as: "What happened then/before/after", or "Can you say a bit more about...?", rather than asking for opinions or attitudes, or even asking "Why?" question.
4. Conclusion phase. Lastly, the interviewer concludes the interview and explains the next steps, such as transcribing of the interview, whether the participant has any further input, etc.

### Data analysis

To analyze data, Colaizzi's descriptive seven-step method [19] was applied. First step: the interviews were transcribed verbatim, and then reviewed several times to generally understand their contents. Second step: for each of the interview transcripts, an interpretive summary was written to extract its latent meanings and themes. Third step: the researcher talked to participants to extract the themes. Fourth step: transcribed interviews were reviewed to obtain a general sense of the transcript, and to find the essential elements. Fifth step, the basic relations between the themes and essential elements were understood, and organized descriptions were extracted. Sixth step: the transcripts were summarized to find out key data from the themes extracted from the transcripts. Qualitative categories, initial themes, and final themes that were more harmonious were organized, and core concept of the categories was extracted. Lastly, in the seventh step, the important statements of experiences directly related to medical and nursing service during the COVID-19 pandemic were extracted in the form of rich comprehensive description.

### Rigor and trustworthiness

To ensure rigor of the study, the principles of trustworthiness [17] were utilized. Credibility was verified through peer debriefing, and member-checking by three participants. Regarding peer debriefing, the principle investigator (PI) shared

summaries of the interviews and discussed the findings with co-authors who are experts in qualitative methodology, to decrease bias and obtain feedback on data collection and analysis. Member-checking was conducted by three participants through returning a summary of the interview to the participants who provided the information to discuss and shared interpretation reports. Regarding dependability, reflection and written notes were used throughout data collection processes and data analysis. All processes were approved by co-authors as auditors. Moreover, confirmability was enhanced through an audit trail, in which the co-authors examined the research processes, checked the accuracy of codes during the analysis process, and confirmed the consistency of researcher's inferences. Additionally, transferability was achieved by providing a thick description.

## Results

Thirty-four participants were enrolled in the study, including 14 nurses, 6 physicians, and 14 PLHIV. Most of the participants were 35 years old and older, women, and had a college degree. More than half of the participants were married, and more than three quarters were employed (Table 1). Furthermore, the current study revealed three primary themes, including: 1) new normal in medical and nursing

service during the COVID-19 pandemic; 2) participative management of HIV medical and nursing service during COVID-19; and 3) factors contributing to the success of HIV medical and nursing service delivery during COVID-19.

### New normal of HIV medical and nursing service during the COVID-19 pandemic

The participants described new normal healthcare service during the COVID-19 pandemic. Interview data revealed four sub-topics relating to new normal healthcare service during the COVID-19 pandemic: 1) lessen step to access HIV medical and nursing service; 2) rotation of PLHIV group service; 3) using alternative methods to obtain medications during the COVID-19 pandemic; and 4) modification of HIV medical and nursing service environment.

#### Lessen step to access HIV medical and nursing service

Several participants who received ART services shared their positive attitudes and experiences with efficient clinic visit procedures:

"They (healthcare providers) lessened step to access HIV medical and nursing service. The clinic also scheduled limited number of people. So, the place was not crowded, and they maintained physical distancing and all preventive measures. The procedure was very smooth and fast. I could finish all procedures and received my medication within an hour." (Pt. 0004).

"Prior to the COVID-19 pandemic, at our clinic, we would made a follow-up visit and refill medication every two months. Then, we modified our working protocol for patients who live in a remote area, we made appointment with them every 3-4 months." (Nur. 1401).

#### Rotation of PLHIV group service

Some participants who provided HIV medical and nursing service shared their experiences with efficient clinic service:

"After the COVID-19 pandemic across Thailand, our clinic modified the service by rotating a group of clients (PLHIV) to access the service. Hence, a small group, like 10 patients, can get access at the same time to prevent the COVID-19 transmission. So, we can save time and get things done very fast. The clients understood our service, and they were very co-operative." (Nur. 0011).

"I would say that service at the clinic during the pandemic is very fast. I love this because I did not wait for long time. Nurse divided patients to a small group and informed us about the visit according to date and time of our appointment. It is one-stop service. No later than the afternoon of the day, I visited, I could finish, and then go back home. The patients could take turn to a clinic, but I would not see all of my friends (patients) because they would take a turn to visit a clinic at different time." (Pt. 0220).

**Table 1.** Participant characteristics (N = 34)

Characteristic	PLHIV (n = 14)	Nurses (n = 14)	Physicians (n = 6)
Age (years)			
18-24	2	0	0
25-34	6	6	2
35	6	8	4
Gender			
Man	10	2	3
Woman	2	12	3
Non-conformed gender	2	0	0
Education			
High-school graduate	6	0	0
Part of college	4	0	0
College graduate	4	12	0
Post-college studies	0	2	6
Marital status			
Single	2	7	3
Married	12	7	3
Work status			
Employed	7	14	6
Unemployed	1	0	0
Self-employed	6	0	0



### *Alternative HIV service delivery for refilling medications*

The participants universally appreciated HIV service delivery changes during the COVID-19 epidemic, especially extended help, home delivery, and mailing options offered by healthcare providers for ART refill service to avoid overcrowding at clinics:

"I had less than one month's pills left with me. HIV clinic contacted me offering to send the medicine via the Kerry Service (the parcel delivery service company). I was okay with that, and then I waited for the package to arrive. When I was unboxing the package, the medicine was camouflaged and well-wrapped." (Pt. 0003).

"We, at the HIV clinic, agreed to help our clients by mailing medicines to them, even though almost everything was lock downed, except for the parcel delivery service company. So, we chose the Kerry Service as mailing option. Prior to doing that, we asked our clients whether they were comfortable with home delivery. If they agreed, we would carefully do that. In case they did not, they needed to make a follow-up visit at the clinic to get their medications." (Nur. 1401).

### *Modification of HIV medical and nursing service environment*

The participants also described the modification of medical and nursing service environment at the HIV clinic during the epidemic, highlighting their experiences regarding the modified clinic environment:

"During the COVID-19 pandemic, our clinic was modified, and we relocated to a new building to avoid crowded area; we wanted our clients not to contact with other patient groups. We initiated "one-stop service" by using distancing, mask wearing, hand washing, temperature testing, and Thai Chana application (DMHTT). When we called patient to see a doctor in an examination room, the patient came in and sat down on a chair at another side of a plastic partition between doctor and patient, so I think this might prevent the COVID-19 transmission at our clinic." (Nur. 0027).

"Service step was modified a lot; it was faster than usual. I was informed by phone about my appointment time, so it was very convenient for me not to wait for a long period of time. I could go to the one-stop service area, no need to walk pass by any room, and did not need to meet other people. When I went to a clinic, I always wore double masks, prepared alcohol hand washing for myself, and kept physical distancing from others." (Pt. 0001).

### **Participative management of HIV medical and nursing service during COVID-19**

Interview data demonstrated two sub-themes regarding participative management of HIV medical and nursing service during COVID-19: 1) communication in the organization to reach mutual understanding; and 2) networking.

### *Communication in the organization to reach mutual understanding*

Communication within the organization to reach mutual understanding was highlighted in the interviews by some of the participants:

"Our team members always communicate using telephone. When there are some concerns/problematic issues, we would not hesitate to talk and share the situation to make sure that there is not a problem at the moment." (Nur. 2035).

"Yes, nurses at the (HIV) clinic would tell us about service steps, and how to self-manage or deal with sign and symptoms of HIV infection. Since we practiced according to the old protocol for years, when COVID-19 emerged, we modified many things. For example, when we made a follow-up visit to HIV clinic, things were changed, such as clients' group and method to obtain/refill medication. They (nurses and pharmacists) at the clinic prepared us (the clients) beforehand. So, if we did not understand, we could ask at that time. They would clearly explain. Regarding the medication, they would let us talk to the pharmacists, and they (the pharmacists) would explain us until we had no further questions." (Pt. 0021).

### *Networking*

Networking was underlined in the interviews by some of the participants:

"We have a mutual project. There are many organizations and sectors in our network, including Tambon (sub-district) health promoting hospital and local government organization, which all take part in medication delivery (medication referral system) from hospital to clients in the community. Our goal is to minimize medication non-adherence, and we also continue to monitor our clients." (Nur. 0001).

"I am a leader of patient's group. My major role is to cooperate with other HIV patients. I am like a moderator between the hospital and patient's group. And, I also help to prepare a clinic setting, such as preparing chairs/tables and to run a patient's queue on the day they (patients) visit. The queue management system is important because it helps to improve patient flow in HIV clinic." (Pt. 0002).

### **Factors contributing to the success of HIV medical and nursing service delivery**

Interview data demonstrated three sub-themes regarding factors contributing to the success of HIV medical and nursing service delivery during COVID-19: 1) effort of team members to deliver excellent service; 2) administrator's support; and 3) awareness of self-management among clients.

### *Effort of team members to deliver excellent service*

Effort of team members to deliver excellent service was highlighted in the interviews by some of the participants:

“We, as nurses, would love to have patients visiting us at the clinic, or their cousins, living not far from the clinic who might come to obtain medications for them. If we mailed the medicine via the postal service, we would not see the patient in person, so we would not know about the progress of the illness. At least, when we meet the patients, we can ask them how they are doing.” (Nur. 0155).

“The major role in working for ARV clinic is to work as a team, both doctors and pharmacists all cooperate in a team. We all have a intention to work for patients. When whoever in our team got sick, the others in our team would visit to comfort and support. Even the patients, we would visit when they were in grief of loss of family members. We are like cousins.” (Dr. 0045).

### *Administrator's support*

The participants constantly mentioned about administrator's support during the epidemic. They highlighted their experiences of working with strong support of administrator:

“Regarding the administrator's support, in a meeting, the leader of every sector, directors, and all staff joined the discussion, shared their ideas, and made arguments in all aspects. Especially, we discussed about how we could have sufficient staff to work during the pandemic. We always had a large meeting.” (Nur. 0123).

“Regarding human resources, the administrative team of the hospital founded working procedure to tackle the challenges attributed to the pandemic. All problematic issues were brought into the consideration of the team. Head of the staff and administrators were working together, reaching a mutual agreement. Consequently, all decisions of the administrative team would be conveyed to the work-

ing staff. Especially, the work load was a major issue among our team, and the COVID-19 pandemic caused significant staff challenges. As the COVID-19 outbreak progresses, staff shortages would likely to occur due to COVID-19 exposures or illness.” (Dr. 0045).

### *Awareness of self-management among PLHIV*

Later in the interview, the participants frequently mentioned the awareness of self-management among PLHIV during the pandemic. The participants highlighted their experiences of awareness of self-management among patients:

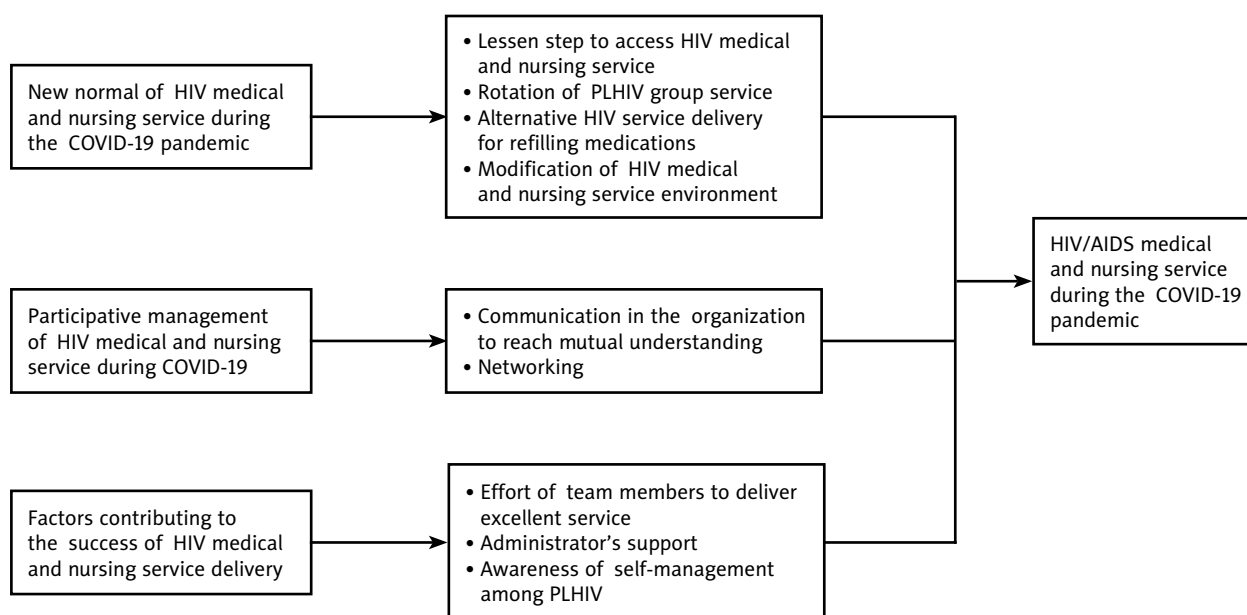
“We, at the clinic, suggested the patients that they might have their relatives came to refill their medications, instead of visiting the clinic themselves. We supposed that our patients would not have medication non-adherence because these patients always practiced good self-management, they are afraid to die. So, they have a high level of medication adherence.” (Dr. 0207).

“The patients are aware of taking medication and medication adherence. I can say that I noticed when they were running out of their pills or they had less than a month's pills left with them, they would call a clinic. Some of them were afraid that we (the clinic) would run out of medication doses; they cannot live without medicines.” (Nur. 0155).

The model of HIV/AIDS medical and nursing service during the COVID-19 pandemic is shown in Figure 1.

## **Discussion**

The current study was one of the first efforts to investigate medical and nursing service model and experiences of HIV/AIDS healthcare follow-up during the COVID-19



**Figure 1.** Model of HIV/AIDS medical and nursing service during the COVID-19 pandemic

pandemic from the perspective of HIV healthcare providers (physicians and nurses) and PLHIV in Thailand. The study aimed to understand experiences of HIV/AIDS healthcare service during COVID-19 pandemic among PLHIV and healthcare providers (physicians and nurses). It also explored medical and nursing service model of HIV/AIDS healthcare follow-up during the COVID-19 pandemic in Thailand. Our findings are summarized under three themes: 1) new normal in medical and nursing service during the COVID-19 pandemic; 2) participative management of HIV medical and nursing service during COVID-19; and 3) factors contributing to the success of HIV medical and nursing service delivery during COVID-19.

Our study findings revealed that new normal in medical and nursing service during the COVID-19 pandemic was seriously introduced to avoid contracting COVID-19. New normal in medical and nursing service during the COVID-19 pandemic consisted of reducing HIV medical and nursing service step, rotation of PLHIV group service, using alternative methods to obtain medications during the COVID-19 pandemic, and modification of HIV medical and nursing service environment. PLHIV who participated in our study reported adequate access to ART, and stated that they were able to maintain optimal ART adherence during the COVID-19 pandemic. ART adherence was also facilitated by their desire to maintain healthy, with strong immunity. HIV service delivery measures by the Thai healthcare system, including home ART delivery using parcel delivery service (Kerry Express), helped the participants to maintain their ART medication adherence during the COVID-19 pandemic. This finding is similar to a recent study from Uganda that showed the adoption of new different service delivery models for ART, such as the use of motorcycle taxis and introduction of an individualized ART delivery model for patients with non-disclosed HIV status [20]. No previous study has documented this evidence about the use of Kerry Express for ART delivery in Thailand. Noticeably, challenges of delivering HIV healthcare service appear to deeply influence patient HIV care outcomes during the early phase of the COVID-19 pandemic.

Furthermore, several PLHIV recognized concerns relating to a possible shortage of ART medications as a result of transportation restrictions and national lockdowns, which is in line with a study from Central and Eastern Europe [21]. Moreover, HIV healthcare providers' concerns over patient care outcomes heavily focused on retention in care and medication adherence. A number of HIV healthcare providers were deeply concerned for their patients not getting ARVs refills timely. Our finding is generally consistent with studies among HIV patients in Guangxi, China, and Latin America showing that ARV refill and medication adherence are prevalent problems for HIV care during an outbreak [9, 22]. However, specific attention and adequate effort should be paid to the aspect of HIV care not only during the pandemic but also post-COVID-19. Hence, a post-crisis of the pandemic or next normal of HIV care might be of concerns. A set of HIV healthcare services for the next normal should

be introduced as a response to PLHIV demands. The new model may incorporate several approaches that employ digital health or telehealth as feasible alternatives to in-person visits of PLHIV during the COVID-19 pandemic [23, 24].

Another unique finding of this study underlines the need of improving participative management of HIV healthcare service during public health crisis, such as COVID-19. The participative management of HIV healthcare service can be attributed to some common traits of organization, such as communication within the organization to reach mutual understanding, and networking [25]. Health administrative team is able to use both internal and external resources, and also make great impact on health organizations' ability to be flexible for designing health service. Taking this approach requires health provision sectors to better understand each other, their needs, and how they can work together. Therefore, in response to dual epidemics of COVID-19 and HIV/AIDS, the health administrative team should consider the needs of healthcare providers in order to best serve patients, including mutual understanding in the organization during the pandemic [9].

Our results showed that leaders of HIV clinics worked with health administrators to provide training and protocols to assist health providers to navigate shifting tasks and priorities effectively, and to develop clear guidelines and clinic-level arrangements based on existing resources in order to best serve both COVID-19 and HIV/AIDS patients. Several strategies were applied to guarantee continuity of HIV service delivery while promoting patient and staff safety. Task-shifting ensured continuous service delivery during the COVID-19 pandemic. Effective and regular communication with healthcare providers is very important to provide support, reduce uncertainty, and enhance confidence. These findings are similar with a study conducted among healthcare workers in Ghana [26] that reported strategies used in ART unit in tackling COVID-19. They established strategies, such as adjusting patient's appointment schedule, health professionals' work schedule, launching several work stations, or task shifting. They also ensured the implementation of COVID-19 protocols to warrant consistent service delivery and patient and staff safety.

Other findings also provide evidence that there are factors contributing to the success of HIV/AIDS medical and nursing service delivery during the COVID-19 pandemic, including effort of team members to provide excellent service, administrator's support, and awareness of self-management of patients. As a long-term plan, we need to develop a mechanism to effectively assess, monitor, and deliver HIV medical and nursing service in HIV-related institutions via regular evaluation and tailored training for healthcare providers at different levels. More research studies on medical and nursing service model and experiences of HIV/AIDS care during public health crisis, such as COVID-19, are needed to identify facilitators and barriers at various socio-environmental levels, and developing evidence-based interventions for front-line healthcare providers.

The findings of the current study must be viewed within the context and limitations of the research. We describe pandemic-related experiences within a short period of time, i.e., when PLHIV participants were learning how to navigate their lives during the first wave of the COVID-19 pandemic, adapting to stay-at-home mandates, and physical distancing recommendations. We also interviewed a smaller than anticipated number of hospital administrators and physicians. During the recruitment period, COVID-19 cases were rising steeply in Thailand, which we believe made recruitment difficult. In addition, as in all qualitative research, we purposefully selected participants, and a different group of individuals may have experienced different situations. Although our sample size is small, if disaggregated per informant group, our purposive sampling approach worked to optimize for information power and variation of a group, while considering implementation feasibility [27]. Nevertheless, the findings of this study provide a rich description of the medical and nursing service model and experiences of HIV/AIDS health-care follow-up during the COVID-19 pandemic from the perspectives of selected group of physicians, nurses, and PLHIV of one medical and nursing service area, Thailand.

## Conclusions

The current study is one of the first empirical studies that linked HIV service challenges to patient care outcomes from the perspectives of HIV care providers and PLHIV. Compared with the lack of personal protective equipment and shortage of personnel caused by high demands and burden to health system during the pandemic, challenges at policy and institution levels were more relevant compared with the negative impacts on patient care outcomes. Our findings suggest that it is crucial to comprehensively consider how the organizational level responses to the COVID-19 pandemic may impact the delivery of healthcare for HIV/AIDS patients; it is also urgent to improve organizational readiness of HIV service facilities. Telehealth can be considered for delivering HIV care in the next normal. Hence, the healthcare system will be able to provide timely and effective support to HIV healthcare providers in terms of training, guidelines, logistics, and clinic-level arrangements in response to future public health emergencies.

## Disclosures

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4. Conflicts of interest: None.

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