



COMMENTARY

The syndemic burden of HIV/AIDS in Africa amidst the COVID-19 pandemic

Olivier Uwishema^{1,2,3}  | Charles Taylor^{2,4}  | Lukman Lawal^{2,5} |
 Nakyanzi Hamiidah^{2,6} | Isoke Robert^{2,6} | Abdurashed Nasir^{2,5} |
 Elie Chalhoub^{1,7} | Jeffrey Sun^{2,8} | Burak T. Akin³ | Irem Adanur^{1,3} |
 Rehema M. Mwazighe^{1,9} | Helen Onyeaka¹⁰

¹Oli Health Magazine Organization, Research and Education, Kigali, Rwanda

²Clinton Global Initiative University, New York, New York, USA

³Faculty of Medicine, Karadeniz Technical University, Trabzon, Turkey

⁴Faculty of Medicine, University of Southampton, Southampton, UK

⁵Department of Medicine, College of Health Sciences, University of Ilorin, Ilorin, Kwara State, Nigeria

⁶Department of Nursing and Midwifery, Faculty of Health Sciences, Lira University, Lira, Uganda

⁷Faculty of Medicine, University of Saint Joseph of Beirut, Beirut, Lebanon

⁸Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada

⁹Medical Laboratory Technologist, The Mombasa Hospital, Mombasa, Kenya

¹⁰School of Chemical Engineering, University of Birmingham, Edgbaston, Birmingham, UK

Correspondence

Olivier Uwishema, Faculty of Medicine, Karadeniz Technical University, Trabzon 61080, Turkey.

Email: uwolivier1@ktu.edu.tr

Abstract

Introduction: The human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) has long affected millions of individuals across the globe. Historically, the prevalence of this disease is particularly noted within the African continent. Before the coronavirus disease 2019 (COVID-19) pandemic, many African countries struggled to effectively manage the increasing burden associated with HIV/AIDS. There is now a need to reassess this in a COVID-19 pandemic context so that the impact of COVID-19 on HIV/AIDS healthcare within Africa can be adequately evaluated.

Methods: Data collection was performed on the PubMed, Ovid MEDLINE and Embase bibliographical databases with a predefined search strategy. Searches were performed in blind duplicate and all articles considering COVID-19 and HIV/AIDS within African healthcare were considered.

Results: The COVID-19 pandemic has severely exacerbated the many issues surrounding HIV/AIDS care within many African countries. These impacts are noticeable in medical, psychological, and socio-political contexts.

Conclusions: Before efforts are made to improve the provision of HIV/AIDS and COVID-19 care within Africa, it is important that this issue is brought to the attention of the scientific and clinical community so that the continent can receive the necessary support and aid.

KEYWORDS

acquired immune deficiency syndrome, Africa, antiretroviral therapy, coronavirus, COVID-19, HIV/AIDS, human immunodeficiency virus

1 | INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a respiratory illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹ Coronavirus was first identified in Wuhan City, Hubei Province of China.¹ Despite only being reported to the World Health Organization (WHO) on December 31, 2019, COVID-19 was declared a global health emergency on January 30, 2020.² This was later classified as a Public Health Emergency of International Concern (PHEIC).² The WHO subsequently declared COVID-19 a global pandemic on March 11, 2020. This was the first such designation since the pandemic announcement of H1N1 influenza in 2009.^{3,4}

The impacts of COVID-19 have been felt across the globe. However, even though the prevalence of COVID-19 in Africa is relatively low, many believe that the impacts were felt more significantly in resource-limited countries who already suffered from less established health-care systems.⁵

As global health-care networks offer their undivided attention toward the COVID-19 pandemic, attention is drawn away from the far more established and equally devastating human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) pandemic. Global efforts to fight COVID-19 have resulted in a mismanagement of other illnesses such as HIV/AIDS.⁵ In addition to HIV/AIDS, some African countries were simultaneously facing other infectious diseases and viral outbreaks.^{6,7} Consequently, many countries failed to hit the 2020 United Nations 90-90-90 treatment target to help end the AIDS epidemic within Africa.⁸⁻¹⁰ However, it is worth noting that HIV morbidity and mortality were not affected as severely as previously expected due to large disruptions to HIV management being less severe than anticipated.^{11,12}

The aggregation of two concurrent epidemics is known as a syndemic.¹³ This is when two or more epidemics interact synergistically to produce an increased burden of disease.¹⁴ Despite steadily improving efforts to address COVID-19 within developing countries, previous efforts toward the treatment of pre-existing infectious diseases such as HIV were currently inadequate.^{10,14}

Biochemical and lab-based studies regarding COVID-19 and HIV/AIDS show largely contradictory outcomes. Currently, it is suggested that immunosuppression associated with HIV/AIDS increases the risk of contracting COVID-19 and results in more severe COVID-19 symptoms.¹⁵⁻¹⁷ On the contrary, other studies indicate that a low CD4 cell count confers an advantage as it protects against a cytokine storm reaction.^{18,19} It is therefore evident that this literature base is subject to much

heterogeneity, and that further clarification is required before decisive clinical action can be taken.

The effects of COVID-19 on the management of HIV/AIDS are of particular concern within African countries as these countries account for approximately two-thirds of all HIV infections and deaths.^{2,20} COVID-19 has subsequently resulted in a reduced quality of care for HIV/AIDS patients globally.^{5,10} However, this is of particular significance within Africa as in 2019, 17% of African HIV patients were undiagnosed and a further 30% went untreated.²¹ Consequently, COVID-19 held the potential to further exacerbate HIV/AIDS care within Africa and to halt any progress that was being made.

More consideration must be given toward the interaction between COVID-19 and HIV/AIDS. This attention must be paid in a pathophysiological, epidemiological, and geopolitical context. In an attempt to do achieve this, this review evaluates HIV/AIDS within Africa during COVID-19 and outlines the current strategies attempting to minimize the negative impact of coronavirus on HIV care delivery. This review also aims to explore the current burden of these diseases and the future challenges that many African health-care systems may face within this field.

2 | HIV/AIDS IN AFRICA DURING COVID-19

HIV has previously been referred to as a pandemic and according to 2019 data, 38.0 million people live with HIV (PLHIV) globally. Up to 25.7 million of these individuals (two-thirds) originate from sub-Saharan Africa, of which, around 20.7 million were from Eastern and Southern Africa and 4.9 million from Western and Central Africa.²² In addition, in 2019, the numbers of new HIV infections were 730,000 in Eastern and Southern Africa and 240,000 in Western and Central Africa. Consequentially, in 2019, the number of AIDS-related deaths was 300,000 in Eastern and Southern Africa and 140,000 in a Western and Central Africa.²²

Before the COVID-19 pandemic, UNAIDS set their 90-90-90 target. This was an effort to ensure that 90% of PLHIV knew their disease status, 90% of people diagnosed with HIV were initiated on standard antiretroviral therapy (ART), and 90% of patients on ART had a suppressing viral load by 2020.²² Additionally, in 2015, the United Nations General Assembly introduced interim 2020 milestones in the 2016 Political Declaration on Ending AIDS which outlined their goals to reduce new annual HIV infections and AIDS-related deaths to fewer than 500,000 and to eliminate HIV-related stigma and discrimination by 2020.²²

Efforts to minimize the prevalence of HIV and its comorbidities were mostly successful and uninterrupted. Notably, in sub-Saharan Africa, great strides had been taken in a bid to meet the UNAIDS 90-90-90 targets by the end of 2019. In Eastern and Southern Africa, 87% of PLHIV knew their status, 72% of PLWH were on treatment, and 65% of were virally suppressed by 2019. However, in Western and Central Africa, only 68% of PLWH knew their status, 58% of PLWH were on treatment, and 45% were virally suppressed.²² The figures indicated a slight but notable setback in achieving the UNAIDS targets by 2020.

Furthermore, it has been reported by the WHO that the number of people starting treatment in 2020 is far below what was expected.¹⁸ This was largely attributed to limited access to HIV/AIDS services such as HIV-testing and treatment initiation. This in turn was correlated to the lockdown measures enforced in many parts of the world that prevented access to these vital health-care services.^{20,23}

By the beginning of 2020, most African countries had integrated community-based interventions into HIV health-care service delivery to achieve the UN-AIDS 90-90-90 targets. These interventions included follow-up of patients on ART, reduction in transportation costs and the extension of HIV testing and treatment services to local health systems. However, these targets have still not been achieved by many African countries including Uganda, Zimbabwe, Malawi, Ethiopia, South Africa, Mozambique, and Nigeria.²⁴ Only Rwanda and Botswana have made significant progress toward achieving the 90-90-90 target.²⁴ Lockdown restrictions, despite successfully managing COVID-19, were instrumental in preventing many of these countries reaching their 90-90-90 targets and further elucidate the negative implications of COVID-19 on the care for PLHIV.^{23,25}

The already inadequate health-care systems of many African countries were overwhelmed by the increased demands resulting from the COVID-19 pandemic.²³ This led to clinic closures, lack of pharmaceutical drugs, and loss of contact with many HIV patients.^{23,26} Reallocating resources to aid the fight against coronavirus meant that many other essential health-care services such as HIV testing and treatment services suffered from inadequate resource allocation.^{5,10} This led to a compromise in the quality of care received by PLHIV.^{27,28} This in turn further slowed the progress toward attainment of the UNAIDS 90-90-90 targets.²⁴

It is therefore essential that African governments take proactive measures to mitigate the disruptions in the supply of HIV/AIDS services irrespective of COVID-19. Appropriate planning, financial allocation, and resource

distribution will be fundamental in limiting the impacts of COVID-19 on HIV/AIDS care delivery.

3 | CURRENT EFFORTS

It is suggested that prioritizing COVID-19 over HIV within Africa could lead to a 10-year reversal of current HIV treatment progress.^{10,29,30} To prevent this, African leaders and organizations are currently undertaking several efforts to ensure rapid adaptation of HIV treatment programs in response to COVID-19. These efforts can be broadly classified as follows.

3.1 | Reorientation of HIV health-care services

Many African countries have adopted multimonth (3–6 months) dispensing (MMD) of ART to PLHIV. This is opposed to a weekly regime as previously practiced. This has led to 50% reduction in the number of PLHIV clinic visits, thereby reducing COVID-19 exposure.³¹ Furthermore, Burundi,³¹ Liberia,³² and other countries have scaled up HIV self-testing and at-home testing. This has helped to overcome stigma and structural barriers to HIV diagnosis.³³ Finally, in Togo, Niger, and Namibia health-care professionals have adopted the use of the telephone and social media for counseling and supporting PLHIV.^{32,33}

3.2 | Strengthening community action

Nigeria, Burkina Faso, Mali, and many other countries have increased community engagement in the distribution of ART. Furthermore, in Namibia, community ART dispensing was expanded via the creation of new ART collection points in many communities via the use of mobile van and home delivery HIV services. An additional strategy being used in many African countries is the formation of community adherence groups that ensure PLHIV are compliant with ART and provide other support programs via virtual platforms.³³

3.3 | Creating a supportive environment for the continuous management of PLHIV

Before COVID-19, Ghana has been successful in forming peer support groups to improve communication between PLHIV and to improve their access to care.³² However, with the implementation of travel restriction and social

distancing, the provision of this support has been hindered. To adapt to this challenge, many African countries have switched to digital platforms to ensure continuity of the peer support program. Specific efforts cited in the virtual meeting on "The impact of the COVID-19 on HIV programs in the ECOWAS region," organized by West-Africa Health Organization, USAID and UNAIDS, include: the use of WhatsApp by trained health-care workers to support counseling of people living with HIV in Togo; the opening of a hotline to communicate with PLHIV, tuberculosis patients, and key populations in Niger.³² Before COVID-19 pandemic, the effectiveness of these digital tools in Africa had been illustrated by a study performed in Cameroon and Kenya.³⁴ Within this study it was reported that two-way text messaging supports for PLHIV markedly improved ART adherence and rates of viral suppression.³⁴

3.4 | Mitigating economic and food insecurity

Financial interventions by African governments have included a \$1.4bn fiscal stimulus and grant to the poorest Nigerian populations as well as a \$26bn economic package and new cash transfer scheme in South Africa. Other schemes include tax relief within Kenya.^{20,31,32,35} It is well reported in Tanzania that food and cash incentive increased PLHIV retention in care and adherence to treatment.³⁶

3.5 | Addressing misinformation and misconception about HIV and COVID-19

Many Africans (including PLHIV) have misconceptions about the origin of COVID-19. Some believe it is a disease of a particular race and some believe the virus cannot survive in the tropics.³⁷ In addressing this problem, many African countries are leveraging technologies to educate PLHIV and the public.³⁸ For instance, the use of virtual sensitization of key populations in Guinea Bissau and the collaboration of the Nigeria Centre for Disease Control with the United Nations Children's Fund to launch a Short Message Service-based interactive Chatbot to provide Nigerians with timely and accurate information on COVID-19 were effective in raising awareness.³⁸ The interplay between knowledge, attitude, and practice toward COVID-19 among PLHIV was well documented in a correlational study in Rwanda.³⁹ Within this study, a high prevalence of poor attitudes and misconceptions toward COVID-19 was reported among the participants (26%). It was concluded that a good knowledge of COVID-19 promoted positive

attitudes toward the disease and in return the positive attitudes promoted good COVID-19 practices which reduced the risk of PLHIV contracting the disease.³⁹

In addition to these four key strategies, other notable efforts in Africa include cross-border support which is well evidenced by Gambia loaning ART to Guinea-Bissau to help solve supply interruption issues.^{21,32} Despite COVID-19's clear detrimental effects on HIV/AIDS healthcare within many African countries, it is encouraging to know that several authorities are undertaking proactive and effective management strategies to address the issue. However, as is made clear by the failing of many countries to meet their HIV health-care targets, these efforts are not yet sufficient. These strategies must continue in a sustainable and financially viable manner if we are to see these countries reach their 90-90-90 targets.

4 | FUTURE CHALLENGES

Despite the previously mentioned efforts to address these issues, by the end of 2019, 87% of PLHIV in Eastern and Southern Africa knew their disease status but only 72% were on treatment and only 65% of were virally suppressed. In Western and Central Africa, these numbers fall to 68%, 58%, and 45%, respectively.²² The emergence of COVID-19 has therefore undoubtedly hindered Africa's progression toward achieving their 90-90-90 goals.^{27,28}

The aspects of HIV care that have been most greatly affected by COVID-19 are those of HIV testing and ART treatment initiation.^{10,30} This can be attributed to most of the African ART being manufactured outside the continent.^{29,38} The closure of international borders has greatly affected the supply chain of ART and therefore poses a continual threat to the effective management of patients with HIV within Africa.

In addition, with the enforcement of lockdown and social distancing during the current pandemic, there has been a spike in human rights abuse, discrimination, and stigmatization of PLHIV.⁴⁰ These factors have created further barriers within the accessibility of PLHIV to HIV services such as access to pre-exposure prophylaxis and condoms. Therefore, it is not unreasonable to suggest that the hard-won achievements within HIV care previously attained by many African countries could be somewhat disrupted by the COVID-19 pandemic.^{41,42} During COVID-19 there has also been an increase in sexual violence due to the stay-at-home restrictions.³¹ Winnie Byanyima, the Executive Director of UNAIDS stated: "Sexual violence is a key driver of HIV infection, and the environment that makes a girl unsafe has been worsen by COVID-19."^{29,38}

Finally, DW Africa, an African news corporation, reported that the lack of access to internet and high data cost within Africa has posed a challenge to the virtual smartphone support programs of health professionals, civil society organizations, community peer support group, and close relatives of PLHIV.⁴³ COVID-19 restrictions have undoubtedly affected many African health-care systems and despite current efforts acting as positive first steps in mitigating these issues, the problem is far from solved. Sustainable and consistent ART supply, de-stigmatization, sexual violence support, and access to technology are all additional strategies that must be addressed to ensure that HIV/AIDS patients can continue to receive the care that they require.

5 | CONCLUSIONS AND FUTURE RECOMMENDATIONS

Within this area of research, it is unsurprising that COVID-19 has exacerbated many of the already existing issues regarding HIV/AIDS care within Africa. These impacts may be considered in a biological, psychological, social, and political context. Consequentially, multimodal, and multidisciplinary approaches to these issues are those that are most likely to yield the most promising results.

Accessibility of HIV/AIDS care within Africa was limited before COVID-19. However, access to care had improved in recent years and many countries were experiencing rapid health-care reform. Nevertheless, the additional stresses that COVID-19 placed on the African health-care systems only served to worsen current issues and to hinder progress.

Before efforts can be made to continue improving the provision of both HIV/AIDS and COVID-19 care in Africa, we have brought to the attention of the wider scientific and clinical communities that these two pathologies cannot be considered as separate entities. Rather, they must be considered as two potentially devastating diseases that are intrinsically linked through an array of biopsychosocial and geopolitical factors. It is now imperative to ensure that HIV/AIDS health-care progress continues irrespective of coronavirus or any future barriers.

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

Conceptualization, project administration, writing-review and designing: Olivier Uwishema. *Reviewed and edited the first draft:* Jeffrey Sun. *Reviewed and edited the second*

draft: Helen Onyeaka. *Manuscript writing:* All authors. *Final approval of manuscript:* All authors.

ORCID

Olivier Uwishema  <http://orcid.org/0000-0002-0692-9027>

Charles Taylor  <http://orcid.org/0000-0002-1386-5244>

REFERENCES

- Li G, Fan Y, Lai Y, et al. Coronavirus infections and immune responses. *J Med Virol.* 2020;92(4):424-432. doi:10.1002/jmv.25685
- World Health Organization COVID-19 Public Health Emergency of International Concern (PHEIC) Global research and innovation forum. February 12, 2020. Accessed April 15, 2021. [https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-\(pheic\)-global-research-and-innovation-forum](https://www.who.int/publications/m/item/covid-19-public-health-emergency-of-international-concern-(pheic)-global-research-and-innovation-forum)
- World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19. March 11, 2020. Accessed April 15, 2021. <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020>
- Udwadia ZF, Raju RS. How to protect the protectors: 10 lessons to learn for doctors fighting the COVID-19 coronavirus. *Med J Armed Forces India.* 2020;76(2):128-131. doi:10.1016/j.mjafi.2020.03.009
- Demissie B, Okebukola P, Holt T, Sun YS, Kimeu M. Acting now to strengthen Africa's health systems | McKinsey. May 29, 2020. Accessed May 31, 2021. <https://www.mckinsey.com/featured-insights/middle-east-and-africa/acting-now-to-strengthen-africas-health-systems#>
- Willige A. Here are 4 other infectious diseases that should not be forgotten during COVID-19. World Economic Forum. May 26, 2020. Accessed August 12, 2021. <https://www.weforum.org/agenda/2020/05/coronavirus-infectious-diseases-tb-malaria-cholera-measles/>
- Uwishema O, Adanur I, Babatunde AO, et al. Viral infections amidst COVID-19 in Africa: implications and recommendations. *J Med Virol.* 2021. Published online July 22, 2021, doi:10.1002/jmv.27211
- UNAIDS. HIV treatment target for 2020 to be missed. November 30, 2020. Accessed April 2021. https://www.unaids.org/en/resources/presscentre/featurestories/2020/november/20201130_hiv-treatment-target-for-2020-to-be-missed
- Sophie Barton-Knott. UNAIDS report on the global AIDS epidemic shows that 2020 targets will not be met because of deeply unequal success; COVID-19 risks blowing HIV progress way off course. July 2020. Accessed April 21, 2021. https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2020/july/20200706_global-aids-report
- Dorward J, Khubone T, Gate K, et al. The impact of the COVID-19 lockdown on HIV care in 65 South African primary care clinics: an interrupted time series analysis. *Lancet HIV.* 2021;8:e158-e165. doi:10.1016/s2352-3018(20)30359-3
- Hosken G. Coronavirus fears keep HIV, TB patients from medication. TimesLIVE. May 17, 2020. Accessed April 15, 2021. <https://www.timeslive.co.za/sunday-times/news/2020-05-17-coronavirus-fears-keep-hiv-tb-patients-from-medication/>

12. FinMark Trust. Livelihood impacts of Covid-19 in Kenya, Nigeria and South Africa - TechCentral. techcentral.co.za. April 28, 2020. Accessed April 15, 2021. <https://techcentral.co.za/livelihood-impacts-of-COVID-19-in-kenya-nigeria-and-south-africa/97669/>
13. Singer M. Pathogen-pathogen interaction. *Virulence*. 2010; 1(1):10-18. doi:10.4161/viru.1.1.9933
14. Jewell BL, Mudimu E, Stover J, et al. Potential effects of disruption to HIV programmes in sub-Saharan Africa caused by COVID-19: results from multiple mathematical models. *Lancet HIV*. 2020;7(9):e629-e640. doi:10.1016/S2352-3018(20)30211-3
15. Tesoriero JM, Swain CE, Pierce JL, et al. COVID-19 outcomes among persons living with or without diagnosed HIV infection in New York State. *JAMA Netw Open*. 2021;4(2):e2037069. doi:10.1001/jamanetworkopen.2020.37069
16. Huang J, Xie N, Hu X, et al. Epidemiological, virological and serological features of coronavirus disease 2019 (COVID-19) cases in people living with human immunodeficiency virus in Wuhan: a population-based cohort study. *Clin Infect Dis*. 2020. doi:10.1093/cid/ciaa1186. Published online August 17, 2020.
17. Kenmoe S, Bigna JJ, Fatawou Modiyangi A, et al. Case fatality rate and viral aetiologies of acute respiratory tract infections in HIV positive and negative people in Africa: the VARIAFRICA-HIV systematic review and meta-analysis. *J Clin Virol*. 2019; 117:96-102. doi:10.1016/j.jcv.2019.06.006
18. Guo W, Ming F, Dong Y, et al. A Survey for COVID-19 among HIV/AIDS patients in two districts of Wuhan, China. *SSRN Electron J*. Published online 2020. doi:10.2139/ssrn.3550029
19. Sheth AN, Patel P, Peters PJ. Influenza and HIV: lessons from the 2009 H1N1 influenza pandemic. *Curr HIV/AIDS Rep*. 2011;8(3):181-191. doi:10.1007/s11904-011-0086-4
20. World Health Organization. HIV/AIDS. World Health Organization. November 30, 2020. Accessed April 15, 2021. <https://www.who.int/news-room/fact-sheets/detail/hiv-aids>
21. AIDSinfo | UNAIDS. [Unaids.org](https://aidsinfo.unaids.org/). 2019. Accessed April 20, 2021. <https://aidsinfo.unaids.org/>
22. UNAIDS Data 2020. UNAIDS 2020 reference. 2020. Accessed April 20, 2021. https://www.unaids.org/sites/default/files/media_asset/2020_aids-data-book_en.pdf
23. Tarkang EE. The fight against COVID-19 in sub-Saharan Africa-a threat to the continuous management of HIV patients: application of the action areas of the Ottawa charter for health promotion. *Pan Afr Med J*. 2020;35(Supp 2):25. doi:10.11604/pamj.supp.2020.35.2.23224
24. Yusuff Adebayo A, Adrian R, Aniekan E, et al. Towards 90-90-90 Target: COVID-19 and HIV response in Africa. *J Infect Dis Epidemiol*. 2021;7(2), 1-2. doi:10.23937/2474-3658/1510191
25. Parmley LE, Hartsough K, Eleeza O, et al. COVID-19 preparedness at health facilities and community service points serving people living with HIV in Sierra Leone. *PLOS One*. 2021;16(4):e0250236. doi:10.1371/journal.pone.0250236
26. Umaru ES, Enang NV, David KB. Effect of Covid-19 on people with chronic diseases. *J Med Public Health*. 2020;1(1):1005.
27. Okereke M, Ukor NA, Adebisi YA, et al. Impact of COVID-19 on access to healthcare in low- and middle-income countries: current evidence and future recommendations. *Int J Health Plan Manag*. 2020;36(1):13-17. doi:10.1002/hpm.3067
28. Mhango M, Chitungo I, Dzinamarira T. COVID-19 lockdowns: impact on facility-based HIV testing and the case for the scaling up of home-based testing services in Sub-Saharan Africa. *AIDS Behav*. 2020;24(11):3014-3016. doi:10.1007/s10461-020-02939-6
29. Musau Z. UNAIDS Chief Winnie Byanyima: COVID-19 could roll back gains made in fighting HIV in Africa. *Africa Renewal*. May 28, 2020. Accessed June 2, 2021. <https://www.un.org/africarenewal/web-features/coronavirus/covid-19-could-roll-back-gains-made-fighting-hiv-and-aids>
30. Shiau S, Krause KD, Valera P, Swaminathan S, Halkitis PN. The burden of COVID-19 in people living with HIV: a syndemic perspective. *AIDS Behav*. 2020;24:1-6. doi:10.1007/s10461-020-02871-9
31. UNAIDS. Adapting HIV services during the COVID-19 pandemic – AIDS. 2020. <https://www.unaids.org>. Accessed June 2, 2021. <https://aids2020.unaids.org/chapter/chapter-3-synergies-between-pandemic-responses/adapting-hiv-services-during-the-covid-19-pandemic/>
32. UNAIDS. Virtual meeting on the impact of the COVID-19 on HIV programmes in the ECOWAS region. July 27, 2020. Accessed June 2, 2021. https://www.unaids.org/en/20200727_ecowas
33. Hong SY, Ashipala LSN, Bikinesi L, et al. Rapid adaptation of HIV treatment programs in response to COVID-19 — Namibia, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(42): 1549-1551. doi:10.15585/mmwr.mm6942a6
34. Bigna JJR, Noubiap JJN, Kouanfack C, Plottel CS, Koulla-Shiro S. Effect of mobile phone reminders on follow-up medical care of children exposed to or infected with HIV in Cameroon (MORE CARE): a multicentre, single-blind, factorial, randomised controlled trial. *Lancet Infect Dis*. 2014; 14(7):600-608. doi:10.1016/s1473-3099(14)70741-8
35. Zane D. Coronavirus: What African countries are doing to help people to eat amid the lockdowns. *BBC News*. April 27, 2020. Accessed June 2, 2021. <https://www.bbc.co.uk/news/world-africa-52426040>
36. Czaicki NL, Mnyippembe A, Blodgett M, Njau P, McCoy SI. It helps me live, sends my children to school, and feeds me: a qualitative study of how food and cash incentives may improve adherence to treatment and care among adults living with HIV in Tanzania. *AIDS Care*. 2017;29(7):876-884. doi:10.1080/09540121.2017.1287340
37. Schmidt T, Cloete A, Davids A, Makola L, Zondi N, Jantjies M. Myths, misconceptions, othering and stigmatizing responses to Covid-19 in South Africa: a rapid qualitative assessment. *PLOS ONE*. 2020;15:e0244420. doi:10.1371/journal.pone.0244420
38. NCDC and UNICEF launch chatbot to combat COVID-19 misinformation in Nigeria. November 11, 2020. Accessed June 2, 2021. <https://www.unicef.org/nigeria/press-releases/ncdc-and-unicef-launch-chatbot-combat-covid-19-misinformation-nigeria>
39. Iradukunda PG, Pierre G, Muhozi V, Denhere K, Dzinamarira T. Knowledge, attitude, and practice towards COVID-19 among people living with HIV/AIDS in Kigali, Rwanda. *J Community Health*. 2020;46(2):245-250. doi:10.1007/s10900-020-00938-1
40. Bhalla N. "Hunger or murder": lockdown poverty exposes African sex workers to more violence. *Reuters*. June 4, 2020. Accessed June 1, 2021. <https://www.reuters.com/article/us-health-coronavirus-women-sexworkers/hunger-or-murder->

lockdown-poverty-exposes-african-sex-workers-to-more-violence-idUSKBN23B0CS

41. UNAIDS. Mitigating the impact of COVID-19 on key populations. June 4, 2020. Accessed June 1, 2021. https://www.unaids.org/en/resources/presscentre/featurestories/2020/june/20200604_covid19-key-population-focused-hiv-programs
42. Adebisi YA, Alaran AJ, Akinokun RT, Micheal AI, Ilesanmi EB, Lucero-Prisno DE. Sex workers should not be forgotten in Africa's COVID-19 response. *Am J Trop Med Hyg.* 2020;103(5):1780-1782. doi:10.4269/ajtmh.20-1045
43. Hairsine K. How the internet is making stay-at-home difficult for Africans | DW | 07.04.2020. DW.COM. July 4, 2020.

Accessed June 5, 2021. <https://www.dw.com/en/how-the-internet-is-making-stay-at-home-difficult-for-africans/a-53048013>

How to cite this article: Uwishema O, Taylor C, Lawal L, et al. The syndemic burden of HIV/AIDS in Africa amidst the COVID-19 pandemic. *Immun Inflamm Dis.* 2022;10:26-32. <https://doi.org/10.1002/iid3.544>