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**COMMENTARY | COVID-19 AND HIV/AIDS**

## **COVID-19 Infection among People with HIV/AIDS in Africa: Knowledge Gaps, Public Health Preparedness and Research Priorities**

**Ekere James Essien, MD, DrPH;<sup>1,2,3</sup> Osaro Mgbere, PhD, MS, MPH;<sup>1,2,4</sup> Sorochi Iloanusi, B.Pharm;<sup>2</sup> Susan M. Abughosh, PhD<sup>1,2</sup>**

<sup>1</sup> Institute of Community Health, University of Houston College of Pharmacy, Houston, Texas, USA; <sup>2</sup> Department of Pharmaceutical Health Outcomes and Policy, University of Houston College of Pharmacy, Houston, Texas, USA; <sup>3</sup> Department of Health Promotion and Behavioral Sciences, University of Texas School of Public Health, Houston, Texas, USA; <sup>4</sup> Disease Prevention and Control Division, Houston Health Department, Houston, Texas, USA

✉ Corresponding author email: [ejessien@uh.edu](mailto:ejessien@uh.edu)

### **ABSTRACT**

The emergence of novel virus SARS-CoV-2 that causes COVID-19 has complicated Africa's public health challenges, especially with the pre-existing epidemics such as HIV/AIDS. We highlight the known evidence related to COVID-19 infections among people with HIV (PWH) with specific reference to Africa. The knowledge gaps, level of public health preparedness and the potential research priorities are also outlined. Although the epidemiology and clinical course of COVID-19 in HIV patients are evolving, existing evidence indicate that the disease outcomes are comparable to that of the general population. However, PWH with low CD4 cell counts may have worse outcomes than individuals with restored immunity, whereas old age and co-morbidities such as obesity, hypertension and diabetes can further increase their overall risk. While there may be slight disruption of HIV service delivery in selected African countries, the resilience and resourcefulness of others have helped to sustain HIV service delivery and enhanced the level of public health preparedness and fight against the pandemic. The paucity of data and research studies on HIV-COVID-19 coinfection in Africa, call for concerted efforts to address these limitations.

**Keywords:** • COVID-19 • SARS-CoV-2 • HIV • PWH • Public Health • Research • Africa

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### **1. Introduction**

Globally, the COVID-19 pandemic has spread to over 52 million persons and caused 1.2 million deaths since it was first discovered in Wuhan.<sup>1</sup> COVID-19 was first reported in Africa on February 14, 2020 in Egypt, and has since spread across the region causing 1.9 million infections and 46,000 deaths,<sup>2</sup> further straining the region's low health resources. The impact of the novel pandemic also complicates the region's public health challenges

with pre-existing epidemics such as HIV/AIDS and tuberculosis (TB). As of 2019, people with HIV (PWH) in Sub-Saharan Africa (SSA) accounted for about 67% of the 38 million PWH globally, with 1.7 million incident cases of HIV in that year.<sup>3</sup> Currently, there is no evidence of greater risk of contracting COVID-19 among PWH on effective antiretroviral treatment than their uninfected peers.<sup>4</sup> However, recent evidence suggests that there is worsened COVID-19 prognosis for patients

with pre-existing TB,<sup>5,6</sup> a common HIV coinfection especially in SSA.<sup>7</sup> People living with HIV are 18 times more likely to have active TB, a leading cause of death among PWH which accounts for over 30% of mortality in the group.<sup>3</sup> PWH and TB, if infected with COVID-19, are more likely to experience severe COVID-19 symptoms that could result in hospitalization and/or death than their counterparts without TB.<sup>5,6</sup> This has huge implications for Africa which has the highest burden of HIV-related TB, with 86% of TB patients also coinfecting with HIV.<sup>7</sup> In view of the adverse outcome associated with COVID-19 and TB, tailored COVID-19 interventions for PWH in Africa needs to be prioritized. Currently, there is a paucity of research on the intersection between TB and COVID-19, and HIV infection in Africa.

## 2. Key Considerations

### 2.1. Knowledge Gaps

Presently, not much is known about the clinical and epidemiological outcomes of PWH infected with SARS-CoV-2 as only a handful of case reports or small case series have been published.<sup>8-10</sup> This lack of information is of great concern in countries with high HIV cases, especially in Africa—home to 67% of people living with HIV.<sup>3</sup> In a recent published overview of studies assessing COVID-19 infections among more than 11,000 HIV-positive individuals, the estimated COVID-19 prevalence reported in various studies did not suggest increased rates of hospitalization or mortality in HIV-positive patient populations.<sup>11</sup> It has been concluded that the clinical characteristics and disease outcomes among PWH were comparable to those described for the general population with COVID-19 infection.<sup>12-14</sup> Consequently, the reasons for these observations are still unclear, and the risk associated with HIV/COVID-19 coinfection remains a matter of debate, requiring further research. Several scientists have come up with interesting hypotheses including that ART use by HIV patients may be causing ‘viral interference’ with SARS-CoV-2 replication, thereby offering some level of protection against severe COVID-19 infection,<sup>15,16</sup> among others. As we learn more about the SARS-CoV-2 virus, it is important to ramp up and prioritize research efforts in Africa, especially in such areas as understanding

transmission dynamics among PWH in the urban and rural areas, vaccine development, immunity, and potential uptakes. In addition, there is the need to examine how TB, malaria and parasitic worm infections affect COVID-19 disease progression in PWH; impact of COVID-19 pandemic on HIV service delivery; and the socio-economic ramifications of the COVID-19 pandemic on the society. Filling these and other knowledge gaps will clarify how the engines of transmission interact to drive the pandemic—and how best to fight back.<sup>17</sup> Gaining insight into this population in Africa will help inform the development of targeted and effective interventions for the continent.

### 2.2. Impact of COVID-19 Pandemic on HIV Service Delivery

COVID-19 pandemic has negatively impacted HIV care service delivery and access to care in Africa, leading to worsened health outcomes for PWH and vulnerable groups. Shutdown of cities, border closures and restriction of movement which ensued in an attempt by governments in Africa to curb the spread of COVID-19 has led to interruption of HIV care services such as steady supply of antiretroviral drugs (ARV), HIV counselling and testing services, TB diagnosis, condom distribution and other vital services, thus hindering the achievement of the HIV prevention goals.<sup>18</sup> For instance, a study in South Africa, revealed that retention and prescription of pre-exposure prophylaxis for pregnant and post-partum women (PrEP-PP) – a key prevention strategy for infant HIV transmission— was significantly reduced during the national COVID-19 lockdown.<sup>19</sup> Such interruptions to HIV care delivery and access could potentially lead to offsetting of previous gains made in HIV control in the region.<sup>20</sup> In addition, travel restrictions affected ARV drug production and supply, which could significantly increase the cost of generic ARV drugs relied upon to manage HIV in SSA,<sup>3</sup> causing further strain on already limited resources. A modelling study projected up to 500,000 HIV-related adult deaths within a year, doubling of mother-to-child HIV transmission and increased HIV incidence if vital HIV care services were interrupted for up to 6 months due to the COVID-19 pandemic.<sup>21</sup> To prevent this potential catastrophe, Africa’s health

systems will need to leverage on experiences gained from management of other epidemics like Ebola, and quickly adapt, and curate simultaneous response to COVID-19 and HIV infections without sidelining either of the diseases.

### 2.3. Public Health Preparedness

While the African Union (AU) and the Africa Centers for Disease Control and Prevention (Africa CDC) have continued to spearhead and coordinate the continent's COVID-19 prevention strategy, the United States President's Emergency Plan for AIDS Relief (PEPFAR) has focused on integrating HIV/AIDS prevention and management with COVID-19 management in the region.<sup>22</sup> Recognizing the importance of an integrated COVID-19/HIV service delivery, the Africa CDC in response created a webinar series on maintaining HIV & TB testing in the context of COVID-19 infection to train health care workers in the early stage of the outbreak in April 2020.<sup>23</sup> However, Africa's health system is markedly under-resourced with numerous African countries ranking low in key health system capacity indicators such as ratio of health care workers, and hospital facilities per patient.<sup>24</sup> Furthermore, the health system structure is different across African countries, hence the response to adapting HIV and COVID-19 services vary. For instance, while Rwanda has a universal health care system where 90% of the population have health insurance coverage thereby increasing access to care, Nigeria's National Health Insurance Scheme (NHIS) covers only about 5% of her citizens.<sup>25</sup> Additionally, within most African countries, there are significant differences in the level of preparedness for COVID-19 pandemic between private and public HIV care facilities in rural and urban areas of the country. For example, a study in Tanzania noted that personal protective equipment (PPE) and safety materials such as medical masks, alcohol-based hand rub, disinfectants and running water needed for COVID-19 prevention by health care workers (HCW) were in short supply, especially at public HIV facilities and HIV facilities located in the rural areas.<sup>26</sup> These issues pose a challenge for HCWs' adherence to COVID-19 prevention guidelines and puts them at risk of contracting and spreading COVID-19.

Aside from providing PPE and safety materials, other factors such as food insecurity constitute major challenges to preventing COVID-19 infection in this population. The PEPFAR program, provided additional technical guidance to adapt HIV care delivery in the context of COVID-19, stressing the importance of preventing food insecurity among PWH during the COVID-19 pandemic.<sup>27</sup> Food insecurity, a social determinant of health,<sup>28</sup> is more prevalent among PWH compared to the general public and is linked to worse health outcomes among PWH.<sup>29-31</sup> The severe economic disruption caused by COVID-19 infection has worsened food insecurity in Africa, a continent already marked by poverty prior to the pandemic.<sup>31</sup> Ensuring access to nutritious food in Africa during this COVID-19 pandemic should be considered a public health priority. Care must therefore be taken to provide palliatives, especially to PWH to mitigate the impact of COVID-19 and prevent offset of the previous HIV control gains made over the years in the continent. In the long run, Africa's food systems must be strengthened to mitigate the impact of the pandemic on food security and better prepare the continent against future emerging diseases that could disrupt access to nutritious food.

Despite the issues facing Africa due to fragile health care systems, scarcity of healthcare resources, and poverty, the continent is well experienced in containing deadly epidemics such as Ebola, Lassa fever, malaria, polio and other endemic conditions.<sup>32</sup> Drawing upon that, the region has risen to the challenge posed by COVID-19 and has sustained HIV service delivery and in some cases expanded access to HIV care services. For example, in Namibia the Ministry of Health and Social Services (MoHSS) supported by PEPFAR coordinated the national HIV treatment program with the COVID-19 nationwide response.<sup>33</sup> Namibia was able to improve care access for PWH through use of technology such as Zoom, Skype, WhatsApp to deliver virtual HIV services, multi-month dispensing of ARV, community advocacy to ensure ARV distribution and adherence, scaling up of HIV self-testing by clients, and establishment of a national ART hotline to facilitate easy access to HIV

care.<sup>33</sup> These COVID-19 safety-compliant delivery of HIV services have been recommended for Africa to prevent loss of progress made in achieving the continent's HIV prevention and treatment goals during the pandemic period.<sup>34,35</sup>

To ensure success in curbing potential HIV adverse outcomes due to the COVID-19 pandemic disruption, health promotion is vital to empowering PWH to take charge of improving their health through optimal adherence to their ARV drugs and recommended COVID-19 prevention practices. To achieve sustained HIV service delivery, the Ottawa Charter for Health promotion<sup>36</sup> has suggested a framework to guide government health promotion interventions.<sup>37</sup>

#### 2.4. Research Priorities

Although African countries have been resourceful in applying lessons from past disease management to the present HIV/COVID-19 response, paucity of both data and published research remain one of the major setbacks. Lack of coordination of health records and suboptimal data management in health institutions in Africa make it difficult for researchers in the continent to effectively carry out certain kinds of research. In addition, this limits the ability to accurately estimate, predict, plan and adequately allocate resources for emerging health issues such as the dual pandemic of COVID-19 and HIV using data projections. Despite the prevalence of infectious diseases such as HIV, TB, malaria, and other respiratory infections or those caused by helminths in Africa, there is currently little information on whether, or how, these infections affect COVID-19 disease progression. Hence, there is strong need for reliable age-specific data to fully understand the disease dynamics in Africa, particularly as it relates to PWH. To improve HIV/COVID-19 coinfection outcomes in Africa, priority should be given to organized, ethical and extensive data collection, documentation, and management. This will facilitate better understanding of the HIV/COVID-19 *dual* pandemic and aid in planning and delivering better tailored interventions for PWH.

Furthermore, even though substantial progress has been made in the discovery and development

of effective COVID-19 vaccines, it will take some time before it is accessible for up to 60% of Africans to induce herd immunity in the continent.<sup>38</sup> This is because large scale importation of sufficient amount of vaccine might not be feasible, due to cost, storage and time to delivery of the vaccine products. In the interim, convalescent plasma has sometimes been used as a transient treatment for severe COVID-19 in the absence of an effective therapy or vaccine.<sup>39</sup> Care must be taken to ensure that plasma product if used does not lead to an outbreak of HIV in the continent due to suboptimal screening of blood products.<sup>40</sup> Therefore, research is needed to devise ways to improve safety of plasma products for COVID-19 management in Africa. Similarly, misperceptions about COVID-19 vaccination and vaccine uptakes among PWH should also be made a research priority.

### 3. Conclusion and Global Health Implications

In conclusion, several factors affect the prognosis and transmission dynamics of COVID-19 infection among PWH in Africa. These include poverty, food insecurity, crowded transportation system, which increases the risk of COVID-19 spread among PWH;<sup>41</sup> the adverse psychosocial impact of the pandemic on PWH,<sup>42</sup> and disparities in health system preparedness across health care facilities in some parts of the continent.<sup>26</sup> Fortunately, the health systems in Africa have risen up to the challenge of ensuring continued HIV service delivery in the face of the COVID-19 pandemic.<sup>43</sup> While this achievement is commendable, more work is needed in the continent to fill the existing knowledge gaps and provide data to inform the development of evidence-based intervention programs.

#### Compliance with Ethical Standards

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### Key Messages

- ▶ Although the epidemiology and clinical course of COVID-19 in PWH are evolving and not well understood, existing evidence indicate that the disease outcomes in HIV patients are comparable to that of the general population.
- ▶ In spite of Africa's fragile health care systems and scarce resources, the resilience, resourcefulness, and past experience of managing pandemics, to some extent, have helped to sustain HIV service delivery.
- ▶ There is an urgent need for research studies that examine the impact of COVID-19 pandemic among PWH in Africa.

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